U.S. Department of Agriculture

Evaluation of the Healthy Incentives Pilot (HIP)
FINAL REPORT

Food and Nutrition Service

September 2014

United States Department of Agriculture

Food and Nutrition Service, Office of Policy Support | September 2014

Evaluation of the Healthy Incentives Pilot (HIP): Final Report

Authors:

Susan Bartlett
Jacob Klerman
Lauren Olsho
Christopher Logan
Michelle Blocklin
Marianne Beauregard
Ayesha Enver
Abt Associates

Parke Wilde
Friedman School of Nutrition Science and Policy, Tufts University

Cheryl Owens
Margaret Melhem
MAXIMUS

Submitted by:
Abt Associates Inc.
55 Wheeler Street
Cambridge MA 02138

Submitted to:
Office of Policy Support
Food and Nutrition Service
3101 Park Center Drive
Alexandria, VA 22302-1500

Project Director:
Susan Bartlett

Project Officer:
Danielle Berman

This study was conducted under Contract number AG-3198-D-10-0044 with the Food and Nutrition Service, United States Department of Agriculture.

This report is available on the Food and Nutrition Service website: http://www.fns.usda.gov

Suggested Citation:
Bartlett, Susan, Jacob Klerman, Lauren Olsho, et al. *Evaluation of the Healthy Incentives Pilot (HIP): Final Report*. Prepared by Abt Associates for the U.S. Department of Agriculture, Food and Nutrition Service, September 2014.

Acknowledgements

The Healthy Incentives Pilot (HIP) evaluation was conducted under the direction of the Office of Policy Support in the Food and Nutrition Service, US Department of Agriculture. We thank our project officer, Danielle Berman, for her guidance and support. We also thank Kathryn Law, Anita Singh, Kelly Kinnison, Usha Kalro, and Frank Martinez Nocito for thoughtfully reviewing the report.

The evaluation would not have been possible without the support of the Massachusetts Department of Transitional Assistance (DTA) as well as the households that agreed to participate in the study. DTA staff participated in interviews and answered questions throughout the pilot. Householders responded to several rounds of interviews, including 24-hour dietary recall interviews. We are grateful for the information and insights provided by all those who participated in the evaluation.

The evaluation's Technical Working Group (TWG) provided valuable guidance throughout the study, advising on design and analysis issues and reviewing reports. The TWG members, experts in the fields of evaluation design, nutrition, and public health, included Tom Baranowski (Department of Pediatrics, Baylor College of Medicine), Simone French (Division of Epidemiology and Community Health, School of Public Health, University of Minnesota), Joel Gittelsohn (Department of International Health, Johns Hopkins Bloomberg School of Public Health), David Just (Department of Applied Economics and Management, Cornell University), and Diane Whitmore Schanzenbach (School of Education and Social Policy, Northwestern University and National Bureau of Economic Research).

At Abt Associates, Patty Connor played a key role in developing the survey instruments and overseeing data collection activities. Our evaluation partner, Westat, collected and processed all the household data. Susie McNutt led the Westat team along with Crystal MacAllum. Peter Relich at MAXIMUS made valuable contributions to the cost analysis. Karen Webb and Lorrene Ritchie of the Atkins Center for Weight and Health, University of California, Berkeley, helped develop the participant survey instruments. Jan Nicholson produced the report. Finally, William Hamilton and Patricia McKinney, our Project Quality Advisors, provided guidance and insight.

Evaluation of the Healthy Incentives Pilot (HIP): Final Report

Table of Contents

List of Exhibits

Executive Summary

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

Chapter 6

Chapter 7

Chapter 8

Appendix G

Appendix H

Appendix I

Glossary of Acronyms

BEACON	DTA's client-server based eligibility application system
CBOs	Community based organizations
CPs	Community partners
DTA	Massachusetts Department of Transitional Assistance
EBT	Electronic Benefit Transfer
EOHHS	Massachusetts Executive Office of Health and Human Services
EPPIC	Electronic Payment Processing and Information Control (Xerox's EBT system)
FNS	Food and Nutrition Service
HIP	Healthy Incentives Pilot
HoH	Head of household
IECR	Integrated Electronic Cash Register
JAD	Joint Application Design
NDG	Novo Dia Group
PIN	Personal identification number
POS	Point of sale
RFP	Request for Proposals
SNAP	Supplemental Nutrition Assistance Program
TFVs	Targeted fruits and vegetables
TPP	Third-party processor
USDA	United States Department of Agriculture
WIC	Special Supplemental Nutrition Program for Women Infants and Children

Executive Summary

The Food, Conservation, and Energy Act of 2008 authorized funds for pilot projects to determine if financial incentives provided at the point of sale to Supplemental Nutrition Assistance Program (SNAP) participants would increase their consumption of fruits, vegetables, and other healthful foods. On the basis of this legislative authority, USDA's Food and Nutrition Service (FNS) designed the Healthy Incentives Pilot (HIP) to investigate the impact of making fruits and vegetables more affordable for SNAP participants.

Under HIP, SNAP participants received on their SNAP Electronic Benefit Transfer (EBT) card an incentive of 30 cents for every dollar of SNAP benefits that they spent on targeted fruits and vegetables (TFVs) in participating retailers. TFVs included fresh, canned, frozen, and dried fruits and vegetables without added sugars, fats, oils or salt (with some exceptions), but excluded white potatoes, mature legumes, and 100% fruit juice (the same set of fruits and vegetables eligible for the WIC Fruit and Vegetable Cash Value Voucher). The incentive was capped at $60 per household per month to prevent misuse and ensure that total incentive payments would not exceed $2 million.

The pilot was implemented by the Massachusetts Department of Transitional Assistance (DTA) in Hampden County beginning in late 2011 and continuing through the end of 2012. Located in western Massachusetts, the county is a mix of urban, rural, and suburban areas with 55,095 SNAP households in July 2011. Hampden County has the lowest median household income in the State. Massachusetts, like the rest of the country, is in the midst of an obesity epidemic, and residents in the western region have the highest rates of obesity and related chronic illness.

HIP was evaluated using a rigorous research design where SNAP households in Hampden County were randomly assigned to either the HIP group or the non-HIP group. Comparisons between the two groups thus provide a reliable estimate of the impact of HIP.

Abt Associates Inc. and its partners, Westat and MAXIMUS, conducted the evaluation for the USDA Food and Nutrition Service. This Executive Summary provides a high-level overview of the evaluation design and key findings from the HIP evaluation Final Report.

Evaluation Objectives

The goal of the HIP evaluation was to assess the impact of the financial incentive on participants' intake of fruits and vegetables. Within this broad goal, FNS identified five specific objectives:

1. Assess the causal impact of HIP on fruit and vegetable consumption by SNAP participants and on other key measures of dietary intake
2. Identify and assess factors that influence the impact of HIP
3. Describe the processes involved in implementing and operating HIP
4. Assess HIP's impact on the grantee (the State SNAP agency), the local SNAP agency, and their partners (including retailers, State EBT processor, and community organizations)
5. Quantify, to the extent possible, the Federal, State, and local administrative and benefit costs of the pilot

This Final Report addresses these five research objectives, analyzing all the data collected during the evaluation period.

Design and Data Collection

Evaluation Design

To compare food intake and other outcomes for HIP participants relative to outcomes for otherwise similar non-participants, the HIP evaluation used a random assignment research design, which is widely viewed as providing the strongest evidence of causal impact. Of the 55,095 SNAP households in Hampden County, 7,500 households (the "HIP group") were randomly assigned to participate in HIP, while the remaining 47,595 SNAP participating households (the "non-HIP group") continued to receive SNAP benefits as usual.

The HIP households were divided into three waves of 2,500 households each, to begin earning incentives during the pilot's first three months of operation. The first wave began earning the HIP incentive on November 1, 2011, the second wave on December 1, 2011, and the third wave on January 1, 2012. HIP participants were eligible to earn incentives for 12 months, ending in December 2012.

A random subsample of approximately 5,000 households, equally divided between the HIP and non-HIP groups was selected to participate in survey data collection.

Data Collection

We conducted a wide array of qualitative and quantitative data collection activities as part of the HIP evaluation. To collect the necessary data on dietary intake, trained telephone interviewers conducted 24-hour dietary recall interviews, a widely used, reliable methodology. Respondents were also asked about their attitudes and preferences for fruits and vegetables, shopping patterns, food expenditures, and household characteristics.

The data collection for the HIP evaluation included three rounds of participant surveys. Round 1 was conducted before HIP implementation. Rounds 2 and 3 were conducted during HIP, one fielded 4 to 6 months after implementation, and the other fielded 9 to11 months after implementation. Both Round 2 and Round 3 surveys collected information on dietary intake using 24-hour dietary recall interviews. Two rounds of focus groups were also conducted with HIP participants, corresponding to the Round 2 and Round 3 surveys.

Several other types of data were collected as part of the evaluation. EBT transaction data provided detailed information on households' SNAP EBT purchases, including HIP-eligible purchases and the incentive amounts earned. Two rounds of retailer surveys, three rounds of store observations, and three rounds of interviews with key stakeholders provided information on HIP operations and implementation, the effect of the pilot on stakeholders, and estimated costs of the pilot and of nationwide expansion of HIP.

Findings

The evaluation findings are discussed below, including:

- Impacts of HIP on participants
- Effect of HIP on Hampden County retailers
- HIP implementation process, costs, and feasibility of nationwide expansion

HIP Impacts on Participants

In this section, we discuss our evaluation results regarding the main goal of HIP: increasing participants' consumption of targeted fruits and vegetables (the single confirmatory outcome we specified prior to analyzing the data). We then discuss how HIP influenced households' expenditures on targeted fruits and vegetables. Finally, we discuss HIP impacts on participant knowledge, attitudes, and behaviors toward fruits and vegetables. Unless otherwise noted, we only discuss HIP group/non-HIP group differences that are statistically significant at conventional significance levels ($p<0.05$).

Consumption of Targeted Fruits and Vegetables (TFVs)

The primary impact measure for the HIP evaluation is the difference in targeted fruit and vegetable consumption for HIP and non-HIP participants, combining reports from all dietary interviews conducted in both Rounds 2 and 3. Our results show that HIP participants (adults aged 16 and older[1]) consumed significantly more targeted fruits and vegetables per day—almost a quarter of a cup-equivalent—than did non-participants (ES.1).

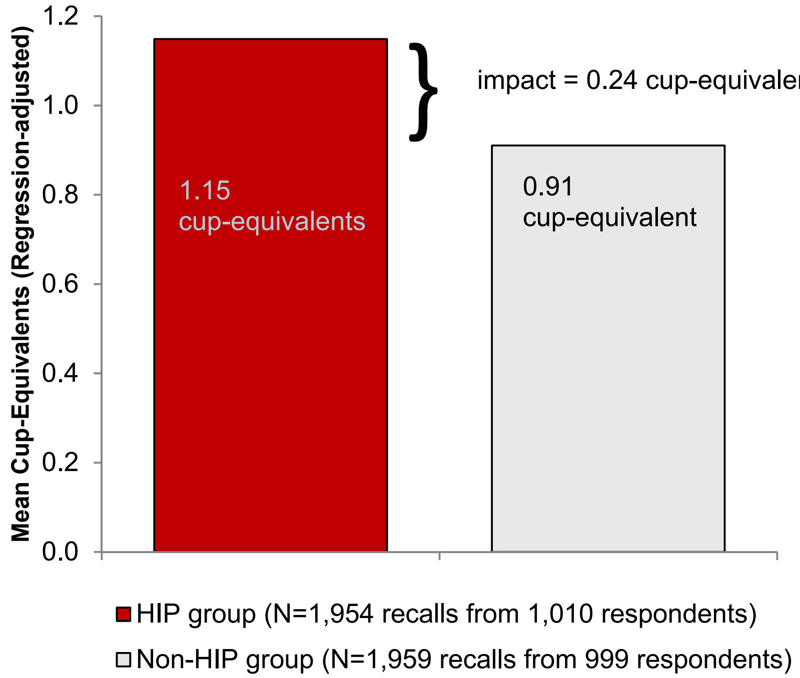
This represents an increase in consumption of 26 percent over non-HIP group members. Approximately 60 percent of the observed difference was due to a difference in consumption of targeted vegetables and 40 percent due to a difference in consumption of targeted fruit.

There is no evidence that the impact of HIP was affected by the presence of children in the household, employment status, age, or amount of the household's SNAP benefit. However, there is some evidence that impacts were larger for those who, prior to HIP, had more positive attitudes about fruits and vegetables.

---

[1] The sample was intended to be representative of all types of SNAP households; respondents aged 16 and 17, who accounted for approximately 6 percent of sampled respondents, were therefore included in the sample as they can be SNAP heads of households.

Exhibit ES.1: HIP Participants Consumed 0.24 Cup-Equivalent More Fruits and Vegetables per Day



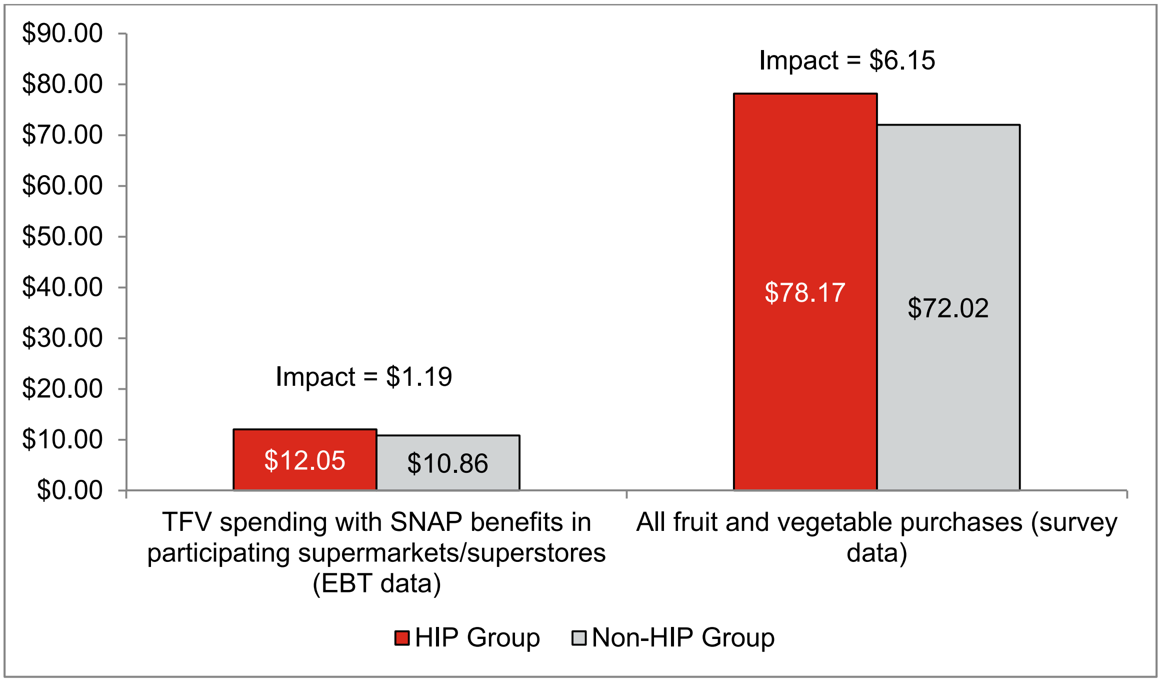
Expenditures on Fruits and Vegetables

HIP impacts on consumption were expected to be larger if participants responded strongly to the price incentive and purchased more fruits and vegetables, thus earning more incentives. Therefore, spending measures are important intermediate variables in the evaluation.

SNAP EBT data show that, in an average month, two-thirds of HIP households that received SNAP benefits earned some HIP incentive and the other one-third earned no incentives. Households with higher SNAP benefits, with children in the household, and with Hispanic or Asian heads were more likely to earn incentives. On average, from March through October 2012, HIP households spent just over $12 per month on targeted fruits and vegetables in participating stores (representing 5 percent of their SNAP benefits), earning an average incentive of $3.65 each month. Average monthly purchases of targeted fruits and vegetables were similar over all the months the pilot operated.

HIP caused households to spend more than non-HIP households on targeted fruits and vegetables in participating stores. (We do not have direct measures of fruit and vegetable expenditures in non-participating stores, which accounted for about half of all SNAP purchases by sample members.) The EBT data allow us to compare the TFV purchases of HIP and non-HIP households in supermarkets/superstores that participated in HIP. In these supermarkets/superstores, non-HIP households spent $10.86 each month using their EBT card on TFVs, and HIP households spent $12.05. This represents an increase of $1.19 or 11 percent (ES.2).

Exhibit ES.2: HIP Households Purchased More Fruits and Vegetables per Month



A separate measure of fruit and vegetable spending comes from survey respondents, who reported their usual expenditures on all groceries, and on all fruits and vegetables. HIP positively affected self-reported spending on total fruits and vegetables. HIP participants reported spending $78.17 each month on fruits and vegetables (21 percent of their total grocery spending) while non-HIP households reported spending $72.02 (19 percent of their grocery spending). This difference of $6.15 represents an 8.5 percent increase in spending (Exhibit ES.2). This measure differs from the EBT-based measure of TFV spending because it includes fruit and vegetable purchases in non-participating stores, purchases made with cash or other forms of payment, and purchases of fruits and vegetables that did not qualify to earn incentives (e.g., white potatoes, legumes, fruit juice).

HIP did not lead households to change their shopping patterns—where they purchased groceries or how frequently they shopped—to any great extent. HIP gave households some impetus to make their purchases of TFVs in participating stores, so they could earn the incentive. However, it does not appear that HIP participants responded significantly to this motivation. While participants spent about half their SNAP benefits in participating stores, they spent the other half in non-participating stores. (A similar pattern was observed for non-HIP households.)

HIP survey respondents reported changes in fruit and vegetable purchasing, saying that they bought larger amounts and a greater variety of fruits and vegetables because of HIP. These households felt that fruits and vegetables had become more affordable due to HIP. Just over one-quarter of HIP households reported that they changed where they purchased fruits and vegetables, generally to have access to fresh produce, a greater variety of fruits and vegetables, and more affordable prices. Because we see no corresponding pattern in the EBT transaction data, it seems likely that these responses reflect only small behavioral changes, such as occasionally switching fruit and vegetable purchases between two stores that the participant already patronized.

Knowledge, Attitudes, and Behaviors

For the HIP incentive to affect purchasing behavior, HIP participants needed to know about the program and understand how it worked. Findings from the participant survey suggest that a sizeable proportion of HIP participants did not fully understand the pilot program, though understanding increased over the course of the pilot.

While 62 percent of HIP participants reported that they had heard about HIP when asked in the Round 2 survey (4 to 6 months after implementation), 38 percent reported that they had not heard about HIP. At the time of the Round 3 survey, which occurred 9 to11 months after HIP implementation, 24 percent of HIP participants reported that they had not heard about the pilot; the other 76 percent had heard of the pilot. This increase in awareness was statistically significant.

Thirty-eight percent of Round 2 respondents and 25 percent of Round 3 respondents reported that it was hard or somewhat hard (or they didn't know how hard it was) to understand how HIP worked. Similar percentages said it was hard or somewhat hard (or they didn't know how hard it was) to remember which fruits and vegetables qualified for the HIP incentive. The improved understanding reported by participants between Round 2 and Round 3 is statistically significant. Focus group participants also described difficulties understanding the pilot. Exploratory analyses suggest that limited understanding of HIP was associated with lower spending on TFVs using EBT benefits.

Attitudes toward and preferences for fruits and vegetables may affect both the level of fruit and vegetable intake and how responsive participants were to the incentive. Respondents were asked several questions about their food preferences and about perceived barriers to consuming fruits and vegetables. Survey respondents generally had positive attitudes toward fruits and vegetables and did not report overwhelming barriers to their consumption. Generally, HIP and non-HIP households had similar preferences and beliefs.

Past research has shown that having fruits and vegetables in the family food environment is associated with increased consumption. As reported in both surveys conducted after HIP began, HIP households had fruits and vegetables available at home more often than did households not participating in HIP.

Effects of HIP on Retailers

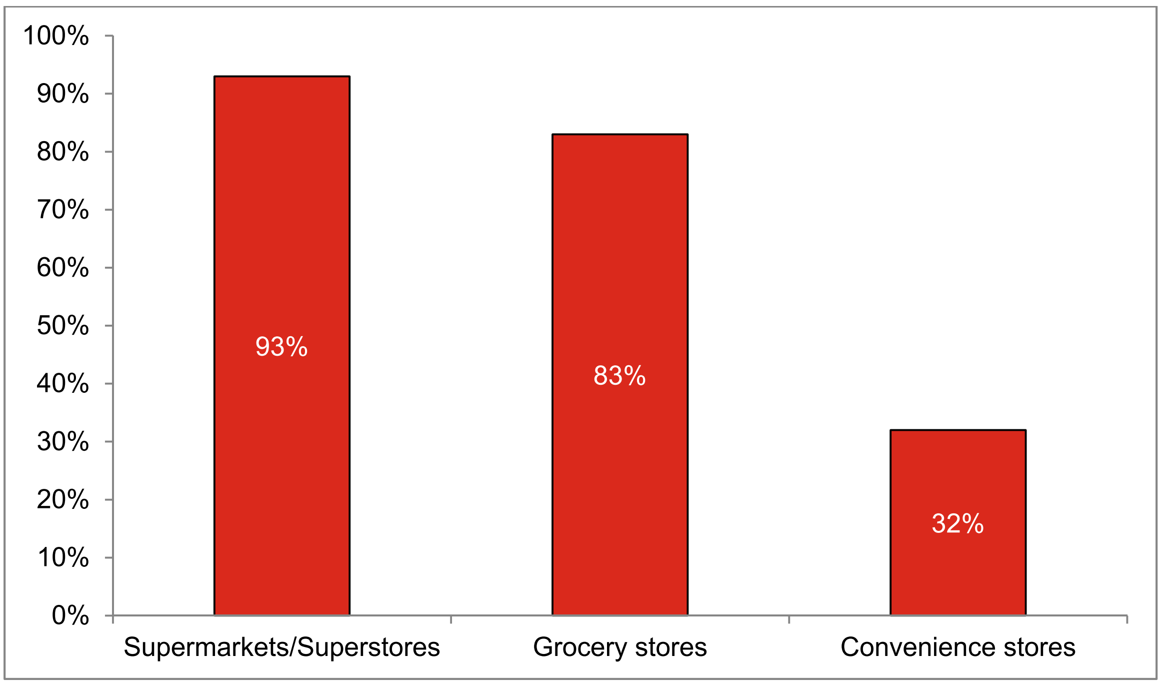
The participation of retailers was critical to the success of HIP. If the HIP incentive was to have an impact on food intake, SNAP participants needed to have easy and adequate access to retailers participating in the pilot. DTA succeeded in recruiting approximately 130 stores to participate in HIP, including supermarkets, superstores, grocery stores, convenience stores, and farmers markets. However, not all households had similar access to participating stores that sold substantial quantities of fruits and vegetables, particularly supermarkets, superstores, and grocery stores. All but one major supermarket/superstore chain in Hampden County participated in HIP, but the non-participating chain had a significant presence in the county. As a result, the stores participating in HIP accounted for just 59 percent of total Hampden County SNAP redemptions. Pilot impacts, particularly the relatively low level of incentives earned by households, were likely affected by the limited retailer participation.

Because HIP required the cooperation of retailers, understanding HIP's effect on retailers' businesses is critical to the potential long-run feasibility of the program. The evaluation found that HIP had relatively little impact on store operations. At the outset of the pilot, some retailers, particularly smaller stores, were concerned that HIP might increase the time and effort required to process SNAP purchases. However, according to store managers, this does not appear to have been the case. In addition, few retailers reported problems during the pilot. The most common problems and questions, which were reported by stores without integrated electronic cash registers, concerned identifying HIP-eligible items and identifying customers participating in the pilot who could earn incentives.

HIP potentially could have induced retailers to increase their stocks of fruits and vegetables in order to attract HIP households, but this does not appear to have happened to any great extent during the pilot. Some of the smaller grocery stores, however, reported that they made additional efforts to sell more fruits and vegetables, including increasing their offerings.

Overall, a majority of retailers reported that they were somewhat or very satisfied with how HIP worked in their stores, though satisfaction varied depending on the type of store (Exhibit ES.3). The vast majority of supermarkets/superstores and grocery stores reported that they were satisfied with HIP. In contrast, only one-third of convenience store managers were satisfied; the rest were neither satisfied nor dissatisfied. These findings are likely explained by the fact that convenience stores carried relatively few HIP-eligible items, which limited the potential benefits for them.[2]

Exhibit ES.3: Percent of Retailers Somewhat or Very Satisfied with How HIP Worked in Their Stores



The incentives earned by HIP households increased SNAP redemptions at Hampden County retailers. However, because the amount of incentives earned was fairly small, the impact on retailer sales was also fairly small. Most SNAP spending occurs in supermarkets/superstores and grocery stores, and these stores benefitted from the increased spending.

---

2 The Agricultural Act of 2014 (Section 4002) established requirements for SNAP retailers to stock more perishable foods. These requirements may increase the proportion of SNAP retailers carrying HIP-eligible fruits and vegetables, thus increasing the benefits of participating in HIP.

HIP Implementation, Costs, and Feasibility of Expansion

HIP was an innovative and complex project. Planning and implementation was difficult, requiring DTA to coordinate the work of several different entities to ensure the pilot was up and running in 15 months. While the implementation process posed many challenges, DTA succeeded in implementing the pilot on schedule.

Key planning and implementation activities included:

- ***Designing and implementing EBT system changes*** that included developing software to identify when incentives were earned, to calculate the incentive amount to credit to HIP clients, and to draw down bank funds to pay retailers for food purchases
- ***Recruiting retailers to participate in HIP*** was critical to the success of the pilot as HIP participants needed to be able to locate and access stores in which they could earn incentives
- ***Developing training materials and notifications for HIP participants*** so that they understood the purpose of the pilot, were able to locate retailers, and were able to identify and purchase qualifying fruits and vegetables

Total costs for implementing HIP, including the incentives earned by HIP participants, were $4.4 million. The majority of the costs (55 percent) were incurred for system design, development, and testing for both EBT and retailer system changes. Retailer recruitment and participant notification and training accounted for an additional 14 percent of implementation costs. General administrative expenses for management and oversight of HIP accounted for 16 percent. Most of the remaining 10 percent of costs were incurred in support of the evaluation. Incentive payments to HIP participants over the course of the pilot represented the smallest proportion of total costs—just 6 percent.

The experience in Hampden County demonstrated that implementing and operating HIP was both technically and operationally feasible. Most stakeholders interviewed in the course of the evaluation, including DTA, EBT systems developers/operators, and large chain retailers, indicated strong support for expanding HIP nationwide. The one exception was convenience store chain retailers, who as noted above carried a limited selection of HIP-eligible items. Nationwide expansion of HIP would need to consider whether retailer participation would be voluntary or mandatory for some or all SNAP-authorized retailers.

Based on the HIP experience and input from industry experts, the initial start-up costs to expand HIP nationwide to all 50 States, DC, Guam, and the Virgin Islands is projected to be $89.9 million. This includes the costs for State agency activities, all EBT and retailer systems modifications, and retailer and participant training materials. While these would be mainly one-time expenditures, payment of the HIP incentive to households would be ongoing in a nationwide expansion. The annual value of incentives earned would depend on participant behaviors that cannot be predicted fully from the pilot. Estimates of incentives based on plausible scenarios range from $0.8 billion to $4.5 billion annually.

Conclusions

Findings from the HIP evaluation indicate that HIP had positive impacts on targeted fruit and vegetable consumption of pilot participants. HIP participants consumed almost one-quarter cup (26 percent) more targeted fruits and vegetables each day than did non-HIP respondents. This HIP impact is both statistically significant and large enough to be nutritionally relevant. Diets with increased fruit and vegetable consumption have strong associations with reduced risk of heart disease, stroke, and several cancers. The HIP impact was sufficiently large to narrow the gap between current consumption and the *Healthy People 2020* objectives for total fruit and vegetable intake. The one-quarter cup increase associated with HIP reduces this "total fruit and vegetable intake gap" by approximately 18 percent.

Further research to understand the underlying mechanisms by which HIP impacted fruit and vegetable consumption would be beneficial. The evaluation clearly shows that households responded to the price incentive and increased their consumption of fruits and vegetables. However, we cannot explain all of HIP's impact on consumption through its impact on TFV purchases in participating stores. HIP may also have worked through other mechanisms, such as informational and attitudinal pathways. Additional studies to help disentangle possible explanations for the observed effects could provide valuable information for policymakers.

1. Introduction

The Food, Conservation, and Energy Act of 2008 authorized funds for pilot projects to determine if financial incentives provided at the point of sale to Supplemental Nutrition Assistance Program (SNAP) participants would increase their consumption of fruits, vegetables, and other healthful foods. On the basis of this legislative authority, USDA's Food and Nutrition Service (FNS) designed the Healthy Incentives Pilot (HIP) to investigate the impact of making fruits and vegetables more affordable for SNAP participants.

Serving 46.6 million low-income Americans at an annual cost of $78.4 billion in 2012 (the year HIP operated), SNAP is the nation's largest nutrition assistance program and a cornerstone of the social safety net. The primary goals of SNAP are to prevent food insecurity and hunger and to promote dietary quality. In addition to directly increasing the food purchasing power of program participants, SNAP also provides nutrition education programs to help families improve their diets. USDA's economic models suggest that SNAP benefits lead to substantial increases in economic activity and employment in the food and agriculture sector, with follow-on effects throughout the macro-economy (Hanson, 2010). SNAP provides benefits to qualifying households on electronic benefit cards (EBT) cards, similar to bank debit cards, which allow participants to purchase foods and nonalcoholic beverages through authorized retailers.

Increasing fruit and vegetable intake is one of several leading strategies recommended by U.S. public health authorities for promoting dietary quality (USDHHS, 2010; USDA and USDHHS, 2010). Most U.S. adults fail to meet the Dietary Guidelines for fruit and vegetable intake, and intake shortfalls are comparatively large for low-income Americans and SNAP participants. Improving dietary quality could help serve key national public health objectives for reducing rates of chronic disease and obesity (USDHHS, 2010).

Under HIP, SNAP participants were offered an incentive of 30 cents for every dollar spent on targeted fruits and vegetables (TFVs), which included fresh, frozen, canned, and dried fruits and vegetables without added sugars, fats, oils or salt (with some exceptions). These are the same fruits and vegetables eligible for the Fruit and Vegetable Cash Value Voucher in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).[3] For every SNAP dollar a household spent on TFVs, they immediately earned a 30 cent credit on their EBT card. The incentive could then be spent on any SNAP-eligible foods and beverages. The incentive was capped at $60 per household per month to prevent misuse and ensure that total incentive payments would not exceed $2 million. The cap did not appear to constrain households as very few households reached it.

The HIP evaluation used a random assignment research design, which is viewed as providing the strongest evidence of causal impact. SNAP participants in the pilot site of Hampden County, Massachusetts, were randomly assigned to a HIP group, eligible to earn the HIP incentive, and a non-HIP group, not eligible to earn the HIP incentive but which continued to receive SNAP benefits as usual. Comparing differences in outcomes across these groups yields rigorous evidence on impacts attributable to HIP.

---

[3] FNS guidance on minimum requirements and specifications for WIC fruits and vegetables is presented in Appendix F, Exhibit F1.1.

This Final Report provides impact estimates on food intake and other outcomes from the HIP evaluation. It describes HIP's effect on SNAP participants, food retailers, and other stakeholders.

In this chapter, we first discuss the background of the pilot, focusing on the context in which it was developed and providing an overview of the pilot site. The second section discusses the research objectives of the evaluation, and the third section presents the theory and conceptual model underlying HIP. The fourth section discusses research on previous nutrition interventions to promote fruit and vegetable consumption. The final section provides a guide to the organization of this report.

1.2 Pilot Background

The Federal government's *Healthy People 2020* objectives and the *Dietary Guidelines for Americans* (DGA) emphasize the goal of promoting fruit and vegetable intake to reduce the risk of obesity and chronic disease (USDHHS, 2010; USDA and USDHHS, 2010). Epidemiological evidence suggests that fruit and vegetable intake reduces the long-term risk of obesity (He et al., 2004). After controlling for other explanatory factors, higher fruit and vegetable intake is associated with lower rates of heart disease (He et al., 2006, He et al., 2007) and several cancers (World Cancer Research Fund, 2007), major causes of death in the United States.

In keeping with this evidence, public health authorities in recent years have emphasized increasing fruit and vegetable intake. The *Healthy People 2020* objectives seek to increase adult intake of fruits and vegetables from a baseline of 1.3 cup-equivalents per 1,000 calories to 2.0 cup-equivalents per 1,000 calories (where one cup-equivalent is equivalent to approximately two servings of fruit or vegetables). The *Dietary Guidelines for Americans, 2010*, describe a healthy diet as one that emphasizes fruits and vegetables, along with whole grains and fat-free or low-fat milk and milk products. The USDA MyPlate consumer education graphic encourages Americans to fill half their plate with fruits and vegetables. According to *USDA's Strategic Plan for Fiscal Years (FY) 2010-2015*, the department aims to double the number of Americans who eat five or more servings of fruits and vegetables daily. One of the plan's strategies is to "promote the increased consumption of fruits and vegetables among the general population."

Most U.S. adults fail to meet fruit and vegetable intake goals as shown in studies conducted since the mid-1970s (Dong and Lin, 2009). Data from the National Health and Nutrition Examination Survey (NHANES) 1999-2002 showed that only 28 percent of adults met the 2005 DGA guidelines recommending daily consumption of greater than or equal to 2 servings of fruit. Excluding 100 percent fruit juice, only 18 percent met these guidelines. Similarly, only 33 percent of adults met the DGA guidelines recommending daily consumption of greater than or equal to 3 servings of vegetables. Excluding fried potatoes, only 28 percent met these guidelines. Comparing these results to previous NHANES estimates from 1976-1980 shows no evidence of improvement over the years (Casagrande et al., 2007). Based on 2009 surveillance data with a different outcome variable (the number of times daily that each food was consumed), 32.4 percent of adults had fruit at least twice daily, and 26.3 percent of adults had vegetables at least three times daily (Grimm et al., 2012).

Fruit and vegetable intake falls short particularly for low-income Americans and participants in SNAP (Guthrie et al., 2007). The Institute of Medicine in 2013 expressed concern that SNAP participants lack adequate food retail access and the ability to purchase fresh fruits and vegetables (IOM and NRC, 2013). Based on 2009 surveillance data, low-income adults, with household income below 130 percent of the Federal poverty standard, were less likely to have fruit at least 2 times daily or vegetables at least 3 times daily, compared with adults with household income above 400 percent of the Federal poverty standard (Grimm et al., 2012). An Abt Associates study estimated Healthy Eating Index component scores for SNAP participants and non-participants, based on their fruit and vegetable intake reported in NHANES (1999-2004). Each component score was reported as a percentage of the recommended food intake quantity. The fruit component score (whole fruit, excluding 100% fruit juice) was 50 percent of the recommendation for SNAP participants, 66 percent of the recommendation for income-eligible non-participants, and 74 percent of the recommendation for higher-income non-participants. The vegetable component score was 58 percent of the recommendation for SNAP participants, 64 percent of the recommendation for income-eligible non-participants, and 66 percent of the recommendation for higher-income non-participants (Cole and Fox, 2008). With earlier data from the Continuing Survey of Food Intake by Individuals (CSFII), Wilde, McNamara, and Ranney (2000) found that, compared with eligible non-participants, SNAP participants had higher intake of added sugars and total fats but not of fruits and vegetables.

The Healthy Incentives Pilot Site

Massachusetts was selected to implement HIP through a competitive application process in August 2010. The State was selected based on its comprehensive pilot application that included strong design, implementation, staffing, and management plans. The State's management plan included significant support from community partners and a wide variety of retailers and farmers markets that accepted EBT.

Hampden County, the HIP pilot site, has the lowest median household income in the State and is located in western Massachusetts, where residents have the highest rates of obesity and related chronic illnesses in the State.[4] The site is self-contained, which means that most SNAP participants live, work, and shop within Hampden County. Thus site boundary issues are not significant, providing households sufficient opportunities to earn incentives and allowing for a strong test of the intervention. Although studying HIP in a single site limits the ability to generalize the findings to the national context, it has the compelling offsetting advantage of permitting the evaluation to have a sound random assignment research design.

HIP was rolled out in three waves: one-third of households began earning HIP incentives on November 1, 2011, the second and third waves began participating on December 1, 2011, and January 1, 2012, respectively. HIP participants were able to earn incentives for 12 months, ending in December 2012.

1.3 Research Objectives

The HIP evaluation used a rigorous research design in which SNAP participants in Hampden County were randomly assigned to a HIP group or a non-HIP group. The overall goal of the evaluation was to assess the impact of HIP on participants' intake of fruits and vegetables. Within this broad goal, FNS identified five research objectives:

1. Assess the causal impact of HIP on fruit and vegetable consumption by SNAP participants, and on other key measures of dietary intake

---

4 Chapter 2, Exhibit 2.7 provides descriptive characteristics of the SNAP population in Hampden County and compares the population to the national SNAP population.

2. Identify and assess factors that influence the impact of HIP
3. Describe the processes involved in implementing and operating HIP
4. Assess HIP's impact on the grantee (the State SNAP agency), the local SNAP agency, and their partners (including retailers, State EBT processor, and community organizations)
5. Quantify, to the extent possible, the Federal, State, and local administrative and benefit costs of the pilot

The primary impact measure for the evaluation is the difference in targeted fruit and vegetable intake between the HIP and non-HIP groups.

The data collection for the HIP evaluation included one participant survey before HIP implementation (Round 1), a second participant survey 4 to 6 months after implementation (Round 2), and a third participant survey 9 to11 months after implementation (Round 3). These surveys included questions for a primary shopper (knowledgeable about food spending and general household characteristics) and a randomly sampled person (who reported food intake for a 24-hour recall period). In addition, the HIP evaluation included in-depth focus groups with HIP participants, two rounds of retailer surveys, on-site visits with retailers, interviews with key informants and stakeholders, EBT transactions data, and data on labor and other costs for stakeholders.[5]

The HIP evaluation was conducted by Abt Associates. The research team included Westat for participant data collection, MAXIMUS for stakeholder data collection and cost analysis, and the Friedman School of Nutrition Science and Policy at Tufts University for contributions to analysis. Two previous reports from the HIP evaluation described the pilot's early implementation and preliminary impact estimates:

- **Early Implementation Report** (Bartlett, Beauregard et al., 2013) focused on documenting the process of implementing HIP. It describes development activities from pilot inception to March 2012 when HIP was fully operational. Chapter 3 of this Final Report is based on the Early Implementation Report.
- **Interim Report** (Bartlett, Klerman et al., 2013) provided initial exploratory analyses based on a limited number of outcome variables for Round 2 (descriptive statistics and some control variables in the analysis used data from the baseline period). This report focused on providing estimates of fruit and vegetable consumption for HIP and non-HIP groups and other early pilot impacts 4 to 6 months after HIP implementation. Based on the Round 2 data, the Interim Report showed that HIP had a positive and statistically significant impact on targeted fruit and vegetable intake.

This third HIP evaluation report addresses all five research objectives and analyzes all the data collected during the evaluation period. It provides confirmatory estimates of the difference in targeted fruit and vegetable intake between the HIP and non-HIP groups, based on combined data from Rounds 2 and 3. It examines additional outcomes and includes analyses to better understand the process by which HIP affected participants.

---

[5] Chapter 2 provides a detailed description of data collection activities and the analytic methods used in the evaluation.

The fourth and final HIP evaluation report, **HIP Spatial Analysis** (Grindal, Schwartz, et al., 2014), further investigates how the food retailer environment influenced Hampden County SNAP participants' fruit and vegetable purchases in general and the HIP impact estimates in particular.

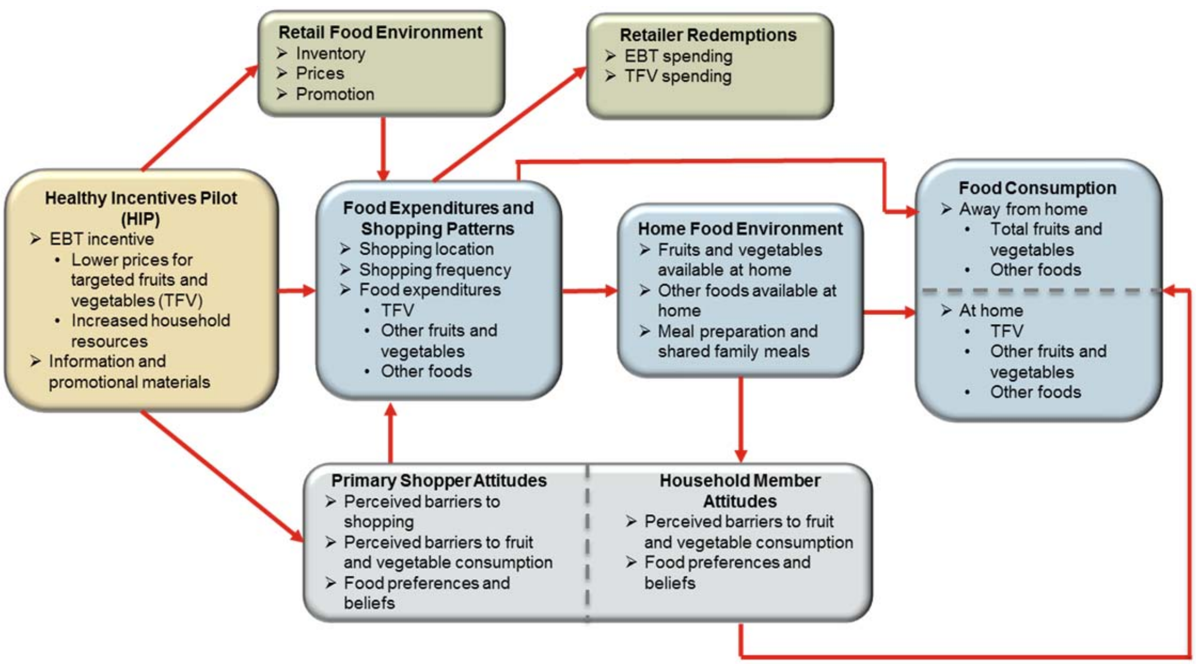
1.4 Theory and Conceptual Model

Exhibit 1.1 shows a conceptual model of HIP mechanisms developed to guide the data collection and analysis for the evaluation. It illustrates the following:

- The primary and secondary mechanisms that may explain HIP's impact on participant food consumption
- Internal and external factors that may influence how HIP affects participants
- Implementation activities that may affect HIP outcomes
- The role of stakeholders who may be affected by HIP and who account for significant pilot costs

The evaluation measured all constructs shown in this model and estimated the effects along all specified pathways.

Exhibit 1.1: Conceptual Model Describing the Potential Effect of HIP on Food Consumption



As the leftmost box indicates, HIP had two design elements ultimately intended to increase the consumption of TFVs. The primary element was HIP's price incentive: the pilot lowered the effective price of targeted fruits and vegetables purchased with SNAP benefits at participating retailers and increased household resources by adding the monetary incentive to the household's EBT card. In addition, HIP provided information and promotional materials to support the pilot. While the pilot did not create materials solely for fruit and vegetable promotion, HIP did involve multiple opportunities for communication with participants. Letters and brochures featured the HIP logo and images of healthy fruits and vegetables. In addition, the mere fact that fruits and vegetables were selected for a special subsidy carried an implicit promotional message.

HIP was hypothesized to work primarily through the middle tier of the conceptual model. By affecting food expenditures and shopping patterns HIP could lead participants to shift more of their grocery spending to retailers that participated in HIP, and at these retailers HIP participants could increase their expenditures on TFVs (with consequent changes in the remaining budget for other foods). These shopping and spending patterns could then lead to changes in the fruits, vegetables, and other foods available in the home food environment and to changes in preparing and sharing family meals. Increased availability of fruits and vegetables at home could lead to increased fruit and vegetable consumption, the ultimate desired outcome. The primary outcome, increased targeted fruit and vegetable consumption, could affect decisions about other foods that are complements and substitutes, both at home and away from home.

In addition to this central pathway, we hypothesized that HIP could operate through a secondary set of pathways related to attitudes about fruits and vegetables, as depicted in the bottom tier of the conceptual model. In addition to affecting food spending directly, HIP could influence the attitudes or preferences of the individual responsible for food shopping and of other household members. The attitudes of the primary shopper could be influenced by promotional materials or other communications about HIP, and they also could be influenced by feedback from other household members. Attitudes of these household members, in turn, could be influenced by the foods available in refrigerators, on counters, or in storage in the home food environment. Improved attitudes toward and preferences for fruits and vegetables among household members would then be expected to directly increase fruit and vegetable intake.

Finally, the top tier of the conceptual model depicts the role of retailers. To achieve its desired effects on food expenditures, HIP had to succeed in recruiting participating retailers, who then had to implement substantial changes to their integrated electronic cash register (IECR) systems or manual check-out processes. HIP could prompt participating retailers to increase their fruit and vegetable inventory and increase promotion of these items. Retailers might also change (increase or decrease) the prices of fruits and vegetables. These changes to the retail food environment as a result of HIP would then be expected to exert further influence on participant shopping and spending. Additionally, if HIP participants increased their expenditures on fruits and vegetables, retailers might experience an overall increase in sales of these items and also an increase in total SNAP spending.

The primary focus of the evaluation is the impact of HIP on consumption of targeted fruits and vegetables, the foods qualifying for the HIP incentive. We specified this as the one confirmatory outcome at the beginning of the study, prior to collecting and analyzing the data. Analyses of all other impacts are considered exploratory.

Factors That Could Influence the Magnitude of HIP Impacts

Given this theory and conceptual model, several important factors could influence the magnitude of HIP impacts.

- **Retailer enrollment**. The pilot's impact is expected to be larger if a higher percentage of retailers in the pilot area participated. The more participating retailers, particularly retailers that carry a good selection of fruits and vegetables at reasonable prices, the easier it is for participants to shop in places where they can earn the incentive. For retailers, participation in

HIP was voluntary, but extensive outreach efforts were undertaken to encourage participation.

- **Participant experiences.** The pilot's impact is expected to be larger if participants received sufficient information and training to understand the incentive, and if the procedures for recognizing eligible purchases and thus earning and crediting incentives functioned smoothly. If participants do not understand key features of the incentive, such as the potential savings from making fruit and vegetable purchases with SNAP benefits instead of cash income, or are unaware of the pilot's existence, then the impact is expected to be smaller.
- **Expenditures and shopping behaviors.** Food expenditures are central to the way HIP is expected to influence food intake. The overall effect of HIP on fruit and vegetable intake is likely to be larger if participants responded to the incentive, purchased more fruits and vegetables, and earned more incentives. Hence, HIP purchase amounts and HIP/non-HIP differences in food expenditures are important intermediate variables.
- **Attitudes toward fruits and vegetables and the family food environment.** Participants' attitudes toward fruits and vegetables, and their usual exposure to fruits and vegetables in the family food environment, may affect both the level of fruit and vegetable intake and the responsiveness of fruit and vegetable intake to incentives. Even if participant attitudes do not change, HIP could have a greater impact on intake for participants with more favorable initial attitudes toward fruits and vegetables.

1.5 Previous Research

A large body of previously published research informed the design of the pilot and offered some hypotheses about possible outcomes. In particular, the following areas of previous research are relevant to HIP:

- Price and income effects on food spending
- Non-price interventions to promote fruit and vegetable consumption
- Availability of fruits and vegetables in the food retail environment

Although informative, the literature consulted generated no firm conclusions about the likely effect of HIP. No previous study involved a large-scale financial incentive operating directly through the EBT card using normal food retail channels. All five research questions posed at the outset of the HIP evaluation remained open empirical questions.

Price and Income Effects on Food Spending

This section reviews the existing literature on the impact of changes in prices and income on fruit and vegetable spending. We begin with a brief overview of the theoretical issues followed by a survey of the general literature on the impact of prices and resources. Finally, we survey evaluations of programs intended to shift prices.

Theoretical Issues

The HIP incentive is similar to a price reduction by means of a rebate. A HIP participant using SNAP benefits at a participating food retailer's cash register pays the (unchanged) posted price for targeted fruits and vegetables, but the incentive essentially reduces the cost of targeted fruits and vegetables by

30 percent. At check-out, the participant's EBT card is immediately credited with additional SNAP benefits based on the amount of targeted fruits and vegetables purchased, thus increasing the amount of SNAP benefits available for the month.

The purpose of the price incentive is simple: lower prices are intended to lead participants to consume more fruits and vegetables. Some additional insight comes from more formally describing the economic theory behind this price effect (see Appendix A). One particular insight is relevant for SNAP participants who purchase part of their food with SNAP benefits and part with ordinary cash income. If these SNAP participants purchase any fruits and vegetables, they can save money by making their purchases at participating HIP retailers and with SNAP benefits instead of cash income. For households that have access to a participating retailer, and that have not already exhausted their SNAP benefits, TFV purchases with cash income or in non-participating retailers represent a missed opportunity to claim the 30 percent incentive.

In advance of the study, to help with research design and to plan sample size requirements, we considered existing information suggesting what effect size a price incentive might generate. The economic measure called price elasticity gives the percent change in spending that occurs in response to a one percent change in price. Based on price elasticity estimates from Andreyeva, Long, and Brownell (2010), a 30 percent decline in the price of fruits and vegetables would be expected to generate an increase in fruit and vegetable spending of roughly 19 percent.[6] Assuming that consumers change their food intake in proportion to changes in their food spending, the expected change in spending provides an estimate of the expected change in food intake from a simple price subsidy. Assessing current per-adult intake at 1.3 cup-equivalents per 1,000 kilocalories (USDHHS, 2010), or roughly 2.6 cup-equivalents in a 2,000-kilocalorie daily diet, this effect would generate approximately half of a cup-equivalent in increased intake of all fruits and vegetables.[7] The HIP evaluation was designed with sufficient statistical power to detect a HIP/non-HIP difference of 0.25 cup-equivalent or larger; thus we expected to be able to detect impacts of the size predicted by the elasticity estimates.

Of course, the actual impact could not be known until the pilot was conducted. The pilot differed in several respects from a simple price discount. These differences turned out to be important in understanding the main food spending results and food intake results. As suggested in the conceptual model above, HIP may influence fruit and vegetable intake through important mechanisms other than changing the household's food resources. The informational or marketing mechanism would suggest a larger impact. Non-universal participation of retailers and participants having an incomplete awareness of the program would suggest a smaller impact.

HIP also may affect fruit and vegetable intake by increasing the household's resources available for food spending. Previous research suggests that this "income effect" on fruit and vegetable spending is fairly small. Frazão et al. (2007) provided two types of evidence for this view. First, they cited Consumer Expenditure Survey evidence that fruit and vegetable spending remains fairly constant

---

6 Based on price elasticity for fruits of 0.70 (90 percent confidence interval: 0.41-0.98) and for vegetables of 0.58 (90 percent confidence interval: 0.44-0.71); using an elasticity of 0.64 (half way between the respective mean elasticities for fruits and vegetables).

7 Calculation: 2.6 cups x 19 percent increase = 0.49 cups.

across income categories. Second, they used older econometric estimates of the effect of increases in SNAP benefits. These estimates indicated that food spending increases by between 17 and 47 cents for each dollar of increased SNAP benefits (Fraker, 1990). Given that fruit and vegetable spending was approximately 12 percent of all food spending, these estimates suggested that fruit and vegetable spending could be expected to increase by between 2 and 5.6 cents for each dollar of HIP incentive earned. Thus, the price effect was expected to be more important than the effect of increasing household resources.[8]

Research on Price Elasticities and Income Effects

Some research has investigated the effects of prices on fruit and vegetable spending. There is clear evidence that price matters in other areas of health promotion (e.g., on smoking see Jha et al., 2006; more broadly, see Horgen and Brownell, 2002). With respect to food purchases, Andreyeva, Long, and Brownell (2010) reviewed evidence on the impact of food prices on broad food categories. Their estimates are in terms of elasticities. For fruits they estimate a price elasticity of 0.70 (90 percent confidence interval: 0.41-0.98), which indicates that, all else equal, a 10 percent decrease in the price of fruit leads to approximately a 7 percent increase in the amount purchased. For vegetables, the price elasticity was 0.58 (90 percent confidence interval: 0.44-0.71). These results are broadly consistent with other recent work.

USDA research suggests that increasing total resources or resources targeted to food in general may have only a modest effect on fruit and vegetable spending for low-income Americans. Stewart and Blisard (2008) estimated income elasticities showing the percentage change in spending for several food products in response to a change in income. For example, for middle-income households a 10 percent change in income was associated with a 1.3 percent change in beef spending, a 1.3 percent change in fruit spending, and a 1.0 percent change in vegetable spending. For low-income households, a 10 percent change in income was associated with a 2.5 percent change in beef spending, but no statistically significant change in fruit or vegetable spending. The study did not directly measure the effect of increasing SNAP benefits, but the authors anticipated a similar pattern. Stewart and Blisard concluded that there may be a hierarchy of demand, in which fruits and vegetables start out as a comparatively low priority for low-income Americans but become a higher priority as the budget constraint is relaxed at somewhat higher income levels. Based on this evidence, the research suggests that price interventions could have larger effects than would increasing resources alone (Guthrie et al., 2007).

Interventions to Change Food Prices

In addition to broad research on price effects that arise for economic reasons, there is a smaller literature on programmatic interventions providing a price incentive with the purpose of affecting food choices. This research generally showed that consumption responds to price changes, but these studies did not allow estimation of elasticities. Earlier studies included research on WIC fruit and vegetable vouchers and some interventions in farmers market and worksite settings. As part of a 6-month program offering fruit and vegetable vouchers valued at $10 per week, Herman et al. (2008)

---

[8] This conclusion applies to participants who do not reach the incentive cap. Economic theory suggests that the price effect on marginal additional fruit and vegetable purchases would be zero for participants who reach the incentive cap, but that possibility is purely hypothetical in this pilot. As noted in Chapter 5, fewer than 10 participant households reached the incentive cap.

randomly assigned WIC mothers to one of two intervention groups (vouchers for grocery stores or vouchers for farmers markets) or to a control group. Fruit and vegetable consumption increased substantially and significantly in both voucher groups but not in the control group, with changes sustained 6 months after the voucher program ceased. Average increases in fruits and vegetable consumption were 2.4 servings per person per day for the farmers market voucher group and 0.9 servings for the supermarket voucher group, where one serving is equivalent to approximately ½ cup-equivalent of fruit or vegetables. A post hoc analysis of correlates of fruit and vegetable intake showed that changes in consumption differed across ethnic groups and for fruits versus vegetables.

Some previous interventions combined pricing and promotion strategies and hence are most comparable to HIP. An evaluation of a farmers market nutrition program in Michigan investigated the effects among 564 low-income women of a multi-component program, including nutrition education combined with farmers market coupons (worth $20) on fruit and vegetable consumption (Anderson et al., 2001). The research design included random assignment to two treatments (education only or farmers market coupons plus nutrition education); the coupon only group and the comparison group were assigned based on clinic appointment time. Among the 455 participants who completed a posttest, the coupon-only group showed a self-reported statistically significant increase in fruit and vegetable consumption, and the impact was larger for nutrition education and coupons combined.

French and colleagues have published several reviews (French, 2003, 2005; French, Story, and Jeffery, 2001; French and Wechsler, 2004) and conducted studies of interventions (Jeffery et al., 1994; French et al., 1997) to increase fruit and vegetable consumption. They have identified lower pricing as a successful strategy, singly or in combination with education and cafeteria improvements in school and worksite settings. In studies French and colleagues reviewed, significant increases in fruit consumption (0.2 to 0.6 servings per day) have been observed as a result of reduced prices for fruits and vegetables at schools and in worksite cafeterias, while reduced prices have been less successful in changing vegetable consumption.

The extent to which these findings are applicable to the HIP demonstration project will depend on several factors: the similarity of the intervention (dollar equivalent amounts for vouchers, the ability to use them in the same types of outlets); differences between the populations (e.g., inclusion in WIC of higher-income households than are found in SNAP, as well as WIC categorical eligibility factors); and the sample demographics. The actual economic value of the vouchers in much of this research has been fairly small.

Other Interventions to Promote Fruit and Vegetable Consumption

Food choices also depend on more proximal variables, such as attitudes, preferences, behavioral intentions, and self-efficacy (Larson and Story, 2009). Analysis of the National Cancer Institute's Food Attitudes and Behaviors (FAB) survey found that respondents who were aware of the U.S. fruit and vegetable promotion campaign ("5 a day") were more likely to consume the recommended number of servings (Erinosho et al., 2012). Previous research has also found some positive effects on fruit and vegetable intake from interventions that encouraged healthy behavioral choices in worksites and health centers (Sorensen et al., 2007). HIP is designed primarily as a financial incentive, but the pilot necessarily included significant outreach to the randomly selected HIP participant group. Outreach materials provided information about participating retailers and described the qualifying targeted fruits and vegetables (see Chapter 3). Thus the overall impact of HIP includes any effects of HIP on attitudes toward or preferences for fruits and vegetables as well as the main effects of the financial incentive. The HIP evaluation collected multiple measures of participants' attitudes toward and exposure to fruits and vegetables.

Much previous research has been done on non-price interventions and policies to increase fruit and vegetable intake (Government Accountability Office, 2008). Some interventions discussed in this review focused on nutrition education or awareness campaigns designed to influence attitudes toward fruits and vegetables. Other research explored the effect of prices on fruit and vegetable spending, and a few previous interventions included a financial component. The HIP evaluation is distinct from all of this previous research, because it provides the first random assignment impact estimates for a financial incentive that is administered directly through SNAP using the EBT card. The previous research does, however, provide some context for understanding the new results in this Final Report.

An international literature review of 44 studies found that results differed based on characteristics of both the intervention and the target population (Pomerleau et al., 2005). Only two of these studies included a monetary incentive or coupon, but they give some indication of the effect sizes that have been found with other approaches. For example, in general population interventions, positive effects ranged from 0.2 to 0.6 servings per person per day (one serving is equivalent to approximately ½ cup-equivalent of fruit or vegetables). In interventions focused on smaller communities, such as African American churches, the positive effects were larger, ranging from 0.7 to 1.4 servings per day. Similarly, interventions for low-income adults tended to have larger effects, ranging from 0.42 to 1.1 servings per day. A review of 22 studies of interventions to influence fruit and vegetable intake revealed positive effects in 17 studies but no effect in another 5 studies (Government Accountability Office, 2008). Interventions with greater intensity, such as face-to-face education and counseling, are more effective but have substantially higher costs.

Improving the Availability of Fruits and Vegetables in the Food Retail Environment

A substantial amount of research has investigated the lack of access to healthy foods in low-income neighborhoods (USDA, 2009). Neighborhoods that are predominantly lower income and minority may have fewer supermarkets or longer distances to travel to supermarkets (Chung and Myers, 1999; Morland et al., 2002). However, it is unclear whether these differences hinder most SNAP participants in acquiring fruits and vegetables. Most low-income people in the United States shop at supermarkets and are reasonably satisfied with their level of food retail access (USDA, 2009). In a sample of SNAP participants, Rose and Richards (2004) studied the association between fruit and vegetable consumption and distance from the retailer where a respondent purchased most food. Greater distance was associated with significantly lower fruit consumption (and with lower vegetable consumption in the sample, but the vegetable results were not statistically significant).

HIP effects could be influenced by the surrounding food retail environment. The converse is also possible. There has been recent interest in whether changes to major nutrition assistance programs could encourage food retailers serving low-income areas to stock more fruits and vegetables. With data from Connecticut, before and after the implementation of new WIC packages that included a voucher for fruit and vegetable purchase, Andreyeva, Long, and Brownell (2012) found increases in a basket of healthy foods (heavily weighted toward fruits and vegetables) supplied by food retailers in low-income neighborhoods.

The HIP evaluation surveyed retailers that participated in HIP and collected information on the availability of fruits and vegetables, both prior to HIP implementation and during the pilot. The evaluation also collected survey data with the respondent's own assessment of access problems in purchasing fruits and vegetables and administrative data identifying the retailers where SNAP benefits were spent. We use these data to examine changes in the food retail environment, households' perceptions of issues purchasing fruits and vegetables, and the types of stores where HIP and non-HIP households shopped.

1.6 Organization of the Report

The remainder of this Final Report is organized as follows:

- Evaluation design, data, and methods (Chapter 2)
- HIP implementation and operations (Chapter 3)
- Retailer experiences (Chapter 4)
- HIP participant experiences (Chapter 5)
- Effects on expenditures and shopping behaviors (Chapter 6)
- Impacts on attitudes toward fruits and vegetables and family food environment (Chapter 7)
- Impacts on consumption (Chapter 8)
- Costs of the pilot and feasibility of nationwide expansion (Chapter 9)
- Conclusions (Chapter 10)

Chapters 4 through 7 focus on the leading factors that could influence the magnitude of HIP impacts—the food retail environment, participant experiences with the pilot, fruit and vegetable expenditures, attitudes, and the home food environment—as discussed above and presented in the conceptual model (Exhibit 1.1). The main fruit and vegetable consumption impacts themselves are then described in Chapter 8.

2. Evaluation Design, Data, and Methods

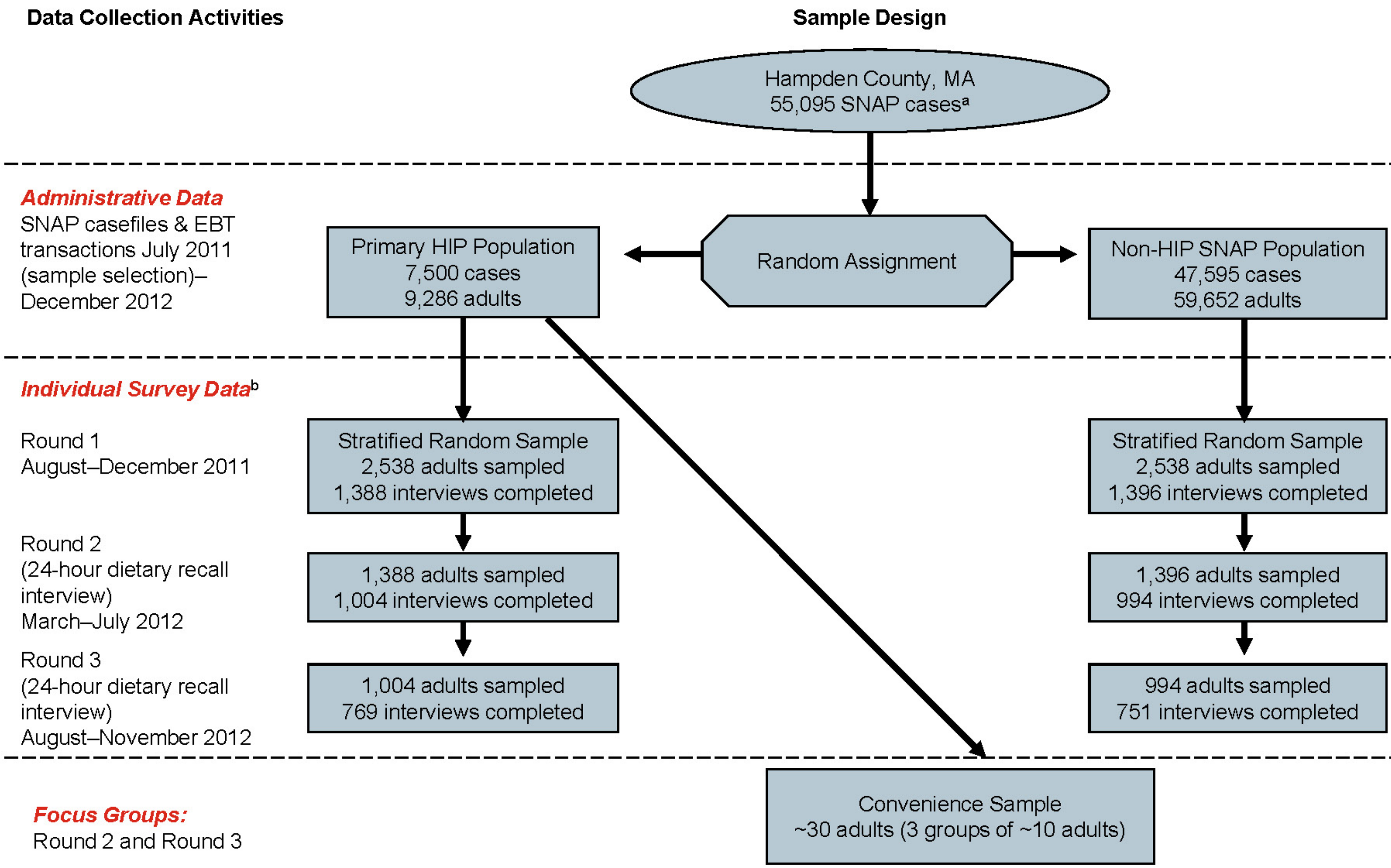
A rigorous research design was critical to answering the HIP evaluation's primary research objective—assessing the impact of HIP on participants' intake of targeted fruit and vegetables. Random assignment, the "gold standard" for assessing causal impacts, was used to select households to participate in HIP. The random assignment design assured that any measured differences between the HIP and non-HIP groups can be attributed to the program (or chance) rather than to factors like seasonal patterns or household preferences. To measure dietary intake we used 24-hour dietary recall interviews, the approach used in most major national nutrition studies. Both of these approaches—random assignment and 24-hour dietary recall interviews—are complicated and resource-intensive, but they give the best possible assurance that the evaluation results will be meaningful and unbiased.

These methods serve to address the numerous challenges to measure accurately the impact of HIP. The amount of fruit and vegetables a household consumes depends on a wide array of factors, ranging from seasonal patterns of food availability to cultural preferences to the household's daily work and school schedule. The research design must therefore find a way to isolate the effects of HIP from these other factors. Adding to the challenge is the difficulty of knowing exactly what the household eats, since household members may eat in a variety of locations throughout the day and do not eat the same foods every day. The evaluation used the most reliable known strategies to deal with these challenges.

Exhibit 2.1 provides an overview of the sampling design, showing the sampling process as it occurred at the different stages of the study. Participant data collection activities associated with each sample are noted to the left of the figure. As described in Section 2.2, dietary intake data, using 24-hour dietary recall interviews, were collected at two points during HIP implementation. Several other types of data collection were additionally conducted as part of the evaluation. EBT transaction data provided detailed information on households' SNAP EBT purchases. Retailer surveys and interviews with key stakeholders provided information to document the process of implementing and operating HIP, to examine the effect of the pilot on stakeholders, and to estimate the costs of the pilot and of nationwide expansion of HIP.

This chapter describes the evaluation design and the different types of data collected. The first section describes the random assignment process in which households were sampled to participate in HIP and given the opportunity to earn incentives for the purchase of targeted fruits and vegetables. The second section discusses random sampling for participant survey data collection, including sample sizes and response rates. It also discusses the types of data collected from participants that are used for the descriptive and impact analysis included in this report. The third section discusses the EBT transaction data that provided information on households' SNAP spending. The retailer survey and stakeholder interviews are detailed in sections four and five, respectively. The sixth section discusses the participant focus groups that were conducted to provide qualitative detail to assist in interpreting the findings. Administrative data from SNAP case files are described in the seventh section and the eighth section discusses data used in the analysis of pilot costs and costs of expansion. Sections nine and ten provide an overview of the analytic methodology used in the report and a description of the

Exhibit 2.1: Overview of Sampling Design and Data Collection Activities



[a]Excludes child-only cases; households that signed over benefits to treatment facility.
[b]Survey response rates: 63 percent-84 percent; see Exhibit 2.3 for detailed calculations.

baseline characteristics of HIP and non-HIP households and of the survey sample, respectively. The final section examines attrition from SNAP over the evaluation period.[9]

2.1 Random Assignment Research Design

The random assignment of eligible SNAP participant households to HIP and non-HIP status was central to the evaluation design and HIP operations. The Massachusetts Department of Transitional Assistance (DTA) provided administrative case file records containing all households and persons on SNAP in Hampden County as of mid-July, 2011.[10] Abt randomly selected 7,500 SNAP households (containing 9,286 adults) to participate in HIP. DTA notified these households, provided specially marked EBT card sleeves to identify them as HIP participants, and offered training on HIP procedures. The remaining 47,595 eligible SNAP households in Hampden (containing 59,652 adults) were not selected to earn the HIP incentive.

To ensure that the HIP (treatment) and non-HIP (control) groups were balanced (similar to each other), we used a blocked random assignment design.[11] Tests on the samples after random assignment confirmed that they were similar with respect to key participant characteristics. Additionally, HIP households were randomly divided into three groups, corresponding to the three waves DTA established to enroll participants in HIP.[12] Non-HIP households were also divided into three waves to facilitate participant survey sampling. The final sizes by wave for the HIP and non-HIP groups are presented in Exhibit 2.2.

Exhibit 2.2: Households and Persons in the HIP and non-HIP Sampling Frames by Wave

	HIP group				Non-HIP group			
	Wave 1	Wave 2	Wave 3	Total	Wave 1	Wave 2	Wave 3	Total
Number of households	2,500	2,500	2,500	7,500	15,865	15,865	15,865	47,595
Number of adults	3,091	3,090	3,105	9,286	19,952	19,792	19,908	59,652

9 Data collection instruments can be found in a separate volume on the FNS website, along with other project reports.

10 The evaluation sought to estimate the impact of HIP on adult food intake, so child-only cases were not eligible for HIP. Furthermore, only households that did their own shopping were eligible for the evaluation. SNAP participants who signed over their benefits to a residential or treatment facility were not eligible. DTA excluded these households prior to providing the file. Homeless participants who retained the use of their own benefits remained eligible for the study.

11 The evaluation created 12 household-level blocking cells defined by three levels of geography (Springfield; Chicopee/Holyoke; and remainder of Hampden County), two levels of household size (one-person and two-or-more-persons), and two genders for head of household (male-headed and female-headed). See Appendix B for additional details about sampling.

12 DTA staggered enrollment in HIP over three months for ease of implementation. The first wave began receiving the HIP incentive on November 1, 2011, the second wave on December 1, 2011, and the third wave on January 1, 2012. HIP participants were eligible to earn incentives for 12 months, ending in December 2012. Prior to each wave's start date, HIP households (that were active SNAP participants in the start month) received several mailings describing HIP. See Chapter 3 for additional details.

Once DTA generated the Hampden County SNAP case extract file of HIP-eligible households, these households remained in the HIP evaluation sample for the duration of the pilot as long as they continued to participate in SNAP; no additional households were added to the pilot.[13]

2.2 Participant Survey

The evaluation collected three rounds of survey data on sampled participants:

- Round 1: baseline or pre-implementation data were collected prior to HIP implementation and prior to notification of HIP/non-HIP status. Data collection occurred between August and December 2011.
- Round 2: early implementation data were collected when households had the opportunity to earn HIP incentives for 4-6 months. Data collection occurred between March and July 2012.
- Round 3: late implementation data collection occurred when households had the opportunity to earn HIP incentives for 9-11 months. The data collection period occurred between August and November 2012.

In this section, we discuss participant sampling and data collection activities for all three rounds of participant survey data collection.

Participant Survey Sampling

The survey samples, equally distributed between the HIP and non-HIP groups, were selected using a stratified random sampling procedure. The stratification variables were the same ones used in the random assignment of households to the HIP and non-HIP groups (geographic region of residence, household size, gender of household head). Among the HIP and non-HIP groups, an equal number of respondents were selected from each of the three waves. Sampled respondents were aged 16 and older and only one respondent was selected per household.[14]

After completion of participant sampling, each household record in the database received a HIP flag or indicator identifying it as one of the following four groups:

- HIP household, non-survey group
- HIP household, survey group
- Non-HIP household, survey group
- Non-HIP household, non-survey group

These flags were applied to all members of the original households in the HIP evaluation sample. Changes in household composition and program participation over time had implications both for

---

[13] Households exited SNAP over the course of the pilot. By the beginning of the pilot, 9.5 percent were no longer receiving benefits. One year later, 21.5 percent of the original sample was not receiving SNAP benefits.

[14] Approximately 6 percent of sampled respondents were aged 16-17 at the Round 2 survey. This group was included in the sample as they can be SNAP heads of households and the sample was intended to represent all types of households.

HIP operations and for survey sampling. The SNAP case was tied to the head of household and therefore, the HIP flag and the HIP incentives were also tied to this individual.[15]

Exhibit 2.3 shows the number of participants sampled and the number who remained on SNAP at the beginning of the survey round and were otherwise eligible to participate in the survey.

We randomly sampled 2,538 SNAP participants each from the HIP and non-HIP households to participate in the Round 1 survey. This sample size was chosen so that a large enough sample would remain for Rounds 2 and 3 to achieve the desired level of precision after accounting for participants who left SNAP, and thus were ineligible for the survey, or who became non-respondents in the later rounds.[16] The target sample was designed to be able to detect a post-implementation HIP/non-HIP difference in targeted fruit and vegetable intake of 0.25 cup-equivalent of fruits and vegetables per day. This amount is somewhat less than the likely difference that we estimated based on economic theory and empirical results, so the target sample sizes were expected to be adequate.

The Round 1 survey was fielded in three waves, corresponding to the three waves DTA established to implement HIP (November 1, 2011, December 1, 2011, and January 1, 2012, respectively). Prior to fielding each round, we used DTA's SNAP case file data to exclude respondents who were no longer participating in SNAP (see Section 2.11 for a discussion of this decision).

Exhibit 2.3: Sample Sizes, Eligible Respondents, Completed Surveys, and Response Rates: HIP and non-HIP Households by Survey Round

	Number sampled	Number eligible for survey	Number of surveys completed	Response rate (%)
HIP group				
Round 1	2,538	2,210	1,388	63
Round 2	1,388	1,198	1,004	84
Round 3	1,004	937	769	82
Non-HIP group				
Round 1	2,538	2,193	1,396	64
Round 2	1,396	1,207	994	82
Round 3	994	931	751	80

All respondents who completed the Round 1 survey were eligible for the Round 2 survey. Similar to procedures for the baseline survey, the Round 2 survey was fielded in three waves. While each wave had been eligible to earn incentives for 4-6 months at the time of the survey, given some EBT systems issues that occurred near the start of HIP implementation, most households had about three months of

15 If the original head of household (HoH) left the SNAP household, DTA closed that SNAP case. Other household members could form a new case, but that new case did not get the HIP flag and thus did not earn HIP incentives even if its prior flag was a HIP case. Similarly, if a member of a HIP household other than the original HoH left the household, that person was not given a HIP flag and was not eligible to earn HIP incentives. In such cases, the household with the original HoH retained the HIP flag and HIP incentives. The SNAP case also could close without any changes in household composition. Regardless of how a SNAP case closed, if the SNAP case reopened with the original HoH, the household once again received the HIP flag and resumed earning HIP incentives.

16 See Appendix B for details on sampling procedures and assumptions.

involvement with a fully operational pilot and thus their experiences reflected the early HIP implementation period.[17] As in the case of the baseline survey, prior to the start of Round 2, respondents who were no longer receiving SNAP benefits were dropped from the sampling frame. Similar procedures were followed for the Round 3 survey that occurred 9-11 months after HIP implementation.

Because a single 24-hour dietary recall measures consumption at one point in time, which may not accurately represent longer-term average intake, the preferred method for estimating "usual intake" is to conduct a second interview for a subset of the study participants and then to use statistical models to adjust the estimates (see discussion in Appendix E). To estimate usual intake distributions for fruit and vegetable consumption, in both Rounds 2 and 3 we drew a 10 percent subsample of respondents who completed the survey and conducted a second dietary intake interview.

Participant Survey Instruments

The participant survey included two modules, one to be completed by the sampled participant and the other by the household's primary shopper. In most cases (79 percent of the final analytic sample) the sampled participant and the primary shopper were the same person. Survey topics, by module, are presented in Exhibit 2.4. Where possible, we used validated questions from other surveys.

Exhibit 2.4: Participant Survey Topics, by Round

Survey topics	Round 1 survey (baseline)	Round 2 survey (4-6 months after implementation)	Round 3 survey (9-11 months after implementation)
Sampled participant module			
Respondent characteristics	✓		
Attitudes, perceptions, and barriers to consuming fruits and vegetables	✓	✓	✓
Fruit and vegetable consumption screener (frequency and quantity)	✓	✓	✓
Exposure to nutrition education		✓	✓
24-hour dietary recall		✓	✓
Primary shopper module			
Household characteristics	✓	✓	✓
Participation in nutrition assistance programs	✓		
Family food environment	✓	✓	✓
General shopping patterns	✓	✓	✓
Food expenditures	✓	✓	✓
Experiences participating in HIP		✓	✓

17 See Chapter 3, Section 3.2 for details of the EBT systems issues.

The Round 1 survey established a baseline for all measures except the outcome measures based on the 24-hour dietary recall, which was not included in Round 1 due to its burden and cost. The random assignment design uses differences between the HIP and non-HIP groups to measure the impact of the program and thus does not require baseline outcome measures.

The Round 2 and Round 3 instruments collected data on most of the same measures as Round 1, except that neither collected information on respondent characteristics nor on participation in nutrition assistance programs. Interview time was limited and only baseline measures were used in the models.[18]

Both the Round 2 and Round 3 surveys included key outcomes for the study. The 24-hour dietary recall was conducted using USDA's Automated Multiple Pass Method (AMPM). The AMPM instrument, which is designed to enhance respondents' ability to recall food consumed during the previous day, is a well-established and frequently used measurement approach. The five steps in the process collect different kinds of information about foods consumed, including detailed description, time and occasion, and amount. Use of two-dimensional drawings in a food model booklet help respondents estimate the amounts of foods consumed.

Despite this, some measurement error undoubtedly remains and one can never completely rule out the possibility that estimated impacts are influenced by measurement error. The AMPM approach yields less underreporting of food and nutrient intake than other assessment methods (Subar et al., 2003), minimizes respondent literacy and memory issues, and minimizes respondent burden.

To provide a consistent measure of fruit and vegetable consumption at baseline and allow for a comparison with the Round 2 and Round 3 surveys, respondents in all three survey rounds completed a modified version of the Eating at America's Table Study (EATS) Fruit and Vegetable Screener (Thompson et al., 2000). This screener asked about usual intake by the respondent over the previous month of nine common foods containing raw and cooked fruits and vegetables (including those eaten as snacks and at meals, eaten at home and away, and eaten alone and mixed with other foods).

Participant Survey Data Collection

Before the beginning of Round 1 data collection, sampled respondents were sent an advance letter informing them of their selection for the evaluation sample. The letters sent to participants before the Round 1 survey did not mention HIP, but instead referred to the study as examining 'how SNAP is working for families in Hampden County.' Round 1 data collection was completed before DTA notified HIP households about the pilot. Advance letters were also sent prior to the start of Round 2 and Round 3 data collection. Within each round of the survey, the sample was released in three waves, corresponding to the three waves of implementation.

Participant survey data were collected through a telephone interview. Spanish-speaking interviewers were available to complete surveys with respondents whose primary language was Spanish. The relatively few respondents whose primary language was neither English nor Spanish had family members or friends provide survey translations. For respondents who could not be reached by phone,

---

18 In addition, some respondent characteristics and participation in other nutrition assistance programs could themselves be influenced by HIP; thus these variables cannot be included in models predicting HIP outcomes.

we sent field locaters to respondents' homes.[19] Once they located respondents and gained their cooperation for the interview, field locaters provided a cell phone that respondents used to complete the interview.

Respondents were offered incentives for completing the surveys: $20 at Round 1, $30 at Round 2, and $40 at Round 3. In addition, respondents who used their own cell phones to call into the telephone center received an additional $10 to compensate them for minutes used. The intensive field methods were designed to address the concern that non-respondents might differ from respondents, such that estimates for respondents would not project to the entire Hampden County SNAP population.[20]

Response rates are presented in Exhibit 2.3. As is standard in panel surveys, response rates were lowest in Round 1; they were substantially higher in Rounds 2 and 3. Several natural disasters contributed to the lower than planned response rates in Round 1, including a hurricane, tornado, and early season snow storm. Higher than expected incidences of missing or bad phone numbers, Spanish-speaking-only cases, and cases that were completed in the field created additional challenges to the first round of data collection.

As discussed above, in order to estimate usual intake distributions for fruit and vegetable consumption, we drew a 10 percent subsample of respondents who completed the surveys and conducted a second dietary intake interview. In Round 2, we completed a total of 230 second day interviews, 107 with respondents in the HIP (treatment group) and 123 with non-HIP (control group) respondents. In Round 3, completed second day interviews totaled 206 (94 treatment group respondents and 112 control group respondents).

2.3 EBT Transaction Data

This report uses EBT transaction data for two types of analysis. The first analysis examines HIP incentive earnings by pilot participants, focusing on HIP-eligible purchases, the amount of incentives earned, and the percent of SNAP benefits spent on HIP-eligible purchases.

The second analysis examines the impact of HIP on SNAP spending patterns, including data for both HIP and non-HIP households. The analysis examines SNAP purchases overall and purchases in different types of stores (e.g., supermarkets, convenience stores). Not all Hampden County retailers participated in HIP and we therefore examine total SNAP purchases in participating and non-participating stores. Finally, we examine purchases by both HIP and non-HIP households of targeted fruits and vegetables in supermarkets and superstores equipped with electronic cash registers that participated in HIP. (No data are available on TFV purchases in stores that did not participate in HIP.)

Xerox, the EBT processor for Massachusetts, collects and maintains data pertaining to SNAP EBT transactions. These data show the amount of SNAP benefits received and the date they were credited, and they show the date, time, amount, and location for each shopping transaction using SNAP benefits. In

---

19 The percentage of interviews completed in the field varied by survey round. Field completes were: 58 percent in Round 1, 37 percent in Round 2, and 26 percent in Round 3.

20 We conducted a non-response analysis to assess the extent of non-response bias in the Round 1 survey. Results are included in Appendix C.

addition, transaction data for the evaluation period provide information (date, time, amount, store) on total HIP-eligible purchases and HIP incentives earned.

We obtained daily EBT transaction data for the full pool of SNAP participants in Hampden County, including both HIP and non-HIP households. Daily transmission of data helped identify issues in the EBT transaction data in time for the EBT vendor to address them. We cleaned the transaction files to remove duplicate transactions and account for any product returns and corrected transactions. Data were transmitted without social security numbers, but case file identification numbers were included to allow linking of EBT transaction data to administrative case file data and survey data. We compiled the EBT transaction data into one observation per household for each calendar month.

EBT transaction data have a number of restrictions that affect the analyses that can be performed:

- Only purchases made with SNAP benefits are included; purchases made with other forms of payment, such as cash or WIC vouchers are not captured.
- Only HIP purchases at stores that participated in HIP earned the incentive; purchases of HIP-eligible items at non-participating retailers did not earn the incentive and are thus not captured.
- At HIP participating stores *without* integrated electronic cash registers (IECRs), HIP households needed to identify themselves as HIP participants and HIP-eligible items needed to be separated from other items. HIP incentives were only earned for properly identified purchases.

In this report, we use transaction data beginning in November 2011, when HIP began.[21] For analyses of key outcomes we focus on transactions beginning in January 2012 when all participants were active. We analyzed EBT data through the end of the pilot, focusing on expenditures in the two periods roughly coinciding with the participant surveys (March-July 2012 and August-October 2012).

2.4 Retailer Survey and Observations

Surveys and on-site observations of food retailers offered insight into the experiences and satisfaction of an important HIP stakeholder group, and they provided useful information about the pilot's implementation process and costs. Exhibit 2.5 shows the different types of retailer data collected over the course of the pilot. The rest of the section discusses each of these activities.[22]

---

[21] The evaluation research design intended that EBT transaction data would be available beginning two months prior to the HIP implementation. However, it proved difficult to compile EBT data files during the period that preparations for implementation were being completed; transaction files for the pre-implementation period could not therefore be reconstructed.

[22] Our evaluation plans originally called for a survey of retailers who withdrew from HIP after initially participating. While some stores closed or changed ownership over the evaluation period, there was only one small store that carried limited HIP-eligible items that decided to withdraw, so we did not pursue this data collection activity.

Exhibit 2.5: Retailer Data Collection Activities

Type of data collection	Early HIP implementation period (Oct-Dec 2011)	Late HIP implementation period (Nov 2012-Jan 2013)
Retailer survey		
HIP participating retailers	✓	✓
Declined to participate in HIP[a]	✓	
Later implementing retailers		✓
Observations in participating stores[b]	✓	✓

[a] These stores received a $40 incentive to encourage completion of the survey.
[b] Abt also conducted observations in 7 participating stores and 3 participating farmers markets in July-August 2012.

Participating Retailer Surveys

We conducted surveys of retailers who were participating in HIP at two periods during the pilot. The first survey, conducted between October and December 2011, included retailers who were participating at the start of the pilot in November 2011. The second survey, conducted November 2012-January 2013, included all retailers who were participating near the end of the pilot (as of October 2012).

The first round of the retailer survey collected information on HIP implementation activities, including:

- How retailers learned about HIP, their understanding of HIP's objectives, and why they chose to participate
- Activities undertaken to prepare for HIP implementation
- Training store personnel

The second retailer survey focused on retailers' experiences with HIP, including:

- How HIP affected store activities, including operational problems, perceived effect on check-out time, and perceived effect on sales and profit
- HIP training for new employees and refresher training
- Opinions about HIP, including satisfaction

In addition, both rounds of the survey collected information on fruit and vegetable promotion activities. The surveys also collected data on a list of specific fruits and vegetables, capturing whether they were available in the store and the prices of those items sold in the store.

For sampling, the goal was to have the retailer sample reflect all participating retailers, so we wanted the sample to have the same proportion of retailers, by type, as among participating retailers. To achieve this goal, we used a stratified random sample design. Participating retailers were first grouped by store type, combining the 12 official FNS store types eligible for HIP into four categories (superstores, supermarkets, grocery and food specialty stores, and convenience stores).[23] The supermarkets, superstores, and convenience store categories included chain stores and all were included in the sample. We then selected a sample of stores within chains, up to a maximum of six stores per chain. For the independent stores, our intent was to randomly select retailers for the survey within retailer type. However, given the number of participating independent retailers, little sampling was required; almost all participating stores were selected for the first round of the survey and all stores were selected for the second round. Exhibit 2.6 presents information on the sample sizes and response rates for the different retailer survey activities.

Surveys of chain stores and independent retailers were conducted slightly differently. Chain store surveys were conducted in two parts. The first part of the chain store survey was conducted with a corporate representative who responded to questions concerning activities for which headquarters was responsible (thus reporting for multiple stores in the sample). The second part of the chain store survey was conducted with managers of the individual chain retail stores. Independent retailers completed one survey. Many questions were similar across the different types of surveys, but some questions were only appropriate for either independent stores or chain stores.

Exhibit 2.6: Retailer Survey: Samples and Response Rates

Retailer survey	Number sampled	Number eligible for survey	Number of surveys completed	Response rate (%)
Participating retailers—early implementation	75	52[a]	39	75
Participating retailers—late implementation[b]	61	58[c]	49	84
Non-participating retailers	20	16	13	81

[a] 23 of the sampled independent stores were not eligible for the survey: 14 were not committed to HIP, 3 were closing/selling their stores, and 6 were planning to begin participating in HIP in February 2012.
[b] Sample includes 12 later implementing retailers who joined HIP after January 2012; 11 completed the survey.
[c] 3 of the sampled independent stores were not eligible for the survey: 2 stores had closed and 1 store changed ownership and the new owner chose not to participate in HIP.

The participating retailer surveys were conducted by mail with telephone and field follow-up. Our experience with the first retailer survey was that in-person follow-up was most effective. Thus in the second fielding of the survey, most follow-up occurred in person.

Later Implementing Retailers

The participating retailer survey that was conducted near the end of the pilot included a group of "later implementing" independent retailers, defined as retailers who were not participating in HIP at the beginning of the pilot. DTA continued retailer recruitment efforts after HIP began and permitted

23 We collapsed the 12 official FNS stores types eligible for HIP into four categories as follows: supermarkets; superstores; grocery stores (small, medium, and large grocery stores and fruit/vegetables, seafood, and meat specialty stores); and convenience stores (convenience store and combination grocery/other). Farmers markets (including direct marketing farmers) were not operating during the periods the retailer survey was conducted and thus are not included in the survey samples.

retailers to join HIP at several points during the pilot (February 2012, June 2012,[24] and October 2012).

The version of the participating retailer survey completed by the later implementing retailers included an additional module that collected information on their decision to join HIP. Topics included: how they learned about HIP; why they hadn't joined HIP when the pilot began; and their reasons for eventually joining.

The participating retailer sample included 12 later implementing retailers. Of these, 11 completed the survey.

Non-Participating Retailers

The focus of the non-participating retailer survey was to understand the factors affecting a store's decision not to participate in HIP. In addition, the survey collected information on how retailers learned about HIP, their understanding of HIP's objectives, and fruit and vegetable promotions in stores.

We selected a small sample of 20 non-participating retailers to complete the survey. Similar to the participating sample, we stratified stores by four store types and randomly sampled within store type. Many non-participating stores were part of corporate chains and we randomly selected one store per chain. Four of the sampled stores were ineligible for the survey: two indicated interest in joining HIP; and DTA was still in discussion with two other stores about participating.

Surveys with non-participating retailers were conducted on the telephone during November and December 2011. We were able to complete 13 interviews or 81 percent of those eligible for the survey (Exhibit 2.6).

Store Observations

Using an observation form developed for the evaluation, we conducted three rounds of observations in HIP participating stores to obtain first-hand information on their fruit and vegetable inventory, the HIP transaction process, and other environmental factors. Specifically, we used the form to conduct an inventory of fresh, frozen, dried, and canned fruits and vegetables. The inventory focused on the availability, variety, visual appeal, and price of a selection of fruits and vegetables available in the store. We also collected information on store signage promoting the consumption of fruits and vegetables. Finally, in stores without integrated electronic cash registers (referred to as EBT-only systems), we observed a simulated HIP transaction.

Observations were conducted in a purposefully selected sample of 10 participating retailers of different store types that agreed to participate in the first retailer survey. Observations were conducted in October 2011, July-August 2012, and December 2012. To the extent possible, we conducted the first and third rounds of observations in the same stores.[25] For the second round of observations, we

---

24 Participating farmers markets joined HIP as they opened for the season in the late spring/early summer 2012. All had closed by the time the time the second retailer survey was conducted (November 2012-January 2013) and thus they were not included in the retailer survey sample.

25 One store selected for the first round observations had closed by the third round. We replaced this store with another store of the same type.

decided that it would be useful to conduct observations in farmers markets, and we selected three markets to visit. We also visited 7 of the original stores selected for observations. In all three rounds, we were able to complete all 10 observations.

2.5 Stakeholder Interviews

To understand the implementation and operations of the pilot we conducted three rounds of in-depth interviews with a wide variety of HIP stakeholders.[26] The first round of interviews, which occurred between mid-October and mid-December 2011, focused on tasks involved in HIP implementation, including design and development of the EBT system modifications for HIP, retailer recruitment, and preparations for notifying and training participants. We conducted a second round of interviews during June and early July 2012. These interviews, which occurred during the middle of pilot operations, addressed issues that arose during the early months, including technical systems problems, continuing efforts to recruit retailers to participate in HIP, and attempts to understand the relatively low HIP take-up rate and efforts that might increase household incentive earnings. The final round of interviews took place in the last months of pilot operations. We conducted most interviews between late November and early December 2012; some interviews with EBT system stakeholders took place in January 2013, once the pilot had concluded. Topics for the final round of interviews included operational issues in the second half of the pilot and efforts to increase HIP households' purchases of targeted fruits and vegetables. During the interviews, we also solicited information on the feasibility of expanding HIP, both statewide and nationwide and the factors and costs that should be considered in such efforts. Stakeholders did not receive any incentives to participate in the interviews.

Information obtained from the stakeholder interviews was used to describe HIP implementation and operations (Chapter 3) and stakeholder perspectives on the feasibility of a potential nationwide expansion of HIP (Chapter 9).[27] Stakeholders involved in EBT and retailer systems also provided information to help estimate the costs of expanding HIP (Chapter 9).

We conducted over 30 stakeholder interviews in each round; generally interviewing the same individuals in all three rounds. Stakeholders interviewed included the following:

- Massachusetts Executive Office of Health and Human Services (EOHHS) and DTA staff—including DTA executives who oversaw the entire process and were directly involved in various aspects of implementation and local DTA office staff in Hampden County
- Massachusetts DTA HIP staff—dedicated staff hired specifically for HIP to manage the pilot, recruit retailers, and train HIP participants

---

26 Several other activities were also important in obtaining information about HIP implementation and operations. We attended two key technical meetings: the orientation meeting for DTA and Xerox (November 2010) and the application design sessions conducted by DTA and Xerox (December 2010). Team members participated regularly in status calls with FNS, DTA, and Xerox to keep abreast of project progress and issues and to make sure that evaluation plans were well synchronized with implementation activities.

27 A more complete discussion of the process involved in implementing HIP, based to a large degree on the stakeholder interviews, can be found in the *HIP Early Implementation Report* (Bartlett, Beauregard et al., 2013).

- EBT processor, Xerox State and Local Solutions, Inc.[28]—responsible for modifying the Massachusetts EBT system for HIP and working with retailers to modify their systems
- Retailers and third-party processors (TPPs)—who had to modify their systems to accept and process HIP
- Novo Dia Group—technical consultants to DTA responsible for coordinating system design and testing activities for retailers
- Community-based organizations (CBOs) involved in HIP

To ensure that the interviews were conducted systematically, we developed detailed interview guides. Interviewers prepared for each interview by reviewing applicable documents, such as the Massachusetts DTA grant application, project status and progress reports, and internal communications. Two-person teams conducted the interviews. The teams generally consisted of a senior researcher and an analyst who recorded the interview. Interviews were generally one to two hours long. After the interviews, teams conducted telephone follow-up as necessary to clarify responses. Interviews were coded into the categories defined by the interview guides.

2.6 Participant Focus Groups

The evaluation conducted two rounds of focus groups with HIP participants to obtain qualitative details on their experiences with HIP. The information from the groups was used to provide additional context for interpreting the participant impact analysis. We conducted the first round of focus groups in April 2012, coinciding with the Round 2 participant survey, and the second round of focus groups in October 2012, coinciding with Round 3 of the survey.

Focus group participants shared their perspectives on several broad topics outlined below:

- How they learned about HIP, including the notifications and training received
- Expectations for the program
- Experiences using HIP
- Financial impact on the household
- Impact on consumption of fruits and vegetables

We conducted three focus group sessions in each round, two in English and one in Spanish. Each group included eight to ten participants. The sessions lasted 90 minutes and participants were invited to come 30 minutes early for light refreshments. All focus group members received $75 for their participation.

Focus group participants were recruited using the case file data used for participant sampling. Eligible participants for the first round of focus groups were selected from the sample of survey participants; participants in the second round of focus groups were not from the survey sample. In addition, focus group participants had to be active SNAP participants and to have heard of the HIP program. The

[28] Xerox State & Local Solutions, Inc. operates as a subsidiary of Xerox Corporation. Throughout the report, we refer to the EBT processor as Xerox.

groups included a roughly equal number of women and men and included participants of different ages and educational levels, with no more than two individuals per group having a college degree or higher.

Focus group data were analyzed by using notes taken during the groups, reviewing audio files, and using verbatim transcription as needed. The analysis of the focus groups focused on several issues and data were coded into the following analytic categories:

- Overall participant understanding of HIP purpose and operation
- How participants learned about HIP
- Expectations of families and the extent to which HIP met expectations
- Changes in willingness to purchase fruits and vegetables
- Unexpected outcomes

2.7 SNAP Caseload Data

DTA maintains information on SNAP households and participants (including demographics, income, contact information, and benefits) in its BEACON eligibility system. This system was used for the initial random assignment of eligible households to HIP and for several additional evaluation purposes, including:

- Survey sampling frame, blocking groups, sorting variables, and demographic analysis variables for the participant survey
- Updates to contact information and demographic data for participants sampled for Rounds 2 and 3 of the participant survey
- Characteristics of HIP and non-HIP households that were matched with monthly EBT transaction data for analysis

Important demographic variables from the SNAP eligibility system included age and race/ethnicity of household head, household size, relationships of SNAP household members, number of adults in the household, number and ages of children in the household, presence of an elderly member, employment status and earnings, and presence of unearned income (including for example, supplemental security income (SSI) and unemployment compensation).

The SNAP caseload data were obtained for all HIP-eligible households in Hampden County receiving SNAP benefits in July 2011 and monthly throughout the evaluation period.

2.8 Cost Data

The cost data collection captured the expenses of the stakeholders participating in the implementation and operation of HIP in Massachusetts. These data were used to estimate the cost of the pilot and also the costs of a potential nationwide expansion of HIP. The primary stakeholders whose costs were captured include: DTA; Xerox (Massachusetts EBT processor), Novo Dia Group (technical consultant), retailers, and third-party processors (TPPs).

All of the identified costs of implementing HIP were paid for through the HIP grant awarded by FNS to DTA. DTA provided ***quarterly expenditure reports*** that detailed all expenditures of HIP grant funds, including staff costs (salaries and wages, fringe benefits, and payroll taxes), payments to contractors and retailers, supplies and other direct costs, and indirect/overhead costs (as charged on the basis of personnel costs).

Staff time records provided the other major source of data used in the cost analysis. All DTA staff working exclusively on HIP reported their time on a weekly basis, with a breakdown by seven key functions: (1) design, development, and testing; (2) household recruiting and customer service; (3) retailer recruiting and relations; (4) community relations; (5) training; (6) general administration; and (7) evaluation. The time records were used to allocate total DTA staff costs and indirect costs among the functions needed to implement HIP (and to exclude evaluation costs from implementation costs). Time for other DTA staff involved in HIP was provided as a single number of hours by week. Contractors reported their HIP staff time on a monthly basis, using the functional breakdown that was used in the DTA time records. The evaluation team used these time records to allocate the actual payments to contractors (from DTA expenditure reports) to the separate functions.[29]

2.9 Analytic Approach

In this section, we describe our analytic approach to estimating the impact of HIP—outcomes with HIP relative to outcomes without HIP.[30] We begin by describing the primary outcome of interest—intake of targeted fruits and vegetables (TFVs), the foods qualifying for the HIP incentive. We then describe the regression models used to estimate impacts on continuous outcomes (such as daily intake of targeted fruits and vegetables). We also discuss the analysis strategy for binary outcomes (such as having fruit available at home) and other categorical outcomes (such as the degree of agreement with a statement about attitudes toward fruits and vegetables). Finally, we discuss the use of survey weights to make sample estimates representative of the SNAP population in Hampden County.

Primary Evaluation Outcome

The primary focus of the impact analysis is the impact of HIP on TFVs. However, it is not possible to precisely measure TFV intake using standard 24-hour dietary recall interview methods and food codes. The issue is that standard dietary coding schemes identify the form in which a food was *consumed*, while whether a food qualifies for the HIP incentive depends on the form in which the food was *purchased*. Our approach to dealing with this issue and constructing the TFV measure is discussed in detail in Chapter 8.

---

29 Additional detail on cost data sources is presented in Chapter 9.

30 The approach estimates the impact of being assigned to the HIP group and therefore eligible to receive the HIP incentive on purchases of targeted fruits and vegetables relative to being assigned to the non-HIP group and not being eligible to receive the HIP incentive on purchases of targeted fruits and vegetables. For many purposes, this is the policy relevant estimate as we cannot force people to use the benefit; all we can do is offer them the benefit. Thus, the analysis estimates the impact of being offered the HIP incentive.

The research questions require analyses of impacts on a large number of outcomes in addition to TFV. When we estimate a large number of impacts, some of them are likely to appear to be significant even if there is no true treatment effect (Schochet, 2009). Our approach to this "issue of multiple comparisons" was to specify, prior to analyzing the data, one confirmatory outcome—targeted fruit and vegetable (TFV) intake, pooled[31] across all interviews from follow-up survey Round 2 and Round 3—so that no further multiple comparison adjustment would be needed. We consider all other analyses exploratory.

Regression-Adjusted Differences Between HIP and non-HIP Groups

The impact analyses presented in this report are based on regression-adjusted differences between the HIP and non-HIP groups. While a simple comparison of mean outcomes for respondents in the HIP and non-HIP groups would yield unbiased estimates of the impact of HIP, we use a regression-adjustment approach to improve the precision of impact estimates by controlling for some portion of the variation in observed outcomes. In other words, we compare the average outcomes (e.g., TFV intake) for HIP participants and non-HIP participants after accounting for a variety of other characteristics.

The characteristics we accounted for (i.e., covariates included in all the regressions) are:

- Stratification/ blocking variables used in the sampling, which include indicators of household residential location, size and composition of household, and gender and age of household head
- Demographic characteristics of respondents, including gender, age, and race/ethnicity
- Baseline fruit and vegetable consumption derived from questions on frequency and quantity of specific types of fruits and vegetables consumed in the week prior to the survey
- Baseline composite scales derived from questions about the home food environment, barriers to grocery shopping, and attitudes about and barriers to consumption of fruits and vegetables

For outcomes in which the same survey question was asked in Round 1, such as attitudes toward fruits and vegetables, the analysis included the Round 1 response as an additional control in the regression. Analysis of dietary intake data also included covariates indicating whether the recall was the first or second recall and respondents' assessment of whether their reported intake was usual.[32]

We calculated regression-adjusted means for the HIP and non-HIP groups that accounted for other characteristics (e.g., demographic characteristics) by using the estimated regression coefficients and the values of the included characteristics.

---

[31] By pooling, we mean that we included all of the observations—both the main interviews for the entire sample and the 10 percent subsample interviews (that will be used for the usual intake computations) from the Round 2 and 3 follow-up surveys. Pooling or stacking the interviews is the most efficient use of the data and provides a natural way to combine responses for individuals with varying numbers of interviews. To account for multiple observations for individuals, we "cluster" the data (i.e., we use the cluster option in Stata). Appendix G presents analyses by follow-up survey round.

[32] Appendix E, Exhibit E.1 presents the complete list of covariates used in the regressions and how they were defined; it also presents means and standard errors for all covariates.

Our strategy for reporting statistical significance in the exhibits and in the text discussion is as follows:

- In the exhibits, we use asterisks to indicate statistical significance: *$p < .10$; **$p < .05$; and ***$p < .01$.
- In the text discussion we consider p-values lower than 0.05 as statistically significant and discuss those results. We consider p-values of greater than 0.05 and lower than 0.10 as "borderline" significant, and discuss those results in the text only when broadly consistent with other findings and/or otherwise placing those findings into context.

Analysis of Binary and Categorical Outcomes

Many of the secondary outcomes analyzed in this report are either binary (e.g., yes/no) or categorical (e.g., strongly disagree/disagree/neither agree nor disagree/agree/strongly agree) variables. As with continuous variables, we present results that are adjusted to account for sample members' characteristics at baseline. In the body of the report, we present analyses based on linear probability and linear regression models as they are more easily interpretable. We also analyzed the outcomes using logistic and ordered logistic regression models and present the models in Appendix F. The results from both types of models are broadly similar.

In all analyses presented in this report, binary outcome variables are coded so that 1= "yes" and 0= "no." Each outcome is regressed on a HIP participation indicator and other explanatory variables (described above). The results show the effect of HIP participation on the probability of saying "yes" to the question.

Categorical outcomes analyzed in this report include items such as the degree of agreement with a particular statement about, for example, nutrition attitudes. These outcomes were coded into five-point Likert scales, with higher values indicating greater levels of agreement. Just as in the binary case above, the outcome was regressed on the HIP participation indicator and the other explanatory variables. The resulting coefficient estimates provide a straightforward description of the direction of HIP's impact on these outcomes (e.g., whether HIP participants more strongly agree or more strongly disagree with a particular statement than do non-HIP participants).[33]

Survey Weights

All analyses using participant survey data were weighted to provide estimates of the SNAP population in Hampden County. Weights were constructed to account for the sampling design and survey non-response. See Appendix C for a detailed discussion of how the weights were constructed.

The analysis uses all available Round 2 and Round 3 interviews. As noted in Section 2.2, for approximately 10 percent of both the Round 2 and Round 3 samples, we conducted a second 24-hour dietary recall interview in order to allow estimation of usual intake. We include these interviews in our analysis.

---

[33] The coefficients cannot, however, be interpreted numerically as a scale score because one cannot assume that each categorical response is one unit different from the next.

2.10 Sample Description

The analyses in this report use two samples, one a subset of the other. As discussed above, all SNAP households in Hampden County were randomly assigned to either the HIP or non-HIP evaluation group. Much of the analysis using EBT data includes all of the approximately 55,000 SNAP households in the county. The participant survey samples were then drawn from among the HIP (treatment) and non-HIP (control) groups. The data collected on this smaller sample are used for the descriptive and impact participant analyses. In this section, we present descriptive statistics for both samples and compare the characteristics of the treatment and control groups.

Hampden County SNAP Participants

In this section, we use data from SNAP caseload files to describe the universe of SNAP participants in July 2011, when random assignment to HIP occurred prior to HIP implementation. SNAP case file data show (Exhibit 2.7) that just under half of SNAP heads of household (HoH) were Hispanic and that Spanish was spoken in nearly one-quarter of all households. SNAP household heads were 43 years old on average and half were disabled. Most participants (80 percent) lived in private residences and 7 percent were homeless. One-third of households included children (and no elderly members) and just over 10 percent of households included elderly members.

Although the SNAP population in Hampden County differs from the national SNAP population on some of these factors,[34] the location was selected by Massachusetts due to its mix of urban, rural, and suburban areas that contain two of the lowest income cities in the State. Hampden County is racially diverse, has the lowest median household income and the highest poverty rate in the State. Residents in the western region of Massachusetts have the highest rates of obesity and related chronic illnesses in the State.

In July 2011, average income for this population was $806, and a majority of SNAP household heads had some form of unearned income: Supplemental Security Income (32 percent); Social Security (27 percent); Temporary Assistance to Needy Families (TANF) (13 percent); unemployment compensation (5 percent); and other types of unearned income (60 percent). The average SNAP benefit was $258 in July 2011.

As expected, due to the random assignment design, no significant differences emerged between the treatment and control groups in these reported characteristics. An overall F-test indicated that there was no difference ($p = 0.556$) between treatment and control groups overall at baseline.

---

[34] Most notably, Hampden County had higher proportions of disabled and Hispanic household heads than the national SNAP caseload.

Exhibit 2.7: Characteristics of SNAP Households in Hampden County, July 2011

Variable	Total (proportion)	Treatment (proportion)	Control (proportion)	P-value
Race/ethnicity of head of household				
Hispanic	0.44	0.43	0.44	[0.722]
Non-Hispanic white	0.37	0.37	0.37	[0.714]
Non-Hispanic black	0.13	0.13	0.13	[0.325]
Non-Hispanic other	0.07	0.07	0.07	[0.930]
Spanish spoken in household	0.22	0.22	0.22	[0.925]
Age of head of household				
16-30	0.28	0.28	0.28	[0.388]
31-40	0.21	0.21	0.21	[0.700]
41-54	0.26	0.26	0.27	[0.243]
Over 54	0.25	0.25	0.25	[0.946]
Mean age (years)	43	43	43	[0.601]
Disabled head of household	0.50	0.50	0.50	[0.974]
U.S. citizen head of household	0.96	0.96	0.96	[0.370]
Household composition				
Elderly (with or without children) in household	0.12	0.12	0.12	[0.348]
Children (no elderly) in household	0.36	0.37	0.36	[0.636]
No elderly or children in household	0.51	0.51	0.51	[0.870]
Household is homeless	0.07	0.07	0.07	[0.990]
Housing type				
Private	0.80	0.80	0.80	[0.369]
Public	0.14	0.14	0.14	[0.358]
Other	0.06	0.06	0.06	[0.860]
Monthly household gross income[a]				
$0	0.24	0.23	0.24	[0.321]
$1-$787	0.26	0.27	0.26	[0.104]
$788-$1,082	0.25	0.25	0.25	[0.941]
$1,083 or higher	0.25	0.25	0.25	[0.459]
Mean income ($)	$806	$804	$807	[0.714]
Types of income received by head				
Supplemental Security Income	0.32	0.32	0.33	[0.823]
Social Security	0.27	0.27	0.27	[0.774]
Temporary Assistance for Needy Families	0.13	0.13	0.13	[0.905]
Unemployment compensation	0.05	0.05	0.05	[0.167]
Other unearned income	0.60	0.60	0.60	[0.241]
Monthly SNAP benefit				
$161 or less	0.25	0.26	0.25	[0.230]
$162-$200	0.39	0.39	0.39	[0.679]
$201-$349	0.10	0.11	0.10	[0.254]
$350 or higher	0.25	0.24	0.25	[0.123]
Mean benefit ($)	$258	$255	$259	[0.076]*
Sample size	**55,095**	**7,500**	**47,595**	
F-value[b]		.93		
P-value		0.573		

Two-sided t-test: *p<0.1, **p<0.05, ***p<0.01.
[a] Includes earned and unearned income.
[b] Variables included in F-test, but not shown in table: Baystate combined application project (CAP) status for SSI recipients; recertification type (semiannual reporting, recertification, other).
Source: DTA SNAP Caseload Data.

Participant Survey Sample

The participant survey sample included equal numbers of HIP and non-HIP respondents. The sample used for the analyses presented in this report included respondents who completed both the Round 1 and either or both of the Round 2 and Round 3 surveys. In this section, we present the (weighted) baseline characteristics (pre-HIP implementation) of the analysis sample. Data come from both the DTA caseload files and the participant survey. Some baseline characteristics are measured at the household level and others pertain to the individual survey respondent or to the head of the sampled household.

Households in the analysis sample contained two or three people, on average, and just under half were single-member households at baseline (Exhibit 2.8). There were children (and no elderly) in approximately 42 percent of households and elderly in just over 10 percent of households. Full-time employment was not common in SNAP households. Less than 20 percent of households had at least one member that was employed full-time.

Examining participation in other assistance programs, we found that about one-fifth of households received WIC in the month prior to the survey, and most households with qualifying children received free school lunch in the week prior to the survey.[35] About one-third of households received a monthly SNAP benefit between $162 and $200, and almost another third received over $350 per month.

Comparing the household characteristics of treatment (HIP) and control (non-HIP) groups in our survey sample, the average number of adults was somewhat larger in the control group. No other statistically significant differences emerged at baseline at the 5 percent level (a few differences were significant at the 10 percent level, as would be expected by chance).

Exhibit 2.8: Baseline Characteristics of Households Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

	Total	Treatment	Control		
	Proportion (N)	Proportion (N)	Proportion (N)	P-value	Sample size
DTA SNAP caseload data					1954
Household residence					
Springfield	0.53 (1030)	0.52 (505)	0.53 (525)	[0.647]	
Chicopee or Holyoke	0.25 (505)	0.27 (255)	0.25 (250)		
Hampden County balance	0.22 (419)	0.21 (220)	0.22 (199)		
Persons in household					
Mean (SE)	2.34 (0.04)	2.26 (0.05)	2.35 (0.05)	[0.208]	

35 If the interview was conducted during the summer, the respondent was asked about receipt of free school lunch in the prior school year.

	Total Proportion (N)	Treatment Proportion (N)	Control Proportion (N)	P-value	Sample size
Single-member household					
One person in household	0.45 (872)	0.45 (450)	0.45 (422)	[0.916]	
Multiple persons in household	0.55 (1082)	0.55 (530)	0.55 (552)		
Adults in household					
Mean (SE)[a]	1.50 (0.02)	1.42 (0.02)	1.51 (0.03)	[0.021]**	
Number of adults					
3 or fewer adults in household	0.97 (1918)	0.98 (965)	0.97 (953)	[0.067]*	
4 or more adults in household	0.03 (36)	0.02 (15)	0.03 (21)		
Household composition					
Elderly (with or without children) in household	0.11 (238)	0.11 (129)	0.11 (109)	[0.975]	
Children (no elderly) in household	0.42 (827)	0.43 (398)	0.42 (429)		
No elderly or children in household	0.46 (889)	0.46 (453)	0.46 (436)		
Monthly SNAP benefit					
$161 or less	0.24 (498)	0.25 (257)	0.24 (241)	[0.937]	
$162–$200	0.31 (592)	0.31 (308)	0.31 (284)		
$201–$349	0.14 (272)	0.14 (134)	0.14 (138)		
$350†	0.31 (592)	0.30 (281)	0.31 (311)		
Participant survey data (primary shopper module) [b]					
Household composition					1849
Persons in household [mean (SE)]	2.87 (0.05)	2.83 (0.05)	2.88 (0.06)	[0.490]	
Children under age 5 [mean (SE)]	0.28 (0.02)	0.32 (0.02)	0.28 (0.02)	[0.156]	
Children age 5-17 [mean (SE)]	0.83 (0.03)	0.80 (0.04)	0.84 (0.04)	[0.479]	
Adults age 18-64 [mean (SE)]	1.58 (0.03)	1.52 (0.03)	1.59 (0.03)	[0.154]	
Adults age 65 and up [mean (SE)]	0.18 (0.01)	0.18 (0.01)	0.18 (0.01)	[0.836]	
Household employment status (prior week)					1829
Any members full-time employed	0.19 (320)	0.17 (150)	0.19 (170)	[0.327]	
Any members part-time employed	0.13 (255)	0.15 (135)	0.13 (120)	[0.239]	
Any members not employed	0.67 (1262)	0.69 (646)	0.67 (616)	[0.536]	

	Total	Treatment	Control		
	Proportion (N)	Proportion (N)	Proportion (N)	P-value	Sample size
Program participation					
Received WIC (prior month)	0.19 (335)	0.20 (169)	0.18 (166)	[0.541]	1842
Used food pantry/soup kitchen (prior month)	0.11 (209)	0.10 (101)	0.12 (108)	[0.425]	1841
Received Sr. Nutrition/Meals on Wheels (prior month)[c]	0.02 (32)	0.02 (17)	0.02 (15)	[0.894]	1847
Child received free/reduced price lunch (prior week)[d]	0.87 (702)	0.90 (349)	0.86 (353)	[0.098]*	789
Participant survey data (respondent module) [b]					
Education level					1945
8th grade or less	0.14 (282)	0.15 (148)	0.14 (134)	[0.378]	
9th-12th grade (no diploma)	0.30 (583)	0.31 (296)	0.30 (287)		
High school diploma/GED	0.29 (539)	0.26 (252)	0.29 (287)		
Some college or higher	0.27 (541)	0.28 (278)	0.27 (263)		

Weighted proportions (unweighted Ns) for categorical variables; weighted means (standard errors) for continuous variables.
Chi-square test for categorical variables, t-test for continuous variables; two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported proportions may not sum to one.
[a] Top-coded at 7.
[b] Don't know," "refused," "inapplicable," and "not ascertained" responses in Participant Survey data coded as missing.
[c] All households responded to this question, including those with no qualifying seniors present.
[d] Households with qualifying child only.
Sources: DTA SNAP Caseload Data (July 2011), Participant Survey Round 1.

Among household heads in our survey sample (Exhibit 2.9), we found that almost three-quarters were female, just over 40 percent were Hispanic and almost one-quarter spoke Spanish in the home. Age varied fairly evenly from between 16 and 30 years old up to 55 years and older. Very few household heads were homeless and a majority lived in private housing. Turning to income and benefits, almost one-fifth of the household heads had no monthly income at baseline, but one-third had a monthly income of over $1,089. Most household heads were not receiving TANF, but about one-third were receiving SSI; 60 percent were receiving some other form of unearned income.[36]

Exhibit 2.9: Baseline Characteristics of Household Heads for Respondents Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

	Total	Treatment	Control	
	Proportion (N)	Proportion (N)	Proportion (N)	P-value
Gender				
Male	0.27 (503)	0.27 (257)	0.28 (246)	[0.861]
Female	0.73 (1451)	0.73 (723)	0.72 (728)	
Race/ethnicity				
Hispanic	0.43 (816)	0.42 (401)	0.43 (415)	[0.882]
Non-Hispanic white	0.37 (733)	0.38 (384)	0.37 (349)	
Non-Hispanic black	0.14 (278)	0.14 (134)	0.14 (144)	
Non-Hispanic other	0.07 (127)	0.06 (61)	0.07 (66)	
Primary language spoken in home				
Spanish language	0.22 (426)	0.22 (213)	0.22 (213)	[0.869]
Other language	0.78 (1528)	0.78 (767)	0.78 (761)	
Disability status				
Disabled	0.51 (1036)	0.51 (534)	0.51 (502)	[0.943]
Not disabled	0.49 (918)	0.49 (446)	0.49 (472)	
Citizenship				
US citizen	0.95 (1876)	0.96 (946)	0.95 (930)	[0.292]
Not a US citizen	0.05 (78)	0.04 (34)	0.05 (44)	

36 For baseline characteristics of sampled respondents and primary shoppers, see Appendix F, Exhibits F2.1–F2.3.

	Total Proportion (N)	Treatment Proportion (N)	Control Proportion (N)	P-value
Age				
16-30 years	0.23 (407)	0.22 (197)	0.23 (210)	[0.773]
31-40 years	0.23 (459)	0.24 (224)	0.22 (235)	
41-54 years	0.30 (587)	0.29 (292)	0.30 (295)	
55+ years	0.24 (501)	0.25 (267)	0.24 (234)	
Homelessness				
Homeless	0.05 (57)	0.04 (23)	0.05 (34)	[0.347]
Not homeless	0.95 (1897)	0.96 (957)	0.95 (940)	
Housing type				
Private	0.80 (1583)	0.81 (807)	0.80 (776)	[0.368]
Public	0.16 (318)	0.16 (152)	0.16 (166)	
Other	0.04 (53)	0.03 (21)	0.04 (32)	
Monthly household gross income				
$0	0.18 (345)	0.20 (180)	0.18 (165)	[0.902]
$1–$787	0.24 (474)	0.24 (242)	0.24 (232)	
$788–$1,088	0.25 (496)	0.24 (246)	0.25 (250)	
$1,089[a]	0.33 (639)	0.32 (312)	0.33 (327)	
Temporary Assistance for Needy Families (TANF)				
Receiving TANF	0.18 (347)	0.17 (164)	0.18 (183)	[0.302]
Not receiving TANF	0.82 (1607)	0.83 (816)	0.82 (791)	
Supplemental Security Income (SSI)				
Receiving SSI	0.32 (654)	0.32 (335)	0.32 (319)	[0.729]
Not receiving SSI	0.68 (1300)	0.68 (645)	0.68 (655)	
Retirement, Survivors, and Disability Insurance (RSDI)				
Receiving Social Security	0.29 (588)	0.28 (306)	0.29 (282)	[0.564]
Not receiving Social Security	0.71 (1366)	0.72 (674)	0.71 (692)	
Unemployment compensation				
Receiving unemployment compensation	0.04 (94)	0.06 (54)	0.04 (40)	[0.047]**
Not receiving unemployment compensation	0.96 (1860)	0.94 (926)	0.96 (934)	

	Total Proportion (N)	Treatment Proportion (N)	Control Proportion (N)	P-value
Other unearned income				
Receiving other unearned income	0.60 (1234)	0.63 (639)	0.60 (595)	[0.211]
No other unearned income	0.40 (720)	0.37 (341)	0.40 (379)	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported proportions may not sum to one.
Source: DTA SNAP Caseload Data, July 2011 (unweighted N=1,954).

Put together, descriptive statistics suggest that characteristics of our survey sample are largely similar to those of the universe of SNAP participants in Hampden County. Furthermore, the random assignment process appears to have been successful in selecting treatment and control groups who are not significantly different from each other.

2.11 HIP/Non-HIP Balance and Attrition Analysis

The previous section shows that the samples of HIP and non-HIP households were similar at the time of random assignment. Our design requires the HIP and non-HIP groups also to be similar at subsequent interview waves. In a standard random assignment design everyone selected would be interviewed at each wave regardless of any subsequent behavior. However, HIP only applies to those receiving SNAP, and SNAP exit is common. Approximately 15 percent of the sample had exited by the beginning of the first follow-up interview. Thus, following the standard approach would lead to expensive interviews with many people who were no longer on SNAP—and therefore no longer eligible for the HIP incentive.[37]

We conducted follow-up interviews only with those still on SNAP. This design yields valid random assignment estimates if either (1) attrition is not related to HIP status or (2) any differential attrition can be controlled for with sampling weights. Both of these assumptions seemed plausible. With respect to the first condition, since the HIP benefit is relatively small compared to the average monthly SNAP benefit it seemed unlikely to have a large impact on SNAP exit.[38] With respect to the second condition, the SNAP case files contain rich information on the households at baseline (demographics, income, benefits received) which can be used to construct sampling weights, which could plausibly control for moderate levels of differential attrition.

Some of these assumptions are testable. The assumption of differential attrition from SNAP is directly testable from the SNAP caseload data. Exhibit 2.10 reports SNAP caseloads for the HIP and non-HIP

---

37 The net result of following the standard randomization design would have been a requirement for a sample more than twice the size of the current sample to include a large enough subsample still on SNAP. That study design was not cost feasible.

38 Chapter 5 reports that on average households purchased just over $12 of HIP-eligible items each month, which earned them incentives of approximately $3.60 per month, a relatively small amount compared to an average monthly SNAP benefit of $258. In addition, the value to households of additional SNAP dollars is smaller than their cash value.

groups from the time they were selected in July 2011. Our concern is whether there was differential attrition in the two groups. In particular, if HIP households were less likely to leave SNAP, we might be concerned that the value of the incentives affected SNAP participation decisions. Exhibit 2.10 provides no evidence for such a conjecture. Retention rates for the HIP and non-HIP groups were quite similar. Over all months, the ratio of the retention rates ranged between 98.4 percent and 100.1 percent. Furthermore, if anything, exit rates were higher for the HIP group despite the benefit (though, as just noted, the differences were trivial).

We also examined retention rates separately for the survey and non-survey samples (see Appendix F, Exhibit F2.4). Again, the differences were trivial. In the survey group, across the survey months, the ratio of the retention rates varied between 97.9 percent and 100.5 percent; in the non-survey group, the ratio varied between 99.0 percent and 100.5 percent.

We conclude that there is little evidence of more than non-trivial differences in attrition rates. It follows that the design decision to only survey those who remained on SNAP is unlikely to affect the impact estimates.

Exhibit 2.10: HIP/Non-HIP Balance from the SNAP Caseload Files

	Number of households		Retention rate (%)		Ratio (%)
Month	HIP (1)	Non-HIP (2)	HIP (3)	Non-HIP (4)	HIP/Non-HIP (3): (4)
July 2011	7,383	46,871	100.0	100.0	100.0
August 2011	7,137	45,374	96.7	96.8	99.9
September 2011	6,952	44,106	94.2	94.1	100.1
October 2011	6,732	43,121	91.2	92.0	99.1
November 2011	6,603	42,321	89.4	90.3	99.1
December 2011	6,494	41,521	88.0	88.6	99.3
January 2012	6,454	41,482	87.4	88.5	98.8
February 2012	6,395	41,052	86.6	87.6	98.9
March 2012	6,287	40,547	85.2	86.5	98.4
April 2012	6,249	40,076	84.6	85.5	99.0
May 2012	6,211	39,788	84.1	84.9	99.1
June 2012	6,153	39,486	83.3	84.2	98.9
July 2012	6,112	39,123	82.8	83.5	99.2
August 2012	6,033	38,361	81.7	81.8	99.8
September 2012	5,990	38,119	81.1	81.3	99.8
October 2012	5,851	37,409	79.2	79.8	99.3

Source: DTA SNAP Caseload Data.

In addition, we tested for HIP/non-HIP balance in the baseline characteristics (July 2011) of the SNAP caseload during the month corresponding to the midpoint of Round 2 (May 2012) and the midpoint of the Round 3 survey (October 2012). The results of those tests are reported in Appendix F, Exhibits F2.5 and F2.6. There were no significant differences between the treatment and control groups on any of the variables tested, and the joint F-test further shows no evidence of difference between the two groups.[39]

In summary, this study adopted a non-standard strategy of only following households who remained on SNAP. We examined the implications of that decision by analyzing attrition from both the HIP and non-HIP groups over time and examining HIP/non-HIP balance on a number of characteristics at the sampling stage and at both 4-6 months and 9-11 months after HIP implementation. All of these tests indicated that the HIP and non-HIP groups have remained balanced over time. Thus, we conclude that it is reasonable to interpret the evaluation results as one would interpret a study that followed everyone who had been randomized.

[39] Appendix F, Exhibit F2.7 shows the balance test for HIP and non-HIP participants' characteristics in May 2012 for sampled households on SNAP that month. Exhibit F2.8 shows the balance test for HIP and non-HIP participants' characteristics in October 2012 for sampled households on SNAP that month. Results similarly suggest no overall difference between the groups.

3. HIP Implementation and Operations

Understanding how HIP was implemented and the challenges that arose is important for two reasons. First, implementation may influence the pilot's outcomes. As discussed in Chapter 1, HIP impacts depended on the project's success in recruiting and training retailers, implementing new EBT processing methods, and informing participants. During the pilot, many difficult aspects of implementation went smoothly, but some did not. Second, HIP provides valuable information for any future pilots or a broad-scale roll-out of a HIP-like program. The discussion in this chapter, which is based primarily on the in-depth stakeholder interviews, draws heavily from the Healthy Incentives Pilot (HIP) Early Implementation Report (Bartlett, Beauregard, et al., 2013), which provides additional details on all aspects of HIP implementation.

This chapter proceeds as follows. The first section provides an overview of HIP implementation, focusing on activities that were central to the development of the pilot, particularly as it affected participants. The second section examines several implementation issues or challenges that arose during the pilot that could potentially have affected participants' understanding of HIP or could have created confusion about how to earn incentives. The final section discusses how the implementation might have affected participant experiences and the pilot's impact on outcomes examined in Chapters 5-8.

3.1 Overview of Implementation and Operations

HIP was an innovative and complex project. Planning and implementation was difficult, requiring DTA to coordinate the work of several different entities to ensure the pilot was up and running in 15 months. While the implementation process posed many challenges, DTA succeeded in implementing the pilot on schedule.

Implementation of HIP required extensive preparations that began with FNS's design of the pilot concept and continued with DTA's submission of a grant application in December 2009. Pilot implementation activities accelerated in August 2010 when FNS selected Massachusetts to operate HIP. The planning and implementation phase extended until November 1, 2011 when HIP operations began and the first SNAP participants began earning incentives. The pilot was rolled out to participants in three waves, beginning November 1, 2011, December 1, 2011, and January 1, 2012.

Key planning and implementation activities included the following:

- Assembling the team, including hiring HIP-specific DTA personnel
- Designing and implementing EBT system changes
- Recruiting retailers to participate in HIP
- Establishing a HIP Steering Committee made up of community partners
- Developing training materials and notifications for HIP participants

Effectively executing and managing these activities was crucial to the pilot's success. The rest of this section discusses these key activities, describing the organizations that were involved and highlighting successes and challenges.

HIP Project Team

FNS understood from the beginning that a successful pilot project would involve multiple entities, including Massachusetts' SNAP EBT system provider, national retail chains, and local SNAP offices. Managing the number and different types of stakeholders involved in HIP was a substantial undertaking.

The following seven organizations or groups played key roles in developing and implementing HIP:

- ***USDA's Food and Nutrition Service (FNS)***, the Federal agency responsible for SNAP
- ***Massachusetts Executive Office of Health and Human Services' (EOHHS) Department of Transitional Assistance (DTA)***, the State agency responsible for SNAP and therefore HIP
- ***Xerox*** (formerly Affiliated Computer Systems), the EBT processor in Massachusetts that operated HIP as part of the EBT system
- ***Third-party processors (TPPs),*** contractors hired by retailers (with integrated electronic cash registers) to provide EBT data processing services
- ***Novo Dia Group (NDG)***, an EBT technology services and consulting company hired by DTA to coordinate system design and testing activities for retailers and TPPs
- ***Hampden County retailers***, recruited by DTA to participate in HIP, ranged from large grocery chains to small stores and farmers markets. Retailers with integrated electronic cash register (IECR) systems contracted with their technology partners to modify their store systems for HIP. (As discussed below, retailers without IECRs used manual processes; no contractor was involved.)
- ***Community partners (CPs)***, local and regional non-profit organizations or community-based organizations (CBOs), State and city agencies, medical centers, religious organizations, libraries, and higher education institutions that assisted with implementation

DTA had ultimate responsibility for managing the implementation and operation of HIP. To meet its HIP responsibilities, DTA hired seven full-time staff members, including a director, assistant director, retailer liaison, two trainers, and two information coordinators. An additional six existing DTA staff worked part-time on HIP.[40]

HIP Systems Design and Modifications

In order for HIP to operate, Massachusetts DTA and its contractors needed to adapt state-level information and financial systems to accommodate HIP-specific tasks that went beyond standard operating procedures for SNAP. Software was developed, pre-tested, and rolled out on a tightly coordinated schedule. EBT system modifications were necessary to identify when an incentive was earned, calculate the incentive amount to credit HIP clients, and draw down HIP funds from the Federal Reserve Bank to pay retailers for food purchases.

---

[40] By design, the three local offices (two in Springfield and one in Holyoke) had only a minimal role in the HIP implementation. Consistent with that design, local DTA office directors reported that HIP had little or no impact on their staff's workload. Clerks and caseworkers were trained to answer basic HIP questions and to refer all other questions to the HIP 800 call line.

FNS began the system design process in October 2008 (prior to conducting the HIP grant application process) and prepared high-level HIP design requirements. More detailed development began after FNS awarded the HIP demonstration grant to Massachusetts in August 2010. As Massachusetts' EBT processor, Xerox had primary responsibility for managing the HIP EBT system design changes and processing HIP transactions. Xerox reviewed and discussed the HIP implementation requirements with the DTA HIP team at an initial start-up meeting in September 2010. In December 2010, Xerox led the Joint Application Design (JAD) sessions, which included DTA, FNS, Novo Dia Group, and the Abt evaluation team. These sessions identified the detailed requirements and rules for HIP, and the necessary modifications to the different systems. Based on the requirements, Xerox and DTA produced the design documents to guide these modifications and the changes to be made by retailers and TPPs.

HIP implementation required each of the major partners in EBT operations to make substantial system modifications. The following modifications were made during the spring and summer of 2011:

- DTA modified its client eligibility system, BEACON, to support the random assignment of HIP participants, their identification in the system, the transmission of participant status to the EBT system, and the generation of notices to HIP households.
- Xerox modified its EBT processing system, the Electronic Payment Processing Information Control (EPPIC), as well as its system for automated and staffed customer service, and the software for EBT-only point-of-sale (POS) terminals used by smaller independent retailers.
- Retailers used specifications provided by Xerox to modify their integrated electronic cash register (IECR) systems to comply with HIP transaction processing requirements. The three TPPs used by Hampden County retailers modified their systems to pass HIP messages between the retailer IECR system and the EBT processing system.

As modifications were completed for each system affected by HIP, team members and technical staff conducted comprehensive testing. The key tests were the user acceptance test (UAT) for the changes to EPPIC and the retailer acceptance tests, which involved both retailer and TPP systems. With the exception of one convenience store chain, the TPPs and IECR retailers were ready for the November 1, 2011 HIP "go live" date.

Retailer Recruitment

DTA recognized early that retailer participation would be critical to the success of the pilot. If HIP was to have any influence over food intake, SNAP participants had to be able to locate and access participating authorized retailers.

One of the pilot's goals was to test this point-of-sale incentives approach in each of the environments in which SNAP operated. Therefore, all 474 SNAP-authorized retailers selling HIP targeted fruits and vegetables were eligible and invited to participate in HIP (see Exhibit 3.1).

Exhibit 3.1: Hampden County Retailers Eligible for HIP and Participating in HIP

Store type (% of total Hampden County SNAP redemptions) [a]	Number eligible for HIP (% eligible for HIP)	Retailers participating as of November 1, 2011			Retailers participating as of October 1, 2012		
		Number (%)	Percent of eligible retailers	Percent of total SNAP redemptions	Number (%)	Percent of eligible retailers	Percent of total SNAP redemptions
Supermarkets (23%)	16 (3.4)	10 (14.1)	62.5	57.5	12 (11.5)	75.0	70.9
Superstores (56%)	29 (6.1)	8 (11.3)	27.6	55.6	8 (7.7)	27.6	65.9
Grocery stores and food specialty stores[b] (12%)	93 (19.6)	19 (26.8)	20.4	29.0	28 (26.9)	30.1	33.0
Convenience stores[c] (9%)	318 (67.1)	34 (47.9)	10.7	5.9	40 (38.5)	12.6	15.3
Farmers markets[d] (<1%)	18 (3.8)	N/A	N/A	N/A	16 (15.4)	88.9	100.0
Total	474 (100.0)	71 (100.0)	15.0	48.7	104 (100.0)	21.9	59.3

[a] July 2011.
[b] Includes small, medium, and large grocery; fruit/vegetable specialty; meat specialty; seafood specialty.
[c] Includes convenience store and combination grocery/other.
[d] Includes farmers markets and direct marketing farmers that began operating in summer 2012.
Source: Retailer list received from DTA. Exhibit includes only stores located in Hampden County. Several chain retailers implemented HIP in stores located outside Hampden County, notably in neighboring counties in Massachusetts and Connecticut (12 stores as of November 2011; 26 stores as of October 2012).

The types of retailers that were eligible to participate are listed below:

- Supermarket and superstore chain retailers—large retailers that serve the highest percentage of SNAP households and account for a substantial majority of SNAP redemptions
- Grocery stores and specialty stores—local stores that have a smaller market share, but may provide ethnically diverse foods and serve households without easy access to large supermarkets
- Convenience stores and combination grocery/other stores[41]—used frequently by SNAP households for small purchases of both food and non-food items. Although many of them do not carry a wide selection of fruits and vegetables, those that carried HIP-eligible fruits and vegetables were eligible to participate in HIP
- Farmers markets—provide locally-grown fresh fruits and vegetables in season, typically operating between May and November

DTA began to identify and recruit a targeted group of retailers while preparing its application. Once Massachusetts was selected to operate HIP, the agency used direct outreach to retailers and indirect outreach through other State agencies and food retailer coalitions. Community partners also played a substantial role in recruiting both large and small retailers.

Large retail chains and smaller independent stores required different recruitment strategies, primarily because the approach and access to the individuals who could make the decision about participating in HIP differed. DTA worked directly with chain retailers that initially expressed interest in HIP, helping them to make the necessary system modifications. DTA also continued efforts to recruit other chain retailers, working through corporate headquarters.

As the pilot moved forward, DTA sent letters to all SNAP-authorized retailers who had not yet been recruited asking them to participate in HIP. The letters invited the retailers to information sessions about HIP. The response from smaller independent retailers to this outreach was low and DTA shifted to a strategy that relied on in-person contact. To implement that revised strategy, DTA hired a retailer liaison to both recruit and train retailers. After this hire, the main recruitment method for independent retailers became in-person store visits. Store visits (generally made without an appointment) focused on explaining HIP and what was required of participating retailers. The retailer liaison provided handouts summarizing the basics of HIP and discussed HIP participation with store owners. Retailers' questions and concerns generally focused on the impact the pilot might have on store operations. The retailer liaison reported that it required approximately five visits for a retailer to commit to HIP, significantly more effort than originally anticipated. The recruitment process involved developing relationships with store owners, which required time and multiple visits.

As of November 1, 2011, when implementation began, 71 stores were participating in HIP. Exhibit 3.1 shows the distribution of HIP-eligible retailers and HIP participating retailers in Hampden County by store type. While overall only 15 percent of eligible retailers were participating in HIP, 63 percent of supermarkets and 28 percent of superstores were participating. These two types of stores accounted for the vast majority (79 percent) of Hampden County SNAP redemptions.

---

41 Combination grocery/other stores stock grocery items as well as other items pertinent to their business. These stores include, for example, gas stations with mini-marts and pharmacies that carry grocery items.

Convenience stores, while numerous, tend to carry very few eligible items and accounted for only 9 percent of SNAP redemptions in the county. An additional 20 percent of eligible retailers were grocery stores and specialty stores; approximately 20 percent of them were participating in HIP. In Hampden County, 12 percent of SNAP redemptions occurred in these types of stores.

DTA continued recruiting efforts after HIP implementation and, as a result, an additional 8 stores began accepting HIP as of February 1, 2012. Additionally, 16 farmers markets/farm stands/mobile markets joined HIP in spring and summer 2012, and 9 new stores began participating in HIP on October 1, 2012.[42] Finally, several chain retailers implemented HIP in a total of 26 stores located outside of Hampden County, in neighboring Massachusetts and Connecticut counties. However, no new superstores joined HIP despite these intensive efforts.

As of the beginning of October 2012 less than 22 percent of eligible stores were participating in HIP, but administrative data showed that SNAP redemptions in these stores represented 59 percent of total Hampden County SNAP redemptions. These percentages indicate that while the overall number of stores participating in HIP was relatively low, the stores that did participate were used by SNAP households for a majority of their SNAP purchases. This shows that households' access to HIP participating stores was greater than is suggested by simply looking at the number of HIP participating stores. However, the relatively lower participation of superstores likely limited opportunities for HIP households to earn incentives when using SNAP benefits.

HIP Steering Committee

Hampden County has a strong network of community organizations, including non-profit community-based organizations (CBOs), health centers, libraries, religious organizations, and educational institutions, as well as State and local agencies. These community partners proved to be an integral factor in the implementation of HIP and an important component of the smooth rollout of the pilot. Approximately 75 community partner organizations contributed services in support of HIP.

DTA established a HIP Steering Committee (HSC) during the application process to discuss policy, hold DTA accountable to the community, and help identify areas where community partners could contribute. The Steering Committee was made up of a diverse and committed group of individuals and organizations that actively supported HIP implementation. It included about a dozen CBOs, plus representatives from WIC, the DTA Central Office, the three local DTA offices, and the DTA Regional Director for western Massachusetts.

The community partners, in general, and the HIP Steering Committee, in particular, were active in the following ways:

- Helping to recruit retailers, both large retailers with IECRs and small local stores without IECRs
- Reviewing and providing feedback on outreach and training materials
- Providing translation and interpretation support (Russian and Vietnamese) for participant training sessions

---

42 One of the 9 stores changed ownership in November 2012. The new owner agreed to continue participating in HIP.

- Providing facilities for HSC meetings and for participant, retailer, and community partner training sessions
- Serving as an information and referral resource to HIP clients and other community organizations

Notification and Training of HIP Participants

For HIP to influence food purchases and diet quality, DTA recognized that HIP participants had to understand the purpose of the pilot, be able to locate retailers, and identify and purchase targeted HIP fruits and vegetables.

DTA and its partners put considerable effort into the notification and training of HIP participants. Activities included the development of user-friendly materials as well as a schedule and process to disseminate those materials in a series of mailings so as not to overwhelm participants. HIP retailers received decals with the HIP logo to install on their store doors to identify them as participating in HIP. DTA scheduled over 140 training sessions and provided other resources such as a toll-free call line to help participants understand HIP. Each activity is described below.

Mailings

Prior to each wave's HIP start date, DTA sent three mailings to participants.[43] Each mailing contained a notification letter and a subset of training materials.

- The *first notification letter,* sent about three weeks prior to each wave's HIP start date, informed participants that they had been selected to participate in HIP and relayed information about the purpose of HIP, the selection process, the option of declining to participate, and the start date. An initial calendar of training sessions was included with the letter.
- The *second notification letter,* sent about two days after the first, explained the incentive. A more extensive subset of training materials was included with this letter: a HIP brochure, guidelines for HIP-eligible fruits and vegetables, a list of participating retailers, and a list of frequently asked questions.
- The *third notification letter,* sent several days prior to the HIP start date, explained that when shopping at retailers where they had to separate their SNAP items from other purchases, participants would need to identify themselves as HIP participants in order to earn the incentive. A HIP EBT card sleeve (shown in Exhibit 3.2), which contained information on eligible foods and could be used as proof of HIP participation, was included with this letter.

To distinguish the HIP mailings from regular SNAP mailings, materials included the HIP logo, which shows pictures of fruits and vegetables and uses the tag line "It's HIP to be healthy." Materials were translated into Spanish, Russian, and Vietnamese. The mailings also included a "Babel Card," a note alerting participants in 21 languages that the materials in the envelope were important and related to

---

43 Mailings were sent to HIP households that were active SNAP participant households at the time of the scheduled mailing. HIP households that were inactive at the time of the scheduled mailing and who later became active SNAP households received the mailing when they again became SNAP participants.

benefits. The card encouraged them to bring the materials to a bilingual friend or relative to be translated.

Exhibit 3.2: HIP Card Sleeve

During the pilot, DTA prepared four additional mailings, designed to keep participants updated on pilot activities. They also prepared a final mailing to remind participants that their opportunity to earn the incentive would be ending. Some mailings were designed to improve participant understanding of the program and to promote HIP. All notifications were translated into Spanish, Russian and Vietnamese.

- In early February 2012, HIP participants received an updated list of retailers that included those that had joined HIP as of February 1.
- A mailing was sent in June that contained the following:
  - a colorful brochure describing HIP and its benefits in simple terms (Exhibit 3.3). This brochure was specifically designed to be "user-friendly" in an effort to improve participant awareness and understanding of HIP
  - an updated list of retailers, including participating chain retail stores outside of Hampden County
  - a list of participating farmers markets
- A mailing, customized for each HIP participant, was sent in mid-August. It was designed to boost HIP participation by informing participants of the amount of the incentives that they had earned through late July and providing an estimate of how much they could earn in the coming month. It also included three recipe cards and information on some of the more visible community partners.
- The mailing sent at the end of September included an updated retailer list and an updated farmers market list with confirmed closing dates. For Wave 1 HIP participants, it also served

as their final mailing, reminding them that their ability to earn the HIP incentive was ending at the end of October.

- A final mailing was sent to Wave 2 and 3 participants, reminding them that their opportunity to earn incentives would be ending at the end of November and December, respectively.

Exhibit 3.3: Brochure from Second Interim Mailing (2 of 6 Panels)

Training Sessions

DTA offered over 140 voluntary training sessions for HIP participants beginning shortly before the system went live (October 2011) until about four months afterward (February 2012). These sessions were intended to help participants understand HIP and how it could benefit their households. The main goals of the trainings were to explain how the financial incentive worked and which foods were eligible for the HIP incentive. Despite the significant efforts that went into developing HIP training, approximately 100 participants attended training sessions, representing less than 1.3 percent of all eligible HIP participants. DTA had hoped to provide meals, childcare, or transportation to help encourage attendance at trainings, but FNS policies did not permit the provision of these services with Federal grant funding. Many at DTA were not surprised by the low turnout, having had similar experiences with the rollout of other program changes. Most trainings were held during the work day, which likely limited the ability of some participants to attend. However, the trainings were well received by those who attended.

Other Resources

DTA developed a number of resources to support HIP participants including a dedicated HIP 800 call line, email address, and website. The HIP call line was the most used resource. Approximately 800 calls were received over the life of the pilot from the 7,500 HIP participant households. The greatest proportion of questions related to how the HIP incentive operated. Calls increased in June after the second interim mailing; almost a quarter of calls were received from August to October 2012, around the time of the third and fourth interim mailings. In addition, community partner organizations served as an informational and referral resource for HIP clients, providing translation and interpretation support, as needed.

3.2 Challenges Potentially Affecting Participant Outcomes

This section describes challenges to implementation that occurred during the operation of the pilot, beginning November 1, 2011, and ending December 31, 2012. Some of these challenges were technical, resulting from the EBT and retailer systems-related changes that were made to implement HIP. Others arose while recruiting retailers and educating SNAP participants selected to participate in HIP. In this section, we focus on the challenges that could have affected HIP participants' understanding of the program and their ability to earn incentives, thereby potentially affecting the impact of HIP on desired participant outcomes.

Technical Systems Issues

The first technical issue arose at the beginning of December 2011 just as the second wave of HIP participants began earning incentives. A third-party processor (TPP) used by two of the four chain retailers operational at the time inadvertently removed the HIP transaction processing code when making an unrelated software change. As a result, HIP participants did not earn incentives for about 45 days during the period from December 2011 to January 2012. This issue affected retailers with 11 participating stores, four in Hampden County and seven outside of it. The TPP corrected the problem within a month of its detection, and HIP functionality was restored by mid-January. DTA subsequently credited the HIP incentives earned by the 1,140 households affected by the outage.

The second technical challenge arose early in 2012 and involved two chain retailers' failure to maintain accurate and updated computerized lists of HIP-eligible items. An ongoing task for IECR-equipped retailers was to update their databases to maintain complete lists of HIP-eligible items. When new HIP-eligible food items were added to the retailers' inventory, they had to be flagged in the database for the IECR system. HIP participants reported that they were not earning incentives when purchasing certain targeted fruits and vegetables. The issue was remedied fairly quickly; the last reported problem occurred in mid-February. DTA and Novo Dia Group worked with retailers during the remainder of the pilot to ensure that their product databases were routinely updated as new food items were added.

A third technical issue arose when a chain retailer installed a new software release and inadvertently erased the HIP eligible product list. This occurred in early August 2012 and was not corrected until mid-October. While about 450 SNAP clients shopped in the stores during the outage, it is likely that only a few HIP participants were affected since this retailer carried a very limited number of HIP-eligible products.

A fourth technical issue was discovered at the end of September 2012 as HIP was being implemented in the four IECR-equipped retailers that joined HIP on October 1, 2012. All of the new IECR retailers used the same TPP, one that was also being used by two of the existing HIP chain retailers. It was the same TPP that had been involved in the December 2011 issue. This time, the HIP month-to-date (MTD) total did not appear on HIP clients' receipts. However, this issue involved only the receipts and did not affect the actual HIP incentives earned. The receipts were accurate at the start of the pilot, but since no HIP participants called the toll-free line to report the incorrect receipts, it is not known exactly when the problem emerged. The problem was not corrected by the end of the pilot.

Retailer Participation

DTA recognized the importance of ensuring that HIP participants had easy and adequate access to retail stores in which they could earn incentives. DTA staff therefore spent considerable effort recruiting retailers, both chain stores and independent stores. As is true across the country, most SNAP benefits in Hampden County are redeemed in supermarket/superstore chain stores and DTA was able to recruit all but one of the major chains in Hampden County. However, the chain that declined to participate has a significant presence in Hampden County. DTA, with support from FNS and several community partners, made substantial efforts to recruit this retailer. In the end, the retailer and its TPP determined that they were unable to commit the resources necessary to meet pilot deadlines. Thus, participants' access to supermarkets/superstores was somewhat limited.

Participant Understanding of HIP

As was discussed in the previous section, DTA put considerable effort into developing participant notification and training materials, working to design brochures and other information that were easy to understand and that fit within the evaluation design parameters. Because HIP was designed to test the effect of a financial incentive, materials needed to inform participants about the program but did not include nutrition education information. In addition, it was not possible to use explicit signage about HIP (e.g., signs on buses) that would be visible and possibly confusing to control group members.

In an effort to improve participants' understanding of which fruits and vegetables were HIP-eligible and to improve participation, DTA worked with retailer partners to develop signage that was installed in HIP retailers during August 2012 (10 months into the pilot). The signage was designed to highlight targeted fruits and vegetables. In developing the signage, DTA took care to strike a balance between signage that would be meaningful to HIP participants, while not confusing or contaminating the control group. Signage included shelf strips, produce stickers, freezer decals, and standees (stand-alone posters). Exhibit 3.4 shows examples of the signage. All of the participating chain retailers (except the convenience store chain) and most of the smaller retailers used some type of signage.

Exhibit 3.4: Sample Retailer Signage

3.3 Discussion

FNS and DTA recognized that recruiting retailers to participate in HIP was crucial to the success of the pilot. While DTA was successful in recruiting a range of stores to participate, not all households had similar access to stores that sold substantial quantities of fruits and vegetables, particularly supermarkets, superstores, and grocery stores. In particular, one chain supermarket/superstore with many stores in Hampden County did not participate despite substantial recruiting efforts. Additionally, several supermarkets and grocery stores did not begin participating until late in the pilot. This suggests that pilot impacts could be affected by retailer participation levels.

DTA expended considerable resources developing training materials, providing training sessions, and mailing participant notifications. Those efforts appeared to have had mixed success. As noted above, few HIP participants availed themselves of training sessions. Many at DTA were not surprised by the low turnout, having had similar experiences with the rollout of other program changes. Few training sessions were offered in the evening or on weekends. Some stakeholders interviewed suggested that more participants might have attended if some trainings were held after work and school hours.

In retrospect, some DTA staff interviewed suggested that simpler notification materials might have been more effective and that alternate means of communicating with participants, such as through social media, should be considered. Focus groups also revealed some literacy issues among HIP participants, suggesting that more visual media may also be useful in increasing understanding and awareness of HIP.

DTA also recognized that the participant notifications needed to be more “user-friendly.” Starting with the second interim mailing, DTA put considerable effort into ensuring that the materials were simple, colorful and easy to read. They were specifically designed to improve participants’ awareness and understanding of HIP. Calls to the HIP call line increased in response to these mailing as some participants wanted to clearly understand how the HIP incentive operated.

Finally, the technical systems issues that occurred during the pilot may have led to confusion and misunderstanding about what stores were participating in HIP and what items earned incentives. They also may have affected the ability of participants to keep track of their HIP incentive earnings which might have led participants not to fully understand the value of the incentives.

We return to participant understanding of HIP later in this report. Specifically, Chapter 5 uses the survey data to provide a more comprehensive picture of HIP participants’ understanding of the pilot and the analysis of HIP incentive earnings is discussed in Chapter 6. To maximize incentive earning, participants had to make sure they purchased targeted fruits and vegetables with their SNAP benefits, that they shopped in stores participating in HIP, and that they identified themselves as HIP participants when shopping at stores without integrated electronic cash registers so that their HIP-eligible purchases could be totaled separately. It seems likely that incomplete understanding of HIP limited the impact of the pilot—better understanding might have increased purchases, incentives earned, and possibly the estimated impact of the program on targeted fruit and vegetable intake. These issues are discussed in later chapters.

4. Retailer Experiences

Because HIP can only operate with the cooperation of retailers, HIP's effects on retailers' business is critical to the long-run feasibility of the program. Implementing HIP required retailers to modify systems or establish check-out procedures to process HIP transactions. While costs to modify IECR systems were covered by the HIP grant, retailers expended time to learn about HIP and to train cashiers and other personnel. In addition, HIP could have affected store operations, including check-out and reconciliation procedures. HIP also had some potential to increase store sales of fruits and vegetables and SNAP redemptions in general.

The analysis in this chapter shows that HIP had very little effect on retailers. Few retailers experienced problems relating to HIP implementation and the pilot had little effect on store operations. HIP generated a modest increase in total SNAP spending, principally in supermarkets and superstores. Stores that participated in HIP captured most of the additional spending, while HIP slightly reduced spending in non-participating stores.

This chapter describes the experiences of retailers who participated in HIP, using data from two rounds of the retailer survey. A total of 83 retailer stores participated in HIP as of November 1, 2011 and 130 stores participated as of October 1, 2012 (see Exhibit 3.1). The first survey (early implementation retailer survey) was conducted in the early period of HIP implementation, from October to December 2011, and the second (late implementation retailer survey) occurred near the end of the pilot, from November 2012 to January 2013. Thirty-nine retailers participated in the early implementation survey and 49 participated in the late implementation survey.[44] Our results are primarily descriptive and weighted to represent the population of participating retailers in Hampden County by store type. Given that we surveyed participating retailers only, we cannot make any causal claims about the impacts of HIP on retailers. Results are presented overall and by store type.[45] When examining changes, we tested for significant differences between the early and late implementation surveys using t-tests for continuous variables and chi-square tests for categorical variables.[46] Survey findings were supplemented with findings from observations. Observations were conducted at 10 retailers each during early and late HIP implementation.[47]

---

44 Somewhat different survey procedures were used for independent stores and chain stores. Some questions that were not relevant to chain stores were only asked of independent stores. Information that was presumed to be the same across all retailers of the same chain was asked of the corporate office and not the individual retailers.

45 We collapsed the 12 FNS official stores types eligible for HIP into four categories: supermarkets/superstores; grocery stores (small, medium, and large grocery stores and fruit/vegetables, seafood, and meat specialty stores); convenience stores (convenience store and combination grocery/other); and farmers markets (including direct marketing farmers). Farmers markets were not operating during the periods the retailer survey was conducted and thus are not included in the survey samples.

46 Only 26 retailers completed both surveys, thus unpaired tests were conducted to take advantage of the full sample of retailers when making comparisons between rounds. Significant changes are mentioned in the text and tables are shown in Appendix F.

47 Observations were also conducted at seven of these retailers at the midpoint between early and late HIP implementation.

The first section of this chapter examines the food retail environment and any changes that occurred during the course of the pilot. The second section presents results related to retailer satisfaction with HIP and the third section uses EBT data to examine the effect of HIP on overall retailer redemptions.

4.1 Changes in Food Retail Environment

This section examines changes in the food retail environment of participating retailers, including the promotion of fruits and vegetables, self-reported "effects" of HIP on check-out time, sales, profit, product stocking, and changes in fruit and vegetable availability and prices.

Activities to Promote and Sell Fruits and Vegetables

To assess the types of fruit and vegetable promotion used by retailers and any changes in promotion activities, we asked retailers whether and how they promoted fruits and vegetables at both survey rounds. Exhibit 4.1 shows promotion activities overall and by store type as reported in the late implementation survey.[48] Findings differed by store type, with supermarkets/superstores reporting more frequent and more varied promotion activities than the other two store types.

Supermarkets/Superstores reported using a variety of activities to promote fruits and vegetables. Most stores (50-70 percent) reported using most of the different methods, from posters and signs to recipes and fliers, advertisements, and price or volume discounts, at least once a month at late implementation. Just under half of the supermarkets/superstores reported using coupons. There is no suggestion that supermarkets/superstores' use of these types of promotion changed over the course of the pilot. This is not surprising given that the scale of the HIP intervention was modest relative to their overall operations.

Fruit and vegetable promotion activities were less widely used in ***grocery stores***. However, 30-40 percent of grocery stores reported using signs inside the store and shelf tags to promote fruits and vegetables at late implementation. These are the types of signage developed by DTA for use by HIP participating retailers. The survey showed some evidence that these activities changed over the course of the pilot. Most grocery stores did not use the remaining promotion activities other than price or volume promotions for fruits and vegetables.

Fruit and vegetable promotion activities were also not very common among ***convenience stores***. This is not surprising given that most of these stores carry only limited offerings of fruits and vegetables. Similar to the findings about promotion activities in grocery stores, 45-50 percent of convenience stores reported using posters, signs, and shelf tags at late implementation. There is some suggestion that convenience stores changed the frequency with which they engaged in these promotion activities, with some increases over the pilot period. A minority of convenience stores engaged in some price or volume promotions and almost none used any other types of promotions.

---

[48] Appendix F, Exhibit F4.1 presents results for both the early and late implementation retailer surveys and shows changes between the two survey rounds. In this section, we only discuss changes between the two rounds that were statistically significant.

Exhibit 4.1: Retailer Promotion of Fruits and Vegetables, Overall and by Store Type: Retailer Survey, Late HIP Implementation Period

Activities used to promote fruits and vegetables once a month or more	Overall (%)	Supermarket /Superstore (%)	Grocery (%)	Convenience (%)
Posters or signs inside the store	54.4	72.0	30.0	51.2
Shelf tags	53.1	72.0	37.5	45.0
Posters or signs in store window or outside	45.1	57.6	12.5	46.0
Fliers/ads in newspaper or direct mail	25.5	69.7	0.0	0.0
Price or volume promotions	24.4	53.8	0.0	9.9
Food samples	21.3	62.2	0.0	0.0
Recipes or fliers in store	19.3	56.3	0.0	0.0
Coupons	17.7	43.7	0.0	4.3
Unweighted number of stores[a]	*49*	*14*	*12*	*23*

Weighted percents.
[a] N varies by question due to item non-response.
Source: Late Implementation Retailer Survey.

Observation data collected in 10 stores during December 2012 were consistent with survey data presented in Exhibit 4.1 and revealed that about half or more of the observed retailers had shelf tags or signs promoting fresh fruits and vegetables. Signage for canned and frozen fruits and vegetables was less common, but by late HIP implementation, 5 of the 10 observed stores had shelf tags promoting canned fruits and vegetables and 4 had small signs promoting frozen fruits and vegetables. While farmers markets were closed by the time the late implementation retailer survey was conducted, we conducted observations in three farmers markets during the summer. Across the three markets, about half of all vendors displayed HIP signs.

In addition to the activities to promote fruits and vegetables described in Exhibit 4.1, retailers were also asked about any activities they had engaged in to sell more fruits and vegetables (Exhibit 4.2). Findings differed by store type. Supermarkets/superstores largely did not engage in activities to increase their sales of fruits and vegetables (or the survey respondents did not know about these activities). In contrast, more than half of the grocery stores received more shipments from a supplier, increased the frequency of restocking the display floor,[49] increased shelf space, and changed where food items were located in the store in order to sell more fruits and vegetables. Although just over one-quarter of convenience stores increased the frequency of restocking the display floor, increased shelf space, and changed where food items were located, most did not engage in activities to increase their sales of fruits and vegetables (or respondents did not know about these activities).

49 The question did not specify restocking of HIP-eligible items. Respondents reported efforts to increase sales of fruits and vegetables generally.

Exhibit 4.2: Retailer Activities to Sell More Fruits and Vegetables, Overall and by Store Type: Retailer Survey, Late HIP Implementation Period

Have you done any of the following since November 2011 so that you can sell more fruits and vegetables?	Overall (%)	Supermarket/ Superstore (%)	Grocery (%)	Convenience (%)
Increased frequency of restocking display floor				
Yes	31.6	15.0	58.3	27.2
No	33.7	68.7	41.7	17.0
Don't know	34.7	16.3	0.0	55.9
Changed where food items are located in store or on shelves				
Yes	30.7	7.5	66.7	25.4
No	31.5	46.3	33.3	25.4
Don't know	37.8	46.3	0.0	49.1
Increased shelf space				
Yes	30.3	0.0	63.6	29.6
No	36.9	83.7	36.4	19.7
Don't know	32.8	16.3	0.0	50.7
Received more shipments from a supplier				
Yes	19.6	0.0	54.5	14.1
No	35.6	53.7	36.4	28.1
Don't know	44.7	46.3	9.1	57.8
Installed new refrigeration or freezer units for storage or display				
Yes	15.4	0.0	36.4	13.6
No	51.1	83.7	63.6	34.0
Don't know	33.5	16.3	0.0	52.5
Started working with a new supplier				
Yes	10.0	0.0	40.0	3.5
No	53.2	83.7	60.0	38.7
Don't know	36.8	16.3	0.0	57.8
Unweighted number of stores [a]	*49*	*14*	*12*	*23*

Weighted percents.
[a] N varies by question due to item non-response.
Source: Late Implementation Retailer Survey.

Self-Reported "Effects" of HIP on Check-Out Time, Sales, and Profits

Next, we assessed the perceived impact of HIP on check-out time, sales, and profits. We expected minimal change among supermarkets/superstores, since processes were automated with IECRs and sales of fruits and vegetables are common. However, most grocery stores and convenience stores were smaller, did not have IECRs, and were more limited in their sales of fruits and vegetables. Thus potential effects of HIP on check-out time, sales, and profits were more plausible in these types of stores.

Exhibit 4.3 shows participating retailers' assessment of the effects of HIP on their time and effort associated with HIP. The majority of respondents in all retailer types reported that HIP resulted in no change in any of these elements of operational cost. (While one-third of supermarkets/superstores indicated a large increase in reconciliation time and effort due to HIP, this represents just one retailer that joined HIP in October 2012.)

Exhibit 4.3: Self-Reported Effects of HIP on Time and Effort, Overall and by Store Type: Retailer Survey, Late HIP Implementation Period

	Overall (%)	Supermarket/ Superstore (%)	Grocery (%)	Convenience (%)
HIP's effect on average check-out time				
Increase	8.9	0.0	16.7	5.9
Decrease	0.0	0.0	0.0	0.0
No change	91.1	100.0	83.3	94.1
HIP's effect on settlement time and effort				
Increase	11.5	18.7	16.7	5.9
Decrease	0.0	0.0	0.0	0.0
No change	88.5	81.3	83.3	94.1
HIP's effect on reconciliation time and effort				
Increase	9.0	31.6	8.3	5.9
Decrease	0.0	0.0	0.0	0.0
No change	91.0	68.4	91.7	94.1
HIP's effect on return time and effort				
Increase	8.9	0.0	8.3	11.8
Decrease	0.0	0.0	0.0	0.0
No change	91.1	100.0	91.7	88.2
Unweighted number of stores [a]	*32*	*3*	*12*	*17*

Weighted percents.
[a] N varies by question due to item non-response.
Source: Late Implementation Retailer Survey (Independent stores only).

Exhibit 4.4 shows retailers' self-reports of how HIP affected their sales of fruits and vegetables and their store profits. Overall, almost half of all participating stores reported increased sales of fruits and vegetables. All supermarkets/superstores and 67 percent of grocery stores reported increased sales. In contrast, few convenience stores reported any change in their fruit and vegetable sales, which is not surprising given the limited number of such items they stocked.

Most retailers reported that HIP did not affect their stores' profits (or they did not know). This result is to be expected since only a small proportion of Hampden County SNAP households participated in HIP. However, just over 40 percent of grocery stores (five stores), reported increased profits as a result of HIP. It is difficult to know what to make of this finding since EBT data (presented in Section 4.3) show small effects of HIP on retailer redemptions. Recall, however, that a substantial proportion of grocery stores reported activities to increase the sale of fruits and vegetables. Perhaps this resulted in increased profits for some grocery stores. Alternatively, it may be coincidental that these retailers experienced increased profits during the pilot.

Exhibit 4.4: Self-Reported Effects of HIP on Sales and Profits, Overall and by Store Type: Retailer Survey, Late HIP Implementation Period

	Overall (%)	Supermarket/ Superstore (%)	Grocery (%)	Convenience (%)
How has HIP affected your store's sales of fruits and vegetables				
Large increase in sales	7.8	0.0	16.7	6.4
Small increase in sales	36.8	100.0	50.0	15.9
No change	53.5	0.0	25.0	77.7
Small decrease in sales	1.9	0.0	8.3	0.0
Large decrease in sales	0.0	0.0	0.0	0.0
How has HIP affected your store's profits				
HIP increased profits	15.8	0.0	41.7	9.5
No difference	74.9	62.0	50.0	87.3
HIP decreased profits	0.0	0.0	0.0	0.0
Don't know	9.3	38.0	8.3	3.2
Unweighted number of stores [a]	*49*	*14*	*12*	*23*

Weighted percents.
[a] N varies by question due to item non-response.
Source: Late Implementation Retailer Survey.

Overall, it is encouraging to see that most retailers reported no increase in time and effort associated with HIP. Supermarkets/superstores and convenience stores reported relatively stable sales. However, grocery stores appeared to have increased their activities to sell more fruits and vegetables, and in turn reported selling more fruits and vegetables.

Changes in Fruit and Vegetable Stocking, Availability, and Prices

To address the research question of whether HIP resulted in changes in fruit and vegetable stocking, availability, and prices, retailers were asked about their stocking of fruits and vegetables late in the HIP implementation period compared to before HIP. They also completed a fruit and vegetable inventory based on a pre-defined list of selected fresh, canned, and frozen fruits and vegetables in which they indicated what was available in their store and the corresponding prices.[50] As with the increased availability of healthy foods that accompanied the revised WIC food packages (Andreyeva, Long, and Brownell et al., 2012), it was plausible that we might see an increase in retailers' availability of fruits and vegetables with the implementation of HIP. We did not expect to see price impacts on supermarkets/superstores where prices are driven by the broad market. Grocery and convenience stores, which tended to be smaller retailers, however, might have increased prices in response to the incentive, or decreased prices if there was an increased demand allowing them to purchase larger quantities at better prices.

[50] In order to calculate a price per pound for each fruit and vegetable, so that data were comparable across retailers, it was necessary to estimate the weight of different units of fruits and vegetables. Missing and illogical units were coded as the modal unit if the price that corresponded to the missing unit was in the range of prices covered by the modal unit.

In general, the majority of respondents in all retailer types reported that they stocked the same amount of fruits and vegetables since the start of HIP in November 2011 (Exhibit 4.5).[51] However, grocery stores often reported that they stocked more fruits and vegetables since the start of HIP; 60-70 percent of grocery stores reported stocking more canned fruits and fresh vegetables, and just under half reported stocking more fresh fruits and canned vegetables (Exhibit 4.5). Earlier in the HIP implementation process, observations revealed one grocery store and three convenience stores that had poor stocking of displays of fresh, canned, dried, or frozen fruits and vegetables, but during the later HIP implementation period, these stores were all observed to have adequate stocking of displays. Grocery stores that stocked more fruits and vegetables said they did so for a variety of reasons—most commonly because the store had more customers and they wanted to promote fruits and vegetables (Exhibit 4.6).

The fruit and vegetable inventory revealed, not surprisingly, that almost all supermarkets/superstores carried a wide variety of fresh, canned, and frozen fruits and vegetables.[52] Grocery store inventories were less extensive, though most of the fresh and canned fruits and vegetables in the inventory were carried by over half of the grocery stores. Frozen fruits and vegetables were much less common, however; one-third or fewer grocery stores carried each of the frozen fruits and vegetables on the inventory. Also, as expected, convenience stores carried relatively few fruits and vegetables; when they did carry fruits and vegetables, they were primarily fresh fruits.

Observations similarly revealed a range in the variety of fruits and vegetables available across the observed retailers, from 0 to 11 or more types each of fresh, canned, dried, or frozen fruits and vegetables in a given store. As in the survey, observed supermarkets/superstores typically carried more fruits and vegetables than did grocery and convenience stores. During the late implementation period, all supermarkets/superstores were observed to have fresh, canned, dried, or frozen fruits and vegetables. All grocery stores carried canned fruits and vegetables, but only one of the three carried fresh, and none carried frozen fruits and vegetables. All observed convenience stores carried fresh and canned fruits and vegetables, but only one out of three carried frozen fruits and vegetables. Also similar to the surveys, observations indicated that supermarkets/superstores had more types of fresh, canned, dried, and frozen fruits and vegetables than did the observed grocery and convenience stores.

While the survey analysis revealed a few statistically significant changes in the availability and prices of fruits and vegetables over the course of the pilot, given the number of tests conducted, this was no more than would be expected by chance (see Appendix F, Exhibit F4.3).

---

51 One-third of supermarkets/superstores indicated that they stocked more fresh fruits and vegetables and more canned and frozen fruits since the start of HIP. However, due to missing data, this percentage refers to only one store. This supermarket/superstore reported increasing their stocks of these foods because their store had different customers (Exhibit 4.6). We do not have any evidence as to whether the new customers were HIP participants or whether the reported increase was a routine change in their customer base.

52 See Appendix F, Exhibits F4.2-F4.4.

Exhibit 4.5: Self-Reported Effect of HIP on Product Stocking, Overall and by Store Type: Retailer Survey, Late HIP Implementation Period

Since November 2011, does your store stock more, the same, or less of…?	Overall (%)	Supermarket/ Superstore (%)	Grocery (%)	Convenience (%)
Fruits				
Fresh				
Stock more	26.4	34.2	45.5	17.6
Stock same	73.6	65.8	54.5	82.4
Stock less	0.0	0.0	0.0	0.0
Canned				
Stock more	36.6	40.6	70.0	25.4
Stock same	63.4	59.4	30.0	74.6
Stock less	0.0	0.0	0.0	0.0
Frozen				
Stock more	11.8	34.2	25.0	3.6
Stock same	85.7	65.8	75.0	92.7
Stock less	2.5	0.0	0.0	3.6
Dried				
Stock more	5.0	0.0	0.0	7.6
Stock same	92.5	100.0	100.0	88.7
Stock less	2.5	0.0	0.0	3.8
Vegetables				
Fresh				
Stock more	29.8	40.6	60.0	17.6
Stock same	70.2	59.4	40.0	82.4
Stock less	0.0	0.0	0.0	0.0
Canned				
Stock more	21.7	0.0	40.0	19.1
Stock same	76.1	100.0	60.0	77.7
Stock less	2.2	0.0	0.0	3.2
Frozen				
Stock more	12.2	0.0	37.5	7.3
Stock same	85.3	100.0	62.5	89.1
Stock less	2.5	0.0	0.0	3.6
Unweighted number of stores [a]	*49*	*14*	*12*	*23*

Weighted percents.
[a] N varies by question due to item non-response.
Source: Late Implementation Retailer Survey.

Exhibit 4.6: Retailer Reported Reasons for Stocking More Fruits or Vegetables, Overall and by Store Type: Retailer Survey, Late HIP Implementation Period

For the foods that your store stocks more of, why did this happen?[a]	Overall (%)	Supermarket/ Superstore (%)	Grocery (%)	Convenience (%)
I/We want to promote fruits and vegetables	50.4	0.0	44.4	66.7
My store has more customers	35.2	0.0	44.4	33.3
My customers want more fruits and vegetables	20.2	0.0	22.2	22.2
My store has different customers	19.4	100.0	11.1	11.1
Other reason	5.1	0.0	0.0	11.1
Missing	5.0	0.0	11.1	0.0
Unweighted number of stores [b]	*19*	*1*	*9*	*9*

Weighted percents.
[a] Respondents could report multiple reasons so percents total to more than 100.
[b] N varies by question due to item non-response.
Source: Late Implementation Retailer Survey.

Overall, the retailer survey suggested some self-reported increased stocking of fruits and vegetables and a few increases and decreases in the availability and prices of canned fruits and vegetables among grocery and convenience stores over time. However, unlike the increased availability of healthy foods associated with the revised WIC food packages, it does not appear that retailers systematically altered their fruit and vegetable inventory or prices over the course of the pilot.

4.2 Retailer Satisfaction

This section broadly discusses retailer satisfaction by examining issues with implementing and participating in the pilot. Specifically, the section examines retailer understanding and support for the objectives of HIP, problems and issues encountered during the pilot, and overall satisfaction.

Understanding of HIP Objectives, Problems, and Questions Encountered

Most retailers, across all store types, reported that they understood the purpose of HIP and how it was supposed to work (Exhibit 4.7). They also agreed that it was important to improve the choices people make when buying foods using SNAP, suggesting retailer buy-in of HIP.

The survey asked retailers about their perspectives on several specific HIP implementation issues, such as training workers, processing HIP purchases, and store payments. Across all retailer types, only a minority reported that HIP had presented difficulties or resulted in additional burden (Exhibit 4.7).

Less than 20 percent of retailers reported that training workers had been a burden or that HIP purchases had been hard to process. Six of the eight retailers that indicated HIP purchases had been hard to process were later implementing stores, suggesting processing HIP purchases may become easier with experience. Retailers also had different perceptions on these issues depending on the type of store they managed. Half of all grocery store managers reported that it was a burden to train store employees and about one-third found HIP purchases difficult to process. Few of the sampled grocery stores used IECRs. Thus, compared with processing other SNAP purchases, processing HIP purchases required an additional step—separating and entering a separate subtotal for HIP-eligible fruits and vegetables. Cashiers had to be trained in this new process.

Not surprisingly, supermarket/superstore and convenience store managers did not report these types of difficulties. Since all supermarkets/superstores participating in HIP used IECRs, processing HIP purchases was no different than processing other SNAP purchases and did not require cashiers to be trained in new procedures. Some convenience stores used IECRs, which minimized the burden of these activities. In general, convenience stores carried few HIP-eligible items, which likely minimized the burden of the additional HIP processing requirements.

Mock transactions conducted as a part of the observations in both IECR and non-IECR stores revealed that most check-out supervisors followed the correct steps, although there were a few questions and some cases of confusion about separating HIP items.

Overall, 10 percent of retailers reported problems receiving accurate and timely payments for HIP purchases. Supermarkets/superstores were more likely to report this problem than other retailer types. However, these supermarkets/superstores represented only one chain retailer with several retail locations. (We do not have additional information about the problems they experienced, and none of the interview respondents or project documents identified any issues with timely settlement related to HIP.) Aside from this supermarket/superstore chain, only one grocery store and one later implementing convenience store reported these problems.

Exhibit 4.7: Retailer Understanding and Perceptions of HIP, Overall and by Store Type: Retailer Survey, Late HIP Implementation Period

How much do you agree or disagree...?	Overall (%)	Supermarket/ Superstore (%)	Grocery (%)	Convenience (%)
I understand the purpose of HIP				
Agree	92.7	92.5	91.7	93.2
Neither agree nor disagree	3.8	0.0	8.3	3.4
Disagree	3.5	7.5	0.0	3.4
Don't know	0.0	0.0	0.0	0.0
I understand how HIP is supposed to work				
Agree	94.5	92.5	91.7	96.5
Neither agree nor disagree	0.0	0.0	0.0	0.0
Disagree	5.5	7.5	8.3	3.5
Don't know	0.0	0.0	0.0	0.0
It is important to improve choices people make when buying foods with SNAP				
Agree	92.6	100.0	91.7	90.1
Neither agree nor disagree	3.7	0.0	8.3	3.3
Disagree	3.7	0.0	0.0	6.6
Don't know	0.0	0.0	0.0	0.0
Training workers has been a burden				
Agree	17.0	0.0	54.5	9.9
Neither agree nor disagree	36.3	23.8	9.1	50.7
Disagree	44.8	76.2	36.4	36.1
Don't know	1.9	0.0	0.0	3.3
HIP purchases have been hard to process				
Agree	15.4	7.5	30.0	13.6
Neither agree nor disagree	34.1	16.3	10.0	49.1
Disagree	50.5	76.2	60.0	37.4
Don't know	0.0	0.0	0.0	0.0
My store is paid on time for HIP purchases				
Agree	53.3	62.5	90.9	35.1
Neither agree nor disagree	3.6	7.5	0.0	3.5
Disagree	10.6	30.0	9.1	3.5
Don't know	32.5	0.0	0.0	57.8
Payments to my store are accurate				
Agree	48.3	62.5	72.7	32.8
Neither agree nor disagree	3.7	7.5	0.0	3.6
Disagree	10.9	30.0	9.1	3.6
Don't know	37.1	0.0	18.2	59.9
Unweighted number of stores [a]	*49*	*14*	*12*	*23*

Weighted percents.
[a] N varies by question due to item non-response.
Source: Late Implementation Retailer Survey.

Grocery store and convenience store managers (lacking IECRs) were also asked about specific problems encountered processing HIP purchases. (Supermarkets/superstores and other stores with IECRs were not asked about these problems as they likely would not have arisen with automated check-out procedures.) Overall, most grocery and convenience store managers reported experiencing few problems with HIP in the previous three months (Exhibit 4.8), though several problems were noted by up to 30 percent of stores as having occurred at least a few times. These problems included:

- Identifying HIP customers (25 percent of grocery stores; 29 percent of convenience stores)
- Knowing what foods were HIP-eligible (8 percent of grocery stores;[53] 29 percent of convenience stores)
- Separating HIP-eligible items from other items (8 percent of grocery stores;[54] 19 percent of convenience stores).

All other problems were reported infrequently. Almost all retailers reported that the problems they experienced were resolved (see Appendix F, Exhibit F4.5 for detailed responses).

Exhibit 4.8: Retailer Problems with HIP in the Previous Three Months, by Grocery and Convenience Stores: Retailer Survey, Late HIP Implementation Period

Experienced problem at least a few times in the previous 3 months	Grocery (%)	Convenience (%)
Problems identifying HIP customers	25.0	29.4
Problems knowing what foods are HIP-eligible	8.3	29.4
Problems separating HIP-eligible from non-HIP-eligible foods	8.3	18.8
Problems processing returns with HIP items	8.3	0.0
Problems having current list of HIP-eligible items in cash registers	0.0	6.3
Problems processing sales of HIP items	0.0	5.9
Problems computing the purchase amount for HIP items	0.0	0.0
Problems responding to customer questions about HIP	0.0	0.0
Problems processing manual vouchers with HIP items	0.0	0.0
Problems getting information about SNAP/EBT sales and settlement	0.0	0.0
Unweighted number of stores [a]	*12*	*17*

Weighted percents.
[a] N varies by question due to item non-response and skip patterns.
Source: Late Implementation Retailer Survey (Independent stores only).

As another indicator of how well retailers understood how HIP operated, the survey asked retailers about questions they or their employees asked about HIP. Across all retailer types, a relatively small minority (about 15-30 percent) reported asking or being asked questions about HIP (see Appendix F, Exhibits F4.6 and F4.7). Fewer supermarket/superstore managers reported questions than did managers of grocery stores and convenience stores, likely because HIP did not require supermarkets/superstores to alter check-out procedures. Most questions focused on knowing what foods were HIP-eligible, being able to separate the items, and knowing how to identify HIP customers. These are the same areas that retailers reported as problems with HIP.

The survey also asked retailers about questions they had received from customers in the previous three months (Exhibit 4.9). About one-third of all retailers reported that customers had asked them questions, though this varied by store type. Store managers in the majority (55–60 percent) of

[53] Only one grocery store indicated problems knowing what foods were HIP-eligible a few times or more.

[54] Only one grocery store indicated problems separating HIP-eligible items a few times or more.

supermarkets/superstores and grocery stores reported that they had received questions about HIP from program participants at least once during the prior three months; most (80 percent) convenience store managers responded that they had not been asked any questions.

The most common questions concerned identifying HIP-eligible foods; some customers also asked questions about the EBT credit and how to read the grocery receipt. Some retailers also mentioned customer questions about how to use HIP and whether all stores participated. Most stores did not receive questions about HIP from SNAP households not participating in the pilot.

Exhibit 4.9: Retailer Perceptions of Customer Questions about HIP, Overall and by Store Type: Retailer Survey, Late HIP Implementation Period

Customer questions about HIP in prior 3 months	Overall (%)	Supermarket/ Superstore (%)	Grocery (%)	Convenience (%)
How often did HIP customers ask questions about HIP?				
Never	62.0	45.5	41.7	79.6
Less than once a week	29.9	54.5	25.0	17.2
Once a week	3.2	0.0	8.3	3.2
More than once a week	4.8	0.0	25.0	0.0
What are the most common questions HIP customers asked about HIP? [a]				
Qs about eligible food	63.3	34.7	85.7	84.4
Qs about EBT credit	33.8	38.9	28.6	31.2
Qs about reading receipt	31.9	44.4	28.6	15.6
Other Qs	8.5	0.0	14.3	15.6
How often did SNAP, non-HIP, customers ask questions about HIP?				
Never	81.7	59.5	91.7	90.5
Less than once a week	15.1	40.5	0.0	6.4
Once a week	0.0	0.0	0.0	0.0
More than once a week	3.3	0.0	8.3	3.2
Have there been questions about HIP that you didn't know how to respond to?				
Yes	7.3	13.6	0.0	6.4
No	92.7	86.4	100.0	93.6
(If "yes") Who did you refer them to?				
Did not refer them to anyone	50.0	50.0	0.0	50.0
Local DTA	0.0	0.0	0.0	0.0
DTA hotline	23.0	50.0	0.0	0.0
Xerox	0.0	0.0	0.0	0.0
SNAP program	27.0	0.0	0.0	50.0
Unweighted number of stores [b]	*49*	*14*	*12*	*23*

Weighted percents.
[a] Respondents selected all options that applied; percents therefore sum to more than 100.
[b] N varies by question due to item non-response and skip patterns.
Source: Late Implementation Retailer Survey.

Satisfaction With Ability To Implement and Participate in the Pilot

Retailers were asked about their overall satisfaction with HIP. This section also reports on the stores that joined HIP after the pilot began and the one store that withdrew after initially participating.

Overall Satisfaction

To assess retailer satisfaction with HIP, retailers were asked about their level of satisfaction with HIP and if they would still join HIP if they had it to do over again (Exhibit 4.10). Overall, a majority of retailers reported that they were somewhat or very satisfied with HIP, though satisfaction varied depending on the store type. Over 90 percent of supermarkets/superstores and 83 percent of grocery stores were somewhat or very satisfied. In contrast, only 32 percent of convenience stores were somewhat or very satisfied and 10 percent (3 stores) were somewhat or very dissatisfied. This finding is likely related to the fact that convenience stores carried relatively few HIP-eligible items and thus the stores had little to gain from the pilot. When asked how HIP might be improved, one of the dissatisfied convenience stores did not think HIP was necessary, and another suggested more advertisement might improve the program.

When asked whether they would still join HIP if they had it to do again, all supermarket/superstore and grocery stores and 91 percent of convenience stores responded that they would.

Exhibit 4.10: Retailer Satisfaction with HIP, Overall and by Store Type: Retailer Survey, Late HIP Implementation Period

	Overall (%)	Supermarket/ Superstore (%)	Grocery (%)	Convenience (%)
Overall satisfaction with HIP				
Very satisfied	34.8	62.5	58.3	15.9
Somewhat satisfied	20.8	30.0	25.0	15.9
Neither satisfied or dissatisfied	38.9	7.5	16.7	58.7
Somewhat dissatisfied	1.8	0.0	0.0	3.2
Very dissatisfied	3.7	0.0	0.0	6.4
If you had it to do again, would you still join HIP?				
Yes	94.5	100.0	100.0	90.5
No	5.5	0.0	0.0	9.5
Unweighted number of stores [a]	*49*	*14*	*12*	*23*

Weighted percents.
[a] N varies by question due to item non-response.
Source: Late Implementation Retailer Survey.

Retailers with Limited Length of Participation

After the launch of the pilot, an additional 12 retail stores joined HIP in February 2012 or later. As discussed in Chapter 3, several smaller grocery and convenience stores began participating in February 2012 and some larger grocery stores joined HIP in October 2012. The most common reason stores did not join HIP originally was that they did not know their store could be a part of HIP (Exhibit 4.11). Half of the stores indicated this was the case, which appears to be due to miscommunication, and not dissatisfaction with HIP. Some reasons given for not originally joining that may reflect initial dissatisfaction included perceptions that joining HIP would have been too difficult (indicated by one grocery store) and that not enough support was given (indicated by one supermarket/superstore and one grocery store). One supermarket/superstore and one convenience store also felt that there was not enough time to get ready and one convenience store also indicated that their store would need to stock more fruits and vegetables, suggesting some anticipated problems and difficulties associated with HIP. The initial dissatisfaction and anticipated problems seem to have been mitigated as these retailers decided to join HIP for a variety of reasons (see Exhibit 4.12).

As noted above, most retailers were satisfied with HIP (or neither satisfied nor dissatisfied). As a result, there was almost no retailer attrition. Only one small convenience store withdrew from HIP after participating for about eight months. This store carried a limited number of HIP-eligible items, and decided to concentrate on the hot prepared food side of their business; they therefore determined that participating in HIP was not worth it for them, although they were not necessarily dissatisfied with HIP.

Exhibit 4.11: Reasons Later Implementing Stores Did Not Join HIP at the Start, Overall and by Store Type: Retailer Survey, Late HIP Implementation Period

Why did your store not join HIP when it started in Fall 2011? [a]	Overall (N)	Supermarket/ Superstore (N)	Grocery (N)	Convenience (N)
I didn't know that the store could be part of HIP	6	1	2	3
Previous owner made the decision	3	0	0	3
There was not enough time to get ready	2	1	0	1
I did not get enough support	2	1	1	
The store would need to stock more fruits and vegetables	1	0	0	1
Joining HIP would have been too difficult	1	0	1	0
I thought that HIP would not increase sales	0	0	0	0
I thought that HIP would increase costs	0	0	0	0
I did not want to be part of a demonstration	0	0	0	0
I knew other retailers who decided not to join HIP	0	0	0	0
Unweighted number of stores [b]	*12*	*3*	*2*	*7*

Unweighted counts.
[a] Respondents selected all options that applied; counts therefore may sum to more than the total number of retailers.
[b] N varies by question due to item non-response.
Source: Late Implementation Retailer Survey.

Exhibit 4.12: Reasons Later Implementing Stores Joined HIP, Overall and by Store Type: Retailer Survey, Late HIP Implementation Period

Why did your store join HIP this year [a]	Overall (N)	Supermarket/ Superstore (N)	Grocery (N)	Convenience (N)
New manager or owner who decided to join	5	0	2	3
The State, DTA or another organization asked us	4	2	0	2
HIP could increase sales of fruits and vegetables	4	0	0	4
HIP could increase sales of other items	3	0	0	3
This year we had time to sign up and get ready	2	1	0	1
New equipment made HIP easier/possible	2	1	0	1
I talked to other retailers who are participating	1	1	0	0
My store was losing sales to stores that are participating	0	0	0	0
It was easier to do than before	0	0	0	0
Unweighted number of stores [b]	*12*	*3*	*2*	*7*

Unweighted counts.
[a] Respondents selected all options that applied; counts therefore may sum to more than the total number of retailers.
[b] N varies by question due to item non-response.
Source: Late Implementation Retailer Survey.

4.3 Impact of HIP on Retailer Redemptions

EBT transaction data provide some evidence about HIP impacts on retailers. According to our conceptual model, HIP may impact households' decisions about where to shop and what to purchase.[55] These decisions could have implications for retailer sales in Hampden County.

As discussed in this section, we found that the effects of HIP on retailer sales during the pilot period likely were quite small. There are two ways that HIP could affect revenue for retailers:

- HIP could increase total SNAP redemptions, due to the value of the incentives earned by SNAP participants; this increase is essentially a positive-sum game, increasing the potential pool of SNAP spending for all retailers in the county.
- HIP could generate shifts in spending from one retailer type to another, perhaps due to the incentive that HIP provides to shop especially in participating retailers; these shifts are essentially a zero-sum game, because any gains for one retailer type must necessarily come at the expense of revenue for another retailer type.

While HIP did increase SNAP redemptions, HIP purchases of eligible TFVs were modest in magnitude, which meant that these additional incentives were also fairly small (Exhibit 4.13). Non-HIP participant households had mean monthly SNAP purchases of $259.81. HIP households had mean monthly SNAP purchases of $264.11, which included the incentives they earned on their TFV purchases. The difference in SNAP redemptions between HIP and non-HIP households was thus $4.30.

---

55 Chapter 6 examines this issue in detail.

Exhibit 4.13: Monthly SNAP Purchases per Household and Projected in Aggregate for Hampden County

	Per household[a]			Projected for 55,095 households in Hampden County			
						Difference	
	HIP ($)	Non-HIP ($)	Difference ($)	With HIP ($)	Without HIP ($)	$	%
All retailers	264.11	259.81	4.30	14,551,140	14,314,232	236,909	1.66
Supermarket/superstores	210.98	206.29	4.69	11,623,943	11,365,548	258,396	2.27
Convenience	26.18	26.13	0.05	1,442,249	1,439,506	2,744	0.19
Grocery	20.23	19.86	0.37	1,114,324	1,093,928	20,396	1.86
Other	2.38	2.48	-0.10	131,231	136,592	(5,361)	-3.92
Out of State	4.35	5.06	-0.71	239,757	278,852	(39,095)	-14.02
Participating retailer	136.80	132.38	4.41	7,536,996	7,293,476	243,520	3.34
Non-participating retailer	127.32	127.43	-0.11	7,014,695	7,020,756	(6,060)	-0.09

[a] Source: EBT Transaction Data, pooled across March-October 2012. See Chapter 6, Exhibit 6.4 for the underlying EBT analysis.

HIP also generated some shifts in spending across retailers. Relative to non-HIP participants, HIP participants spent more of their benefits in stores that participated in HIP, but the change was again small. Most of the change in shopping behavior induced by HIP arose from a modest increase in spending at participating supermarkets/superstores.

We analyzed how much impact these changes in shopping behavior at the household level could have for the retail sector in Hampden County more generally. Taking the mean shopping amounts for non-HIP households as representative of county-wide shopping patterns in the absence of the incentive, and taking the mean shopping amounts for HIP households as representative of the new shopping behavior with the incentive, we estimated total dollar spending levels for the 55,095 households in Hampden County (the size of the SNAP caseload at the start of the pilot). With the new incentive program, projected monthly SNAP spending in all retailers would have a net increase of $236,909, or about 1.7 percent (Exhibit 4.13). If retailer participation patterns were the same as in the pilot, there would be a decrease in monthly SNAP spending of $6,060 (0.1 percent) in non-participating stores, which would be more than offset by an increase in monthly SNAP spending of $243,520 (3.3 percent) in participating stores. The increased SNAP spending would be felt mainly by supermarkets/superstores and grocery stores. Combining participating and non-participating stores, supermarkets/superstores would see a monthly increase of $258,396 (2.3 percent), and redemptions at grocery stores would increase by $20,396 (1.9 percent). This analysis shows that the main impact of HIP on retailers was a modest overall increase in SNAP redemptions, with little shifting of household spending from one retailer type to another. The pilot thus represented a positive-sum game for retailers in the county.

4.4 Discussion

HIP appears to have had limited effects on the food retail environment in stores participating in HIP, according to retailer reports. Reported promotion of fruits and vegetables changed over the course of the pilot in ways consistent with DTA’s activities—HIP participating stores received identifying decals at the start of the pilot and additional signage several months prior to the second retailer survey. At the outset of the pilot, there was concern, particularly among smaller stores, that HIP might increase the time and effort required to process purchases, but this does not appear to be the case.

Grocery stores (that did not have IECR technology) reported more difficulties implementing HIP than did supermarkets/superstores. Nonetheless, relatively few retailers reported problems during the pilot. The most common problems and questions concerned identifying HIP-eligible items and identifying households participating in the pilot. These issues were reported more frequently by managers of grocery and convenience stores, who had to manually separate eligible foods and credit households; the process was completely automated in supermarkets/superstores eliminating most issues.

Most supermarkets/superstores and grocery stores reported that they were satisfied with how HIP operated in their stores. Most convenience stores reported neither satisfaction nor dissatisfaction, likely reflecting the fact that they carried relatively few HIP-eligible items which limited the potential effect of the intervention on their store operations.

Grocery stores reported that they made some additional efforts to sell more fruits and vegetables, including increasing their offerings, and they reported increased sales of fruits and vegetables and also increased profits. Few convenience stores reported efforts to increase sales of fruits and vegetables, though a small minority made some changes to stocking procedures. Supermarkets/superstores reported no additional efforts to promote and sell fruits and vegetables, which is not surprising given that the HIP intervention was modest relative to the overall scale of their operations.

Analysis of EBT transaction data showed that HIP led to only a modest increase in SNAP spending in stores that participated in HIP, and very slightly reduced SNAP spending in stores that did not participate. Most of the additional dollars of SNAP spending went to supermarkets and superstores, as they account for the bulk of SNAP purchases. On a percentage basis, however, grocery stores experienced an increase in SNAP spending roughly comparable to that in supermarkets/superstores.

The analysis of the effects of HIP on retailers presented in this chapter suggests that overall HIP had relatively little impact on store operations. Referring to the conceptual model describing the potential effect of HIP (Exhibit 1.1), the analysis suggests that HIP affected the overall retail food environment by directly affecting participation decisions, but had limited effects on the environment within participating stores. In addition, households only modestly changed their shopping patterns resulting in a relatively small impact on retailer redemptions.

5. HIP Participant Experiences, TFV Purchases, and Incentives Earned

This chapter uses survey and focus group data to describe participants' awareness and understanding of HIP and their experiences and satisfaction with the pilot. The chapter also uses EBT data to describe HIP participants' purchases of HIP-eligible targeted fruits and vegetables (TFVs) from participating retailers, which in turn determined the amount of incentives earned. As noted in Chapter 1, each of these factors might have affected the magnitude of HIP's impact on intake of targeted fruits and vegetables if HIP's effect operated through the hypothesized causal mechanisms shown in our conceptual model (see Exhibit 1.1).

Most of the participant survey questions concerning understanding of and experiences with HIP provided five- or six-point Likert scale response categories (e.g., very easy, easy, somewhat easy, somewhat difficult, difficult, very difficult). In this chapter, we are particularly interested in examining changes over time, and the statistical tests for changes across rounds use all items in the scale.[56] However, we often discuss aggregated results (e.g., at least somewhat easy, at least somewhat difficult) in the chapter.

The first section of the chapter describes awareness and understanding of HIP, while the second section describes the experiences of HIP participants and their satisfaction with the incentive program. Finally, the third section describes HIP purchases and HIP incentives earned.

5.1 Awareness and Understanding of HIP

In order for the HIP incentive to affect purchasing behavior, HIP participants needed to know about the program and understand how it worked. As discussed in Chapter 3, DTA sent multiple notices to HIP households with information on how HIP worked, including frequently-asked questions, guidelines for HIP-eligible fruits and vegetables, and lists of participating retailers. In this section, we examine survey participants' awareness and knowledge of HIP, including knowing how they could earn the incentive and what fruits and vegetables were eligible for the incentive. This section draws on data from the first and second follow-up primary shopper interviews (Round 2 and Round 3), supplemented with relevant findings from focus groups. We present overall results combining reports from both post-implementation survey rounds. In addition, we present separate results for each survey round to examine how awareness and understanding changed over the course of the pilot.

A majority (69 percent) of surveyed HIP participants reported having heard of the program (Exhibit 5.1). Awareness of HIP increased over time. At the time of the Round 2 survey, which occurred 4-6 months after households began participating in HIP, 62 percent had heard of HIP. By the time of the Round 3 survey, 9-11 months after HIP implementation, 76 percent reported having heard about HIP.

---

[56] Note that Round 2 descriptive results as reported in this Final Report may differ slightly from Round 2 results as reported in the prior Interim Report. This is due to (1) use of pooled Round 2/3 weights across rounds when generating the Final Report tables, as compared to use of Round 2 weights alone in the Interim Report, and (2) inclusion of only those respondents in this Final Report that answered questions in both Rounds 2 and 3, to facilitate appropriate paired testing for changes across rounds, whereas all Round 2 responses were included in the Interim Report.

This increase was statistically significant. The second round of focus groups also revealed better awareness of HIP than did the first round of focus groups.

Exhibit 5.1: Primary Shopper Awareness of HIP, by Treatment and Control Status, by Round: Round 2 & 3 Participant Surveys

	Proportion (N)			P-value
	Total	Treatment	Control	
Ever heard of HIP? Proportion reporting "yes"				
Pooled (Rounds 2 & 3) (N=2,890)	0.23 (1222)	0.69 (1000)	0.16 (222)	[<0.001]***
Round 2 (N=1,431)	0.19 (533)	0.62 (444)	0.13 (89)	[<0.001]***
Round 3 (N=1,459)	0.26 (689)	0.76 (556)	0.19 (133)	[<0.001]***
Change: Round 3 – Round 2 [P-value]	0.07 [<0.001]***	0.13 [<0.001]***	0.06 [0.001]***	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" responses coded as missing.
Due to rounding, reported changes may differ from differences between Round 2 and Round 3 proportions.
Pooled test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module).

Awareness of HIP also increased slightly in the control group over time. However, as expected, given that no formal attempts were made to inform the control group about HIP, a significantly greater proportion of HIP participants had heard of the program compared to non-HIP participants.

Awareness among HIP participants varied by some demographic characteristics and by some baseline fruit- and vegetable-related behaviors or preferences.[57] HIP participants who were working, had children in the household, received higher SNAP benefits (over $200), spent more on targeted fruits and vegetables at baseline, or had fewer barriers to eating fruits and vegetables or to grocery shopping were more likely to say they had heard of HIP (see Appendix H, Exhibit H5.1).[58] Perhaps these groups were more motivated to purchase and consume fruits and vegetables and therefore may have been more tuned into programs, such as HIP, that made fruits and vegetables more affordable.

Of those who had heard of HIP, the most common source for learning about HIP was letters (Exhibit 5.2). Over 60 percent of the HIP group reported receiving a letter about the pilot. Similarly, in the HIP focus groups, most respondents remembered receiving a letter notifying them of their selection for the HIP program. As one participant indicated, "I got a letter in the mail; they said they picked me randomly."

Curiously, in the survey both HIP and non-HIP participants reported having heard about HIP through letters (62 percent and 28 percent, respectively). Non-HIP participants were not sent any letters or other materials concerning HIP and the advance letters sent prior to the start of the telephone survey did not mention HIP. Perhaps non-HIP participants were confusing HIP communications with

---

57 Appendix D, Section D.2 discusses creation of the behavior, attitudes, and barriers scales used in this sub-group analysis.

58 See discussion in Chapter 8, Section 8.6 for details on how the subgroups were created.

notifications from another program. As expected, however, a greater proportion of HIP participants heard about HIP through letters compared to non-HIP participants (the difference is 34 percentage points and clearly statistically significant).

Exhibit 5.2: Where Primary Shopper Heard of HIP, by Treatment and Control Status: Round 2 & 3 Participant Surveys

	Proportion (N)			P-value
	Total	Treatment	Control	
Letter	0.42 (676)	0.62 (621)	0.28 (55)	[<0.001]***
Informational pamphlet	0.11 (149)	0.13 (130)	0.10 (19)	[0.163]
DTA case manager	0.07 (89)	0.08 (76)	0.06 (13)	[0.442]
Word of mouth	0.14 (112)	0.06 (67)	0.20 (45)	[<0.001]***
Westat (firm conducting the survey)	0.07 (68)	0.05 (50)	0.08 (18)	[0.131]
Handout	0.05 (62)	0.05 (51)	0.05 (11)	[0.987]
Media (television, newspaper, internet)	0.11 (61)	0.02 (26)	0.17 (35)	[<0.001]***
Community service provider	0.02 (21)	0.02 (15)	0.03 (6)	[0.174]
Other source	0.09 (82)	0.06 (57)	0.11 (25)	[0.017]**

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don't know” responses coded as missing.
Test statistics are adjusted for clustering at the individual respondent level.
Includes responses only from respondents who reported they had ever heard of HIP. Respondents selected all options that applied; proportions therefore sum to more than one.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (unweighted N=1,198).

Of HIP and non-HIP participants who had heard of HIP, non-HIP participants were more likely than HIP participants to have heard of HIP through word of mouth, most likely through friends and family participating in the pilot. Non-HIP participants also reported learning about HIP through the media and other sources more than did HIP participants. However, there was no media discussion of HIP after the initial announcement of the pilot award; perhaps these respondents confused HIP with another program.

HIP participants did relatively little to seek information about HIP (Exhibit 5.3). While DTA offered more than 140 training sessions between October 2011 and February 2012, only 5 percent of surveyed HIP participants reported that they attended a meeting about HIP. There was a slight (though statistically significant) increase, however, between Rounds 2 and 3 in the percentage of HIP participants who reported attending a meeting (4 percent in Round 2 to 6 percent in Round 3). No additional trainings occurred between Rounds 2 and 3, so participants may have been referring to another type of meeting. Although attendance at meetings was low across the board, participants who consumed three or more servings of fruits and vegetables per day at baseline were more likely to attend than those who consumed less than three servings a day. Similarly, those who had more fruits and vegetables at home at baseline were more likely to attend the meetings than were those who had fewer fruits and vegetables at home (see Appendix H, Exhibit H5.2a). Focus groups indicated that participants knew about the trainings. As one participant indicated, “They told you about programs, little workshops you could go to and actually sit down and they’d explain what the program was about.” However, participants indicated that they were too busy to attend and some felt the trainings were not necessary, “Buying fruits and vegetables isn’t rocket science. They couldn’t tell you more than you already know [from the letter].” As mentioned in Chapter 3, attendance data similarly showed that overall attendance at training sessions was very low, at around 1 percent of HIP participants. However, those who said they attended gave positive feedback; over 90 percent felt that the meeting explained HIP well or very well (Exhibit 5.3). This feedback is consistent with participant evaluations completed after the training sessions.

Exhibit 5.3: Primary Shopper Attendance at Training and Use of Hotline, by Round: Round 2 & 3 Participant Surveys, HIP Participants

	Proportion (N)			
	Pooled	Round 2	Round 3	P-value
Did you go to a meeting to learn how HIP works? (N=1,455)				
Yes	0.05 (83)	0.04 (34)	0.06 (49)	[0.015]**
No	0.95 (1372)	0.96 (684)	0.94 (688)	
If yes, how well did the meeting explain HIP? (N=81)				
Very well	0.71 (58)	0.73 (25)	0.69 (33)	[.][a]
Well	0.20 (16)	0.21 (7)	0.19 (9)	
Somewhat well	0.10 (7)	0.06 (2)	0.13 (5)	
Not too well	0.00 (0)	0.00 (0)	0.00 (0)	
Not at all well	0.00 (0)	0.00 (0)	0.00 (0)	
Did you call the EBT or HIP hotline with questions or problems in the past month? (N=1,434)				
Yes	0.06 (91)	0.08 (56)	0.05 (35)	[0.006]***
No	0.94 (1343)	0.92 (639)	0.95 (704)	
If yes, how helpful were the hotline staff in resolving your issue? (N=89)				
Very helpful	0.50 (43)	0.44 (24)	0.60 (19)	[.][a]
Helpful	0.17 (16)	0.17 (10)	0.17 (6)	
Somewhat helpful	0.09 (9)	0.07 (4)	0.12 (5)	
Not helpful	0.10 (10)	0.15 (9)	0.03 (1)	
Very unhelpful	0.13 (11)	0.16 (7)	0.08 (4)	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" and "refused" responses coded as missing.
Due to rounding, reported proportions may not sum to one.
Includes participants who reported they had not heard of HIP.
[a] Test statistics cannot be computed because of stratum with single sampling unit.
Source: Participant Survey (primary shopper module).

The HIP 800 call line was used by a small percentage of participants (Exhibit 5.3). Less than 10 percent of HIP participants said they called this hotline with questions (again, DTA data report calls from a much smaller proportion). Use of the hotline appeared to decline over time as fewer HIP-participants reported calling the hotline in the month prior to Round 3 compared to the month prior to Round 2. Feedback on the hotline, for those who called, was generally positive. About half of HIP participants who said they called the hotline felt that staff were very helpful in resolving their issues, and three-quarters felt that hotline staff were at least somewhat helpful. Similarly, the second round of focus group participants noted general satisfaction with the hotline, "When I called I got a lot of information," and "I was satisfied with the phone call." However, about one-quarter of survey participants felt that hotline staff were not helpful or very unhelpful.

Despite some lack of awareness of HIP, which decreased over time, and very little information seeking, survey participants reported having a fairly easy time understanding how HIP worked (Exhibit 5.4). More than half of HIP participants who responded to survey questions (69 percent) felt that it was somewhat to very easy to understand how HIP worked and to remember which fruits and vegetables earned the HIP incentive.

HIP survey participants who had children in the household, those who were WIC participants, those who received higher SNAP benefits, and those who reported fewer barriers to eating fruits and vegetables reported an easier time understanding how HIP worked and remembering which fruits and vegetables earned the HIP incentive. Households also participating in WIC likely had an easier time understanding HIP given that the TFVs were the same as those that could be purchased with WIC fruit and vegetable vouchers. Those with higher SNAP benefits and children in the home to feed and those with fewer barriers also may have been more motivated to understand these details. Focus group participants noted that they were now encouraging healthy eating behaviors in their children, perhaps indicating a particular motivation among participants with children in the household.

In addition, HIP survey participants who reported more positive attitudes toward food, fruits, and vegetables were more likely to report an easier time remembering which fruits and vegetables earned the incentive compared to those who reported less positive attitudes toward food, fruits, and vegetables. These positive attitudes may have been associated with increased familiarity with fruits and vegetables, which could have helped participants to remember which fruits and vegetables qualified for HIP, or these positive attitudes similarly may have given participants the motivation to remember (see Appendix H, Exhibits 5.3a and 5.3b).

Focus groups underscored the difficulty experienced by some HIP participants. During the first round of focus groups in which participants were asked directly about what they understood about HIP, many participants expressed a general lack of knowledge of how HIP worked, which fruits and vegetables qualified for the incentive, and how incentives were earned. For example, one focus group participant said, "It doesn't really explain if you have to actually buy the fruit itself or if you can buy it in a canned product or a liquid product. And it doesn't explain if you get the incentive or not when you buy those." The different line of questioning in focus groups revealed a greater lack of understanding than did survey questions.

Exhibit 5.4: Primary Shopper Understanding of HIP, by Round: Round 2 & 3 Participant Surveys, HIP Participants

	Proportion (N)			
	Pooled	Round 2	Round 3	P-value
How easy or hard has it been to understand how HIP works? (N=1,460)				
Very easy	0.15 (224)	0.13 (94)	0.17 (130)	[<0.001]***
Easy	0.37 (529)	0.34 (240)	0.40 (289)	
Somewhat easy	0.17 (258)	0.16 (117)	0.19 (141)	
Somewhat hard	0.07 (101)	0.07 (48)	0.08 (53)	
Hard	0.04 (54)	0.04 (26)	0.04 (28)	
Very hard	0.03 (47)	0.04 (26)	0.03 (21)	
Don't know	0.17 (247)	0.23 (170)	0.10 (77)	
How easy or hard is it remembering which fruits and vegetables earn the HIP rebate? (N=1,458)				
Very easy	0.13 (199)	0.12 (89)	0.14 (110)	[<0.001]***
Easy	0.35 (502)	0.33 (233)	0.37 (269)	
Somewhat easy	0.21 (304)	0.19 (131)	0.24 (173)	
Somewhat hard	0.12 (177)	0.14 (95)	0.11 (82)	
Hard	0.07 (96)	0.07 (52)	0.06 (44)	
Very hard	0.03 (47)	0.03 (24)	0.03 (23)	
Don't know	0.09 (133)	0.13 (95)	0.05 (38)	
How easy or hard is it keeping track of the HIP rebates you earn?[a] (N=550)				
Very easy	0.25 (139)	0.26 (66)	0.23 (73)	[.][a]
Easy	0.43 (235)	0.40 (98)	0.46 (137)	
Somewhat easy	0.21 (118)	0.22 (52)	0.21 (66)	
Somewhat hard	0.05 (29)	0.05 (13)	0.06 (16)	
Hard	0.02 (13)	0.03 (8)	0.02 (5)	
Very hard	0.01 (4)	0.01 (3)	<0.01 (1)	
Don't know	0.02 (12)	0.02 (6)	0.02 (6)	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" and "refused" responses coded as missing.
Due to rounding, reported proportions may not sum to one.
Includes participants who reported they had not heard of HIP.
[a]Question asked only of respondents who reported they kept track of HIP rebates earned.
Source: Participant Survey (primary shopper module).

Both focus groups and surveys, however, revealed that understanding of how HIP worked and which fruits and vegetables qualified increased over time. At the time of the Round 2 survey, 63-64 percent of HIP participants reported that it was somewhat to very easy to understand how HIP worked and to remember which fruits and vegetables earned the incentive. By the time of the Round 3 survey, the percentage had increased to 75-76 percent (an increase of 11-13 percentage points). Some participants did report that they did not know how easy or hard it was to understand how HIP worked, indicating some confusion or lack of understanding. However, this confusion decreased over time. Focus groups confirmed increased understanding over time of which fruits and vegetables were eligible. For example, in contrast to the confusion noted above in the first round of focus groups, by the second round of focus groups, participants understood that all fresh produce (except white potatoes) would earn an incentive, provided the store was participating in HIP.

While only about 40 percent of HIP participants said they kept track of HIP incentives earned (Exhibit 5.5), about 90 percent of those who did felt that keeping track of these incentives was somewhat to very easy. Among those who kept track of incentives, those who reported more barriers to grocery shopping reported a more difficult time tracking incentives than did those who reported fewer barriers. However, almost 90 percent of those who reported more barriers to grocery shopping (and kept track of incentives) still felt it was somewhat to very easy to track incentives (see Appendix H, Exhibit 5.3c). Participants who found it difficult to keep track of HIP incentives may not, in fact, have attempted to keep track of them, but those who did it consistently found it somewhat to very easy.

Some confusion about the financial details and logistics of how participants received incentives on their EBT cards persisted through both rounds of focus groups. As one participant indicated, "I haven't received anything…I was expecting to receive a little extra cash that I have not received," and another incorrectly explained, "When you go shopping, it's taken off immediately. Instead of spending 80 bucks, you'll spend 76 'cause you got 4 dollars' worth in HIP—you saved it right then at that moment, it's like a coupon." This confusion on financial details of the incentive may reside primarily among the 60 percent of HIP participants who did not track their HIP incentives.

5.2 Experiences and Satisfaction

This section explores different aspects of primary shoppers' experiences with HIP and their overall satisfaction with the program.

As mentioned above, survey results indicated that only 41 percent of participants kept track of the HIP incentives they earned, which was consistent with our focus group finding that many participants were unclear on the HIP incentives they earned. As one participant claimed, "I found out accidentally I got two dollars left." The second round of focus groups similarly suggested that most participants did not know how much they earned in HIP incentives. However, the percentage of survey participants who reported keeping track of their incentives increased slightly between the Round 2 and Round 3 surveys from 39 percent to 43 percent (Exhibit 5.5).

In addition, those who reported higher spending on targeted fruits and vegetables at baseline, higher intake of fruits and vegetables, and those who reported fewer barriers to eating fruits and vegetables were more likely to keep track of incentives earned than were those who reported lower spending and intake and those who reported more barriers to eating fruits and vegetables, respectively (see Appendix H, Exhibit H5.4).

Of the survey participants who did keep track of incentives, the majority did so through printed receipts (Exhibit 5.5). Over half of the participants felt it was very useful to have receipts showing fruit and vegetable expenditures and incentives, and almost 90 percent felt the receipts were at least somewhat useful. It is interesting that the percentage who found the receipts useful is considerably greater than the percentage who tracked their rebates; perhaps they liked having the information or thought it might be useful.

Exhibit 5.5: Primary Shopper HIP Experiences, by Round: Round 2 & 3 Participant Surveys, HIP Participants

	Proportion (N)			
	Pooled	Round 2	Round 3	P-value
Do you keep track of the HIP rebate you have earned? (N=1,347)				
Yes	0.41 (550)	0.39 (246)	0.43 (304)	[0.027]**
No	0.59 (797)	0.61 (395)	0.57 (402)	
If yes, how do you most often keep track of the HIP rebate? (N=519)				
Printed receipt	0.58 (300)	0.60 (141)	0.56 (159)	[.][a]
By telephone using computerized system	0.22 (112)	0.21 (49)	0.22 (63)	
By telephone using live operator	0.04 (18)	0.05 (9)	0.03 (9)	
Website	0.01 (5)	0.00 (0)	0.01 (5)	
Other	0.16 (84)	0.13 (35)	0.18 (49)	
How useful is it to have a receipt showing how much you spend on fruits and vegetables and the rebate you earn each time you shop? (N=1,327)				
Very useful	0.55 (731)	0.54 (340)	0.56 (391)	[0.054]*
Somewhat useful	0.32 (424)	0.32 (206)	0.31 (218)	
Not too useful	0.07 (94)	0.07 (42)	0.07 (52)	
Not at all useful	0.06 (78)	0.06 (40)	0.05 (38)	
How well do the cashiers and other workers in the store where you go grocery shopping understand HIP? (N=1,230)				
Very well	0.18 (219)	0.16 (91)	0.19 (128)	[0.003]***
Well	0.23 (270)	0.22 (118)	0.23 (152)	
Somewhat well	0.22 (280)	0.22 (133)	0.23 (147)	
Not too well	0.19 (230)	0.19 (108)	0.19 (122)	
Not at all well	0.18 (231)	0.21 (129)	0.15 (102)	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" and "refused" responses coded as missing.
Includes participants who reported they had not heard of HIP.
Due to rounding, reported proportions may not sum to one.
[a] Test statistics cannot be computed because of stratum with single sampling unit.
Source: Participant Survey (primary shopper module).

Participants gave mixed responses concerning how well they felt workers in their grocery stores understood HIP, but their perceptions of store workers' understanding of HIP improved slightly over time. Just under 20 percent of participants felt grocery store workers understood HIP very well (this percentage increased from 16 percent at Round 2 to 19 percent at Round 3), but the same percentage felt that grocery store workers did not understand HIP well at all (this percentage decreased from 21 percent at Round 2 to 15 percent at Round 3). According to focus group participants, cashiers did not seem to take special notice of HIP-eligible items or ask customers to separate HIP items from non-HIP items. This finding does not necessarily signal a problem. Most SNAP spending occurred in stores with integrated electronic cash registers (IECRs); this technology did not require cashiers to make any special accommodations in order for HIP participants to earn incentives for HIP purchases. SNAP participants automatically earned the HIP incentive as items were scanned. In contrast, in stores without IECRs, cashiers did have to enter HIP purchases separately and they may have required shoppers to separate HIP and non-HIP eligible items. In these types of stores, cashiers needed to be aware of which items qualified for the HIP incentive.

Exhibit 5.6: Primary Shopper Problems with EBT Card, by Treatment and Control Status, by Round: Round 2 & 3 Participant Surveys

	Total	Treatment	Control	P-Value
Primary shopper uses household EBT card most often (N=2,916)				
Pooled (Rounds 2 & 3) (N=3421)	0.90 (2646)	0.91 (1335)	0.90 (1311)	[0.466]
Round 2 (N=1,445)	0.91 (1309)	0.90 (656)	0.91 (653)	[0.763]
Round 3 (N=1,471)	0.90 (1337)	0.92 (679)	0.90 (658)	[0.124]
Change: Round 3 – Round 2 [P-value]	-0.01 [0.537]	0.01 [0.368]	-0.01 [0.450]	
Any problems with your EBT card or account in past month? (N=2,918)				
Pooled (Rounds 2 & 3) (N=3,423)	0.03 (88)	0.03 (39)	0.03 (49)	[0.287]
Round 2 (1,445)	0.04 (50)	0.03 (21)	0.04 (29)	[0.159]
Round 3 (N=1,473)	0.03 (38)	0.03 (18)	0.03 (20)	[0.875]
Change: Round 3 – Round 2 [P-value]	-0.01 [0.113]	>-0.01 [0.858]	-0.01 [0.115]	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" responses coded as missing.
Due to rounding, reported proportions may not sum to one.
Pooled test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module).

All SNAP participants—HIP and non-HIP—received their SNAP benefits on EBT cards and the surveys asked both groups about their experiences with the cards (Exhibits 5.6 and 5.7). As expected, the primary shopper, not other household members, used the EBT card most often (90 percent of all households). Few respondents (3 percent) experienced any problems with their EBT card or account in the month prior to the follow-up surveys. Among those who reported problems, the more common problems (reported by 15-30 percent), included a lost, stolen, or damaged card; trouble making a purchase; confusion about balance; problems with benefits; and, for HIP participants only, not getting the HIP incentive that was expected. No significant differences emerged between HIP and non-HIP participants in terms of problems experienced with EBT cards.

Exhibit 5.7: Type of Primary Shopper Problems with EBT Card, by Treatment and Control Status: Round 2 & 3 Participant Surveys

	Total	Treatment	Control	P-Value
Problem with benefits	0.29 (27)	0.27 (11)	0.29 (16)	[0.869]
Lost, stolen, or damaged card	0.25 (20)	0.24 (9)	0.25 (11)	[0.879]
Did not get HIP rebate/incentive expected (N=39)[a]	0.21 (9)	0.21 (9)	N/A	
Trouble making purchase	0.21 (16)	0.12 (5)	0.22 (11)	[0.198]
Confusion about balance	0.16 (15)	0.25 (8)	0.15 (7)	[0.295]
Forgot PIN	0.06 (4)	0.02 (1)	0.07 (3)	[0.244]
Negative attitude from cashier	0.02 (2)	0.02 (1)	0.02 (1)	[0.953]

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" responses coded as missing.
Respondents selected all options that applied; proportions therefore sum to more than one.
Includes responses only from respondents who reported they had problems with their EBT card.
Test statistics are adjusted for clustering at the individual respondent level.
[a] Answer option available for HIP participants only.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (unweighted N=88).

Finally, to examine HIP participants' satisfaction with the program, we asked primary shoppers if they would like to keep participating in HIP (Exhibit 5.8). Ninety-five percent of respondents indicated that they would like to keep participating in HIP, suggesting overall satisfaction with the program, which remained high over time. Satisfaction was also high across subgroups, but those who reported more fruit and vegetable intake and those who shopped primarily at HIP participating stores at baseline were even more likely to indicate that they would like to continue participating in HIP compared to those who reported less fruit and vegetable intake and shopped primarily at non-HIP participating stores at baseline (see Appendix H, Exhibit H5.6). Consistent with the satisfaction reflected in survey responses, focus groups indicated that, overall, participants were happy with the HIP program. One focus group member noted, "I would like to have the incentive program extended. It's a very good program and would like to have it offered to others," and another, "I was happy to get rewarded for eating healthier or making better decisions with my food stamps."

Exhibit 5.8: Primary Shopper Satisfaction with HIP, by Round: Round 2 & 3 Participant Surveys, HIP Participants

Would you like to keep participating in HIP?	Proportion (N)			
	Pooled	Round 2	Round 3	P-value
Yes	0.95 (1311)	0.96 (628)	0.95 (683)	[0.365]
No	0.05 (59)	0.04 (24)	0.05 (35)	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" and "refused" responses coded as missing.
Includes participants who reported they had not heard of HIP.
Due to rounding, reported proportions may not sum to one.
Source: Participant Survey (primary shopper module); (unweighted N=1,370).

5.3 HIP Purchases and Earning HIP Incentives

This section uses EBT data to measure the HIP purchases and incentives earned by HIP participant households. EBT data, described more fully in Chapter 2, report the date, location, and amount of all SNAP transactions. The EBT data include all SNAP households in Hampden County, not only the survey sample. This section uses EBT data for HIP participants only.[59]

Our terminology makes the following distinction between targeted fruit and vegetable purchases (TFVs) in general and HIP purchases more specifically:

- **TFV purchases** are the value of any household's purchases of targeted fruits and vegetables, in any retailer, with any tender (such as credit card, cash, or EBT).
- **HIP purchases** are the value of a HIP participant household's TFV purchases recorded by the EBT system in a participating retailer.

In participating retailers with IECRs, TFV purchases were recorded automatically for both HIP participants and non-HIP participants. In retailers lacking an IECR, cashiers had to identify TFV purchases that qualified as HIP purchases. In these retailers, TFV purchases were therefore recorded only for HIP participants and not for non-HIP participants. HIP participants had to identify themselves and the retailer had to successfully implement the manual procedures. The HIP incentive equaled 30 percent of HIP-eligible purchases up to the cap of $60 per household per month.

Our analysis classified retailers by retail category (collapsing the 12 FNS official store types eligible for HIP into 4 categories) and by whether they participated in HIP:

- **Retail categories**: supermarkets/superstores, convenience stores, grocery and specialty, and other (farmers markets/direct marketing farms). All supermarkets/superstores and some convenience stores were equipped with IECRs. Virtually all grocery, specialty, and other retailers, and some convenience stores did not use IECRs.
- **Retailer participation**: some retailers joined HIP at the start of the pilot in November 2011, some joined HIP in later months (February, June, and October,[60] 2012), and some did not join HIP at all.

For most of the pilot period, SNAP spending by HIP households averaged around $260 per household per month and was nearly equally distributed between participating and non-participating retailers (Exhibits 5.9 and 5.10).[61] Near the end of the pilot nine additional retailers (including three supermarkets and four grocery stores) began participating in HIP. As a result, the fraction of SNAP spending in participating retailers increased somewhat beginning in October 2012.

---

59 Chapter 6 uses EBT data to estimate pilot impacts on food purchase outcomes, comparing HIP participants to non-HIP participants.

60 One retailer in the October 2012 cohort ended up joining on November 1, 2012.

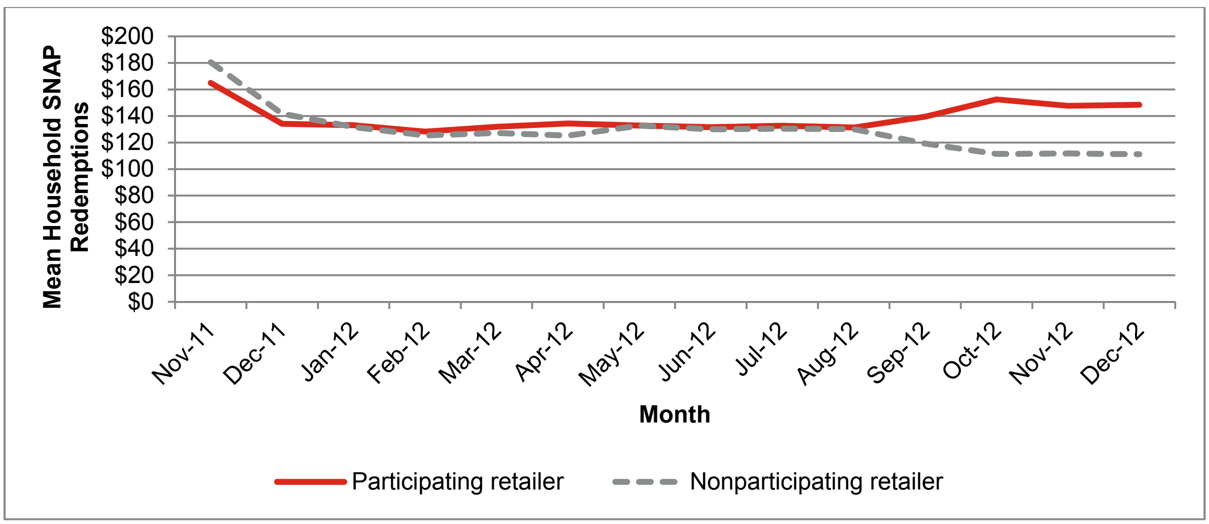
61 SNAP redemptions were relatively high in November 2011 as many households received additional SNAP disaster benefits due to the severe late October snow storm that struck western Massachusetts, including Hampden County.

Exhibit 5.9: Mean Monthly SNAP Redemptions of All HIP Participant Households at Participating and Non-Participating Stores

	Participating retailers		Non-participating retailers		All retailers
	Mean SNAP redemptions ($)	Percent of all SNAP redemptions (%)	Mean SNAP redemptions ($)	Percent of all SNAP redemptions (%)	Mean SNAP redemptions ($)
November 2011[a]	164.95	47.8	180.45	52.2	345.39
December 2011	134.09	48.6	141.64	51.4	275.73
January 2012	132.93	50.2	131.64	49.8	264.58
February 2012	128.32	50.6	125.40	49.4	253.72
March 2012	131.92	50.9	127.20	49.1	259.12
April 2012	134.34	51.8	125.23	48.2	259.57
May 2012	132.71	50.0	132.71	50.0	265.42
June 2012	131.53	50.3	129.95	49.7	261.48
July 2012	132.64	50.4	130.51	49.6	263.15
August 2012	131.33	50.2	130.08	49.8	261.41
September 2012	139.48	53.9	119.28	46.1	258.76
October 2012	152.54	57.8	111.39	42.2	263.93
November 2012	147.76	56.9	111.74	43.1	259.50
December 2012	148.43	57.2	111.14	42.8	259.58

HIP store status determined separately for each month.
Due to rounding, reported percentages may not sum to 100.[a] November 2011 SNAP redemptions elevated due to receipt of SNAP disaster benefits.
Source: EBT Transaction Data (average of 46,440 households per month).

Exhibit 5.10: Mean Monthly SNAP Redemptions of All HIP Participant Households at Participating and Non-Participating Stores



November 2011 SNAP redemptions elevated due to receipt of SNAP disaster benefits
Source: EBT Transaction Data (average of 46,440 households per month).

There was some variation in HIP purchases of targeted fruits and vegetables from month to month, but, in general, monthly HIP purchases remained fairly low, relative to initial expectations, throughout the pilot.[62] Within the participating retailers, mean monthly HIP purchases rose from slightly under $10 in January 2012 to more than $12 in June 2012, and then subsided slightly through September 2012 (Exhibit 5.11). Mean monthly HIP purchases increased slightly again in October 2012 as additional retailers began participating in HIP.

Exhibit 5.11: Mean Monthly HIP Purchases of all HIP Participant Households, by Store Type

	Supermarkets/ Superstores ($)	Convenience ($)	Grocery ($)	Other ($)
November 2011[a]	11.18	0.04	0.10	0.00
December 2011 [a]	7.74	0.04	0.04	0.00
January 2012 [a]	9.68	0.03	0.07	0.00
February 2012	10.60	0.07	0.04	0.00
March 2012	10.91	0.05	0.08	0.00
April 2012	11.68	0.06	0.10	0.00
May 2012	11.84	0.04	0.08	0.00
June 2012	12.80	0.03	0.12	0.02
July 2012	12.68	0.03	0.11	0.05
August 2012	12.14	0.06	0.15	0.07
September 2012	11.13	0.03	0.30	0.10
October 2012	12.32	0.03	0.38	0.09
November 2012	11.61	0.01	0.41	0.01
December 2012	10.71	0.01	0.39	0.00

Includes all HIP households, including those who made no HIP purchases of TFVs during the month or no HIP purchases in a given store type.
[a] HIP rollout occurred November 2011-January 2012 and HIP purchases were lower until all HIP households were participating; November 2011 elevated due to receipt of SNAP disaster benefits.
Source: EBT Transaction Data (average of 46,440 households per month).

SNAP and HIP Purchases by Retailer Type

We examined SNAP purchases and HIP purchases separately by retailer type to understand where HIP participants spent their SNAP benefits and earned HIP incentives. We aggregated the monthly transaction data across the period from March to October 2012 and also divided transactions into two time periods roughly corresponding to the Round 2 and Round 3 participant surveys. This allowed us to examine SNAP expenditures in the same time period when food consumption was measured by the 24-hour dietary recall data.

For the time period corresponding to the Round 2 participant survey (March through July 2012), mean monthly HIP purchases were $12.12 (Exhibit 5.12). For the time period corresponding approximately to the Round 3 participant survey (August through October 2012), mean monthly HIP purchases were almost unchanged at $12.21, even though total SNAP purchases in participating retailers had increased moderately (from $132.99 to $140.36 per month).

---

62 Initial expectations were based on USDA's Thrifty Food Plan (TFP) recommendation for fruit and vegetable spending and Blisard and Steward's (2006) estimate of average fruit and vegetable spending as a fraction of the TFP. Early calculations (designed to estimate a likely upper bound for HIP purchases, so that the implications of the incentive cap could be anticipated) suggested that on average SNAP households in Hampden County might spend about $70 on fruits and vegetables per month and earn incentives of about $20 per month.

To provide a sense of the size of HIP purchases relative to households' overall grocery spending, we calculated the percent of all SNAP purchases and the percent of SNAP purchases in participating retailers that HIP purchases represented. In both rounds, these HIP purchases represented approximately 5.1 percent of SNAP purchases in all retailers (including both retailers that did and did not participate in HIP). HIP purchases represented 10.3 percent of SNAP purchases in participating retailers in Round 2 and 9.7 percent of SNAP purchases in participating retailers in Round 3.

Exhibit 5.12: Mean Monthly SNAP Purchases and HIP Purchases of all HIP Participant Households, by Round

	Pooled (March-October 2012)	Round 2 (March–July 2012)	Round 3 (August–October 2012)	Change: Round 3 – Round 2	[P-value]
SNAP purchases at all retailers ($)	261.82	262.54	261.09	-1.45	[0.112]
SNAP purchases at participating retailers ($)	136.68	132.99	140.36	7.37	[<0.001]***
Supermarkets/superstores ($)	126.36	122.83	129.88	7.06	[<0.001]***
Convenience—IECR and non-IECR ($)	3.95	4.03	3.88	-0.14	[0.375]
Grocery ($)	6.21	6.11	6.30	0.19	[0.343]
Other ($)	0.16	0.03	0.30	0.27	[<0.001]***
HIP purchases ($)	12.16	12.12	12.21	0.09	[0.482]
HIP purchases as a percent of total SNAP purchases at all retailers[a] (%)	5.10	5.10	5.10	-0.03	[0.625]
HIP purchases as a percent of total SNAP purchases at participating retailers[a] (%)	10.00	10.30	9.70	-0.59	[<0.001]***
Incentives earned ($)	3.65	3.64	3.66	0.03	[0.498]
Percent of SNAP households that earned an incentive (%)	65.60	65.60	65.70	-0.10	[0.794]

F-test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported changes may differ from the differences between the means for Round 2 and Round 3.
Test statistics are adjusted for clustering at the household level for the separate Round 2 and Round 3 results.
[a] Calculated as average of household-level percentages.
Source: EBT Transaction Data (6,214 HIP participant households).

Almost all HIP purchases (97.7 percent), and therefore almost all incentives earned, were in supermarkets and superstores (Exhibit 5.13). There are three plausible and not mutually exclusive reasons why HIP purchases were predominantly in just this single retail format. First, most SNAP spending (80 percent overall and 92.5 percent of spending in HIP participating stores) is in supermarkets and superstores. It is common for SNAP participants to make a major shopping trip shortly after benefits are credited, usually in a supermarket or superstore (Wilde and Ranney, 2000; Wilde and Andrews, 2000; Shapiro, 2005; Castner and Henke, 2011). Second, supermarkets and superstores sell comparatively more fruits and vegetables than smaller stores. Third, it is possible that through lack of knowledge or because of the transaction time burden, some fruit and vegetable purchases in smaller stores lacking IECRs may not have been separated and registered so that the incentive could be earned (though we have no direct evidence on this point).

Exhibit 5.13: Mean Monthly SNAP Purchases for HIP Participant Households at HIP Participating Retailers, by Round

Retailer type	Pooled (March-October 2012)	Round 2 (March–July 2012)	Round 3 (August–October 2012)	Change: Round 3 – Round 2	[P-value]
SNAP purchases					
All retailers ($)	136.68	132.99	140.36	7.37	[<0.001]***
Supermarkets/superstores ($)	126.36	122.83	129.88	7.06	[<0.001]***
Convenience—IECR and non-IECR ($)	3.95	4.03	3.88	-0.14	[0.375]
Grocery ($)	6.21	6.11	6.30	0.19	[0.343]
Other ($)	0.16	0.03	0.30	0.27	[<0.001]***
HIP purchases					
All retailers ($)	12.16	12.12	12.21	0.09	[0.482]
Supermarkets/superstores ($)	11.88	11.96	11.81	-0.15	[0.205]
Convenience—IECR and non-IECR ($)	0.04	0.05	0.04	>-0.01	[0.711]
Grocery ($)	0.19	0.10	0.27	0.17	[<0.001]***
Other ($)	0.05	0.02	0.09	0.07	[<0.001]***
HIP purchases as percentage of SNAP purchases[a]					
All retailers (%)	10.00	10.30	9.70	-0.59	[<0.001]***
Supermarkets/superstores (%)	9.70	10.10	9.30	-0.82	[<0.001]***
Convenience—IECR and non-IECR (%)	0.10	0.10	0.10	>-0.01	[0.947]
Grocery (%)	0.20	0.10	0.30	0.18	[<0.001]***
Other (%)	0.10	<0.01	0.10	0.05	[0.058]*

F-test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported changes may differ from the differences between the means for Round 2 and Round 3.
Test statistics are adjusted for clustering at the household level for the separate Round 2 and Round 3 results.
[a] Calculated as average of household-level percentages.
Source: EBT Transaction Data (6,214 HIP participant households).

HIP Incentives Earned

More than a third (34 percent) of HIP households had no HIP purchases at all in a given month (Exhibit 5.14). However, few HIP households (4.5 percent) did not earn any incentives at all during the pilot.[63]

Experiences in Rounds 2 and 3 were similar. There are two categories of households that did not earn incentives in a given month:

- Half of this group had no SNAP purchases in participating HIP retailers. There are a number of possible explanations for this finding. Retail access issues could be one important reason for not making use of the pilot. Alternatively, some households may have chosen not to change their usual shopping location (maybe because the incentive was not large enough) or they may not have understood that since not all retailers participated, they might have to change their usual shopping location to earn the incentive.
- The other half of the zero incentive earners did patronize participating retailers but did not make any HIP purchases at those retailers, suggesting that some consumers did not seek to purchase targeted fruits and vegetables at the participating retailers, or at least did not use their SNAP benefits for this purpose.

At the other end of the spectrum, slightly more than one third (36 percent) of HIP households had monthly HIP purchases greater than $12. Only a few of these households either spent all their benefits on TVFs or reached the $60 incentive cap in any month. The remaining 30 percent of HIP households had monthly HIP purchases greater than zero but less than $12.[64]

---

63 Only 126 Wave 1 households, 122 Wave 2 households, and 77 Wave 3 households earned no incentives during their eligibility period. The total number of HIP households that received a SNAP benefit in any month during the November 2011 to December 2012 period was 7,301. Thus, the percent of HIP households that never earned any incentives is [(126+122+77)/7301] 4.45%.

64 Appendix F, Exhibit F5.1 presents these data on incentive earnings broken down by store type and separately for Round 2 and Round 3. Most SNAP purchases, HIP purchases, and incentives earned occurred in supermarkets and superstores.

Exhibit 5.14: Distribution of HIP Households by TFV Purchases

	Pooled (March-October 2012)	Round 2 (March–July 2012)	Round 3 (August–October 2012)	Change: Round 3 – Round 2 [P-value]	
Never shopped at participating stores (%)	17.00	17.45	16.55	-0.90	[0.004]***
HIP households that shopped at participating stores (%)					
TFV = $0	17.36	16.97	17.75	0.78	[0.021]**
$0<TFV<=$6	15.00	14.99	15.02	0.03	[0.923]
$6<TFV<=$12	14.63	14.60	14.66	0.06	[0.860]
TFV > $12	36.01	36.01	36.01	0.01	[0.987]
Total	100.00	100.00	100.00		

F-test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported percentages may not sum to 100 and reported changes may differ from the differences between the means for Round 2 and Round 3.
Test statistics are adjusted for clustering at the household level for the separate Round 2 and Round 3 results.
Source: EBT Transaction Data (6,214 HIP participant households).

SNAP and HIP Purchases by Participant Subgroup

HIP purchases, and hence HIP incentives earned, differed for subgroups defined by the demographic, financial, and location characteristics of SNAP participant households (Exhibit 5.15). We conducted these subgroups analyses separately; the separate associations do not necessarily imply that all of these characteristics independently affect HIP purchases.

In any given month over the period from March to October 2012, 65.7 percent of households had some positive amount of HIP purchases and hence earned some incentive. As noted earlier, the mean monthly HIP purchase was $12.16, so the mean incentive earned was $3.65. For all households combined (including those who had no HIP purchases), mean HIP purchases represented 5.1 percent of all SNAP purchases.

As one would expect, the take-up of the HIP incentive increased with higher SNAP benefits. Of households with more than $350 in monthly SNAP benefits, 80 percent had some positive amount of HIP purchases. Compared to households with lower benefit levels, the mean HIP purchase amount in dollars ($18.57) was elevated for households in this highest category of SNAP benefits. However, HIP purchases as a percentage of all SNAP purchases was largest for households who received the lowest SNAP benefits.

Male one-person households had lower take-up of HIP benefits, compared with other household types including single females and households with children. Only 52.7 percent of single males had any HIP purchases at all. The mean HIP purchase was $7.52, which represented only 4.4 percent of all SNAP purchases.

Compared to other households, the take-up of the HIP incentive was higher for households whose primary language was Spanish. Take-up also was higher for households who identified as Hispanic or "other" race/ethnicity (principally Asian). The take-up of the HIP incentive was lower, and the mean HIP purchase amount was lower, for households that included a disabled person, compared with households that did not.

For households whose head was 55 or older, the mean SNAP benefit was lower than for other households. SNAP households with an older head are frequently one-person households and are likely to have some cash income (both of which are characteristics that lead to lower SNAP benefits). Despite the low mean SNAP benefits, the mean HIP purchase amount for these households was almost as high as for households with the youngest heads of household. For households having an older household head, HIP purchases were fully 7.6 percent of all SNAP purchases, a higher percentage than was observed for other households.

Exhibit 5.15: HIP Purchases, SNAP Purchases, and HIP Incentives Earned, by Subgroup

Baseline household characteristics	HIP household with HIP purchases in a given month (%)	Mean monthly SNAP purchases ($)	Mean monthly HIP purchases[a]		Mean HIP incentive earned[c] ($)
			Dollars ($)	Percent of SNAP purchases[b] (%)	
Race/ethnicity of HoH					
Hispanic	69.74	285.67	12.83	4.91	3.85
White	62.37	239.53	11.64	5.32	3.49
Black	61.31	256.36	10.07	4.42	3.02
Other	64.52	229.32	14.79	6.81	4.43
Across subgroups p-value	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
Primary language					
Other primary language	64.08	265.34	11.14	4.63	3.34
Spanish primary language	70.01	251.28	15.05	6.46	4.51
Across subgroups p-value	<0.001***	0.002***	<0.001***	<0.001***	<0.001***
Monthly household income					
$0	64.76	308.03	11.97	3.97	3.59
$1 - $787	64.73	262.83	11.88	4.73	3.56
$788 - $1,083	63.83	203.11	10.64	5.74	3.19
$1,084 +	69.67	285.17	14.50	5.91	4.35
Across subgroups p-value	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
Age of HoH					
16 - 30	69.15	337.30	12.47	3.74	3.74
31 - 40	69.10	339.44	14.12	4.24	4.23
41 - 54	61.04	222.69	10.45	4.71	3.14
55 +	64.04	162.38	12.06	7.64	3.62
Across subgroups p-value	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
Disabled HoH					
Not disabled	71.06	330.79	14.41	4.75	4.32
Disabled	61.04	202.36	10.28	5.43	3.08
Across subgroups p-value	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
Household composition					
Household with children (no elderly)	77.63	403.12	16.72	4.41	5.01
Household with elderly (with or without children)	62.66	152.43	12.49	8.46	3.75
Other household	57.78	187.43	8.83	4.78	2.65
Across subgroups p-value	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
Household size and headship					
HH Size 2+ male head	73.09	320.40	20.16	6.75	6.03
HH Size 2+ female head	76.37	382.63	15.77	4.48	4.73
HH Size 1 male head	52.69	170.35	7.52	4.44	2.26
HH Size 1 female head	61.39	165.89	10.10	6.39	3.03
Across subgroups p-value	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***

Baseline household characteristics	HIP household with HIP purchases in a given month (%)	Mean monthly SNAP purchases ($)	Mean monthly HIP purchases[a] Dollars ($)	Mean monthly HIP purchases[a] Percent of SNAP purchases[b] (%)	Mean HIP incentive earned[c] ($)
Monthly SNAP benefit					
$1 - $160	57.20	146.28	8.86	6.53	2.66
$161 - $200	59.08	193.92	9.47	4.85	2.84
$201 - $349	75.93	304.36	14.89	5.12	4.47
$350 +	79.95	466.49	18.57	4.05	5.57
Across subgroups p-value	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
Location					
Springfield	65.45	265.77	11.78	4.90	3.53
Chicopee & Holyoke	68.35	264.54	12.23	5.16	3.67
Other	63.13	248.18	13.10	5.60	3.93
Across subgroups p-value	<0.001***	<0.001***	0.016**	0.001***	0.016***
All	65.66	261.59	12.18	5.12	3.65

F-test: *p<0.1, **p<0.05, ***p<0.01.
Test statistics are adjusted for clustering at the household level
[a]HIP purchases are SNAP expenditures recognized in EBT records as having been spent on target fruits and vegetables, net of returns; mean includes households that made $0 purchases.
[b]HIP purchases as a percent of SNAP purchases calculated for each household; column shows the mean percentage across households, including those with $0 HIP purchases.
[c]Equal to 30 percent of HIP purchases up to the statutory cap; includes households with $0 HIP incentives earned.
Source: EBT Transaction Data, pooled across March-October 2012 and DTA SNAP Caseload Data, July 2011(average of 6,212 households per month).

5.4 Discussion

Taken together, the findings from the participant survey suggest that some HIP participants did not fully understand the pilot, especially near the beginning of their period of participation. Just over 60 percent of HIP participants reported that they had heard about HIP when asked in the Round 2 survey, which occurred 4–6 months after HIP implementation. Awareness increased over time; by the Round 3 survey, 9–11 months after implementation, three-quarters of HIP participants reported having heard about HIP. Understanding how HIP worked and which fruits and vegetables qualified for the incentive also increased over time. About 60 percent of households in Round 2 reported that it was at least “somewhat easy” to understand. Understanding increased by about 15 percentage points in Round 3 with approximately 75 percent of households reporting it was at least “somewhat easy” to understand HIP.

As discussed in Chapter 3, DTA expended considerable resources developing participant notifications and materials that provided information on how HIP operated. The department also developed training materials and provided many training sessions. Despite these efforts, few HIP participants availed themselves of training sessions. Few trainings were offered in the evening or on weekends and some stakeholders interviewed suggested that more participants might have attended if some trainings were held after work and school hours. In retrospect, some DTA staff interviewed suggested that simpler notification materials may be more effective and that alternate means of communicating with participants, such as through social media, should be considered if HIP were to be expanded nationwide. Focus groups also revealed some literacy issues among HIP participants, suggesting that more visual media may also be useful in increasing understanding and awareness of HIP. Also, widespread communication about HIP was not possible during the pilot due to the design of the evaluation and the fact that not everyone was selected to participate in HIP.

Although HIP participants valued the program (95 percent wanted to keep participating), HIP purchases remained fairly low throughout the pilot relative to initial expectations. Based on analyses conducted during the evaluation's design phase (and consistent with self-reported total fruit and vegetable expenditures reported in Chapter 6), it seemed plausible that households might spend $70 per month on TFVs, earning them $20 in incentives. On average, HIP households spent $11-$13 on targeted fruits and vegetables using their EBT card in participating retailers each month, which earned them an average of $3-$4 in HIP incentives. Overall, two-thirds of HIP households purchased some HIP-eligible foods in an average month, thus earning incentives. The other one-third of households did not earn any incentives in a specific month. Of these households, about half of them did not make any SNAP purchases in stores participating in HIP. The other half did some shopping in HIP participating stores, but did not purchase any targeted fruits and vegetables.

Several barriers may have prevented HIP participants from achieving higher levels of HIP purchases and earning higher levels of incentives. As reported in both surveys and focus groups, some participants did not fully understand how the pilot worked and how incentives could be earned, including the types of fruits and vegetables that were eligible to earn incentives and which retail stores were participating in HIP. Others may have understood the basic mechanics of the pilot, but without fully appreciating the potential value of altering shopping patterns so that TFV spending was conducted specifically in participating retailers (and not in other authorized SNAP retailers) and specifically with EBT benefits (not cash). Still other participants may have faced transportation barriers that prevented their access to participating retailers, or they may have patronized participating retailers without IECRs that did not reliably separate out qualifying HIP purchases. Finally, some participants may simply not have wanted to consume fruits and vegetables in the first place. Taken together, HIP purchases and incentives earned were only about 20 percent of what was anticipated at the start of the pilot.

6. Effects on Expenditures and Shopping Behaviors

HIP was expected to affect fruit and vegetable consumption primarily by affecting food expenditures and shopping patterns. Over the course of the pilot, SNAP participants made decisions every month about where to shop and what to purchase. HIP's price incentive may have encouraged households to increase total spending on targeted fruits and vegetables. Also, even when households would have made particular TFV purchases anyway, HIP gave the households an economic motivation to conduct such purchases with SNAP benefits at participating retailers, so that the purchases would earn the incentive. Thus, HIP potentially could have led households to shift more of their grocery spending to retailers that participated in HIP and to have increased their purchases of TFVs.

As we discuss in detail, we use both EBT data and household survey data to explore the presence and magnitude of the expected changes in where households shopped and how much TFVs they bought. Specifically, this chapter examines HIP effects on expenditures and shopping behaviors and is organized as follows:

- HIP impacts on food expenditures, including total SNAP spending and fruit and vegetable spending (Section 6.1)
- HIP impacts on shopping patterns, including decisions about which retailers to patronize in order to understand the mechanisms by which HIP affected expenditures (Section 6.2)
- Spending in farmers markets (Section 6.3)

As discussed in Chapter 2, the analyses of both EBT transaction data and participant surveys are based on (regression-adjusted) comparisons of the HIP and non-HIP groups.[65] Participant survey analyses combine reports from both post-implementation survey rounds (Round 2 and Round 3). Similarly, EBT analyses combine transaction data from March-October 2012, the six-month period spanning the last two participant surveys.[66]

---

[65] SNAP spending measures calculated from EBT transaction data presented in this chapter differ slightly from the estimates presented in Chapter 5 because Chapter 6 uses regression-adjusted estimation procedures. Covariates included: household residential location; size, composition, and primary language of household; household income and SNAP benefit; age, race/ethnicity, gender, and disability status of household head; and sampling wave.

[66] Appendix G presents analyses of changes between Round 2 and Round 3; results are similar to those presented here. Appendix H presents subgroup analyses for the outcomes presented in this chapter. Specifically, we considered differential impacts for those subgroups for which we found significant differential impact of HIP on consumption variables (current or preliminary analyses), as well as for subgroups by baseline shopping occurring predominantly in HIP-participating stores, which might substantively be expected to influence impacts on expenditures even in cases where differential impacts on consumption were not observed. See discussion in Chapter 8, Section 8.6 for details on how the subgroups were created. These differences are discussed in the main text only when consistent patterns emerged that provided context for the pooled findings.

Each section uses data from both EBT transaction records and participant surveys. The two data sources appear to give different answers for some research questions; in these cases, we consider possible explanations for the observed discrepancies as appropriate.

6.1 Food and Targeted Fruit and Vegetable Expenditures

In this section, our analysis of food expenditures has four parts:

- First, we report how much HIP affected total SNAP spending. HIP participants earned incentives and therefore had some additional resources in their SNAP account.
- Second, we use EBT transaction data to measure HIP impacts on TFV purchases made with EBT cards in participating supermarkets and superstores.
- Third, we use the participant surveys to measure HIP impacts on total food spending and on fruit and vegetable spending. These self-reported food spending measures encompass both cash and SNAP resources, in both participating and non-participating retailers.
- Fourth, we discuss the similarities and differences between the EBT spending results and the participant survey spending results.

HIP Impact on Total SNAP Spending

Total SNAP spending recorded in EBT transaction data was slightly higher for HIP participant households than for non-HIP participant households (Exhibit 6.1). The original amount of SNAP benefits issued was not significantly different for the randomly assigned HIP and non-HIP groups. Total SNAP spending was higher for the HIP group because of the value of the incentives that were added to the SNAP account for HIP households only. Mean monthly SNAP spending was $264.11 for HIP households and $259.81 for non-HIP households. This small but statistically significant difference of $4.30 represents an increase of 1.7 percent over SNAP expenditures in the absence of HIP.

This small HIP impact on total SNAP spending likely increased total food spending by HIP participants, although one cannot say for certain. Previous research on SNAP spending suggests that households that receive additional SNAP benefits offset some of their value by spending less cash on food (Southworth, 1945; Fox, Hamilton, and Lin, 2004; Wilde, Troy, and Rogers, 2009; Klerman, 2013).

HIP Impact on TFV Purchases

In order to examine how HIP affected expenditures for TFVs, we would like to be able to compare TFV purchases by HIP participants to similar purchases by the non-HIP group. The following analysis of EBT transaction data provides some insight into that comparison, but with a limitation.

The limitation is that such comparisons can only be done for purchases in IECR-equipped retailers, because these retailers automatically recorded TFV purchases for *both* HIP and non-HIP participants. In Hampden County, participating retailers included several chains of IECR-equipped supermarkets/superstores and only one chain of IECR-equipped convenience stores. To avoid disclosing company-specific information, we conducted this analysis using only data for the supermarkets/superstores. The IECR-equipped supermarkets/superstores also implemented HIP in some areas outside Hampden County, notably in adjoining Massachusetts and Connecticut counties. SNAP household spending in these stores is captured in the EBT data.

This analysis excludes TFVs purchased in non-supermarkets/superstores and in non-participating retailers. Moreover, by definition, our EBT data do not include any information about cash purchases of fruits and vegetables. As shown in Chapter 5 (Exhibit 5.13), 92.5 percent of all SNAP purchases made in HIP participating retailers and 97.7 percent of all HIP purchases in participating retailers were made in supermarkets/superstores, so the HIP/non-HIP comparison in supermarkets/superstores captures the overwhelming share of TFV purchases using SNAP benefits in participating retailers.

In these supermarkets/superstores, non-HIP participant households had mean monthly TFV purchases of $10.86, and HIP participants had significantly higher mean monthly TFV purchases of $12.05, an increase of $1.19, or 11 percent (Exhibit 6.1). These HIP/non-HIP differences are statistically significant. For non-HIP households, eligible TFV purchases represented 9.3 percent of total SNAP purchases in participating supermarkets/superstores. For HIP households, TFV purchases were 10 percent of SNAP purchases in these stores.

Exhibit 6.1: Impact of HIP on Mean Monthly SNAP Issuance, SNAP Purchases and TFV Purchases

	Regression-adjusted mean (SE)		Impact			
Monthly issuance/purchases	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
SNAP issuance ($)	260.94 (1.07)	260.49 (0.42)	0.45	{1.15]	{0.390}	(0.696)
SNAP purchases in all retailers ($)	264.11 (1.09)	259.81 (0.43)	4.30	[1.17]	{3.687}	(<0.001)***
Purchases in HIP participating supermarkets/superstores						
SNAP purchases ($)	126.51 (1.06)	122.17 (0.41)	4.34	[1.13]	{3.836}	(<0.001)***
Eligible TFV purchases ($)	12.05 (0.15)	10.86 (0.05)	1.19	[0.16]	{7.600}	(<0.001)***
Eligible mean household TFV purchases as percent of SNAP purchases (%)[a]	10.03 (0.11)	9.32 (0.04)	0.71	[0.12]	{6.197}	(<0.001)***

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the household level.
[a] Calculated as average of household-level percentages.
Source: EBT Transaction Data, pooled across March-October 2012 (average of 45,912 households per month).

In addition to these analyses of HIP impacts on TFV spending in participating supermarkets/superstores, Appendix H presents results by subgroups (Exhibit H6.2).[67] There were

[67] Appendix H, Exhibit H6.2 also presents subgroup analyses of HIP impacts on SNAP purchases in participating supermarkets/superstores. Overall, there is little evidence of differential changes in SNAP purchases; the only significant difference was for residential location.

few statistically significant differences in HIP impact across subgroups, though we did find differences by age of the household head, by household head race/ethnicity, household composition, and residential location. Given multiple comparisons issues (discussed in Chapter 2), these results should be viewed with caution. In particular, note that similar subgroup tests for differences in impact were conducted for key food consumption measures and there were no corresponding differences in HIP impacts (see Chapter 8).

Self-Reported Expenditures on All Food and on Fruits and Vegetables

Survey participants reported their usual expenditures on all groceries and more specifically on fruits and vegetables (Exhibit 6.2).[68] In contrast with the EBT analysis in the previous section, the survey spending data encompass both participating and non-participating retailers, supermarkets/superstores and other retail formats, non-SNAP purchases (e.g., with cash), and fruits and vegetables of all kinds, including some that do not qualify as TFVs. No significant impacts of HIP were found on usual grocery spending using SNAP benefits, on usual grocery spending using cash, or on spending in restaurants.

Exhibit 6.2: Impact of HIP on Self-Reported Monthly Expenditures, Linear Regression Model

	Regression-adjusted mean (SE)		Impact			
Monthly expenditures ($)	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Groceries using only SNAP (N=31,31)	275.16 (4.49)	276.84 (3.83)	-1.67	[5.90]	{-0.284}	(0.776)
Groceries not using SNAP (N=3,051)	149.06 (3.83)	148.29 (3.91)	0.77	[5.31]	{0.145}	(0.885)
Food items [a] (N=2,949)	105.52 (3.34)	106.91 (3.33)	-1.39	[4.56]	{-0.304}	(0.761)
Nonfood items (N=2,949)	43.30 (1.67)	41.26 (1.54)	2.04	[2.30]	{0.888}	(0.374)
Restaurants (N=3,088)	35.20 (1.31)	36.63 (1.53)	-1.43	[1.98]	{-0.720}	(0.472)
All fruits and vegetables [b] (N=2,708)	78.17 (1.95)	72.02 (2.06)	6.15	[2.69]	{2.285}	(0.022)**

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Continuous outcomes: self-reported expenses in dollars per month; "don't know" and "refused" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Calculated as grocery expenditures not using SNAP minus expenditures on nonfood items.
[b] Purchased with SNAP and with other forms of payment.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

---

68 Unless otherwise noted, the survey analysis reported in this chapter includes both Round 2 and Round 3 interviews, clustering standard errors at the respondent level to account for non-independence of interview responses within respondents. Most outcomes analyzed in this chapter are either binary or categorical outcomes. In the chapter, we present the results of analyses based on linear probability and linear regression models of pooled Round 2 and Round 3 data as these models are more easily interpretable. Appendix F presents analyses based on logistic and ordered logistic regression models.

The survey-based self-reported estimates of total grocery spending with SNAP benefits were not sufficiently precise to pick up the small increase in SNAP spending that EBT data showed for HIP participants due to the incentives earned. EBT data for all SNAP participant households in Exhibit 6.1 showed that HIP participants had mean monthly SNAP spending $4.30 higher than non-HIP participants had. For the smaller survey sample in Exhibit 6.2 there was no significant HIP/non-HIP difference in mean self-reported grocery spending with SNAP.

HIP positively affected self-reported spending on fruits and vegetables. HIP participants reported that they spent $78.17 per household per month on fruits and vegetables (across Round 2 and Round 3) and non-HIP households reported that they spent $72.02 per month. This difference of $6.15 per month is statistically significant, and represents an 8.5 percent increase in fruit and vegetable spending.[69] Note, however, that the self-reported difference between HIP and non-HIP participants refers to the HIP impact on all fruit and vegetable spending—with the EBT card or with cash, at participating retailers and at non-participating retailers, for TFVs and for non-TFVs (e.g., white potatoes, fruit juice, candied yams).

Comparing EBT Transaction Data and Survey Evidence on TFV Spending

This section compares fruit and vegetable spending as calculated from EBT transaction data and as reported by survey participants. The spending measures from the two sources are defined quite differently, and we provide evidence on how the differences can be reconciled. We examine differences in the ***level*** of fruit and vegetable spending and in the ***HIP impact*** on fruit and vegetable spending. In order to compare EBT transaction data and survey data, we estimated models for the EBT food spending measures on the survey sample only (Exhibit 6.3).

Differences in the Level of Fruit and Vegetable Spending

The differences in the level of fruit and vegetable spending are roughly as large as one would expect, given the distinct food spending concepts that are captured in the two data sources. The survey-based measure of fruit and vegetable spending includes three types of spending that are excluded from the narrower EBT-based measure:

- ***SNAP spending in non-participating retailers.*** Somewhat less than 50 percent of SNAP spending took place in non-participating retailers, which were excluded from the EBT-based estimates of fruit and vegetable spending.[70]

- ***Grocery spending using cash income.*** SNAP households purchased approximately 28 percent of their food each month using cash income.[71]

---

[69] For baseline monthly expenditures of treatment and control groups, see Appendix F, Exhibit F6.1.

[70] See Chapter 5, Exhibit 5.9, for the specific estimates of SNAP redemptions in participating and non-participating retailers.

[71] See Exhibit 6.2 for the specific estimates of self-reported grocery spending with SNAP benefits and cash income. Calculation: groceries using only SNAP/total food expenditures. For HIP households: $275.16/($275.16+$105.52) = 72.3 percent. For non-HIP households: $276.64/($276.64+$106.91) = 72.1 percent.

- ***Fruits and vegetables that do not qualify as TFVs.*** A large fraction, approximately 60 percent of fruit and vegetable intake by volume (as measured in cup-equivalents), did not qualify as TFVs. The leading fruit and vegetable foods and beverages that did not qualify as TFVs were fruit juices and white potatoes.[72]

Considering these three distinctions together, one might expect TFV spending with EBT benefits in participating retailers to be very roughly 14 percent as large as total fruit and vegetable spending in all retailers.[73] In the actual spending estimates, the HIP group had $13.83 in mean monthly EBT spending on TFVs in participating supermarkets/superstores and $78.17 in self-reported spending on all fruits and vegetables in all retailers. Similarly, the non-HIP group had $12.76 in mean monthly EBT spending on TFVs in participating supermarkets/superstores and $72.02 in self-reported spending on all fruits and vegetables in all retailers. Hence, for both groups, TFV spending with EBT benefits in participating supermarkets/superstores was approximately 18 percent as large as total fruit and vegetable spending in all retailers, which is only a little higher than our rough expectation. The main conclusion from comparing these multiple sources of information about food spending is that the EBT measure is narrowly defined, so roughly 80 percent of all self-reported fruit and vegetable spending is not captured in the EBT estimates.

72 See later Chapter 8, Exhibit 8.3, for the specific estimates of TFV intake and other fruit and vegetable intake.

73 Fifty percent of spending in participating retailers * 72 percent of food spending using SNAP benefits * 40 percent of all fruit and vegetables qualified as TFVs = 14.4.

Exhibit 6.3: Impact of HIP on Monthly Expenditures, Survey-Based vs. EBT Transaction-Based Measures, Linear Regression Model

	Regression-adjusted mean (SE)		Impact			
Monthly expenditures ($)	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Survey-reported usual monthly expenditures						
Groceries using only SNAP (N=3,131)	275.16 (4.49)	276.84 (3.83)	-1.67	[5.90]	{-0.284}	(0.776)
All fruits and vegetables [a] (N=2,708)	78.17 (1.95)	72.02 (2.06)	6.15	[2.69]	{2.285}	(0.022)**
EBT-recorded expenditures per household per month						
Total EBT purchases (N=3,434)	287.00 (4.85)	282.93 (4.64)	4.07	[6.68]	{0.610}	(0.542)
EBT purchases at HIP participating supermarkets/ superstores (N=3,434)	146.71 (3.79)	141.32 (3.44)	5.39	[5.01]	{1.075}	(0.282)
EBT IECR TFV purchases at HIP participating IECR supermarkets/superstores (N=3,434)	13.83 (0.50)	12.76 (0.51)	1.07	[0.66]	{1.614}	(0.107)
HIP incentives earned	4.15					

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Continuous outcomes: self-reported expenses in dollars per month; "don't know" and "refused" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Purchased with SNAP and with other forms of payment.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample and EBT Transaction Data, pooled across March-October 2012, for survey respondents only.

Differences in HIP Impact on Fruit and Vegetable Spending

A more difficult challenge is to explain the contrast between HIP impacts measured in the EBT transaction records and survey data. Recall that the HIP impact—that is, the HIP/non-HIP difference—for monthly household TFV purchases with EBT benefits in participating supermarkets/superstores was $1.07 (Exhibit 6.3). If HIP functioned in household budgets purely as a price incentive, we would expect essentially all of the increased fruit and vegetable spending to take place with EBT benefits in participating retailers, so we might expect this amount to represent the entire impact of HIP on fruit and vegetable spending. Yet, the HIP impact on self-reported total food spending was more than five times as large, estimated at $6.15.

It is surprising that the HIP impact on self-reported total fruit and vegetable spending is so much larger than the HIP impact on TFV spending with EBT benefits in participating supermarkets/superstores. The conceptual framework in Chapter 1 assigned a central role to HIP's financial incentive, which is only earned for TFV purchases with EBT benefits in participating retailers. It is challenging to explain why HIP should have had a large impact on types of fruit and vegetable spending that did not earn the incentive. Chapter 10 will discuss several possible explanations, including (1) the possibility that HIP had an educational or persuasive effect, leading participants to increase all types of fruit and vegetable spending and (2) the possibility that HIP participants misunderstood the incentive and thought they could receive the incentive for some purchases that were in fact ineligible. It is likely that a combination of these explanations is responsible for the comparatively high estimated HIP impact on self-reported total fruit and vegetable spending.

Food Spending Patterns at Different Levels of Understanding HIP

To further address the possibility that misunderstanding the incentive could have affected the HIP impact estimates, we conducted a *post hoc* exploratory analysis of food spending and shopping patterns by subgroup (Appendix I). The subgroups were defined by participant self-assessment of how well they understood the pilot. Among HIP survey respondents, mean monthly EBT purchases of TFVs in participating supermarkets/superstores and superstores was $14.19 for those who found HIP "easy to understand," $14.90 for those who found it "easy to understand" which fruits and vegetables earned incentives, and $14.95 for those who kept track of their incentive earnings. In contrast, TFV purchases were significantly smaller, only $12.33 among those who found HIP "not easy to understand," $12.36 for those who found it "not easy to understand" which fruits and vegetables qualified for incentives, and $12.59 for those who did not keep track of their incentive earnings. Further details are in Appendix I. In contrast with the random assignment research design used for HIP impacts throughout this report, these comparisons are merely cross-sectional and do not show the "effect" or "impact" of participant understanding on HIP spending outcomes. Nonetheless, the analysis suggests that incomplete understanding of the pilot was associated with lower HIP spending on qualifying TFVs using EBT benefits.

6.2 Shopping Patterns for HIP and non-HIP Participants

In this section, our examination of shopping patterns includes three different types of analyses:

- First, we use EBT transaction data to study the impact of HIP on SNAP purchases in retailers of different types (for example, supermarkets/superstores versus smaller retailers and participating versus non-participating retailers). HIP turned out to have only small effects on these shopping patterns in the EBT data.
- Second, we describe the changes in shopping behavior that were reported in the participant surveys. HIP participants reported that they changed their shopping behaviors in some respects, but in general HIP/non-HIP differences in self-reported shopping patterns were small.
- Third, we explore whether HIP impacts on fruit and vegetable spending was influenced in part by variation in access to participating retailers in the baseline time period.

HIP Impacts on Shopping Patterns in Different Retailer Types

This section compares HIP and non-HIP participants' SNAP purchases, including their choice of different types of retailers. HIP gave households an economic motivation to switch TFV purchases from non-participating to participating retailers because TFV purchases in non-participating retailers did not earn any incentives. The EBT transaction data provided information on the amount of SNAP purchases that took place in participating and non-participating retailers (Exhibit 6.4).

HIP had a small but statistically significant impact on the use of SNAP benefits in retailers that participated in HIP and no impact on the use of SNAP benefits in non-participating retailers. For the non-HIP group, mean monthly purchases in participating retailers were $132.38 (representing 51 percent of all SNAP purchases). For the HIP group, mean monthly purchases in participating retailers were $136.80 (representing 51.8 percent of all SNAP purchases), which is $4.41 (or 3.3 percent) higher than those of non-HIP participants. This difference is roughly equal to our estimate of mean incentive earned. Thus, these estimates are consistent with the heuristic that incentives were spent where they were earned—in participating retailers.

Supermarkets/superstores were the retail format in which most SNAP purchases were made. Approximately 80 percent of the value of all SNAP purchases made by both HIP and non-HIP households occurred in supermarkets/superstores (Exhibit 6.4). HIP had a significant impact on purchases in supermarkets/superstores. HIP participants spent $4.69 (or 2.3 percent) more in supermarkets/superstores than did non-HIP participants. Again, this increase is roughly equal to our estimate of mean incentives earned.

Exhibit 6.4: Impact of HIP on Mean Monthly SNAP Purchases by Retailer Type

	Regression-adjusted mean (SE)		Impact			
Monthly SNAP purchases ($)	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
All retailers	264.11 (1.09)	259.81 (0.43)	4.30	1.17	(3.687)	(<0.001)***
Supermarkets/ superstores	210.98 (1.11)	206.29 (0.43)	4.69	1.19	(3.951)	(<0.001)***
Convenience	26.18 (0.45)	26.13 (0.18)	0.05	0.48	(0.103)	(0.918)
Grocery	20.23 0.45	19.86 0.18	0.37	0.48	(0.767)	(0.441)
Other	2.38 (0.19)	2.48 (0.08)	-0.10	0.20	(-0.481)	(0.630)
Out of State	4.35 (0.28)	5.06 (0.11)	-0.71	0.30	(-2.362)	(0.018)**
Participating retailers	136.80 (1.06)	132.38 (0.41)	4.41	1.14	(3.879)	(<0.001)***
Non-participating retailers	127.32 (1.04)	127.43 (0.42)	-0.11	1.12	(-0.101)	(0.920)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the household level.
Source: EBT Transaction Data, pooled across March-October 2012 (average of 45,912 households per month).

Self-Reported Shopping Patterns

Self-reported shopping patterns from the participant survey were consistent with the findings from EBT data indicating little change in shopping patterns. One notable exception was that a little more than a quarter of HIP participants reported shopping at "a different store to buy fruits and vegetables." While this response is striking, whatever changes the respondents had in mind were not perceptible in other measures of shopping patterns, as discussed below.

To examine the impact of HIP on self-reported general shopping patterns from survey data, we first compared the responses of HIP participants and non-participants concerning their usual grocery store type (Exhibit 6.5). Across the nine store types examined, ranging from chain supermarkets to convenience stores to farmers markets, no significant differences emerged. HIP participants and non-HIP participants did not differ in their usual grocery shopping location; similar to findings from the

EBT data, for both groups, the most common store type was a large chain grocery store or supermarket.[74]

Exhibit 6.5: Impact of HIP on Self-reported Usual Grocery Store Type, Linear Probability Model

Usual place to shop	Regression-adjusted mean (SE) Treatment (T)	Regression-adjusted mean (SE) Control (C)	Impact T-C	Impact [S.E.]	Impact {t-statistic}	Impact (P-value)
Large chain grocery store or supermarket	0.815 (0.011)	0.816 (0.010)	-0.001	[0.015]	{-0.052}	(0.958)
Discount superstore (such as Walmart)	0.125 (0.009)	0.118 (0.008)	0.007	[0.012]	{0.573}	(0.567)
Small local store or corner store	0.022 (0.004)	0.026 (0.004)	-0.004	[0.006]	{-0.574}	(0.566)
Warehouse club store (such as Sam's Club or Costco)	0.018 (0.004)	0.023 (0.004)	-0.006	[0.006]	{-0.976}	(0.329)
Natural or organic supermarket (such as Whole Foods Market)	0.006 (0.002)	0.005 (0.002)	0.001	[0.003]	{0.559}	(0.577)
Ethnic market	0.004 (0.002)	0.006 (0.002)	0.002	[0.002]	{-0.944}	(0.345)
Farmers market/co-op	0.003 (0.002)	0.001 (0.001)	0.002	[0.002]	{0.851}	(0.395)
Convenience store (such as 7-11 or mini market)	0.002 (0.001)	0.001 (0.001)	0.001	[0.001]	{0.414}	(0.679)
Some other location[a]	0.003 (0.002)	0.003 (0.001)	>-0.001	[0.002]	{0.048}	(0.962)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Appendix F, Exhibit F6.3 presents the logistic regression model.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample; (unweighted N=3,298).

We then examined the impact of HIP on the reasons given by respondents for choosing their usual grocery store type (Exhibit 6.6). For both HIP and non-HIP households, the most common reasons were: prices/affordability (about 50 percent); store was close to home (about one-third); and variety of products available (about 20-25 percent). All other reasons were reported by fewer than 20 percent of all households.

[74] For baseline proportions of treatment and control groups who shopped at these locations, see Appendix F, Exhibit F6.2.

Exhibit 6.6: Impact of HIP on Reasons for Choice of Usual Grocery Shopping Place, Linear Probability Model

Usually shop there because…	Regression-adjusted mean (SE) Treatment (T)	Regression-adjusted mean (SE) Control (C)	Impact T-C	Impact [S.E.]	Impact {t-statistic}	Impact (P-value)
Prices/affordability	0.483 (0.015)	0.512 (0.014)	-0.030	[0.020]	{-1.507}	(0.132)
Close to home	0.309 (0.013)	0.324 (0.012)	-0.015	[0.018]	{-0.805}	(0.421)
Variety of products	0.242 (0.012)	0.200 (0.010)	0.042	[0.016]	{2.711}	(0.007)***
Produce better or fresher	0.161 (0.010)	0.134 (0.009)	0.028	[0.013]	{2.145}	(0.032)**
Sales/promotions in store	0.100 (0.008)	0.132 (0.009)	-0.032	[0.012]	{-2.570}	(0.010)**
Preferred products are available	0.095 (0.008)	0.128 (0.008)	-0.033	[0.011]	{-2.941}	(0.003)***
Familiarity with store	0.069 (0.007)	0.056 (0.007)	0.013	[0.010]	{1.242}	(0.214)
One-stop shopping	0.058 (0.006)	0.056 (0.006)	0.002	[0.008]	{0.194}	(0.846)
Quality	0.041 (0.005)	0.049 (0.006)	-0.009	[0.007]	{-1.169}	(0.243)
EBT card accepted	0.029 (0.005)	0.015 (0.003)	0.014	[0.006]	{2.412}	(0.016)**
Good service	0.027 (0.004)	0.018 (0.003)	0.010	[0.006]	{1.714}	(0.087)*
Easy to get there	0.023 (0.004)	0.018 (0.003)	0.005	[0.005]	{0.977}	(0.329)
Bulk purchases	0.021 (0.004)	0.025 (0.004)	-0.004	[0.006]	{-0.592}	(0.554)
Clean	0.020 (0.004)	0.017 (0.004)	0.003	[0.005]	{0.568}	(0.570)
Hours of operation convenient	0.006 (0.002)	0.008 (0.002)	-0.001	[0.003]	{-0.442}	(0.659)
Ethnic foods are available	0.006 (0.002)	0.008 (0.002)	-0.001	[0.003]	{-0.383}	(0.701)
Close to work	0.006 (0.002)	0.004 (0.001)	0.002	[0.003]	{0.836}	(0.403)
Close to some other location	0.004 (0.002)	0.004 (0.001)	<0.001	[0.002]	{0.054}	(0.957)
Disability accessible	0.003 (0.001)	0.001 (0.001)	0.002	[0.002]	{1.147}	(0.251)
Some other reason	0.009 (0.003)	0.007 (0.002)	0.002	[0.004]	{0.483}	(0.629)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=Yes, 0=No; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Appendix F, Exhibit F6.5 presents the logistic regression model.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample; (unweighted N=3,281).

Despite the lack of any significant differences in their usual grocery store type, HIP participants were more likely than non-participants to say they chose their usual store type because of the variety of products, better or fresher produce, and EBT card acceptance. They were less likely to say they chose their usual store type because of sales or promotions in the store,[75] because their preferred products were available, and, among those who consumed three or more servings of fruits and vegetables a day at baseline, because of quality (see Appendix H Exhibit H6.6j).[76] This pattern contains some hints, though hardly conclusive evidence, that HIP might have been influencing the choice of stores. If HIP participants were purchasing more fruits and vegetables and aiming to earn incentives, they may have chosen stores because of more variety, better produce, and acceptance of EBT cards.[77] However, given the large number of tests, these responses can be considered no more than suggestive of an impact.

HIP did not have a significant impact on reported grocery shopping frequency or the likelihood that participants would go out of their way or make a special effort to shop at a particular store for fruits and vegetables (Exhibit 6.7). Both HIP and non-HIP participants went grocery shopping about every other week, on average, and HIP and non-HIP participants said they were equally likely to go out of their way or make a special effort to shop at a particular store for fruits and vegetables.[78]

Aside from a few significant impacts on reasons for the choice of a usual grocery store type, survey results suggest that HIP did not have an impact on participants' general shopping patterns as described above. This lack of impact on general shopping patterns was consistent with comments in HIP participant focus groups, which indicated that their shopping habits had not changed, and their shopping location was primarily determined by lower prices overall, rather than a store's participation in HIP. As one participant noted, "Pretty much, I just have noticed I've stuck to my old habits."

---

75 This was the case primarily among those who frequently had fruits and vegetables in the home at baseline (see Appendix H, Exhibit H6.6e).

76 See Appendix G, Exhibit G6.5 for some significant differences between Round 2 and Round 3 in impacts of HIP on reasons for choice of usual shopping location.

77 For baseline proportions of treatment and control groups who chose their usual shopping place for different reasons, see Appendix F, Exhibit F6.4.

78 For baseline statistics on reported shopping frequency and proportion who went out of their way to shop at a particular store, for both treatment and control groups, see Appendix F, Exhibits F6.6 and F6.7.

Exhibit 6.7: Impact of HIP on Grocery Shopping Behaviors, Linear Regression Model

	Regression-adjusted mean (SE)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Grocery shopping frequency[a] (N=3,311)	5.239 (0.026)	5.218 (0.024)	0.020	[0.035]	{0.588}	(0.557)
Go out of way to shop for fruits and vegetables at particular store[b] (N=3,283)	0.387 (0.014)	0.402 (0.013)	-0.015	[0.019]	{-0.818}	(0.413)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Appendix F, Exhibits F6.8 and F6.10 present the logistic regression model; Exhibit F6.9 presents the ordered logistic regression model.
[a]Categorical outcome, 1=yearly or not at all, 2=2 to 3 times a year, 3=every other month, 4=once a month, 5=every other week, 6=once a week, 7=more than once a week; “don’t know” and “refused” responses coded as missing.
[b]Binary outcome, 1=yes, 0=no; “don’t know” and “refused” responses coded as missing.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

We also examined HIP participants’ reports of HIP-induced changes in their shopping habits. We specifically focused on changes related to purchasing fruits and vegetables and changes in shopping location. While HIP participants were asked about their perception of changes in shopping habits due to HIP, the control group was not asked about their changes in shopping habits. Thus we cannot conclude that the changes reported in this section are true impacts of HIP.

More than 70 percent of HIP participant households reported that fruits and vegetables had become more affordable to the family due to HIP (Exhibit 6.8). Consistent with this survey finding, one focus group participant noted that, “It helps a little bit, you know.” Another echoed that HIP helped with day-to-day purchasing, “Yeah, it helps. I can’t say it doesn’t.” A majority (over 60 percent) of HIP participants also felt that their family was buying a larger amount and a greater variety of both fruits and vegetables due to HIP, and those reporting buying and eating a greater variety of fruits also significantly increased over time (from Round 2 to Round 3). Consistent with this survey finding, some focus group participants noted that they had started eating more and a greater variety of fruits and vegetables, and that the program has encouraged these healthier eating behaviors in their households. As one focus group respondent commented, “It’s causing better eating habits…for my health I have to start eating right. Now everyone else is getting to eat more vegetables and more fruit because I have to purchase more of them,” and another, “It’s not the typical apples and oranges anymore—you got the apples, the oranges, the grapes, the cantaloupe, a variety.”

Less than half of HIP participants reported that HIP resulted in their family buying new fruits and vegetables that they had not tried before. However, this proportion of participants who reported buying new vegetables they had not tried before, because of HIP, significantly increased over time, and a focus group participant did note, “I’m trying lots of different vegetables and fruits that I never tried before. Before this program, I wasn’t even thinking about buying fruits and vegetables like I am now, I’m more conscious about it now.” In summary, participants reported that HIP was having the desired effects on increasing the amount and variety of fruits and vegetables purchased, as well as their affordability.

Exhibit 6.8: Primary Shopper Self-Reported Changes in Fruit and Vegetable Purchasing Due to HIP: Round 2 & 3 Participant Surveys, HIP Participants

Because of the Healthy Incentive Pilot rebates...	Proportion (N)			Change (P-value)
	Pooled	Round 2	Round 3	
Fruits and vegetables have become more affordable to family (N=1,571)	0.73 (974)	0.71 (447)	0.75 (527)	0.03 (0.093)*
Fruits				
Family is buying larger amounts of fruits (N=1,590)	0.64 (866)	0.62 (397)	0.67 (469)	0.04 (0.068)*
Family has bought and eaten greater variety of fruits (N=1598)	0.65 (888)	0.63 (404)	0.68 (484)	0.04 (0.036)**
Family is buying new fruits not tried before (N=1,603)	0.48 (660)	0.46 (293)	0.50 (367)	0.04 (0.080)*
Vegetables				
Family is buying larger amounts of vegetables (N=1,599)	0.63 (864)	0.63 (403)	0.64 (461)	0.02 (0.311)
Family has bought and eaten greater variety of vegetables (N=1604)	0.63 (870)	0.62 (404)	0.64 (466)	0.02 (0.328)
Family is buying new vegetables not tried before (N=1,600)	0.44 (609)	0.42 (267)	0.47 (342)	0.06 (0.023)**

Weighted portions (unweighted Ns).
“Don’t know” and “refused” responses coded as missing.
Due to rounding, reported Round 2/3 change may differ from differences between reported proportions for Rounds 2 and 3.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

In terms of shopping location, 72 percent of HIP participants (pooled across Rounds 2 and 3), reported that they had not changed their shopping location for fruits and vegetables due to HIP (Exhibit 6.9). The other 28 percent reported some change, though from the survey responses we cannot determine whether they began shopping in a new store or just shifted some of their fruit and vegetable purchases to a store they were already patronizing. The percentage reporting a change was slightly higher for HIP participants that had favorable baseline attitudes toward fruits and vegetables (31 percent) than for those who did not have favorable baseline attitudes (23 percent) (Appendix H, Exhibit H6.8). Because the EBT analysis in the preceding section found comparatively small HIP/non-HIP differences in food spending by retailer type, and because this section found comparatively small HIP/non-HIP differences in usual shopping locations, the most plausible interpretation is that HIP participants generally made only small changes to their choice of shopping location. Those who changed stores reported that they did so primarily because of the price of fruits and vegetables, the availability of fresh fruits and vegetables, and the greater variety of fruits and vegetables. Those who shopped primarily at HIP participating retailers at baseline were more likely to endorse these reasons for changing stores than were those who shopped primarily at non-HIP participating retailers (see Appendix H, Exhibits H6.9a-H6.9c).

Exhibit 6.9: Primary Shopper Self-Reported Changes in Shopping Location Due to HIP: Round 2 & Round 3 Participant Surveys, HIP Participants

	Proportion (N)
Because of HIP, have you changed which stores you go to, to buy fruits and vegetables? (N=1,611)	
Yes	0.28 (445)
No	0.72 (1166)
If yes, why have you changed which stores you go to? [a]	
Price of fruits & vegetables more affordable at other store (N=442)	0.77 (342)
Other store has fresh fruits & vegetables (N=442)	0.75 (333)
Other store has greater variety of fruits & vegetables (N=444)	0.65 (287)
Other store participates in HIP (N=443)	0.22 (100)
Other reason (N=443)	0.05 (23)

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" and "refused" responses coded as missing.
[a]Respondents could choose multiple reasons, so proportions do not add to one.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Relationship Between Pre-Implementation Shopping Patterns and HIP Impacts

Previous results in this chapter suggested that HIP had only small impacts on participants' choice of retailers, while hinting that HIP may have had impacts on food choices within particular retailers. Taken together, these results raise the possibility that lack of access to participating retailers could have limited HIP impacts on food spending.[79] If HIP participants did not change where they shopped during the pilot, then those who usually patronized non-participating retailers could have had fewer opportunities to earn incentives resulting in lower HIP impacts.

To explore this possibility, this section uses EBT data to compare HIP impacts on TFV spending for two groups of participants, distinguished by where they spent most of their SNAP benefits during the pre-implementation period. The hypothesis is that HIP could have had a stronger impact on TFV spending for SNAP participants who were patronizing participating retailers even before the pilot began.

This analysis used data from November 2011, the first month of the pilot, to study the pre-implementation shopping patterns for a subset of households. HIP was implemented in three waves in, respectively, November 2011, December 2011, and January 2012. For HIP participants in Waves 2 and 3, the EBT data for November 2011 describe shopping patterns prior to their participation in HIP.

---

[79] The evaluation explored issues of geographic access more directly in a separate report: *Healthy Incentives Pilot (HIP) Spatial Analysis* (2014). The analysis studied how HIP impacts varied with the distance to the nearest retailers and the distance to the retailers where SNAP participants spent most of their benefits.

We divided the Wave 2 and Wave 3 SNAP households into two groups, based on their pre-implementation shopping patterns. The two shopping groups, which were approximately equal in size, were defined as:

- **Pre-HIP participating store shoppers:** participant households who made at least 50 percent of their November 2011 (pre-implementation) SNAP purchases in participating retailers.

- **Pre-HIP non-participating store shoppers:** participant households who made less than 50 percent of their November 2011 (pre-implementation) SNAP purchases in participating retailers.

Wave 1 households and those that had no SNAP spending in November 2011 were omitted from this additional analysis. A retailer counted as "participating" if it was participating in HIP sometime during the March-October 2012 period.[80]

For both shopping groups, we used post-implementation EBT data pooled across March to October, 2012 to repeat our analysis of HIP impacts on shopping patterns and TFV purchases in participating supermarkets/superstores. Note that the two shopping groups were defined based on households' *pre-implementation* shopping patterns, while the analysis of HIP impacts was based on their *post-implementation* outcomes.

Not surprisingly, monthly TFV purchases in participating supermarkets and superstores during the pilot were much higher for households that primarily shopped in participating stores during the pre-implementation period. Among HIP households, pre-HIP participating store shoppers purchased an average of $14.44 of TFVs each month, compared with $9.50 for pre-HIP non-participating store shoppers (Exhibit 6.10). This pattern is consistent with the notion that HIP households did not make major changes in where they shopped during the pilot.

However, even though HIP purchases were greater for households that primarily shopped in participating stores prior to HIP, the HIP impact—the difference between purchases of treatment and control households—was not larger for these households than for households that primarily shopped in non-participating stores prior to HIP. Looking at the households who already shopped in participating supermarkets/superstores, the HIP impact on TFV purchases in these stores was $1.23 (Exhibit 6.10). In contrast, for households that did not already shop at participating stores prior to HIP, the impact was $1.78. We had hypothesized that the HIP impact would be greater for households that were already shopping at retailers that later ended up participating in the pilot. However, this hypothesis did not turn out to be correct. This may suggest that some households who had previously shopped mainly in non-participating stores shifted some of their TFV purchases to participating stores.

80 Appendix F, Exhibit F6.11 presents descriptive statistics of location, SNAP benefits, SNAP purchases for the two samples. Pre-HIP participating store shoppers were more likely to be located in the Chicopee/Holyoke region, while pre-HIP non-participating store shoppers were more likely to be located in Springfield or in the "other" (more rural) parts of the county.

Exhibit 6.10: Impact of HIP on Mean Monthly SNAP and TFV Purchases at Participating Supermarkets and Superstores, by November 2011 (Pre-Implementation) Shopping Behavior

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
SNAP purchases ($)				
Pre-HIP participating store shoppers	153.92 (1.67)	148.53 (0.64)	5.40 (0.003)***	
Pre-HIP non-participating store shoppers	90.41 (1.80)	85.91 (0.68)	4.50 (0.019)**	
Impact: participating – non-participating store shoppers				0.90 (0.732)
Eligible TFV purchases ($)				
Pre-HIP participating store shoppers	14.44 (0.25)	13.21 (0.09)	1.23 (<0.001)***	
Pre-HIP non-participating store shoppers	9.50 (0.28)	7.71 (0.09)	1.78 (<0.001)***	
Impact: participating – non-participating store shoppers				-0.56 (0.155)
Eligible TFV purchase as % of SNAP Purchases [a]				
Pre-HIP participating store shoppers	9.94 (0.16)	9.38 (0.06)	0.56 (0.002)***	
Pre-HIP non-participating store shoppers	10.82 (0.27)	9.46 (0.09)	1.37 (<0.001)***	
Impact: participating – non-participating store shoppers				-0.80 (0.014)**

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the household level.
Pre-HIP participating store shoppers are Wave 2 and Wave 3 households who spent at least 50 percent of their November 2011 (pre-implementation) SNAP benefits in retailers that later participated in HIP during March-October 2012 (post-implementation). Pre-HIP non-participating store shoppers are Wave 2 and Wave 3 households who spent less than 50 percent of their November 2011 (pre-implementation) SNAP benefits in retailers that later participated in HIP during March-October 2012 (post-implementation).
[a]Calculated as average of household-level percentages.
Source: EBT Transaction Data, pooled across March-October 2012 (average of 29,846 Wave 2 and 3 households per month that were identified as pre-HIP participating and non-participating store shoppers).

6.3 HIP Spending in Farmers Markets

A distinctive feature of HIP was the provision of a financial incentive directly through SNAP clients' EBT cards, which could be used in participating retailers of all types, including farmers markets. There have been previous efforts, through "Bounty Bucks" or "Double Up Bucks" programs,[81] to provide SNAP participants with incentives for fruit and vegetable purchases specifically through farmers markets. This section explores SNAP spending and HIP purchases in farmers markets in Hampden County.

Although the farmers market SNAP purchases were quite small, this topic was salient because DTA and community partners had made considerable effort to ensure that almost all farmers markets were included in the pilot. We therefore wanted to assess whether HIP affected farmers market sales.

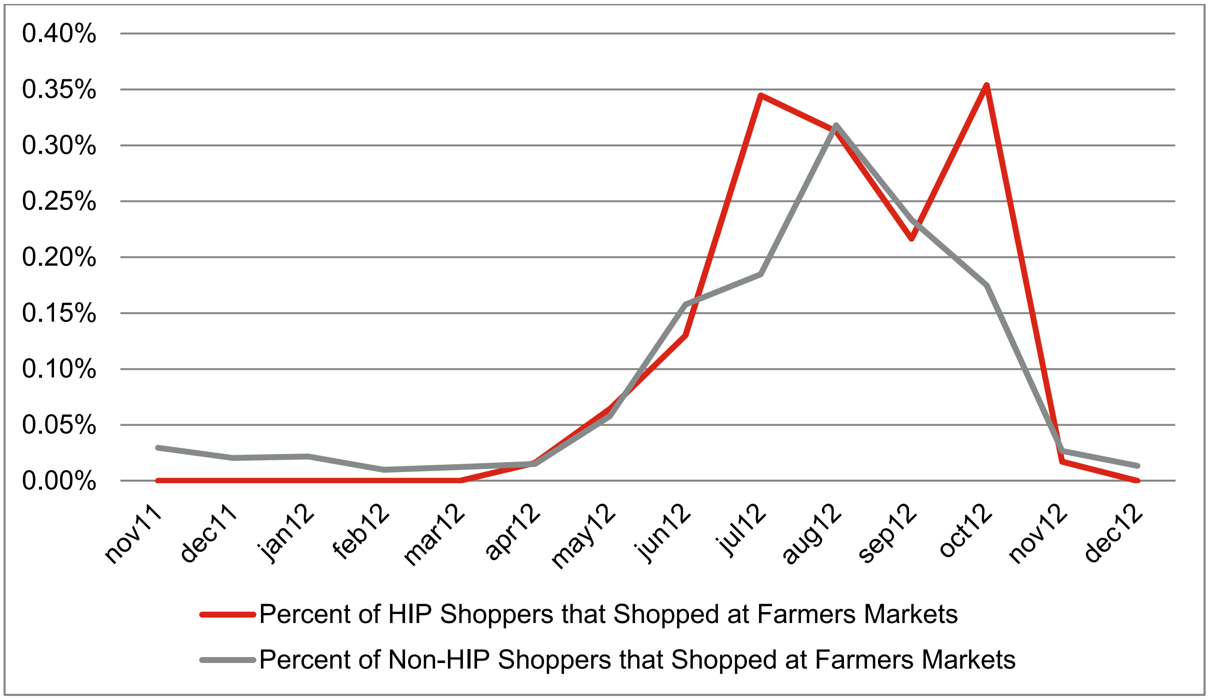
Only a small fraction of SNAP households—less than half of 1 percent—shopped in farmers markets during any given month (Exhibit 6.11). As one would expect, the highest spending months for farmers markets was when farmers markets were most active, from July through October 2012.[82] For HIP participants, use of farmers markets peaked at about 0.35 percent of all households. For non-HIP participants, use of farmers markets peaked just slightly lower at 0.32 percent of all households. One farmer who sold crops in seven different markets commented that "some people still feel stigma behind EBT [card purchases]" and that "people will sometimes go to markets outside the community to use their EBT card." Perhaps in farmers markets where the majority of transactions were cash, households felt more stigma using EBT cards. In addition, the electronic modes of implementation (as opposed to the use of tokens) used in two of the farmers markets we observed were relatively new and farmers commented that HIP transactions took considerable time. This may have discouraged some HIP participants from using their benefits in farmers markets.

---

81 For additional information see: http://wholesomewave.org/wholesomewaveresearch/.

82 The spike in October in the percent of HIP participants who shopped at farmers markets represents a very small number of households, about 20 more than would be expected from the control group percentage.

Exhibit 6.11: Percent of Households That Shopped at Farmers Markets

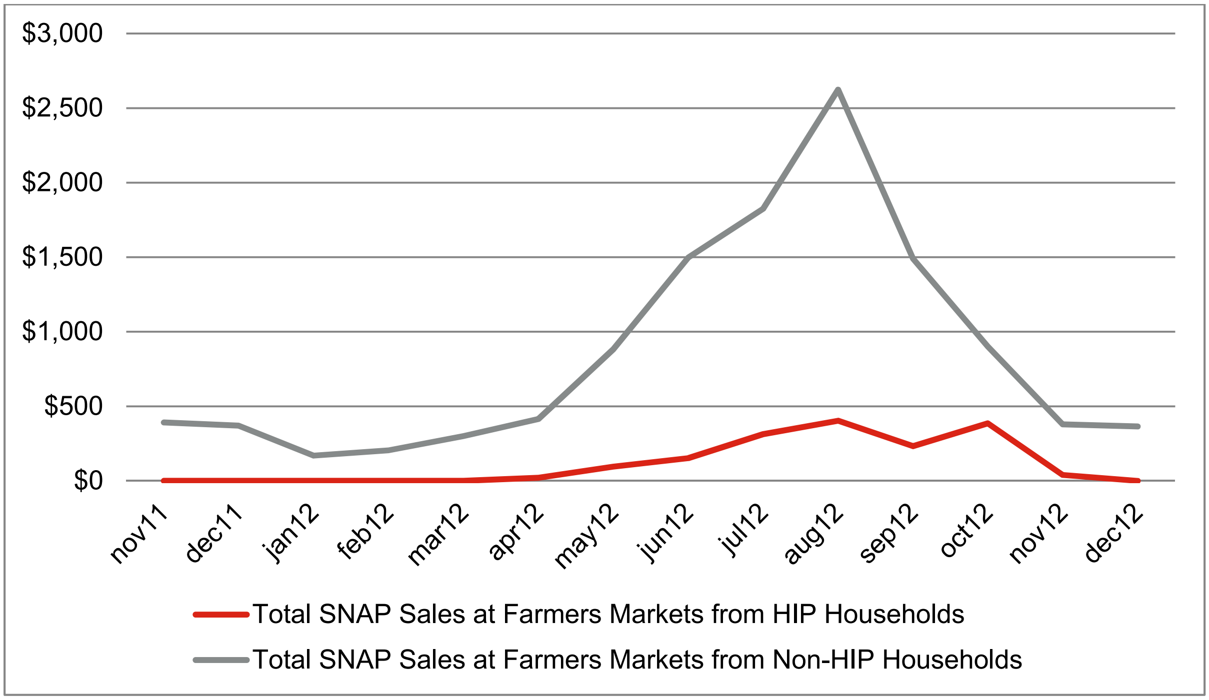


Source: EBT Transaction Data. HIP shoppers: average of 5,800 households per month; non-HIP shoppers: average of 40,640 households per month.

Averaged across all SNAP participant households, including the large number who did not patronize farmers markets, the mean SNAP spending in farmers markets amounted to 1 to 4 cents per month. We did not find significant HIP/non-HIP differences in SNAP purchases in farmers markets (see Appendix F, Exhibit F6.12).

From the perspective of the farmers markets, SNAP participants may represent a promising, and so far little-tapped, market. In the peak month (August 2012), the SNAP participant cohort (both HIP and non-HIP) represented in our EBT analysis spent almost $3,000 at Hampden County farmers markets (Exhibit 6.12). Because the non-HIP households were more numerous than HIP households overall, most of these farmers market sales came from non-HIP households.

Exhibit 6.12: Total SNAP Sales at Farmers Markets



Source: EBT Transaction Data. HIP shoppers: average of 5,800 households per month; non-HIP shoppers: average of 40,640 households per month.

Because they provide an array of fresh TFVs, farmers markets remain a promising retail format, so it is valuable that great effort was made to include farmers markets in HIP. Yet, the large majority of SNAP purchases of fruits and vegetables took place in supermarkets/superstores, which remains the central venue for reaching SNAP participants with financial incentives. At least in Hampden County, a fruit and vegetable incentive program that focused only on farmers markets would reach only a tiny fraction of SNAP households.

6.4 Discussion

HIP had significant effects on households' expenditures on fruits and vegetables. EBT data showed that HIP households spent $1.19 more per month than did non-HIP households using EBT benefits on targeted fruits and vegetables in participating supermarkets/superstores. Survey respondents were asked about their total monthly expenditures for all fruits and vegetables, including spending that would not have qualified for HIP incentives. HIP households reported spending $6.15 more per month on all fruits and vegetables than did non-HIP households.

One interpretation of the difference between the EBT estimates and the self-reported spending estimates is that HIP participants increased fruit and vegetable spending even when not earning the incentives, because the purchases were in stores that were not participating in HIP, were conducted using cash, or were for fruits and vegetables that did not qualify for the incentive. HIP's impact on total self-reported fruit and vegetable spending is more than five times as large as HIP's impact on the particular TFV purchases that earned the incentive. We return to a discussion of this divergence in Chapter 10.

This chapter also examined the shopping patterns of HIP and non-HIP participants during the pilot. EBT data showed a small but significant increase in SNAP spending in retailers participating in HIP, and no significant impact on SNAP spending in non-participating retailers. Survey analyses generally corroborated the finding that HIP impacts on shopping patterns were small.

7. Impacts on Attitudes Toward Fruits and Vegetables and Family Food Environment

This chapter analyzes the effects of HIP on participants' personal attitudes toward fruits and vegetables and on the family food environment. The participant survey collected multiple measures, including:

- Exposure to nutrition education and promotion
- Food preferences and beliefs
- Perceived barriers to the consumption of fruits and vegetables
- Barriers to grocery shopping
- Family food environment

HIP's financial incentive was the main mechanism by which the pilot was expected to influence fruit and vegetable intake. Yet, substantial literature supports the effects of attitudes, behaviors, and the family food environment, and the conceptual framework for this study recognized the role of these factors.

The analysis in the chapter is based primarily on participant survey data. Focus group findings are incorporated when relevant. The next five sections of the chapter discuss the impact of HIP on the five attitudinal outcomes measured in the participant surveys. The surveys asked multiple questions to capture participants' attitudes, and we estimate the impact of HIP on all the individual measures. In addition, to improve measurement precision and reliability, we created and analyzed composite scales based on multiple survey items. Specifically, we created scales to reflect: (1) positive attitudes toward food, fruits, and vegetables; (2) perceived barriers to fruit and vegetable consumption; (3) perceived barriers to grocery shopping; and (4) availability of fruits and vegetables in the home.[83]

Within each section, the analysis centers on regression-adjusted comparisons of HIP and non-HIP responses, combining reports from both post-implementation survey rounds (Round 2 and Round 3). Where relevant, we discuss changes in impacts between Rounds 2 and 3 of the study and also any differences in impacts across subgroups of the population. [84]

The outcomes analyzed in this chapter are either binary or categorical. For ease of interpretation, the estimates presented here are based on linear probability and linear regression models. Appendix F

---

83 Appendix E, Section E.4 discusses scale creation.

84 Appendix F, Exhibits F7.1–F7.4, presents baseline responses to all questions analyzed in this chapter. As would be expected if randomization was properly implemented, there are few statistically significant differences between the treatment and control groups in these baseline measures. Appendix G presents separate results for Round 2 and Round 3 and tests for significant changes in the impact estimates. Appendix H presents subgroup analyses for the outcomes presented in this chapter. Specifically, we considered differential impacts for those subgroups for which we found significant differential impact of HIP on consumption variables (current or preliminary analyses). These differences are discussed in the main text only when consistent patterns emerged that provided context for the pooled findings.

presents supplementary analyses based on logistic and ordered logistic regression models; results are similar to those presented here.

7.1 Exposure to Nutrition Education and Promotion

HIP participants were significantly more likely to say they had heard or seen messages about the importance of eating fruits and vegetables as part of a healthy diet. As shown in Exhibit 7.1, 76 percent of HIP participants compared to 68 percent of non-HIP participants said they had received this type of message in the prior three months. By contrast, few participants in either group attended formal nutrition education classes or programs, and there was no significant difference across the groups. These findings—impacts on messages, but not on nutrition education—are not surprising given that the pilot included multiple occasions in which DTA communicated with HIP participants about targeted fruits and vegetables, but the pilot design included no formal nutrition education component.

Exhibit 7.1: Impact of HIP on Self-Reported Exposure to Nutrition Education and Promotion in Past Three Months, Linear Probability Model

	Regression-adjusted mean (S.E.)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Heard or seen messages about fruits & vegetables (N=3,392)	0.755 (0.013)	0.679 (0.012)	0.077	[0.018]	{4.331}	(<0.001)***
Attended nutrition education class or program (N=3,406)	0.101 (0.009)	0.108 (0.008)	-0.007	[0.012]	{-0.574}	(0.566)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Appendix F, Exhibit F7.5 presents the logistic regression model.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample.

7.2 Food Preferences and Beliefs

HIP appears to have had little, if any, impact on the food preferences and beliefs of SNAP participants (Exhibit 7.2). While HIP participants appeared to agree more strongly that they enjoy trying new foods, [85] the difference was only borderline significant. HIP participants were no more likely than non-HIP participants to report that they like trying new fruits and vegetables, that they eat enough fruits and vegetables to keep healthy or that they often encourage family and friends to eat fruits and vegetables. Similarly, the composite scale reflecting positive attitudes toward food, fruits, and vegetables was not significantly different for HIP participants and non-participants.

Subgroup analyses, however (see Appendix H), indicated that HIP may have had an impact on some food preferences and beliefs for those who consumed three or more servings a day of fruits and

---

[85] Items were measured on a scale from 1 to 5, thus mean scores closer to 5 indicate that a higher percentage strongly agree and mean scores closer to 1 indicate that a higher percentage strongly disagree (e.g., a mean score of 5.0 would indicate that 100 percent said "strongly agree").

vegetables at baseline.[86] Among these respondents, HIP participants subsequently had more positive attitudes than non-HIP participants toward food, fruits, and vegetables, as indicated by the composite scale (Exhibit H7.2g; subgroup difference significant at p < .10). Specifically, HIP participants who consumed three or more servings a day of fruits and vegetables at baseline more strongly agreed than did non-HIP participants that they enjoyed trying new vegetables (Exhibit H7.2c) and that they encouraged friends and family to eat fruits and vegetables (Exhibit H7.2f). By contrast, among respondents who consumed less than three servings a day of fruits and vegetables at baseline, HIP participants were no different from non-HIP participants with respect to these attitudes.

Exhibit 7.2: Impact of HIP on Food Preferences and Beliefs, Linear Regression Model

How much do you agree or disagree that…?	Regression-adjusted mean (S.E.)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
I enjoy trying new foods (N=3,381)	3.900 (0.022)	3.834 (0.024)	0.066	[0.034]	{1.953}	(0.051)*
I enjoy trying new fruits (N=3,388)	3.903 (0.023)	3.934 (0.023)	-0.031	[0.032]	{-0.961}	(0.337)
I enjoy trying new vegetables (N=3,392)	3.680 (0.025)	3.651 (0.025)	0.029	[0.036]	{0.818}	(0.414)
I eat enough fruits to keep me healthy (N=3,383)	3.729 (0.025)	3.688 (0.025)	0.042	[0.035]	{1.182}	(0.237)
I eat enough vegetables to keep me healthy (N=3,393)	3.735 (0.026)	3.693 (0.023)	0.042	[0.035]	{1.215}	(0.225)
I often encourage family/friends to eat fruits & veg. (N=3,346)	3.866 (0.024)	3.819 (0.024)	0.047	[0.034]	{1.388}	(0.165)
Composite scale – Positive attitudes about food, fruits, & vegetables (N=3,392)	3.802 (0.015)	3.768 (0.015)	0.034	[0.021]	{1.638}	(0.102)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=strongly agree; “don't know” and “does not apply” responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Appendix F, Exhibit F7.6 presents the ordered logistic regression model; Exhibit F7.7 presents the logistic regression model.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample.

7.3 Perceived Barriers to Fruit and Vegetable Consumption

The survey examined numerous perceived barriers to consuming fruits and vegetables, including difficulty in finding and preparing these foods, cost and spoilage, and household members disliking fruits and vegetables. Overall, cost and problems eating fruits and vegetables before they spoiled were the biggest barriers to fruit and vegetable consumption seen by both the HIP and non-HIP groups (Exhibit 7.3).

[86] See discussion in Chapter 8, Section 8.6 for details on how the subgroups were created.

In addition to the participant survey, focus group discussions also raised concerns about the cost of fruits and vegetables. Focus group respondents noted that the high cost of fruits and vegetables limited their purchases. Representative comments included: "Fresh fruits and vegetables are wonderful, but they can be very expensive. You can get a quart of good quality apple juice for the price of two apples. It's less expensive to buy apple juice."

Exhibit 7.3: Impact of HIP on Perceived Barriers to Fruit and Vegetable (FV) Consumption, Linear Regression Model

How much do you agree or disagree that…?	Regression-adjusted mean (S.E.)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Hard to eat vegetables because don't know how to prepare (N=3,366)	2.388 (0.029)	2.398 (0.026)	-0.010	[0.039]	{-0.255}	(0.799)
Hard to eat vegetables because hard to find where I shop (N=3,369)	2.186 (0.023)	2.208 (0.022)	-0.022	[0.032]	{-0.672}	(0.502)
Hard to eat fruits because hard to find where I shop (N=3,372)	2.164 (0.023)	2.152 (0.021)	0.011	[0.031]	{0.361}	(0.718)
Don't eat FV as much as would like because cost too much (N=3,379)	2.921 (0.031)	2.941 (0.030)	-0.020	[0.043]	{-0.470}	(0.639)
Don't eat FV as much as would like because they spoil (N=3,372)	2.804 (0.029)	2.899 (0.029)	-0.094	[0.041]	{-2.281}	(0.023)**
Don't eat FV as much as would like because family dislikes (N=3,230)	2.139 (0.023)	2.106 (0.021)	0.034	[0.031]	{1.081}	(0.280)
Don't eat FV as much because I don't like (N=3379)	2.028 (0.020)	2.059 (0.021)	-0.030	[0.029]	{-1.060}	(0.289)
Composite scale–barriers to eating fruits & vegetables (N=3,358)	2.372 (0.015)	2.396 (0.014)	-0.024	[0.021]	{-1.178}	(0.239)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=strongly agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Appendix F, Exhibit F7.8 presents the ordered logistic regression model; Exhibit F7.9 presents the logistic regression model.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample.

HIP had no statistically significant impact on the composite scale measure of barriers to fruit and vegetable consumption. A statistically significant impact was found for only one of the seven individual perceived barriers to consumption: HIP participants were significantly less likely than non-HIP participants to agree to a statement that they ate less fruits and vegetables because they spoil. Given the large number of comparisons and the general pattern of non-significant results, we are not inclined to give much weight to this one significant finding. It is noteworthy that we see no significant difference in agreement to the statement, "I don't eat fruits and vegetables as much as I like to because they cost too much," as this suggests that the HIP price incentive was not strongly affecting participants' perceptions of costs. Taken as a whole, these findings provide little evidence that HIP affected perceived barriers to eating fruits and vegetables.

7.4 Barriers to Grocery Shopping

The participant survey investigated whether HIP affected barriers to local food retail access. The presence of supermarket "food deserts" or areas with limited supermarket access could in principle have reduced the effectiveness of the pilot. However, primary shoppers reported fairly good access to grocery retail (Exhibit 7.4).

Primary shoppers reported that they seldom were kept from grocery shopping by limited transportation or distance to the grocery store. HIP respondents were somewhat more likely than non-HIP respondents to report difficulties shopping due to limited transportation, but the difference was only borderline significant. The composite scale summarizing the two barriers to grocery shopping found no statistically significant difference between HIP and non-HIP respondents.

Exhibit 7.4: Impact of HIP on Grocery Shopping Barriers, Linear Regression Model

How often kept from grocery shopping by...	Regression-adjusted mean (S.E.)		Impact			
	Treatment	Control	T-C	[S.E.]	{t-statistic}	(P-value)
Limited transportation (N=3,275)	2.173 (0.034)	2.090 (0.032)	0.082	[0.047]	{1.748}	(0.081)*
Distance to grocery store (N=3,253)	1.965 (0.033)	1.951 (0.033)	0.014	[0.046]	{0.304}	(0.761)
Composite scale—Barriers to grocery shopping (N=3,230)	2.063 (0.030)	2.013 (3.030)	0.050	[0.043]	{1.161}	(0.246)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always; "don't know" and "refused" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Appendix F, Exhibit F7.10 presents the ordered logistic regression model; Exhibit F7.11 presents the logistic regression model.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

7.5 Family Food Environment

Past research suggests that having fruits and vegetables in the family food environment is associated with increased consumption. This could occur for several reasons: availability and visibility of fruits and vegetables at home might facilitate increased consumption; or people with stronger preferences for fruits and vegetables might be more likely to have them available at home (Jago, T. Baranowski, and J. C. Baranowski, 2007). To assess the family food environment, the household survey asked respondents a series of questions about how often fruits and vegetables were available in the home and how often they engaged in various healthy eating practices.

Based on survey responses, both the HIP and non-HIP groups commonly have fruits and vegetables at home (Exhibit 7.5). It was slightly less common to have these fruits and ready-to-eat vegetables in the refrigerator or on the counter, where they are particularly accessible and visible. Most HIP and non-

HIP respondents reported cooking evening meals at home most of the time or always, although they reported sitting down for evening meals somewhat less frequently.

Exhibit 7.5: Impact of HIP on Family Food Environment, Linear Regression Model

	Regression-adjusted mean (S.E.)		Impact			
How often do you…?	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Have fruit available at home (N=3,314)	4.303 (0.023)	4.192 (0.024)	0.111	[0.033]	{3.347}	(0.001)***
Have fruit in refrigerator or on counter (N=3,311)	4.010 (0.026)	3.955 (0.025)	0.055	[0.036]	{1.525}	(0.130)
Have vegetables available at home (N=3,315) [a]	4.501 (0.023)	4.418 (0.023)	0.083	[0.032]	{2.572}	(0.010)**
Have ready-to-eat vegetables in fridge or on counter (N=3,284)	3.898 (0.031)	3.828 (0.030)	0.070	[0.044]	{1.594}	(0.110)
Composite scale—Fruits & vegetables available at home (N=3,318)	4.175 (0.019)	4.094 (0.019)	0.081	[0.027]	{2.996}	(0.003)***
Have salty snacks at home (chips, crackers) (N=3,312)	3.202 (0.033)	3.215 (0.031)	-0.014	[0.045]	{-0.302}	(0.760)
Have lowfat/nonfat milk at home (N=3,292)	3.347 (0.045)	3.280 (0.043)	0.067	[0.063]	{1.068}	(0.290)
Have soft drinks/fruit drinks (not juice) at home (N=3312)	3.149 (0.038)	3.238 (0.036)	-0.089	[0.053]	{-1.678}	(0.093)*
Sit down with family at home for evening meals (N=2,306) [b]	3.913 (0.035)	3.920 (0.031)	-0.007	[0.047]	{-0.147}	(0.880)
Cook evening meals at home (N=3,311)	4.432 (0.022)	4.415 (0.022)	0.017	[0.032]	{0.538}	(0.590)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never/no refrigerator or freezer, 2=rarely, 3=sometimes, 4=most of the time, 5=always; “'don't know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Appendix F, Exhibit F7.12 presents the ordered logistic regression model; Exhibit F7.13 presents the logistic regression model.
[a] “No refrigerator or freezer” responses coded as missing.
[b] Asked only in households with more than one member.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

HIP participation appears to have shifted those aspects of the food environment directly related to fruits and vegetables. HIP participants more frequently had fruits and vegetables available at home, as measured by the composite scale, than did households not participating in HIP. In addition, the individual measures of fruit availability and vegetable availability were significantly higher for HIP participants than non-HIP participants.[87]

The perception that fruits and vegetables were available more frequently at home was also mentioned in the focus group discussions. One HIP participant commented, “Yeah, I definitely started eating more vegetables and fruits, definitely.” Another focus group participant noted that, “My daughter is eating more fruit now. Now she’ll have an apple, orange, grapes. Now she asks for fruit.”

There were no significant differences in other measures of the family food environment, such as having fruit and ready-to eat vegetables in the refrigerator or on the counter, on the availability of other food categories, including salty snacks, lowfat/nonfat milk, and soft/fruit drinks, or on preparing and sitting down for evening meals at home.[88]

7.6 Discussion

In two respects, HIP influenced informational and home environment measures in a direction that is consistent with our conceptual model depicting the potential effect of HIP on fruit and vegetable consumption and the mechanisms or intermediate outcomes through which HIP may work.

First, HIP increased the probability of having heard or seen messages about fruits and vegetables, but not the probability of participating in a nutrition education class. As discussed in Chapter 3, the HIP group received multiple mailings from DTA about the operation of HIP. All mailings included the HIP logo, which showed pictures of fruits and vegetables and the tag line, “It’s HIP to be healthy.” Additionally, several of these mailings had an appealing graphical design and messaging that highlighted fruits and vegetables. The findings suggest that at least some members of the HIP group remembered these messages. By contrast, SNAP nutrition education (SNAP-Ed) is voluntary, and there was no difference in nutrition education programs offered to the HIP and non-HIP groups. Thus, the observed outcomes are consistent with HIP outreach activities to participants and suggest that HIP participants were aware of the messaging.

Second, HIP increased the probability of having fruits and vegetables available at home. HIP had no such effect for non-targeted foods, whether these foods are commonly identified as more healthful (for example, low-fat/nonfat milk) or less healthful (for example, salty snacks and soft/fruit drinks). Again, the observed outcomes appear consistent with the HIP focus on fruits and vegetables rather than food choices more broadly.

---

[87] The composite home food environment scale did not show a statistically significant difference between Round 2 and Round 3 responses. However, for fruits only, the Round 2 and Round 3 results were statistically different; the frequency of having fruit at home was higher for the HIP than for the non-HIP groups in Round 2, but the HIP impact was not statistically significant in Round 3.

[88] Subgroup analyses revealed a marginally significant positive impact of HIP on how often evening meals are cooked at home among those who consumed less than three servings a day of fruits and vegetables at baseline, but not among those who consumed three or more servings a day of fruits and vegetables at baseline (Appendix H, Exhibit H7.5j).

Given HIP's financial incentive, one might have expected to find that HIP reduced the problem of cost as a reported barrier to fruit and vegetable consumption. However, there was no difference between HIP and non-HIP participants in the probability of agreeing with a statement about not eating fruits and vegetables as much as they would like due to the cost. Perhaps HIP participants did not reflect upon the price adjustment provided by HIP in answering this question. Alternatively, perhaps even a 30 percent incentive was not sufficient to eliminate cost as a perceived barrier. We note that when asked directly whether HIP made fruits and vegetables more affordable, 72 percent of HIP respondents replied in the affirmative (see Exhibit 6.8).

8. Impact on Fruit and Vegetable Consumption

The main goal of the HIP evaluation was to assess the impact of HIP on participants' consumption of targeted fruits and vegetables, which are the fruits and vegetables that earned the incentive. This is the single confirmatory outcome we specified before analyzing the data. In addition to this main outcome, the evaluation also examined the impact of HIP on the consumption of total fruits and vegetables, on the consumption of different types of fruits and vegetables, and on overall dietary quality.

Detailed information on the definition and construction of the targeted fruit and vegetable intake measure from the AMPM 24-hour dietary recall data is provided below. Like the impact analyses reported in earlier chapters, this analysis is based on (regression-adjusted) comparisons of the HIP and non-HIP responses.[89] The analyses combine responses from all 24-hour dietary recalls (Round 2 and Round 3).[90]

We additionally present analyses of secondary intake outcomes from both the dietary recalls and from the modified Eating at America's Table Study (EATS) fruit and vegetable screener completed by each sampled respondent in each round. Like the analyses of intermediate outcomes (spending/shopping patterns, attitudes, and home food environment) presented in prior chapters, analyses of these secondary outcomes should be considered exploratory, since these analyses include multiple hypothesis tests. Because we test at the 5 percent level, it is likely that 5 percent of the tests would appear statistically significant using a conventional two-tailed hypothesis test just by chance. The best practice to address this issue is to identify a single confirmatory outcome in advance, as we have done here.

The chapter begins by presenting impacts on various aggregate measures of fruit and vegetable intake, including our confirmatory outcome measure, targeted fruit and vegetable intake (Section 8.1). We then compare these intake estimates to spending estimates as reported in Chapter 6 to assess the overall consistency of the study findings (Section 8.2). The following two sections of the chapter, respectively, report impacts on consumption of specific fruit and vegetable categories (Section 8.3) and impacts on threshold measures of fruit and vegetable consumption (Section 8.4). We then examine whether the impact of HIP varies for particular demographic subgroups (Section 8.5) or for households with different baseline preferences and behaviors toward fruits and vegetables (Section 8.6), and whether the Round 2 and Round 3 impacts differ (Section 8.7). The chapter then presents

---

89 To estimate the impact of the pilot, these estimates exploit the evaluation's random assignment design, comparing mean intake for those assigned to the treatment group and thus eligible to earn the HIP incentive ("HIP participants") with mean intake among those assigned to the control group and thus ineligible to earn the HIP incentive ("HIP non-participants"). We report regression-adjusted estimates, which offer somewhat greater precision than direct comparison of unadjusted means (see Appendix E for additional detail on the methodology).

90 The analysis sample includes both Round 2 and Round 3 recall interviews, pooling the first interviews with the 10 percent subsample of second interviews for each round. Our analyses cluster standard errors at the respondent level to account for non-independence of interview responses within respondents. After deleting records that lacked a complete 24-hour dietary recall, our analysis file includes 3,913 dietary recall interviews with 2,009 respondents.

analyses of selected secondary food and nutrient outcomes, showing, for example, whether HIP increased total food energy intake or caused a substitution between one food group and another (Section 8.8), and impacts of HIP on overall dietary quality (Section 8.9). We conclude the chapter with a brief discussion in Section 8.10.

8.1 Fruits and Vegetables

This section reports HIP impacts on fruit and vegetable consumption. We begin by reporting the impact on targeted fruit and vegetable (TFV) intake. As will be described in greater detail below, our preferred TFV intake measure[91] is a conservative proxy; it includes only fruit and vegetable intake from foods we can be reasonably sure would have qualified to earn the HIP incentive if purchased from a participating retailer. We then consider progressively broader fruit and vegetable intake aggregates and components. In particular, we consider impacts on an alternative, more inclusive proxy measure for TFV intake, and on intake of all fruits and vegetables, including a breakdown of impacts on individual components of these aggregates such as mixed foods; white potatoes, legumes, and 100% fruit juice; and other fruits and vegetables acquired outside of retail stores.

Targeted Fruits and Vegetables

Exhibit 8.1 shows HIP impacts on daily adult (aged 16 and older) consumption of TFV, based on our preferred proxy measure. TFV intake after the pilot was introduced was almost a quarter cup (0.24 cup-equivalent)[92] higher among HIP participants as compared to those not selected to participate in HIP. Because we used a random assignment design, this difference can be interpreted as the causal impact of HIP. This difference represents an increase of 26 percent compared to consumption in the absence of HIP (0.91 cup-equivalent for non-HIP households). Furthermore, the result is highly statistically significant. [93]

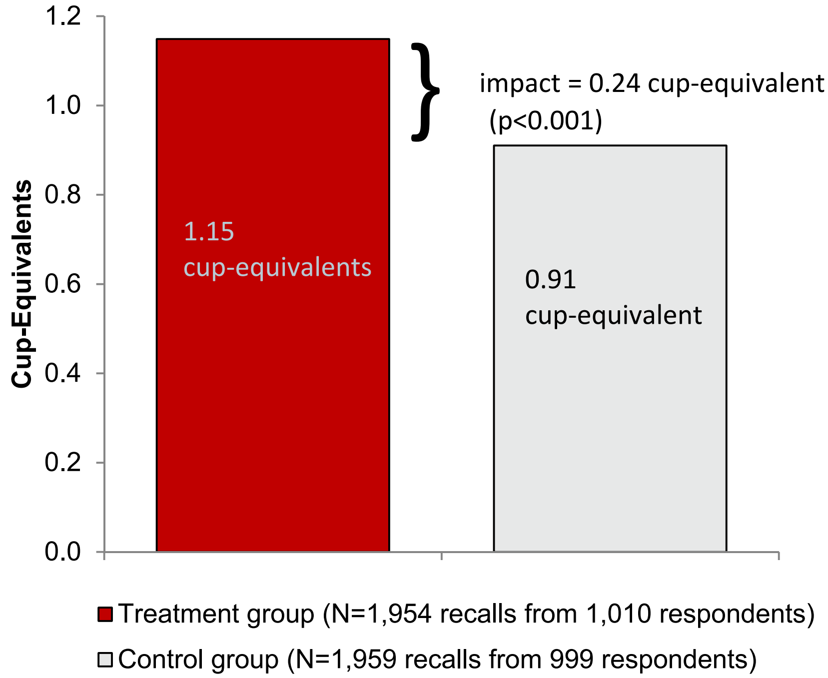
---

[91] Note that construction of this TFV proxy measure differs slightly from that of the preliminary "lower-bound modified targeted fruits and vegetables" measure described in the *Interim Report*. Based on a recoding of some of the available 24-hour dietary recall data, this proxy excludes intake from mature legumes, which do not qualify for the HIP incentive (which were included in the *Interim Report* measure), and includes intake from a greater proportion of mixed foods (relative to the *Interim Report* measure) where the respondent was able to explicitly identify the source of included fruit and vegetable ingredients.

[92] One cup-equivalent is equal to one cup of cut-up raw or cooked fruits or vegetables.

[93] The appropriate statistical test decisively rejects the null hypothesis of no impact. Specifically, we test the treatment dummy in the regression model for all 24-hour dietary recall interviews, using a heteroscedasticity and cluster robust version of the t-test.

Exhibit 8.1: Impact of HIP on Consumption of Targeted Fruits and Vegetables, Mean Cup-Equivalents Consumed



Targeted fruit and vegetable intake includes intake of fruits and vegetables acquired from the store. It excludes white potatoes, legumes, and 100% juice, as well as mixed foods where the source of individual ingredients was not identified by the respondent.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10 percent second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents)

To understand these results, it is important to understand the definition of and motivation for this preferred TFV intake measure.

As shown in greater detail in Appendix Exhibit F1.1, the targeted fruits and vegetables that qualified for the HIP incentive include fresh, canned, frozen, and dried fruits and vegetables without added sugars, fats, oils, or salt[94] as purchased from HIP participating retailers. TFVs exclude white potatoes, mature legumes,[95] and 100% juice.[96] Exhibit 8.2 visually depicts TFVs as a subset of all fruits and vegetables.

When constructing a proxy TFV intake measure based on standard data elements recorded from the 24-hour dietary recall, the first four exclusions (100% juice, legumes, white potatoes, and fruits and vegetables purchased outside stores, the four "slices" at the top of the oval) are relatively straightforward to implement. Standard nutritional coding schemes allow for identification of fruit

---

94 Vegetables with added salt do qualify for the HIP incentive, but fruits with added salt do not.

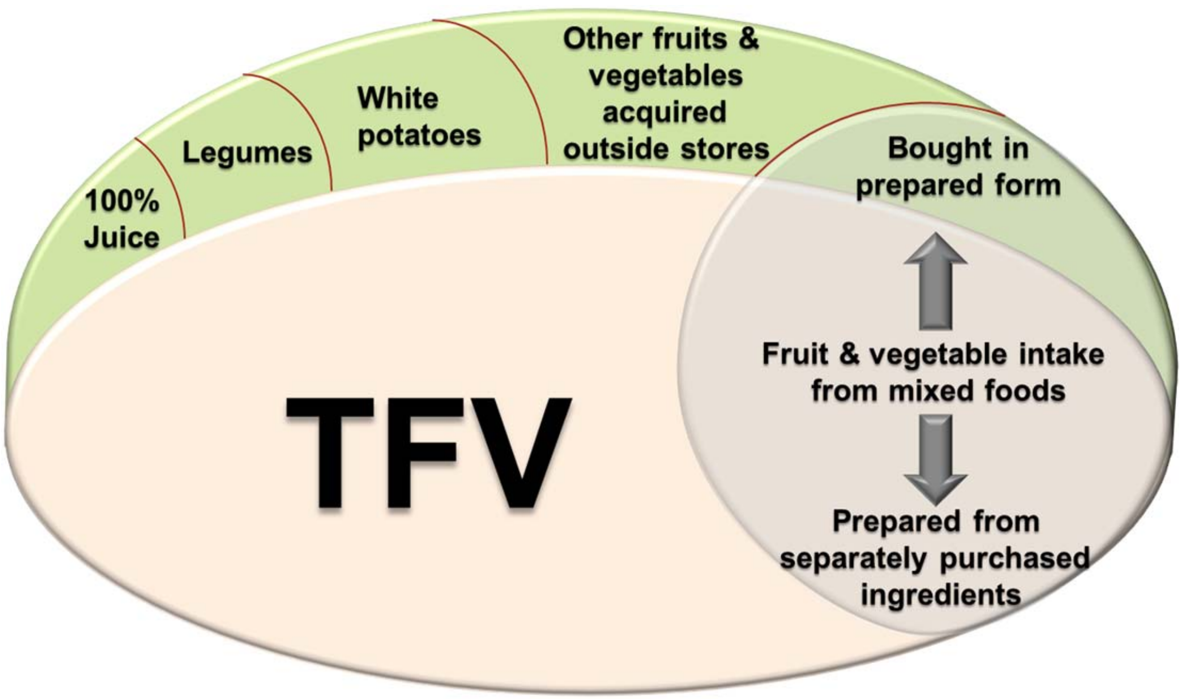
95 Mature legumes include dried peas, beans, and lentils.

96 Beverages containing less than 100% juice would also not qualify for the incentive because they generally include non-fruit, non-vegetable content; the exclusion of "100% juice" is thus intended to explicitly disqualify all-fruit or all-vegetable juices with no *whole* fruit or vegetable content.

and vegetable intake from 100% juice, legumes, or white potatoes, which can then directly be excluded from a constructed TFV intake proxy measure.

Similarly, for each food consumed, the respondent reports whether that food was purchased from a retail store or acquired from some other location (e.g., a food pantry, as part of a school meal, at a restaurant). If the respondent is able to separately report individual ingredients and quantities for a food prepared from multiple ingredients ("mixed food"), the source of acquisition for each ingredient will additionally be reported. This coding allows us to appropriately restrict the measure to intake from foods and/or individual ingredients purchased at stores only, although note that we cannot further distinguish fruits and vegetables acquired from HIP participating versus non-participating retailers.

Exhibit 8.2: Targeted Fruits and Vegetables (TFV) as a Proportion of All Fruits and Vegetables



However, when a respondent cannot enumerate individual ingredients, intake of TFVs included in "mixed foods" purchased from stores presents a more formidable coding challenge for our purposes. For example, suppose a respondent tells us he ate beef and vegetable stew, and that the stew was purchased from the store. If the respondent is able to separately list the stew ingredients (e.g., beef, celery, carrots, potatoes, salt, spices) and tell the interviewer whether the potentially qualifying fruit and vegetable ingredients (celery and carrots) were purchased from the store, we can readily conclude whether they should be included in our TFV measure. On the other hand, if the respondent is unable to describe the individual ingredients and where they were acquired, as might happen, for example, if the meal was prepared by another household member, it is not possible to distinguish between the following two scenarios:

- The stew was prepared from individual ingredients *after* purchase, in which case the TFV ingredients *would have* been eligible for the HIP incentive, as in the lower part of the circle depicting intake of fruits and vegetables from mixed foods.

- The stew was purchased in prepared form, with the ingredients combined *prior to* purchase, in which case the TFV ingredients *would not* have been eligible for the incentive, as in the upper part of the circle depicting intake of fruits and vegetables from mixed foods.

These constraints suggest two possible approaches to constructing our TFV proxy: we can either *include* all intake of fruits and vegetables from store-acquired mixed foods (the entire right-hand circle in Exhibit 8.2) or *exclude* all such intake. The former "inclusive" definition would include some non-TFVs, while the latter "restrictive" definition would exclude some TFVs.

We accordingly constructed two alternative proxy measures for TFV intake reflecting these inclusive and restrictive definitions. For store-purchased foods only, both measures include fruit and vegetable intake from foods containing *only* fruit and vegetable ingredients. Both measures exclude white potatoes, legumes, 100% juice, and all fruits and vegetables purchased or acquired from restaurants, cafeterias, food pantries, or other non-store locations, since only store-purchased items were eligible for the HIP incentive.

- The ***restrictive*** TFV intake proxy measure, which we take as our preferred measure, excludes all food items that include both TFV and other ingredients in cases when the respondent did not identify where individual ingredients were acquired. That is, it explicitly *excludes* any fruit and vegetable intake from mixed foods reported as consumed in their prepared form (rather than as a list of individual ingredients) that contain non-fruit, non-vegetable ingredients (e.g. apple pie, vegetable noodle soup, or chili). It also *excludes* any intake from fruit and vegetable preparations that include added sugars, fats, or oils (e.g. stir-fried string beans, dried sweetened cranberries, canned peas with added sugar), unless, once again, the respondent was able to identify individual ingredients and indicate where those ingredients were acquired. This strict definition ensures that all included fruit and vegetable intake in the restrictive measure comes from foods that would have qualified to earn the HIP incentive if purchased in a participating store. We take this as our confirmatory outcome measure because its conservative definition ensures that it does not include any fruit and vegetable intake from non-TFVs.
- Our alternative, ***inclusive*** TFV intake proxy measure is defined somewhat less conservatively. It includes all those foods included in our preferred TFV proxy as described above, plus some additional mixed foods *that may or may not have* qualified for the HIP incentive at purchase. Like our preferred restrictive TFV proxy measure, the inclusive measure excludes all fruits and vegetables not purchased from a store. Unlike our preferred measure, however, it also *includes* fruit and vegetable intake from mixed foods (again excluding white potatoes, legumes, and 100% fruit juice), even in cases where respondents were unable to identify individual ingredients and sources.

As Exhibit 8.3 shows, the difference between the two proxy measures is substantial. In the control group, regression-adjusted TFV intake as measured using the inclusive proxy is 34 percent higher than TFV intake as measured using the restrictive proxy (1.22 cup-equivalents vs. 0.91 cup-equivalent). Because of this large difference between alternative definitions, we report results for our alternative, inclusive measure in Exhibit 8.3 alongside results for our preferred, restrictive measure. Intake of fruits and vegetables from mixed foods did not significantly differ between HIP participants and non-participants. As a result, impacts on the alternative inclusive measure were similar in magnitude and significance to impacts on our preferred restrictive TFV intake proxy. (However, the change as a percent of control group consumption is smaller.) This result suggests that HIP primarily influenced intake of TFVs consumed alone, without added sugars, fats, oils, or other ingredients.

Other Fruit and Vegetable Aggregates

HIP may affect fruit and vegetable intake beyond targeted items for several reasons. First, a HIP effect on TFV intake might cause substitution between eligible and ineligible foods. Second, HIP may affect non-targeted fruits and vegetables by influencing participant attitudes and preferences toward fruits and vegetables in general, including those that do not qualify for the incentive (see Chapter 7). This may be a result of increasing a household's total resources available for food purchases or due to confusion about what foods were eligible for the incentive (see the first section of Chapter 5 for evidence of such confusion).

Exhibit 8.3: Impact of HIP on Consumption of Fruits and Vegetables and Disaggregated Components, Cup-Equivalents

	Regression-adjusted mean (S.E.)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Targeted fruits and vegetables (preferred restrictive proxy measure)	1.149 (0.043)	0.910 (0.035)	0.238	[0.054]	{4.382}	(<0.001)***
Plus TFV from mixed foods	0.307 (0.013)	0.304 (0.013)	0.002	[0.019]	{0.114}	(0.909)
Targeted fruits and vegetables (alternative inclusive proxy measure)	1.455 (0.045)	1.215 (0.039)	0.241	[0.059]	{4.082}	(<0.001)***
Plus additional components:						
100% fruit juice	0.549 (0.029)	0.453 (0.023)	0.095	[0.036]	{2.617}	(0.009)***
White potatoes	0.336 (0.017)	0.359 (0.017)	-0.023	[0.024]	{-0.963}	(0.336)
Legumes	0.106 (0.007)	0.114 (0.007)	-0.008	[0.010]	{-0.858}	(0.391)
Other fruits and vegetables acquired outside stores	0.171 (0.016)	0.152 (0.015)	0.018	[0.023]	{0.806}	(0.420)
All fruits and vegetables	2.616 (0.060)	2.294 (0.055)	0.323	[0.080]	{4.016}	(<0.001)***

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
TFV intake proxy measures include intake of fruits and vegetables acquired from the store, excluding white potatoes, legumes, and 100% juice. The preferred restrictive proxy measure additionally excludes fruit and vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent, while the alternative inclusive proxy measure includes fruit and vegetable intake from all mixed foods.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10 percent second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents).

Exhibit 8.3 also reports impact estimates for various fruit and vegetable aggregates and included components to assess potential impacts on non-TFV intake of fruits and vegetables.[97] Considering progressively more inclusive aggregates in turn provides suggestive evidence on which components contribute to HIP impacts on overall fruit and vegetable intake, beyond TFVs considered alone. As already noted, HIP did not have an impact on fruit and vegetable intake from mixed foods.

White Potatoes, Legumes, and 100% Fruit Juice

Because 100% fruit juice, legumes, and white potatoes do not qualify for the HIP incentive, both the restrictive and inclusive TFV proxy measures exclude these items. However, as seen in Exhibit 8.3, 100% fruit juice, legumes, and white potatoes contribute substantially to total fruit and vegetable intake. Individuals in our control group consumed 0.45 cup-equivalent of 100% fruit juice (comprising about 20 percent of all fruit and vegetable intake); 0.36 cup-equivalent of white potatoes (about 15 percent of all fruit and vegetable intake); and 0.11 cup-equivalents of legumes (about 5 percent of all fruit and vegetable intake).

There was no statistically significant impact of HIP on white potato or legume consumption. In contrast, however, HIP participants consumed significantly more 100% fruit juice than non-participants (0.10 cup-equivalent), even though fruit juice does not qualify for the HIP incentive. Perhaps some HIP participants thought that 100% fruit juice purchases earned the incentive. Consistent with this hypothesis, exploratory evidence as presented in Appendix I implies that impacts on 100% fruit juice were concentrated among those respondents who reported that they found it difficult to understand how HIP worked. Alternatively, perhaps HIP influences on participants' beliefs about the benefits of fruit consumption more generally induced greater intake of 100% fruit juice due to those perceived benefits. Or perhaps increased consumption of fruit gave participants a taste for 100% fruit juice.

Fruits and Vegetables Acquired Outside Stores

The two TFV intake proxy measures additionally exclude all intake of fruits and vegetables not purchased from a retail store (e.g., restaurants, cafeterias, and food pantries). Together these foods comprise the difference in intake between our alternative, inclusive TFV intake proxy measure and all fruit and vegetable consumption not otherwise attributable to intake from white potatoes, legumes, or 100% fruit juice. This residual comprises about 0.15 cup-equivalent in the control group, or a little less than7 percent of all fruit and vegetable intake. We find no evidence that HIP influenced intake of fruits and vegetables acquired from non-store sources.

All Fruit and Vegetable Intake

HIP participants' total fruit and vegetable consumption is almost one third of a cup (0.32 cup-equivalent) greater than that of non-participants. This impact is somewhat larger than the 0.24 cup-equivalent impact on our preferred TFV proxy measure described above.[98] The 0.10 cup-equivalent impact on 100% fruit juice intake explains the bulk of the difference in impacts between these two

---

97 Full regression results including coefficients for all covariates appear in Appendix F, Exhibit F8.1.

98 However, the difference between impacts on our preferred TFV proxy and impacts on total fruits and vegetables was not statistically significant (test not shown); in other words, we cannot reject the hypothesis that impacts on TFV and impacts on total fruits and vegetables were identical in magnitude at the conventional 95 percent confidence level.

measures. These findings suggest that HIP may have an impact on total fruit and vegetable consumption beyond its direct effects on TFV consumption, though it is unclear why these indirect impacts would be concentrated on 100% fruit juice.

8.2 Comparing HIP Impacts on Fruit and Vegetable Spending and Intake

A major goal of this evaluation is to investigate the hypothesis that the HIP price incentive encourages increased purchase of TFVs, and that these increased purchases may in turn lead to increased TFV intake. We showed in Exhibit 8.3 that, in fact, HIP increased mean daily TFV intake by 0.24 cup-equivalent per adult.

In this section, we explore whether the magnitude of the estimated HIP impact on fruit and vegetable intake corresponds, as would be expected, to the earlier estimates of HIP impact on fruit and vegetable spending reported in Chapter 6, Section 6.1. To make this comparison, we rely on two key assumptions that allow us to translate our estimates of impacts on *per-adult* fruit and vegetable intake, reported in *cup-equivalents*, into estimated *per-household* impacts, reported in *dollars.* Those assumptions are:

- an estimated ***number of adults*** per household
- an estimated ***price*** per fruit and vegetable cup-equivalent

Our estimates assume 1.5 adults per household, based on estimated counts in our sample (Exhibit 2.8), and a price of $0.50 per cup-equivalent based on estimates from existing research by USDA's Economic Research Service (Stewart et al., 2011).[99] Converting estimates from a daily to a monthly basis is then a straightforward task. Together these conversions allow the direct comparison of intake estimates to spending estimates in the same units.

Note that using the estimated number of adults per household, rather than the total number of household members (including children), is necessary because we did not collect dietary recall data from children and cannot therefore project intake levels for this group. Using the number of adults per household as our multiplier implicitly assumes that children consume no fruits and vegetables at all. If we attributed some positive amount of consumption to children, per-household intake implied by the survey would be higher. Our converted estimates thus represent a lower bound on true per-household intake.[100]

---

99 This price estimate from the literature is moderately smaller than a very rough price estimate derived using data from our own study. HIP participants reported total monthly household fruit and vegetable spending of $78.17, which is equivalent to $1.72 per adult per day (Exhibit 6.3). Dividing this total by estimated daily per-adult fruit and vegetable intake of 2.616 cup equivalents (Exhibit 8.3) suggests an implicit price of $0.66 per fruit and vegetable cup-equivalent. A parallel computation for the control group suggests a similar implicit price of $0.69 per cup-equivalent. This implicit price would be an upper bound, since we do not include children in the estimate of household consumption.

100 An alternative approach would have been to multiply by the total number of persons in the household, implicitly assuming that child intake was the same as adult intake. Since in reality child intake is generally lower than adult intake, that approach would produce a likely upper bound on true per-household consumption.

Exhibit 8.4 shows the results of this reconciliation exercise for TFVs and for all fruits and vegetables, respectively. For TFVs, our estimated daily per-adult impact of 0.238 cup-equivalent translates to a lower-bound impact of $5.43 per household per month. This survey-based measure compares to an impact of $1.07 on TFV spending based on EBT transactions data for our survey sample, as previously reported in Chapter 6; this is more than a four-fold difference. In fact, since we have argued that our converted intake estimates represent a lower bound on true per-household monthly intake in dollar terms, the true difference must be even larger.

Exhibit 8.4: Comparison of HIP Impacts on Intake and Spending Measures, Targeted Fruits and Vegetables and All Fruits and Vegetables

Measure	Data Source	Impact (T-C)
Targeted fruits and vegetables (TFVs)		
TFV intake, daily cup-equivalents per adult	AMPM dietary recall interview	0.238
TFV intake, lower-bound, monthly dollars per household ($)	AMPM dietary recall interview	5.43
TFV expenditures at participating supermarkets/superstores, monthly dollars per household ($)	EBT transactions data	1.07
All fruits and vegetables		
Fruit and vegetable intake, daily cup-equivalents per adult	AMPM dietary recall interview	0.323
Fruit and vegetable intake, lower-bound, monthly dollars per household ($)	AMPM dietary recall interview	7.37
Fruit and vegetable expenditures, self-reported, monthly dollars per household ($)	Participant survey (primary shopper module)	6.15

TFV intake proxy measures include intake of fruits and vegetables acquired from the store, excluding white potatoes, legumes, and 100% juice. The preferred restrictive proxy measure additionally excludes fruit and vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent, while the alternative inclusive proxy measure includes fruit and vegetable intake from all mixed foods.

Intake measures were converted from a daily per-adult cup-equivalent basis to a monthly per-household dollar basis assuming 30.4375 days per month, a price of $0.50 per cup-equivalent, and 1.5 adults per household; since this conversion implicitly assumes zero intake for children in the household, it represents a lower bound on true monthly per-household intake.

Sources: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents); Participant Survey (primary shopper module) (N=2,708); EBT Transaction Data, pooled across March-October 2012 (average of 45,912 households per month).

Unlike our TFV measures (in which intake is derived from survey data and spending is derived from EBT data), our intake and spending measures for all fruits and vegetables are both derived from survey data. Perhaps for this reason, impacts on intake and spending measures for all fruits and vegetables appear to be more closely aligned than those for TFVs. Specifically, the 0.323 daily cup-equivalent impact on all fruit and vegetable intake translates to a $7.37 impact in monthly per-household terms, which is similar to the estimated impact of $6.15 on self-reported monthly expenditures.

In Chapter 10, we further discuss possible explanations for the contrast between impacts on self-reported TFV intake and spending measures versus impact on TFV expenditures in participating retailers as derived from EBT transactions data.

8.3 Targeted Fruit and Vegetable Groups and Subgroups

Although fruits and vegetables from all major fruit and vegetable subgroups qualified to earn the HIP incentive, it is plausible that impacts could be concentrated within a particular fruit or vegetable group or subgroup.[101] For example, HIP participants might have differentially increased spending on a handful of familiar fruits or vegetables within a subgroup already comprising a relatively large proportion of their prior fruit and vegetable consumption. Alternatively, they might have spread additional spending proportionally across specific subgroups.

To understand how impacts on total intake were distributed across fruit and vegetable categories, we separately report HIP impacts on TFV intake disaggregated by USDA Food Pattern food groups and subgroups (Exhibit 8.5) and on usual intake of fruits and vegetables as reported on a fruit and vegetable consumption screener (Exhibit 8.6).

USDA Food Pattern Fruit and Vegetable Groups and Subgroups

For these analyses of fruit and vegetable groups and subgroups, we use USDA Food Pattern food group definitions, defined in accordance with the 2010 Dietary Guidelines for Americans (USDA and USDHHS, 2010). The three major fruit subgroups are (1) citrus, melon, and berries; (2) other fruits; and (3) 100% fruit juice. The five major vegetable subgroups are (1) dark green (broccoli, spinach, most greens); (2) red and orange (tomatoes, carrots, sweet potatoes, winter squash, pumpkin); (3) starchy (corn, white potatoes, green peas); (4) legumes (dry beans and peas)[102]; and (5) other vegetables (cabbage, celery, cucumber, lettuce, onions, peppers, green beans, cauliflower, mushrooms, summer squash).

For this analysis, we use measures based on our preferred restrictive TFV intake proxy measure, which includes intake only from store-purchased fruits and vegetables and excludes intake from mixed foods. Targeted fruit intake therefore includes intake from whole fruit only, excluding intake from 100% fruit juice. Similarly, targeted vegetable intake excludes intake from white potatoes and legumes. Impacts on TFV intake disaggregated by USDA Food Pattern food group and subgroup are reported in Exhibit 8.5.[103]

---

101 In this section and in the rest of the chapter, we use our preferred TFV intake measure, which Section 8.1 referred to as the restrictive TFV intake proxy measure. This is a conservative proxy measure; it includes only fruit and vegetable intake from foods we can be reasonably sure would have qualified to earn the HIP incentive if purchased from a participating retailer.

102 This legumes measure includes only beans and peas consumed in excess of levels needed to meet protein group recommendations in combination with intake from meat, poultry, fish, eggs, nuts, and seeds.

103 Appendix F, Exhibits F8.2 and F8.3, provides supplemental exhibits showing impacts on our alternative TFV proxy and on total fruit and vegetable intake by USDA Food Pattern food group and subgroup; results are qualitatively similar to those for our preferred restrictive TFV proxy measure, and so have been omitted from the main text for the sake of brevity.

Exhibit 8.5: Impact of HIP on Consumption of Targeted Fruits and Vegetables (TFV), Cup-Equivalents, by USDA Food Pattern Food Group

	Regression-adjusted mean (SE)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Total fruits and vegetables	1.149 (0.043)	0.910 (0.035)	0.238	[0.054]	{4.382}	(<0.001)***
Total fruits	0.571 (0.030)	0.465 (0.024)	0.106	[0.038]	{2.813}	(0.005)***
Citrus fruits, melons, berries	0.131 (0.010)	0.119 (0.012)	0.012	[0.016]	{0.774}	(0.439)
Other fruits (e.g., apples, pears, bananas, grapes, peaches)	0.439 (0.025)	0.346 (0.019)	0.093	[0.031]	{3.005}	(0.003)***
Total vegetables	0.578 (0.025)	0.445 (0.021)	0.133	[0.032]	{4.106}	(<0.001)***
Dark green vegetables	0.076 (0.007)	0.044 (0.005)	0.032	[0.009]	{3.690}	(<0.001)***
Red and orange vegetables	0.136 (0.009)	0.105 (0.007)	0.031	[0.012]	{2.629}	(0.009)***
Tomatoes	0.087 (0.006)	0.069 (0.005)	0.017	[0.008]	{2.093}	(0.036)**
Other red and orange vegetables[a]	0.049 (0.007)	0.035 (0.004)	0.014	[0.008]	{1.847}	(0.065)*
Other starchy vegetables	0.092 (0.008)	0.084 (0.007)	0.008	[0.011]	{0.720}	(0.472)
Other vegetables (e.g., celery, cucumbers, mushrooms, green beans, onions, asparagus)	0.275 (0.015)	0.213 (0.014)	0.062	[0.020]	{3.090}	(0.002)***

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Targeted fruit and vegetable intake proxy measure includes intake of fruits and vegetables acquired from the store. It excludes white potatoes, legumes, and 100% juice, as well as mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Note that this result appears to be driven by the presence of two extreme outliers during Round 2 who reported intake of 5 or more cups of other read and orange vegetables in the prior 24 hours. Excluding those individuals from the analysis, differences between treatment and control groups are no longer statistically significant
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents).

We find higher TFV fruit intake of 0.11 cup-equivalent in HIP participants relative to the non-participants. Most of this impact was due to a statistically significant 0.09-cup equivalent difference in intake of TFV fruits from the “other fruit” subgroup. We did not detect a statistically significant difference in consumption of TFV citrus fruits, melons, and berries.

The treatment-control difference in TFV vegetable intake was 0.13 cup-equivalent. This includes a 0.03-cup equivalent difference in intake of dark green vegetables; a 0.06-cup equivalent difference in intake of the “other vegetables” subgroup; and a 0.03-cup equivalent difference in intake of red and orange vegetables, driven primarily by a 0.02 cup-equivalent difference in intake of tomatoes, along with a borderline-significant 0.01 cup-equivalent difference in intake of other red and orange vegetables. We find no evidence of an increase in consumption of starchy vegetables (which, as noted above, excludes white potatoes, the most commonly consumed starchy vegetable).

Usual Daily Intake from Fruit and Vegetable Screener

In addition to completing 24-hour intake dietary recall interviews, sampled respondents also completed a modified version of the Eating at America's Table Study (EATS) Fruit and Vegetable Screener (Thompson et al., 2000) that asked about usual intake of nine common foods containing raw and cooked fruits and vegetables (including those eaten as snacks and at meals, eaten at home and away, and eaten alone and mixed with other foods) by the respondent over the prior month.[104] Respondents were asked how often during the past month they had consumed 100% juice, fruit, leafy green salads, fried potatoes, other potatoes, beans, other vegetables, tomato sauce, and salsa. In addition, they reported how much they usually consumed when they ate these items. Using standard EATS scoring procedures these reported frequencies and amounts were used to calculate an estimate of usual intake per day in standardized cup-equivalents for each respondent.

Impacts on intake from the EATS screener were broadly consistent with impacts on comparable measures constructed from 24-hour recall interviews. Exhibit 8.6 shows a statistically significant impact on self-reported usual daily intake of fruit, and a borderline-significant impact on leafy green salads, broadly consistent with the impacts on fruit, dark green vegetables, and other vegetables (including lettuce) found in the 24-hour dietary recall data. We additionally found a borderline-significant impact on fried potatoes, which as noted above are not included in TFV intake measures. We did not, however, find impacts on the screener measure of 100% juice, or on the two common tomato-based foods, tomato sauce and salsa, in contrast to the significant impact on 100% fruit juice and tomato intake from the recall data. In addition, we find no impact on intake of other potatoes or beans.

[104] Baseline responses to the fruit and vegetable screener are presented in Appendix F, Exhibit F8.4. There were no statistically significant differences between the treatment and control groups in reported screener measures at baseline.

Exhibit 8.6: Impact of HIP on Estimated Usual Daily Intake from Fruit and Vegetable Screener, Cup-Equivalents

	Regression-adjusted mean (SE)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
100% juice (N=3,350)	1.011 (0.041)	0.929 (0.040)	0.082 [0.055]	{1.478} (0.140)	{1.478}	(0.140)
Fruit (N=3,355)[a]	0.676 (0.026)	0.608 (0.022)	0.068 [0.033]	{2.059} (0.040)**	{2.059}	(0.040)**
Leafy green salad (N=3,371)	0.306 (0.010)	0.281 (0.010)	0.025 [0.014]	{1.750} (0.080)*	{1.750}	(0.080)*
Fried potatoes (N=3,389)	0.055 (0.004)	0.072 (0.007)	-0.017 [0.009]	{-1.929} (0.054)*	{-1.929}	(0.054)*
Other potatoes (N=3,379)	0.215 (0.010)	0.205 (0.008)	0.009 [0.013]	{0.727} (0.467)	{0.727}	(0.467)
Beans (N=3,376)	0.192 (0.010)	0.187 (0.008)	0.004 [0.013]	{0.352} (0.725)	{0.352}	(0.725)
Other vegetables (N=3,350)	0.506 (0.018)	0.476 (0.016)	0.030 [0.024]	{1.231} (0.219)	{1.231}	(0.219)
Tomato sauce (N=3,331)	0.102 (0.005)	0.107 (0.005)	-0.005 [0.007]	{-0.687} (0.492)	{-0.687}	(0.492)
Salsa (N=3,383)	0.009 (0.001)	0.009 (0.001)	<0.001 [0.001]	{0.035} (0.972)	{0.035}	(0.972)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
“Refused” and “don't know” responses on frequency or amount items coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Note that this result appears to be driven by the presence of one extreme outlier during Round 3 who reported estimated usual intake of 15 cup-equivalents of fruit per day. Excluding this individuals from the analysis, differences between treatment and control groups are only borderline statistically significant.
Source: Participant Survey (respondent module, Modified Eating at America's Table Study (EATS) Fruit and Vegetable Screener), pooled Round 2 and Round 3 responses.

8.4 Fruit and Vegetable Cutoff Measures

The results in the previous subsection clearly show higher fruit and vegetable intake levels among HIP participants. Also interesting is understanding how that difference is distributed across participants. For example, are individuals more likely to eat at least some fruits and vegetables on any given day as a result of HIP? Or, are they more likely to consume what might be considered a nutritionally adequate amount?

To investigate these questions, we examined HIP impacts on several cutoff measures of fruit and vegetable intake: the probability that individuals consumed *any* fruits and vegetables in the past 24 hours; the probability that they consumed *at least one* cup-equivalent of fruits and vegetables; and the probability that they consumed *two-and-a-half or more* cup-equivalents of fruits and vegetables (Exhibit 8.7). Note that 2.5 cup-equivalents of fruits and vegetables corresponds to 5 servings, the minimum recommended threshold under the older “5 A Day” program guidelines corresponding to the 2000 Dietary Guidelines for Americans; newer USDA food patterns under the 2010 Dietary Guidelines for Americans recommend between 2 and 6.5 cup-equivalents per day depending on total energy intake levels.

Exhibit 8.7: Impact of HIP on Cutoff Measures of Fruit and Vegetable Intake in the Past 24 Hours

	Regression-adjusted mean (SE)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Consumed any fruits or vegetables	0.965 (0.005)	0.955 (0.005)	0.009	[0.007]	{1.363}	(0.173)
Consumed 1 or more cup-equivalent of fruits & vegetables	0.743 (0.011)	0.714 (0.011)	0.029	[0.016]	{1.872}	(0.061)*
Consumed 2.5 or more cup-equivalents of fruits & vegetables	0.416 (0.013)	0.354 (0.012)	0.063	[0.017]	{3.653}	(<0.001)***

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents).

HIP participants were about 6 percentage points more likely to have consumed at least two and a half cup-equivalents of fruits and vegetables in the past 24 hours (42 percent vs. 35 percent).In addition, they were about 3 percentage points more likely to have consumed one or more cup-equivalent of fruits and vegetables in the past 24 hours than were non-participants (74 percent vs. 71 percent), though this difference was only borderline statistically significant. There was no statistically significant difference in proportions of HIP participants and non-participants consuming any fruits or vegetables, indicating that the pilot did not necessarily induce those not already consuming fruits and vegetables to consume them on a day they otherwise would not have. Note, however, that rates of consumption of any fruits and vegetables are quite high in the control group (96 percent), so there is not much scope for HIP to improve this measure.

There is some evidence, however, that HIP may have caused individuals to consume some types of fruits and vegetables on days when they otherwise would not have consumed any (Exhibit 8.8). The probability of having eaten any fruits in the past 24 hours was about three percentage points higher among participants than among non-participants (74 percent vs. 71 percent) with increases in two of the three USDA Food Pattern fruit subgroups. The probability of 100% fruit juice consumption increased as did the consumption of other fruits. For vegetables, the probability of consuming dark green vegetables was higher among HIP participants than non-participants (16 percent vs. 12 percent), as was the probability of consuming other vegetables (68 percent vs. 65 percent).

Exhibit 8.8: Impact of HIP on Probability of Any Fruit and Vegetable Intake, by USDA Food Pattern Food Group

	Regression-adjusted mean (SE)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Total fruit and vegetables	0.965 (0.005)	0.955 (0.005)	0.009	[0.007]	{1.363}	(0.173)
Total fruit	0.742 (0.012)	0.710 (0.011)	0.032	[0.017]	{1.916}	(0.056)*
Citrus fruits, melons, berries	0.257 (0.011)	0.232 (0.010)	0.024	[0.015]	{1.601}	(0.109)
Other fruits (e.g., apples, pears, bananas, grapes, peaches)	0.469 (0.013)	0.423 (0.012)	0.046	[0.018]	{2.557}	(0.011)**
Fruit juice	0.499 (0.014)	0.454 (0.013)	0.045	[0.019]	{2.415}	(0.016)**
Total vegetables	0.907 (0.007)	0.895 (0.008)	0.013	[0.010]	{1.209}	(0.227)
Dark green vegetables	0.162 (0.010)	0.115 (0.008)	0.047	[0.012]	{3.903}	(<0.001)***
Red and orange vegetables	0.706 (0.011)	0.687 (0.011)	0.018	[0.016]	{1.127}	(0.260)
Tomatoes	0.617 (0.012)	0.608 (0.012)	0.009	[0.017]	{0.560}	(0.575)
Other red and orange vegetables	0.240 (0.011)	0.217 (0.010)	0.023	[0.015]	{1.553}	(0.121)
Starchy vegetables	0.505 (0.012)	0.503 (0.012)	0.002	[0.017]	{0.128}	(0.899)
White potatoes	0.400 (0.012)	0.406 (0.012)	-0.006	[0.017]	{-0.370}	(0.712)
Other starchy vegetables	0.218 (0.010)	0.195 (0.009)	0.024	[0.014]	{1.725}	(0.085)*
Legumes (beans and peas computed as vegetables)	0.207 (0.010)	0.212 (0.009)	-0.004	[0.013]	{-0.319}	(0.750)
Other vegetables (e.g., celery, cucumbers, mushrooms, green beans, onions, asparagus)	0.684 (0.012)	0.649 (0.011)	0.035	[0.016]	{2.233}	(0.026)**

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10 percent second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents).

Consistent with the overall increase in fruit and vegetable intake and the increased probability of intake of specific fruit and vegetable subgroups, there was a corresponding increase in variety of fruits and vegetables consumed overall, as indicated by higher numbers of fruit and vegetable subgroups consumed in the past day (Exhibit 8.9).

Exhibit 8.9 Impact of HIP on Total Number of USDA Food Pattern Fruit and Vegetable Groups Consumed in Past 24 Hours

	Regression-adjusted mean (SE)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Number of fruit & vegetable groups (range: 0-8)	3.489 (0.042)	3.275 (0.040)	0.213	[0.058]	{3.712}	(<0.001)***
Number of fruit groups (range: 0-3)	1.224 (0.025)	1.109 (0.023)	0.115	[0.034]	{3.356}	(0.001)***
Number of vegetable groups (range: 0-5)	2.265 (0.030)	2.166 (0.027)	0.098	[0.040]	{2.459}	(0.014)**

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10 percent second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents).

8.5 Differences in Impacts by Demographic Subgroup

Findings above demonstrated statistically significant impacts of HIP on the treatment group as a whole. We were also interested in examining whether some types of individuals experienced larger or smaller impacts of HIP, so we assessed whether impacts differed across subgroups defined by household and individual demographic characteristics. To maximize power for these comparisons, we defined binary subgroup designations such that as close as possible to half of respondents fell into each group. However, for some demographic characteristics with categorizations not lending themselves to binary classification (e.g., race/ethnicity, education status), we considered more disaggregated subgroups. In particular, we tested for differences in impacts on TFV intake by the following:[105]

- Respondent gender (males vs. females)
- Respondent age group (age 16-40 years vs. 41+ years)
- Respondent education level (less than high school, including GED vs. high school diploma vs. more than high school)
- Respondent race/ethnicity (Hispanic vs. non-Hispanic white vs. non-Hispanic black vs. non-Hispanic other race)
- Respondent disability status (disabled vs. non-disabled)
- Primary shopper employment status (employed full- or part-time vs. not employed)
- Household composition (households with children and no elderly vs. other households)
- Household WIC participation (WIC participants vs. non-participants)
- SNAP benefit size ($200 or less vs. over $200)

105 Appendix F, Exhibits F2.1–F2.3 presents baseline characteristics for these measures.

Exhibit 8.10 displays impact estimates on TFV intake by demographic subgroup.[106] We find no evidence of differential impacts by any of the characteristics examined. We note, however, that our study was not powered to detect subgroup differences.

Exhibit 8.10: Differences in Impacts of HIP on Consumption of Targeted Fruits and Vegetables, Cup-Equivalents, by Demographic Subgroup

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Respondent gender (N=3,913 recalls from 2,009 respondents)				
Females	1.170 (0.060)	0.903 (0.050)	0.267 (<0.001)***	
Males	1.103 (0.096)	0.926 (0.080)	0.178 (0.100)*	
Impact: females – males				0.090 (0.477)
Respondent age group (N=3,913 recalls from 2,009 respondents)				
16-40 years	0.366 (0.188)	0.173 (0.198)	0.193 (0.006)***	
41+ years	1.462 (0.086)	1.179 (0.081)	0.283 (0.001)***	
Impact: 16-40 years – 41+ years				-0.090 (0.408)
Respondent educational attainment (N=3,892 recalls from 2,000 respondents)[a]				
Less than high school (including GED)	1.186 (0.064)	0.873 (0.048)	0.314 (<0.001)***	
High school diploma	1.034 (0.088)	0.928 (0.074)	0.106 (0.359)	
More than high school	1.155 (0.077)	0.976 (0.074)	0.179 (0.084)*	
P-value for difference [c]				(0.292)
Respondent race/ethnicity (N=3,913 recalls from 2,009 respondents)				
Hispanic	1.169 (0.068)	0.955 (0.051)	0.215 (0.005)***	
Non-Hispanic white	1.013 (0.074)	0.782 (0.058)	0.231 (0.010)**	
Non-Hispanic black	1.168 (0.121)	0.949 (0.108)	0.220 (0.151)	
Non-Hispanic other	1.724 (0.249)	1.241 (0.225)	0.483 (0.153)	
P-value for difference [c]				(0.895)
Respondent disability status (N=3,913 recalls from 2,009 respondents)				
Disabled	1.141 (0.063)	0.936 (0.052)	0.205 (0.009)***	
Non-disabled	1.157 (0.063)	0.884 (0.050)	0.273 (<0.001)***	

[106] Corresponding estimates for targeted fruits, targeted vegetables, and total fruits and vegetables appear in Appendix H (Exhibits H8.1, H8.3, H8.5). No consistent patterns in subgroup differences were detected for these additional outcomes, although the impact of HIP on intake of total fruits and vegetables was found to be statistically significantly higher for those of lower educational attainment.

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Impact: disabled – non-disabled				-0.068 (0.536)
Primary shopper employment status (N=3,751 recalls from 1,916 respondents)[b]				
Working full or part-time	1.079 (0.091)	0.925 (0.071)	0.155 (0.171)	
Not working	1.166 (0.050)	0.894 (0.038)	0.272 (<0.001)***	
Impact: working – not working				-0.118 (0.364)
Household composition (N=3,913 recalls from 2,009 respondents)				
Children (and no elderly) in household	1.312 (0.077)	1.030 (0.069)	0.282 (<0.001)***	
Other household	1.029 (0.064)	0.823 (0.050)	0.206 (0.006)***	
Impact: Children in HH– Other HH				0.076 (0.492)
Household WIC status (N=3,744 recalls from 1,915 respondents)[b]				
Participant	1.040 (0.093)	0.859 (0.071)	0.181 (0.082)*	
Non-participant	1.171 (0.051)	0.911 (0.038)	0.261 (<0.001)***	
Impact: participant – non-participant				-0.079 (0.513)
Household SNAP benefit amount (N=3,913 recalls from 2,009 respondents)				
$200 or less	1.135 (0.069)	0.909 (0.053)	0.227 (0.004)***	
Over $200	1.166 (0.072)	0.913 (0.061)	0.253 (0.001)***	
Impact: $200 or less – over $200				-0.027 (0.805)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted fruit and vegetable intake proxy measure includes intake of fruits and vegetables acquired from the store. It excludes white potatoes, legumes, and 100% juice, as well as mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Sample size is smaller for this subgroup analysis due to missing data on educational attainment for some sampled respondents.
[b] Sample size is smaller for this subgroup analysis because the primary shopper employment status and household WIC status items are included in the primary shopper survey, which was not completed in all households with a sampled respondent completing a dietary recall interview.
[c] For demographic characteristics with more than two subgroup categories (respondent educational attainment and respondent race/ethnicity), p-value in parentheses represents significance level for joint test across all categories.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10 percent second-day subsamples for each round.

8.6 Differences in Impacts by Baseline Fruit and Vegetable-Related Behaviors and Preferences

In addition to differences in impacts by demographic subgroup, we are interested in understanding how HIP impacts differed by baseline fruit and vegetable-related behaviors and preferences. For example, larger impacts might be expected among those individuals who already eat and enjoy fruits and vegetables because they may be more responsive to opportunities to increase their intake. Alternatively, if HIP succeeds in shifting attitudes and preferences toward fruits and vegetables, larger impacts might be expected among those who started off with lower levels of intake or weaker preferences for fruits and vegetables, since those individuals have more room to improve.

To provide exploratory evidence on this question, we assessed differences in impacts on TFV intake by the following baseline respondent characteristics:[107]

- Baseline fruit and vegetable intake from screener (three or more servings/day vs. less than three servings per day)[108]
- Predicted baseline TFV intake (above vs. below median)
- Predicted baseline TFV spending (above vs. below median)
- Attitudes about fruit and vegetables scale (above vs. below median)
- Barriers to eating fruit and vegetables scale (above vs. below median)
- Barriers to grocery shopping (above vs. below median)
- Fruit and vegetables at home scale (above vs. below median)
- Pre-HIP shopping patterns (primarily at HIP vs. non-HIP participating retailers)

Exhibit 8.11 provides these subgroup estimates for TFV intake.[109] We find no evidence of a larger impact for those with higher reported baseline intake of fruits and vegetables from the EATS screener; as noted above, this is a relatively noisy measure of intake as compared to the 24-hour dietary recall interview (which was not conducted at baseline). We also find no evidence of a larger impact for those with higher predicted baseline levels of TFV intake, though there is a borderline significant difference in impact by predicted baseline levels of TFV spending.

However, we do find some evidence that stronger preferences toward fruits and vegetables at baseline predict stronger HIP impacts. In particular, impacts were higher among those with above-median baseline scores on the attitudes about fruit and vegetables scale. These findings suggest that HIP may

---

107 Appendix D, Section D.2 includes a discussion of scale creation. Appendix F, Exhibits F7.1-F7.4, F8.4 present baseline responses to these items.

108 As discussed in Section 8.3, fruit and vegetable intake from the screener is converted to standardized cup-equivalents for each respondent; 1.5 cup-equivalents of fruits and vegetables represents 3 servings, which is close to the median intake level.

109 Corresponding estimates for intake of targeted fruits, targeted vegetables, and total fruits and vegetables appear in Appendix H (Exhibits H8.2, H8.4, H8.6); findings are similar to those presented here for TFV intake.

be more successful in increasing intake among those that already enjoy and consume fruits or vegetables, as opposed to those who dislike or do not regularly consume these items.[110]

Exhibit 8.11: Differences in Impacts of HIP on Consumption of Targeted Fruits and Vegetables, Cup-Equivalents, by Baseline Fruit and Vegetable-Related Behaviors and Preferences and Shopping Patterns Subgroup

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline fruit and vegetable intake (screener) (N=3,913 recalls from 2,009 respondents)				
3+ servings/day	1.199 (0.076)	0.909 (0.061)	0.290 (0.001)***	
<3 servings/day	1.099 (0.063)	0.912 (0.054)	0.187 (0.003)***	
Impact: 3+ servings – <3 servings				0.103 (0.346)
Baseline TFV intake (predicted) (N=3,162 recalls from 1,604 respondents)				
High (above median)	1.247 (0.089)	0.909 (0.057)	0.337 (0.001)***	
Low (below median)	1.077 (0.070)	0.878 (0.065)	0.199 (0.004)***	
Impact: high – low				0.138 (0.256)
Baseline TFV spending (predicted) (N=3,162 recalls from 1,604 respondents)				
High (above median)	1.254 (0.080)	0.878 (0.055)	0.376 (<0.001)***	
Low (below median)	1.078 (0.071)	0.910 (0.063)	0.168 (0.047)**	
Impact: high – low				0.208 (0.093)*
Attitudes about food, fruits, and vegetables (N=3,913 recalls from 2,009 respondents)				
High (above median)	1.305 (0.067)	0.946 (0.054)	0.359 (<0.001)***	
Low (below median)	0.950 (0.073)	0.862 (0.060)	0.088 (0.225)	
Impact: high – low				0.272 (0.011)***
Barriers to eating fruits and vegetables (N=3,913 recalls from 2,009 respondents)				
High (above median)	1.155 (0.071)	0.855 (0.047)	0.300 (<0.001)***	
Low (below median)	1.132 (0.054)	0.967 (0.056)	0.164 (0.035)**	
Impact: high – low				0.136 (0.237)

110 Appendix H, Exhibits H8.7-H8.15 present subgroup analyses for the outcomes presented in this rest of this chapter. Subgroups included: baseline fruit and vegetable intake (screener), attitudes about food, fruits, and vegetables scale, and fruits and vegetables at home scale. Differences are discussed in the main text only when consistent patterns emerged that provided context for the pooled findings.

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Barriers to grocery shopping (N=3,913 recalls from 2,009 respondents)				
High (above median)	1.150 (0.098)	0.886 (0.074)	0.264 (0.004)***	
Low (below median)	1.148 (0.074)	0.932 (0.064)	0.216 (0.001)***	
Impact: high – low				0.048 (0.672)
Fruits and vegetables at home (N=3,913 recalls from 2,009 respondents)				
Frequently	1.122 (0.085)	0.940 (0.067)	0.182 (0.042)**	
Infrequently	1.169 (0.066)	0.887 (0.060)	0.282 (<0.001)***	
Impact: frequently – infrequently				-0.100 (0.377)
Pre-HIP shopping patterns (N=2521 recalls from 1,327 respondents)				
Shopped primarily at HIP participating retailers	1.187 (0.065)	0.885 (0.058)	0.302 (<0.001)***	
Shopped primarily at non-HIP participating retailers	1.258 (0.098)	0.887 (0.063)	0.371 (0.002)***	
Impact: HIP shoppers – non-HIP shoppers				-0.070 (0.632)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
TFV intake proxy measure includes intake of fruits and vegetables acquired from the store. It excludes white potatoes, legumes, and 100% juice, as well as mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10 percent second-day subsamples for each round.

8.7 Differences between Round 2 and Round 3

The earlier sections of this chapter reported results pooling all 24-hour dietary recalls (Round 2 and Round 3; main interview for the entire sample and the 10 percent sub-sample second interview). We collected two rounds of follow-up data from HIP participants, in part to support an exploratory analysis of changes in HIP impacts over time. If pilot implementation and participant understanding improve with HIP maturity, one might expect impacts to increase between Rounds 2 and 3 of the study. On the other hand, impacts of many nutritional interventions tend to attenuate over time, so we might expect to see a decrease in impacts between Rounds 2 and 3.

To explore this issue, Exhibit 8.12 reports differences between Round 2 and Round 3 impacts on TFV intake. We find no statistically significant increase or decrease in TFV intake across rounds.

Exhibit 8.12 Differences in Impact of HIP on Consumption of Targeted Fruits and Vegetables, Cup-Equivalents, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Pooled (Rounds 2 & 3)	1.149 (0.043)	0.910 (0.035)	0.238 (<0.001)***	
Round 2	1.179 (0.058)	1.003 (0.051)	0.176 (0.020)**	
Round 3	1.097 (0.055)	0.862 (0.049)	0.235 (0.001)***	
Change: Round 3 – Round 2				0.040 (0.653)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
TFV intake proxy measures include intake of fruits and vegetables acquired from the store, excluding white potatoes, legumes, and 100% juice, as well as mixed foods where the source of individual ingredients was not identified by the respondent.
Pooled standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10 percent second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents).

8.8 Secondary Dietary Outcomes

One purpose of HIP is to encourage healthful eating patterns, which may in turn improve overall nutritional status and lower the risk of becoming overweight or obese and of related chronic conditions. It is therefore of interest to examine HIP impacts on foods other than fruits and vegetables, which may provide suggestive evidence as to whether observed higher targeted fruit and vegetable intake among HIP participants is an indication that they are substituting fruits and vegetables for other foods in their diets. In addition, we estimate impacts on broader measures of dietary status including total food energy, fiber, and micronutrients commonly found in fruits and vegetables.

Other Intake

Exhibit 8.13 reports impacts of HIP on foods other than fruits and vegetables for each of the major USDA Food Pattern food groups.[111] If participants were substituting fruit and vegetable consumption for other types of intake, then we might expect concurrent decreases in consumption of other foods. Alternatively, income effects from the HIP incentive might result in an increase in consumption of other foods. (We note, however, that earnings from HIP incentives do not seem large enough to induce a substantial income effect; see Chapter 5, Section 5.3 and Appendix A.) To address these issues, we report intake estimates for nine USDA Food Pattern food group measures. These results

111 Exhibit 8.13 includes all major USDA Food Pattern non-fruit, non-vegetable food groups, including "discretionary" foods such as alcohol, added sugar, and solid fats and oils, to provide a comprehensive picture of dietary composition across all major categories of intake.

should be interpreted with care, as multiple comparisons considerations suggest that we would expect some of them to appear to be statistically significant, even if there was no true impact.

We find statistically significantly lower grain consumption among the HIP participant group of 0.44 ounce-equivalents,[112] driven by a 0.43 ounce-equivalent difference in intake of refined grains. We also see greater alcohol consumption among HIP participants of 0.08 drinks,[113] though this result appears to have been driven by a handful of extreme outliers in Round 2 who reported consuming eight or more alcoholic drinks per day; when these seven individuals are excluded from the sample, the difference between treatment and control groups is no longer statistically significant. Especially given concerns about multiple comparisons noted above, these patterns of impacts are not sufficiently consistent to provide clear evidence in support of either a substitution or an income effect.

112 One ounce equivalent of grains is equal to one slice of bread, one cup of ready-to-eat cereal, or ½ cup of cooked rice, cooked pasta, or cooked cereal.

113 One drink of alcohol is equal to 12 ounces of regular beer, 5 ounces of wine, or 1½ ounces of 80-proof distilled spirits.

Exhibit 8.13: Impact of HIP on Consumption of Other Foods, by USDA Food Pattern Food Group

	Regression-adjusted mean (SE)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Total grains (oz-eq)	5.067 (0.102)	5.512 (0.099)	-0.444	[0.143]	{-3.106}	(0.002)***
Whole grains (oz-eq)	0.632 (0.027)	0.647 (0.028)	-0.016	[0.039]	{-0.402}	(0.688)
Refined grains (oz-eq)	4.436 (0.095)	4.864 (0.093)	-0.429	[0.135]	{-3.179}	(0.002)***
Total dairy (milk, yogurt, cheese, whey) (cup-eq)	1.580 (0.045)	1.560 (0.040)	0.020	[0.060]	{0.331}	(0.740)
Total protein foods (oz-eq)	5.035 (0.119)	5.063 (0.099)	-0.028	[0.155]	{-0.180}	(0.857)
Oils (gm-eq)	17.40 (0.47)	18.36 (0.48)	-0.96	[0.68]	{-1.406}	(0.160)
Solid fats (gm-eq)	29.74 (0.73)	31.43 (0.68)	-1.69	[1.02]	{-1.660}	(0.097)*
Added sugars (tsp)[a]	15.16 (0.47)	15.79 (0.43)	-0.63	[0.64]	{-0.986}	(0.324)
Alcoholic drinks (drinks)[b,c]	0.209 (0.031)	0.132 (0.017)	0.077	[0.035]	{2.211}	(0.027)**

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Includes, for example, the sugar added to sweetened soft drinks consumed.
[b] One drink is defined as the amount of alcoholic beverage containing 0.6 fluid ounces or 14 grams of alcohol.
[c] Note that this result appears to be driven by the presence of several extreme outliers during Round 2 who reported 8 or more drinks of alcohol in the prior 24 hours. Excluding those individuals (7 in all) from the analysis, differences between treatment and control groups are no longer statistically significant.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10 percent second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents).

Total Food Energy

The impact of HIP on total food energy is of interest because increasing fruit and vegetable intake without increasing total food energy is thought to decrease risk of weight gain (USDA and USDHHS, 2010).

The estimated impact of HIP on total energy intake was small (49 fewer kilocalories per day in the HIP group) and not statistically significant (Exhibit 8.14). However, we note that our study was not powered to detect an impact on total energy of the magnitude that would be implied by the observed one-third of a cup-equivalent increase in total fruit and vegetable consumption. In the absence of a statistically significant impact in either direction, we cannot determine whether higher fruit and vegetable consumption associated with HIP participation was in addition to or in place of the consumption of other foods. Doing so would have required a random sample several times as large.

In addition, we note that regression-adjusted mean energy intake in our sample was somewhat lower than in the U.S. population as a whole. Nationally representative estimates from the National Health and Nutrition Examination Survey (NHANES) for 2009-2010 suggest mean energy intake of 2,133 kilocalories per day among adults aged 20 and over, as compared to our estimated control group mean of 1,797 kilocalories. This difference is explained in part by the fact that approximately three-quarters of our sample is female; in the NHANES 2009-2010 sample, females age 20 and over consumed approximately 1,778 kilocalories per day, as compared to intake levels of 2,512 kilocalories per day among males in the same age group (USDA, 2012). Weighting the NHANES estimates to reflect the gender composition of our sample would imply intake levels of 1,976 kilocalories per day, making up a substantial portion of the gap. In addition, intake of total food energy is generally lower among SNAP participants (Cole and Fox, 2008), which may explain the remaining difference.

Exhibit 8.14: Impact of HIP on Total Energy Intake

	Regression-adjusted mean (SE)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Total energy (kcal)	1749 (28)	1797 (25)	-49	[38]	{-1.28}	(0.201)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10 percent second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents).

Fiber and Micronutrients

To assess impacts of HIP on the overall nutritional profile of HIP participants, we analyzed intake of fiber and micronutrients most commonly found in targeted fruits and vegetables (Exhibit 8.15). We find statistically significant impacts on vitamin C intake, consistent with the observed increase in consumption of fruit; many fruits are good sources of vitamin C.

Exhibit 8.15: Impact of HIP on Nutrient Intake

	Regression-adjusted mean (SE)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Fiber (g)	13.47 (0.25)	13.09 (0.23)	0.38	[0.33]	{1.13}	(0.258)
Beta carotene (mcg)	1685 (93)	1492 (80)	193	[121]	{1.59}	(0.112)
Vitamin A (mcg RAE)	586 (18)	571 (17)	15	[24]	{0.63}	(0.528)
Vitamin C (mg)	107 (3)	93 (3)	14	[4]	{3.31}	(0.001)***

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10 percent second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents).

Other Ingredients in Foods with Fruits and Vegetables

Finally, we were interested in knowing whether HIP participants shifted consumption toward fruits and vegetables without added ingredients that would disqualify those foods from earning the HIP incentive (sodium in fruits; discretionary oils, solid fats, and added sugar in fruits or vegetables). Exhibit 8.16 shows impacts on intake of sodium, discretionary oils, discretionary solid fat, and added sugar in foods that also contain fruit or vegetable ingredients. (Note that these estimates do *not* reflect total intake from all sources, but only amounts included in foods containing fruits or vegetables.) We did not detect any statistically significant differences in intake between treatment and control groups.

Exhibit 8.16: Impact of HIP on Other Ingredients in Foods Containing Fruits and Vegetables

	Regression-adjusted mean (SE)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Sodium (mg)	929 (26)	981 (28)	-52	[39]	{-1.33}	(0.185)
Discretionary oils (gm-eq)	7.04 (0.28)	7.66 (0.31)	-0.62	[0.42]	{-1.48}	(0.140)
Discretionary solid fats (gm-eq)	6.55 (0.30)	6.96 (0.33)	-0.41	[0.47]	{-0.86}	(0.387)
Added sugar (tsp)	2.95 (0.15)	2.86 (0.18)	0.10	[0.24]	{0.40}	(0.688)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that totals reported here reflect *only* daily intake from foods that also contain fruits and vegetables, and do not reflect *total* intake from all sources.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10 percent second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents).

8.9 Dietary Quality

Since HIP appears to have successfully increased fruit and vegetable consumption, one might expect that the pilot also improved overall dietary quality among participants. To assess the extent to which such improvement occurred, we examined HIP impacts on the proportion of participants who successfully complied with selected guidelines from the 2010 Dietary Guidelines for Americans (DGAs), and on overall scores on the 2010 Healthy Eating Index (HEI-2010).

Unlike analyses reported in other sections of this chapter, assessment of impacts on these outcomes requires estimation of the distribution of usual intake in the study population, as opposed to a single point estimate of mean daily intake over the past 24 hours. We employed the NCI method (Tooze et al., 2006) to estimate the distribution of usual intake for the analyses of impacts on the 2010 DGAs. For the HEI-2010, we employed the population ratio method (Freedman et al., 2010) to obtain estimates of usual HEI-2010 scores. More details of the usual intake estimation approach appear in Appendix E.8.

Dietary Guidelines for Americans

Exhibit 8.17 shows estimated impacts of HIP on the proportion of respondents meeting the following 2010 DGAs:

- Daily recommendations for total fruits
- Daily recommendations for total vegetables
- Weekly recommendations for USDA Food Pattern vegetable subgroups (dark green vegetables, red and orange vegetables, beans and peas (legumes), starchy vegetables, and other vegetables)
- Daily recommendations for total, whole, and enriched[114] grains
- Daily recommendations for protein foods
- Daily recommendations for total dairy
- Daily allowance for oils
- Daily allowance for solid fats and added sugars (SoFAS)

There were no statistically significant differences in proportions of respondents meeting the 2010 DGAs. In general, though point estimates for the 2010 DGA impacts were consistent in direction with impacts on mean intake of corresponding USDA Food Pattern food groups and subgroups as reported above, statistical precision of the DGA estimates was quite low, perhaps explaining the null findings.

[114] Note that the USDA Food Pattern equivalent subgroups refer to non-whole grains as "refined grains."

Exhibit 8.17: Impact of HIP on Proportion of Respondents Meeting 2010 Dietary Guidelines for Americans

	Regression-adjusted proportion (SE)		Impact			
2010 DGAs	**Treatment (T)**	**Control (C)**	**T-C**	**[S.E.]**	**{t_statistic}**	**(P-value)**
Percent of respondents at or above recommendations for...						
Total fruit	0.255 (0.175)	0.177 (0.193)	0.078	[0.260]	{0.765}	(0.765)
Total vegetables	0.062 (0.221)	0.043 (0.225)	0.019	[0.315]	{0.952}	(0.952)
Dark green vegetables	0.100 (0.210)	0.035 (0.225)	0.065	[0.308]	{0.832}	(0.832)
Red and orange vegetables	0.021 (0.229)	0.017 (0.230)	0.004	[0.325]	{0.990}	(0.990)
Legumes	0.132 (0.202)	0.150 (0.198)	-0.018	[0.282]	{0.950}	(0.950)
Starchy vegetables	0.126 (0.206)	0.119 (0.208)	0.007	[0.293]	{0.980}	(0.980)
Other vegetables (e.g. celery, cucumbers, mushrooms, green beans, onions, asparagus)	0.195 (0.189)	0.144 (0.201)	0.051	[0.276]	{0.853}	(0.853)
Total grains	0.241 (0.177)	0.329 (0.157)	-0.088	[0.237]	{0.711}	(0.711)
Whole grains	0.001 (0.233)	0.001 (0.233)	<0.001	[0.330]	{0.999}	(0.999)
Enriched grains	0.838 (0.040)	0.894 (0.026)	-0.056	[0.048]	{0.244}	(0.244)
Protein foods (meat, poultry, seafood, eggs, nuts, seeds, & processed soy products)	0.385 (0.144)	0.404 (0.139)	-0.019	[0.200]	{0.923}	(0.923)
Dairy	0.060 (0.221)	0.063 (0.220)	-0.003	[0.311]	{0.991}	(0.991)
Percent of respondents below allowances for...						
Oils	0.853 (0.199)	0.818 (0.191)	0.035	[0.276]	{0.899}	(0.899)
Calories from solid fats & added sugars (SoFAS)	0.064 (0.017)	0.053 (0.014)	0.011	[0.022]	{0.600}	(0.600)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted proportions for the treatment and control groups.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10 percent second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents).

Healthy Eating Index

Exhibit 8.18 shows estimates of HIP impacts on the 2010 Healthy Eating Index, including both the total score and individual components. Consistent with impacts on total intake of fruits and vegetables as described above, all four fruit and vegetable components of the HEI-2010 were significantly higher among the treatment group following HIP implementation. These differences drove a parallel increase in the total HEI-2010 score, which was approximately five points higher in the treatment group. Interestingly, regression-adjusted mean HEI-2010 scores for both the treatment and control groups

(61.9 and 57.1, respectively) were somewhat higher than the 53.5 average seen nationally among US adults (Guenther et al., 2013). As for total food energy intake as reported above, some of this difference may be explained by the fact that our sample is disproportionately female; however, reweighting NHANES-based estimates to reflect the gender composition of the HIP evaluation sample would imply a reweighted score of 53.8, so the gender difference alone does not fully explain the gap.

Exhibit 8.18: Impact of HIP on Healthy Eating Index-2010, Components and Total Score

HEI-2010 Component (maximum score)	Regression-adjusted mean (SE) Treatment (T)	Control (C)	Impact T-C	[S.E.]	{t-statistic}	(P-value)
Adequacy (higher score indicates higher consumption)						
Total fruit (5)	4.39 (0.18)	3.53 (0.14)	0.85	[0.23]	{3.769}	(<0.001)***
Whole fruit (5)	4.91 (0.14	4.00 (0.21)	0.91	[0.25]	{3.645}	(<0.001)***
Total vegetables (5)	3.70 (0.10)	3.35 (0.09)	0.35	[0.13]	{2.738}	(0.006)***
Greens and beans (5)	3.02 (0.17)	2.47 (0.17)	0.55	[0.24]	{2.301}	(0.022)**
Whole grains (10)	2.40 (0.11)	2.36 (0.11)	0.04	[0.15]	{0.272}	(0.786)
Dairy (10)	6.89 (0.18)	6.67 (0.16)	0.22	[0.24]	{0.919}	(0.358)
Total protein foods (5)[a]	5.00 (<0.01)	5.00 (<0.01)	<0.01	[<0.01]	--	(1.000)
Seafood and plant proteins (5)	3.48 (0.33)	2.88 (0.21)	0.06	[0.39]	{1.531}	(0.126)
Fatty acids (10)	3.36 (0.16)	3.48 (0.15)	-0.12	[0.22]	{-0.548}	(0.584)
Moderation (higher score indicates lower consumption)						
Refined grains (10)	7.08 (0.16)	6.38 (0.16)	0.71	[0.22]	{3.152}	(0.002)***
Sodium (10)	4.72 (0.16)	4.43 (0.17)	0.29	[0.24]	{1.239}	(0.215)
Empty calories[b] (20)	12.90 (0.30)	12.57 (0.27)	0.33	[0.41]	{0.810}	(0.418)
Total HEI-2010 score (100)	61.85 (0.89)	57.12 (0.79)	4.73	[1.19]	{3.975}	(<0.001)***

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
[a]All respondents in both treatment and control groups achieved the maximum score of 5 on the total protein foods component of the HEI-2010.
[b]Includes calories from solid fat, alcohol, and added sugars (SoFAAs)
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10 percent second-day subsamples for each round; (unweighted N=3,913 recalls from 2,009 respondents).

8.10 Discussion

This chapter has reported random assignment-based estimates of the impact of HIP on food intake. The results show statistically significant and meaningful impacts—a little less than one-quarter of a cup-equivalent, or 26 percent higher than the control group intake level—on our chosen (restrictive) proxy for intake of fruits and vegetables qualifying for the HIP. These results are robust when using the alternative inclusive TFV intake proxy measure. Exploratory analyses find impacts on both fruits and vegetables, distributed across several USDA Food Pattern fruit and vegetable subgroups. These results suggest that HIP achieved the goal of increasing fruit and vegetable consumption of SNAP participants.

There are no differential impacts by demographic subgroups. However, some evidence shows differential impacts by baseline attitudes toward fruits and vegetables. Those who began with more positive attitudes about fruits and vegetables and those who were more likely to have fruits and vegetables available in the home have larger impacts; and impacts were borderline significantly higher for individuals with higher predicted baseline levels of TFV intake. However, there is no evidence of a differential impact by baseline food intake—as measured by the EATS screener. We conjecture that this null result may be due to the less precise measurement properties of the EATS screener.

There is no statistically significant impact on total energy intake (though our power to detect an impact on this outcome is low). There is a positive impact on Vitamin C, but not on fiber and the other micro-nutrients (beta carotene and Vitamin A) considered to be indicators of fruit and vegetable consumption.

Finally, this chapter continued the effort begun in Chapter 6 to reconcile the key estimates of spending for and intake of fruits and vegetables. Chapter 6 noted that the HIP impact on total self-reported fruit and vegetable spending, based on survey measures, was more than five times as large as the HIP impact on TFV spending with EBT benefits in participating supermarkets/superstores as estimated from EBT transaction data. Impacts on survey-based intake measures reported in this chapter were roughly equivalent to survey-based spending measures from Chapter 6, and hence much larger than the impacts that one would expect based on impact estimates from the EBT transactions data. In Chapter 10, we provide a more detailed discussion of possible explanations for this difference.

9. Costs of Pilot and Feasibility of Nationwide Expansion

This chapter provides details on the cost of the Healthy Incentives Pilot in Massachusetts and the estimated costs and feasibility of a nationwide expansion of HIP. HIP affected both the systems and processes used for EBT transactions. Implementation of HIP entailed costs for changes to the EBT system and the retailer and third-party processor (TPP) systems that interact with the EBT system. Implementation of HIP also entailed costs for changes to EBT processes (e.g., the establishment of policies, procedures and standards) and for one-time processes to notify and train stakeholders. This chapter also considers how HIP may affect the operational costs of EBT processes, and to what extent the new processes may be absorbed into ongoing operations of stakeholders without requiring additional resources.

The feasibility of expanding a program such as HIP is based on the ability to modify or create systems, change procedures and fund the project. For HIP, we provide estimated costs for expansion but make no judgment as to whether or how the program would be funded or which entities would bear the costs of expansion.

Total costs of the pilot were $4,441,992. This included DTA's implementation costs of $4,109,087, FNS' contractor cost of $69,862 for oversight of testing, and incentive payments to HIP participants of $263,043. For nationwide expansion of HIP, we project that implementation costs would total approximately $89.8 million. The annual value of incentives earned under nationwide expansion would depend on participant behaviors that cannot be predicted fully from the pilot. Estimates of incentives based on plausible scenarios range from $0.8 billion to $4.5 billion annually.

The first section of the chapter describes the pilot cost data collected for the evaluation and the framework for analyzing pilot and expansion costs. The second section presents the pilot costs incurred by DTA, its contractors, and FNS' testing oversight contractor. The third section presents the projected costs for statewide and nationwide expansion of HIP, including annual projections of implementation costs and incentive earnings. The fourth section discusses stakeholder perspectives on the feasibility of expansion and recommendations for how best to implement HIP on a nationwide basis. The chapter concludes with a discussion of key results and outstanding issues.

9.1 Data Description

This section summarizes the roles of the stakeholders included in the cost analysis, describes the cost data sources, and identifies the costs excluded from the analysis. Most of the data sources described in this section were used to calculate the non-recurring implementation costs. The costs for incentive payments come directly from pilot expenditures.

Stakeholders Included in the Cost Analysis

The cost data collection captured the expenses of the stakeholders participating in the implementation and operation of HIP in Massachusetts. These data were used to estimate the cost of the pilot and also the projected costs of a nationwide expansion of HIP. The primary stakeholders and their roles in HIP implementation and operations are identified in Exhibit 9.1. (The roles of the stakeholders are described in more detail in Chapter 3.) Stakeholders' costs captured in total pilot costs include:

- ***Massachusetts DTA***. FNS awarded a grant to DTA to implement HIP in Hampden County. DTA costs included time for existing management and information technology (IT) staff, additional staff hired to implement HIP, payments to contractors, supplies and other direct costs, and indirect costs for personnel. DTA's partners that received HIP funds included Xerox (the EBT processor), retailers, third-party processors, the Novo Dia Group (technical consultant for retailer systems), and the Massachusetts Department of Agricultural Resources (for farmers market solutions).

- ***Xerox, the EBT processor***. Xerox incurred personnel and overhead costs for its role in HIP design, development, testing, and implementation. These costs were paid with funds from the HIP grant. DTA modified its existing contract with Xerox to include HIP-related expenses.
- ***Retailers***. Under agreements with DTA, major retailers using integrated electronic cash register (IECR) systems received HIP grant funds to modify their systems in order to identify HIP items and process HIP transactions. The retailers used these funds for internal expenses,[115] payments to contractors for IECR system modifications,[116] and payments to TPPs for testing. Xerox's costs included modifying and deploying new HIP-capable "EBT-only" point-of-sale (POS) terminals used by the rest of the participating retailers (i.e., the non-IECR retailers) at no cost to the retailers.
- ***Third-party processors***. For TPPs that route transactions from retailers' IECRs or commercial point-of-sale (POS) terminals to the appropriate processor or network for authorization, HIP required TPPs to modify their systems so that they could capture and forward additional information (the HIP purchase amount) for SNAP EBT transactions, and receive receipt data. Some of the HIP grant funds paid to retailers were used by retailers to support TPP system changes.
- ***Technical consultant services***. DTA contracted with Nova Dia Group (NDG) to provide a wide range of technical consulting services to support major retailers and their third-party processors for system modification, testing, trouble-shooting and problem-resolution throughout HIP implementation and operations. The payments to NDG were part of DTA's contractual costs paid with HIP funds.
- ***Farmers markets***. Through a contract established between Community Involved in Sustaining Agriculture Inc. (CISA) and the Massachusetts Department of Agricultural Resources (MDAR) and paid for through the HIP grant, farmers markets used one of three different systems for processing HIP transactions. Two of the systems were based on electronic point-of-sale systems specially programmed to perform HIP transactions; the third system was based on a variant of the token system widely used for EBT at Massachusetts farmers markets.

The categories in Exhibit 9.1 refer primarily to the one-time activities to implement HIP. The pilot implementation costs measured by the evaluation included operational support for participants, retailers, and community partners provided by DTA, Xerox, and NDG personnel

---

115 Internal retailer expenses were not broken out by cost category and may have included modifications to proprietary systems, training for store personnel, identification of UPC codes for HIP-eligible items, and project management.

116 IECR systems included proprietary systems and Retalix, a commercial off-the-shelf (COTS) system used by several of the retailers.

specifically tasked to work on HIP. The measured costs also included activities by HIP project staff to follow up with stakeholders, document the pilot, and close out operations. Routine operational costs incurred by other personnel were not included and, according to stakeholders, were immaterial.

Exhibit 9.1: Stakeholder Groups and Role in HIP

Stakeholder group	Project management and oversight	Design, develop, test system changes	Recruit participants and/or retailers	Train stakeholders	Support the evaluation of HIP	Costs included in the cost assessment
USDA FNS	✓	✓			✓	Yes[a]
MA DTA	✓	✓	✓	✓	✓	Yes
Local SNAP offices				✓	✓	No
Xerox (EBT processor)	✓	✓	✓	✓	✓	Yes
IECR retailers		✓		✓	✓	Yes
Third-party processors		✓			✓	Yes
Technical consultants	✓	✓	✓		✓	Yes
Community-based organizations			✓	✓	✓	No
Farmers markets		✓			✓	Yes
Abt Associates					✓	No

[a] For FNS, cost assessment includes only costs for system testing services and incentives.

Cost Data Sources

All of the identified one-time costs of implementing HIP were paid for through the HIP grant awarded by FNS to DTA, except for FNS' testing contractor (discussed below). FNS funded the HIP incentives and the evaluation from the appropriation for HIP.[117] Some stakeholders, including retailers with internal IECR systems and TPPs, indicated that additional (i.e., not provided or paid for directly by HIP) resources were used to design, develop, and test system changes. As these entities were not required to capture labor hours and because of the confidentiality of some of the cost information, the expenditure of private funds was not fully captured. Additionally, FNS reported costs for system testing services but also spent an unreported amount of administrative (i.e., not HIP) funds for staff labor, supplies, and other direct costs (ODCs) to oversee HIP.

Data for the pilot cost analysis were obtained from the following sources:

- ***DTA expenditure reports***. These reports provided all expenditures of HIP grant funds by DTA, including staff costs (salaries and wages, fringe benefits, and payroll taxes), payments to contractors and retailers, supplies and other direct costs, and indirect/overhead costs (as charged on the basis of personnel costs).

[117] When a participant earned a HIP incentive, an obligation for the amount earned was created. Xerox's EBT system, EPPIC, tracked purchases made with HIP incentive funds separately, and HIP funds were provided to settle these transactions.

- ***DTA staff time records***. All DTA staff working on HIP reported their time on a weekly basis, with a breakdown by the functions presented in the analysis. The time records were used to allocate total DTA staff costs and indirect costs among the functions needed to implement HIP.
- ***Contractor time records***. Contractors reported their HIP staff time on a monthly basis, using the functional breakdown that was used in the DTA time records. The evaluation team used these time records to allocate DTA payments made to contractors to the activities or functions involved in implementing HIP.
- ***Retailer payment detail***. DTA and its technical consultant provided supporting detail for the payments to retailers,[118] based on the invoices submitted to Xerox by the retailers for HIP infrastructure development and testing. This information was used to determine the costs of IECR system modification and TPP interface testing for the pilot.
- ***EBT system reports***. These reports were used to determine the cost of incentives earned by participants.
- ***FNS information***. FNS provided information on the cost of Booz Allen Hamilton (BAH) support for testing of changes to the Xerox EBT system and IECR retailer systems.

All costs captured for the HIP project were one-time costs—i.e., specific to pilot implementation—with the exception of the actual HIP incentive, which was a recurring cost throughout the project. Stakeholders indicated that the operational cost of a HIP transaction during the pilot was no different than that of a normal SNAP transaction. In other words, once all system changes were developed and tested, no additional system operations costs were incurred, according to stakeholders. DTA's staff who provided participant and retailer support during HIP were hired specifically for the pilot, and DTA staff who would provide participant support in routine program operations were not significantly involved. Xerox did not identify any incremental costs for retailer and participant support during the pilot. The potential for ongoing costs in expansion is discussed in Section 9.3.

Exclusions from the HIP Pilot Cost Analysis

The previous sub-section discussed the costs for which we have detailed information and which we therefore include in our cost analysis. We do not have detailed cost information for other costs, as identified below. We cannot and do not include these costs in our cost analysis, but they ideally would be considered in a more complete cost analysis.

- ***USDA/FNS***. Our analysis includes expenditures by FNS for the HIP incentives and contractual costs for testing services by Booz Allen Hamilton (BAH). USDA FNS staff resources, supplies and other internal costs were not part of the HIP grant and were not tracked separately by FNS and therefore are not included in our cost analysis for the evaluation.

[118] Payments to retailers were made through Xerox, which was a party to the Memoranda of Understanding between DTA and retailers.

- ***Local SNAP offices***. Local SNAP office costs were not captured, but interviews with office directors confirmed that their staff time was limited to brief training sessions for staff providing general information on HIP and occasional support to individual HIP clients.
- ***Community-based organizations (CBOs)***. The CBOs that assisted with training for HIP participants generally did not capture their costs for this effort, and so the cost analysis does not include them.[119] This gap does not appear to be important to the estimates of costs for nationwide expansion of HIP. Information from stakeholders and experts indicates that CBOs might augment efforts of SNAP program staff but would likely do so on a voluntary basis, using existing staff, focusing on promotion of HIP and nutrition education.

9.2 Pilot Costs

This section presents the costs identified for the pilot, beginning with an overview and proceeding with discussion of incentive costs and non-recurring implementation costs, including costs for contractors, retailer infrastructure investment, and farmers markets.

Overview of Pilot Costs

In August 2010, FNS awarded a grant in the amount of $6,392,690 to the Massachusetts Executive Office of Health and Human Services, Department of Transitional Assistance (DTA) to implement the HIP pilot. Through September 2013, HIP pilot expenditures from the grant to DTA totaled $4,109,087 (Exhibit 9.3).[120] FNS spent $69,862 for its testing contractor. The total cost of the HIP incentive was reported to be $263,043. The total cost of the HIP pilot was therefore $4,441,992, including the DTA grant expenditures, FNS' testing contractor, and incentive payments. (This total excludes FNS staff time and ODCs, and other stakeholder costs not identified in available data).

Incentive Costs

FNS bore 100 percent of the cost of the HIP incentive. Funds for the incentives redeemed by participants were part of the appropriation for HIP but were not part of the grant to DTA. The following table (Exhibit 9.2) contains the number of active participants in HIP across all months, the amount earned per household per month and the total amount of incentives paid to participants over the course of the HIP demonstration. These costs were calculated using EBT system data, which includes all transaction data related to SNAP and HIP transactions. As noted in the exhibit, the average of $3.42 per household per month is over the entire pilot, including the periods of phase-in and phase-out of incentives. The average of $3.65 per household per month for March through October 2012 is the best indicator of HIP incentive use for extrapolating to HIP expansion (see Section 9.3).

---

[119] The role of CBOs in retailer outreach, materials development, and participant training was substantial and provided at no cost to the HIP grant. A few CBOs provided partial information on their costs for this process, but the data were too incomplete to use for analysis.

[120] Any additional HIP-related expenditures beyond September 2013 would be considered related to the evaluation and therefore not relevant to projections for expansion costs.

Exhibit 9.2: Calculation of HIP Incentives for Pilot

FNS-supported incentives: ongoing costs	Cost calculations		
	Total $ of incentives	Total active household-months	$ per HIP household per month
Pilot incentives	263,043	76,943	3.42

Notes: Total value of incentives earned as computed by the evaluation team from EBT transaction data. Total number of "active household months" is the sum of the number of active HIP households over all months of the pilot, including all HIP households that had a SNAP transaction (either benefit issuance or purchase). Number of active HIP households for November and December 2012 is estimated from actual counts of all households labeled as HIP in data that had transactions, including those that were no longer earning incentives (Wave 1 in November 2012, and Waves 1 and 2 in December 2012). This table represents the actual average incentive per household for the entire pilot.
Source: EBT transaction data, November 2011-December 2012.

Implementation Costs

Exhibit 9.3 summarizes the total pilot implementation costs paid from the DTA grant and by FNS, by function and cost category. The types of costs for each function and the key stakeholders are identified below. (The total cost is listed in parentheses for each function.)

System design, development and testing ($2,433,340). DTA, Xerox, retailer and TPP systems were modified for HIP. These costs included $1,016,156 paid to contractors, including Xerox and NDG (as discussed below) and $1,410,498 for retailers' infrastructure. The latter cost included $1,283,236 paid to retailers and $127,262 in various expenses to develop and implement farmers market solutions (details and cost breakdown of these components discussed below). DTA's internal costs constituted the balance, $6,686.

Household recruiting and customer service ($131,604). DTA developed, translated, printed, and mailed notification and recruiting materials to households selected for participation in HIP. DTA HIP project staff fielded participant questions and provided HIP dispute support (e.g., answering questions about possible errors on receipts). Most of the DTA costs for this function ($118,058) were for supplies and other direct costs. About three-quarters of the costs identified as supplies and other direct costs were for postage, EBT card sleeves with HIP information, and printing of other participant materials. The rest was for temporary consultants hired for HIP and other services.

Retailer recruiting and relations ($200,668). Retailer participation in HIP was crucial to the success of the pilot, which was voluntary for retailers and required either changes to IECR systems or process changes for retailers using EBT-only POS terminals. DTA had a staff member dedicated to retailer recruiting and ongoing liaison, but other project staff also supported this effort. Nearly all of the cost for this function ($193,778) was for DTA's internal expenses. Xerox staff spent a modest amount of time for recruiting retailers for HIP, and fielding retailer questions or concerns, at a cost of $6,890.

Community relations ($56,929). DTA staff worked with CBOs to encourage and support CBO involvement in HIP participant training and to solicit feedback from CBOs via the HIP Steering Committee. All of the DTA expenses for this function were personnel-related.

Training ($275,943). DTA HIP staff developed training materials and provided training about HIP to local DTA staff, retailers, and participants. Most of the costs were for personnel, including three trainers active during the phase-in of HIP (October 2011 through February 2012). DTA's costs for supplies and ODCs for training ($64,538) included translation services, in-state travel, and miscellaneous other items.

General administration ($703,481). DTA and Xerox staff activities for management and oversight of HIP included: establishing Memoranda of Understanding and contractual relationships with retailers and others (as described above), hiring additional staff, managing the HIP grant, internal operations, and providing required reports to USDA. DTA incurred most of the costs for these functions ($671,047) for personnel, supplies, and overhead; Xerox incurred the balance ($32,434).[121]

Evaluation support ($273,095). These activities included providing data relevant to the HIP evaluation, including system data and HIP reports, and supporting the stakeholder interview process. Most of the evaluation support cost ($191,122) was incurred by Xerox and NDG.

Unassigned costs. As shown in Exhibit 9.3, DTA internal costs of $34,028 were not assigned to one of the specific functions in the time-use and ODC data.

[121] The DTA time for general administration appears to include time spent on activities that were difficult to classify. Thus, some of the cost for this function may in fact be attributable to other functions. This data limitation may partly explain the relatively small DTA cost for system design, development and testing.

Exhibit 9.3: Summary of Implementation Cost of Healthy Incentives Pilot (Including DTA and FNS)

Function	Cost category							Total ($)
	Salaries and wages ($)	Employee benefits ($)	Payroll tax ($)	Contractors ($)	Retailer infrastructure ($)	Supplies and other direct costs ($)	Indirect/ overhead ($)	
System design, development and testing	4,512	1,339	77	1,016,156	1,410,498		759	**2,433,340**
Household recruiting and customer service	9,141	2,712	157	0		118,058	1,537	**131,604**
Retailer recruiting	118,589	35,182	2,031	6,890		18,030	19,946	**200,668**
Community relations	38,414	11,396	658	0			6,461	**56,929**
Training	131,457	39,000	2,251	16,586		64,538	22,111	**275,943**
General administration	448,341	133,010	7,677	32,434		6,608	75,410	**703,481**
Evaluation support	47,828	14,189	819	191,122		11,092	8,045	**273,095**
Unassigned costs	22,650	6,720	388	0		460	3,810	**34,028**
Total DTA costs	**820,932**	**243,547**	**14,058**	**1,263,187**	**1,410,498**	**218,785**	**138,080**	**4,109,087**
FNS expense for testing				**69,862**				**69,862**
Total implementation cost	**820,932**	**243,547**	**14,058**	**1,333,049**	**1,410,498**	**218,785**	**138,080**	**4,178,949**

Notes: Salaries and wages, employee benefits, payroll tax, supplies and other direct costs, and indirect/overhead are for DTA personnel. See Exhibit 9.4 for detail of DTA pilot contractor costs. Retailer infrastructure includes all payments to retailers for HIP-related expense plus farmers market system development and deployment costs; see Exhibit 9.5 and text for details. Retailers used HIP funds to pay IECR system vendors, TPPs, and other contractors, and for internal expenses. Detail of retailer payments is confidential. FNS expense for testing excludes FNS staff time and their travel, for which data were not available.
Sources: DTA expenditure and time-use reports; contractor time-use reports; FNS correspondence.

For DTA, the functions that used the most internal resources were (in decreasing order by size) general administration, training, and retailer recruiting. All personnel-related costs in Exhibit 9.3 (including salaries and wages, fringe benefits, and payroll tax) and all indirect costs were internal DTA expenses. The majority of funds provided by DTA to the two main contractors, Xerox and NDG, were expended on system design, development and testing. All funds paid to retailers are categorized in Exhibit 9.3 as spending on retailer infrastructure; as discussed below, retailers used funds for a combination of internal activities and payments to other firms, including IECR system integrators and TPPs.

DTA Contractor Costs

As discussed in the preceding section, DTA's primary contractors were Xerox and NDG. A third firm, Causemedia, was contracted to provide training materials. The breakdown of pilot contractor costs by firm and function is provided in Exhibit 9.4. (These costs do not include the contractor expenses for retailer enablement, which were incurred by contractors working for retailers and for the Massachusetts Department of Agricultural Resources.)

Exhibit 9.4: Detail of Pilot Contractor Costs

Function	Causemedia ($)	NDG ($)	Xerox ($)	Total ($)
System design, development and testing	0	171,912	844,244	1,016,156
Retailer recruiting	0	0	6,890	6,890
Training	14,035	0	2,551	16,586
General administration	0	0	32,434	32,434
Evaluation support	0	82,020	109,101	191,122
Total	14,035	**253,932**	**995,220**	**1,263,187**

Notes: NDG provided technical support for design, development and testing. Xerox is the EBT processor.
Sources: DTA expenditure reports; contractor time-use reports.

In total, DTA expended $1,263,187 in contractor costs.[122] The majority of contractor costs ($1,016,156) were expended on design, development and testing. These costs included modification of the EBT processing system by Xerox and technical support services provided by NDG during the development and testing of IECR retailer and TPP systems. Another $191,122 was spent on evaluation-related activities. The remaining Xerox costs were for retailer recruiting, training and general administration. The Causemedia cost shown in Exhibit 9.4 was for consulting services to develop HIP training materials.[123] (HIP card sleeves and promotional grocery bags purchased through Causemedia are included in the supplies and other direct costs in Exhibit 9.3.)

Retailer Infrastructure Costs

DTA paid for two kinds of retailer infrastructure costs with HIP grant funds. First, DTA paid $1,283,236 for IECR system modifications and other implementation activities by five retail chains

122 Contractor costs are as of September 30, 2013, prior to close-out of the HIP grant. All contractor payments would be subject to review before they are final.

123 FNS and the evaluation contractor developed the colorful three-step training brochure mailed to HIP participants in June 2012.

and four independent retailers. Second, DTA paid $127,262 for development and implementation of payment systems to process HIP transactions at farmers markets.

Five retail chains and four independent retailers agreed to participate in HIP on the condition that DTA would pay for their costs to ready their stores for HIP transactions. These retailers used proprietary or COTS IECRs for SNAP transactions, so their IECR systems were modified to identify HIP-eligible foods, calculate the HIP sub-total, process HIP transactions, and print receipts with HIP information. In addition, TPPs modified their systems to process HIP transactions as the TPPs routed data from participating stores to the EBT processor and back to the stores. HIP funds paid for these IECR and TPP modifications, and for related internal retailer costs such as identifying and managing the Universal Product Codes (UPCs) of HIP-eligible food items.

Some but not all retailers provided information about how they allocated HIP funds (i.e., between internal costs for the retailer, payments to IECR contractors, and/or payments to a TPP). In addition, not all retailers provided information to separate HIP design, development, and testing from other retailer HIP implementation activities. Thus, all payments to retailers are reported in Exhibit 9.3 as "retailer infrastructure" expenses.

The costs reported by retailers do not include any operational costs for HIP. Staff time might be required on an ongoing basis to address client concerns, fix system issues, and ensure that products are properly flagged in the IECR system. This is true for any program that restricts benefit use to specific products, including SNAP, WIC, and flexible payments for health benefits, and is particularly true during the start-up of a new program. However, retailers indicated in interviews that no new resources were required for HIP-related operations activities.

Cost for Farmers Markets

HIP was implemented through three different systems in the farmers markets in Hampden County: the token system, the e-HIP system, and the Mobile Market Plus (MM+) system. Each of these systems was designed to address the unique constraints of HIP transactions in farmers markets, including non-permanent locations, limited or no electric and telecommunications services, and limited operating funds. In addition to HIP transactions, the two electronic systems (e-HIP and MM+) facilitated regular SNAP transactions and use of other incentive programs for SNAP participants.

Community Involved in Sustaining Agriculture Inc. (CISA) was awarded a contract to coordinate the implementation of test systems at pilot area farmers markets. The actual cost paid from the HIP grant for the farmers market systems was $127,262. Exhibit 9.5 provides the breakdown of these expenses. About 60 percent of the expenses ($78,127) were for design and development of the e-HIP and MM+ systems. The rest of the expenses were for the token system and project management and training for market managers and vendors (including salaries, supplies, and travel).

Exhibit 9.5: Costs of Implementing HIP in Farmers Markets

Farmers market solution	Cost Categories: Salaries ($)	Supplies and travel ($)	Token solution[a] ($)	e-HIP[b] ($)	MM+[c] ($)	Total ($)
Activity						
Design, develop, test and implement solutions	0	0	7,939	42,661	35,466	86,066
Project management and training	17,089	24,108	0	0	0	41,196
Total	**17,089**	**24,108**	**7,939**	**42,661**	**35,466**	**127,262**

Note: Actual costs include only funds paid to CISA and were not itemized by cost categories. Percentages of budgeted costs for each category were used to allocate actual costs.
[a] Modification to existing SNAP token system used in farmers markets.
[b] Developed by Mass Farmers Markets.
[c] Developed by NDG; this solution was originally developed for other farmers markets and modified for HIP.
Source: DTA expenditure reports and budget documents.

9.3 Costs of Nationwide Expansion

The cost of a nationwide expansion includes the annual cost of incentive payments and the (non-recurring) implementation costs. Nationwide implementation costs are estimated based on pilot implementation expenses, input from industry experts and a set of basic assumptions.[124] One-time nationwide expansion costs include costs for the following activities:

- Manage the implementation of HIP within a State
- Modify and test EBT processor systems for HIP transactions
- Modify and test IECRs for HIP transactions
- Modify and test POS terminals for HIP transactions
- Modify and test TPP systems for HIP transactions
- Notify and train SNAP staff, retailers, and participants

As discussed below, stakeholders indicated that the only identifiable ongoing cost of HIP will be the actual cost of the HIP incentive. Stakeholders expected that, in general, expansion would not increase staffing or other ongoing costs of operating and maintaining SNAP EBT systems for States, EBT processors, and retailers. This section first discusses the projected cost of incentive payments and then the non-recurring implementation costs. The section concludes by discussing the expansion and operational costs that are not feasible to estimate.

Cost of the HIP Incentive

Payment of HIP incentives to households would be ongoing in a nationwide expansion. HIP incentives would be by far the greatest cost of nationwide expansion to the Federal government.

---

124 The nationwide implementation costs are provided as point estimates. There is substantial uncertainty about how closely the actual costs will track those of the pilot. Lacking any information about the scope of this uncertainty, we have not attempted to estimate a range of probable values around the point estimates.

While the costs of HIP incentives can be projected from the experience of the pilot, there are three important sources of uncertainty. First, there is considerable uncertainty about how the incentive earnings would change with much wider or universal retailer participation, at least among stores with substantial inventories of fruits and vegetables. The second unknown is how much wider and deeper understanding of HIP among SNAP participants in the context of nationwide expansion would lead to higher levels of TFV purchases. Finally, the HIP participants may be systematically different from the average SNAP household nationwide in ways that might affect incentive earnings (such as household size, presence of children and elderly, and race/ethnicity). The projections in this section address the first two sources of uncertainty. We have not attempted to address the third because the evidence from the pilot suggests that differences in household characteristics between the pilot participants and the national population of SNAP participants would have only a modest influence on HIP incentive earnings relative to the potential effects of wider retailer participation and better participant understanding.

Exhibit 9.6 presents the projected costs of HIP incentives under three scenarios. The projections assume a nationwide roll-out starting in 2014, with incentive earnings starting in 2015 and the first year of full nationwide operation in 2019. The scenarios and assumptions are described below.

1. The ***Baseline*** projection assumes that the average HIP household earns $3.65 per month in incentives. This was the average from March through October 2012 (see Exhibit 5.12).
2. The ***All retailers participating*** scenario assumes that all SNAP authorized retailers participate, and that HIP incentives earned increase in proportion to the share of SNAP spending in participating retailers. In the average month, HIP participants spent 52.9 percent of SNAP benefits in participating retailers (Exhibit 5.9, March through October 2012). Thus, the baseline projection is multiplied by 1.89 (calculated as 1/0.529) to yield the average incentive earned per HIP household in this scenario ($6.90 per month).
3. The ***Thrifty Food Plan (TFP) target*** scenario is based on the analysis conducted to guide the setting of the HIP incentive cap, which projected a mean incentive earned of $19.78 per household. This analysis assumed participants would purchase 53 percent of the TFP recommendation for fruits and vegetables.[125]

All scenarios are based on the same projections of the HIP caseload. The percentages of SNAP households participating in HIP each year are assumed, but approximately align with the assumptions about the number of States implementing HIP each year (as used in the implementation cost projections discussed later in this section).[126] The SNAP household totals for these projections are based on projections of the number of SNAP participants by the Congressional Budget Office (CBO,

---

125 This assumption was based on Blisard and Stewart's (2006) estimate of average fruit and vegetable spending for low-income households as a fraction of TFP.

126 The HIP percentage of SNAP households in Exhibit 9.6 approximately aligns with the assumptions of the implementation cost projections under the additional assumption that the average State implementing each year is of average size. Although the implementation cost projections assume that the first three States implement in 2014, the incentive projections below assume that participants in these States begin earning incentives in 2015, and other States also have a lag between the start of implementation and the start of incentive outlays, so the first year when all SNAP participants are able to earn incentives is 2019.

2014) and an assumption of 2.09 persons per household, as observed in FY2012 (based on data reported on the FNS website).

Exhibit 9.6: Projected Incentives Earned During Nationwide Expansion of HIP

	HIP incentive earned (millions of $)				
	Baseline[a] ($)	All retailers participating[b] ($)	TFP target[c] ($)	HIP share of SNAP (%)	Total HIP households (millions)
Monthly HIP incentive per household	3.65	6.90	19.78		
Year					
2015	121	228	654	12.5	2.8
2016	234	443	1,271	25.0	5.4
2017	448	847	2,428	50.0	10.2
2018	687	1,298	3,721	80.0	15.7
2019	825	1,559	4,469	100.0	18.8
Total	2,314	4,375	12,542		

[a]Baseline: pooled mean incentive, Exhibit 5.12.
[b]All retailers participating: based on mean 52.9 percent of SNAP redemptions by HIP participants in participating stores (March-October 2012).
[c]TFP target: Average household spends 53 percent of the fruit/vegetable target in the TFP on TFV.
Includes the 50 States, the District of Columbia, Guam, and the Virgin Islands. Areas operating alternatives to SNAP are not included. Projections are in 2012 dollars and are not adjusted for inflation or for food costs outside the 48 contiguous States and the District of Columbia.
Sources: EBT transaction data; CBO SNAP caseload projections.

As Exhibit 9.6 indicates, the annual incentive earnings in the first full year of nationwide HIP operation (2019) are projected to range between $825 million and $4.469 billion. The cumulative incentive earnings for 2015 through 2019 are projected to range between $2.314 billion and $12.542 billion. These projections are intended to illustrate the potential scale of incentive earnings and also the wide band of potential earnings under plausible assumptions. While the annual totals may be seen as large, even the highest scenario represents a cost of just 31 cents per household per day.

Implementation Costs Overview

The total non-recurring cost for nationwide HIP expansion is estimated at $89.9 million. This estimate represents costs to expand HIP to include the rest of Massachusetts, the other 49 States, the District of Columbia, Guam, and the Virgin Islands. (These 53 agencies are all referred to as State Agencies below.) Estimated costs for nationwide expansion include those to be incurred for State Agency activities; EBT processor, retailer, and TPP system modifications; technical assistance contractors; participant and retailer training materials; and other supplies and direct costs. The estimates are presented in Exhibit 9.7, and the assumptions for these estimates are summarized below. The intent of the analysis is to estimate the full costs of nationwide HIP expansion without making any assumptions about which stakeholders would pay for these costs (in particular, the cost-sharing between State Agencies and FNS, and between public and private stakeholders).

Compared with the pilot, there will be considerable economies of scale in nationwide expansion, because the costs are one-time and the largest ones are shared across States and retailers. The pilot cost was roughly $100 per participating household. The nationwide cost of $90 million represents a one-time expenditure of less than $5 per SNAP household – less than the cost of providing a $1 brochure to every SNAP household every year for 5 years. Moreover, over three-fifths of the cost is spending on retailer infrastructure that may require little if any funds from FNS or the States.

The estimated expansion costs in Exhibit 9.7 are separated between State Agency costs and retailer infrastructure costs. State Agency costs for expansion include State personnel, contractual costs for EBT processors and consultants, and supplies and other direct costs. The rows for State Agency costs represent the following stages of HIP expansion:

1. ***Statewide expansion within Massachusetts***. This includes design, development, and testing of modifications to the Xerox EBT system to support nationwide expansion.
2. ***The second State to implement HIP***. This State will go through a similar design, development, and testing process with its EBT processor. (This State represents the first State to implement HIP with the other EBT processor, FIS.)[127]
3. ***The third, fourth and fifth States to implement HIP***. These States will need only minor changes to their EBT systems, since the two EBT processors will have already implemented HIP. However, these States' costs will be greater than for the 48 State Agencies that follow due to the need to oversee certification of additional major retailers to participate, as discussed below.
4. ***The remaining 48 State Agencies***.

The rows for retailer infrastructure represent the costs for the different categories of systems that would be modified to expand HIP, including: IECR systems (such as those used by the vast majority of supermarkets and superstores, and other types of stores operated by retail chains), commercial POS terminals (accepting credit and debit cards as well as EBT), and TPPs. These rows represent projected costs for nationwide expansion (all 53 State Agencies), including all systems that must be modified to support HIP in all SNAP retailers. The retailer infrastructure costs are identified separately because of their size (62 percent of the total for nationwide expansion) and because no assumption is made about the portion of these costs to be paid by State Agencies or FNS. The expansion costs in Exhibit 9.7 include FNS costs for contractor support to oversee testing, but we have not attempted to estimate costs for FNS personnel or other FNS administrative costs to oversee expansion.

---

[127] The projections assume that all States implement HIP using either Xerox or FIS. FIS is the current name of the firm formerly known as Fidelity Information Systems. JP Morgan Chase has announced that it plans to cease providing EBT processing services, so the projections assume that this firm does not modify its systems for HIP. Pilot data do not support estimates for design, development, and testing of modifications for other systems, such as those used by Montana and Texas, or for extra State Agency costs in areas with special implementation requirements and challenges (such as Alaska, Hawaii, Guam, and the U.S. Virgin Islands).

Exhibit 9.7: Estimated Implementation Cost of Statewide and Nationwide Expansion

	Cost category							
	Salaries and wages[a] ($)	Employee benefits[a] ($)	Payroll tax[a] ($)	Contractors[b] ($)	Supplies and other direct costs[c] ($)	Indirect/ overhead[a] ($)	Retailer infrastructure[d] ($)	Total ($)
State Agency costs								
MA: Remainder of State	725,549	215,250	12,424	273,550	89,636	34,407		1,350,816
State 2 (with design, development, and testing of HIP modifications for second EBT processor and additional IECR systems)	725,549	215,250	12,424	1,101,278	89,636	34,407		2,178,544
State 3 (with design, development, and testing of HIP modifications for additional IECR systems)	362,775	107,625	6,212	273,550	89,636	17,203		857,001
State 4 (with design, development, and testing of HIP modifications for additional IECR systems)	362,775	107,625	6,212	273,550	89,636	17,203		857,001
State 5 (with design, development, and testing of HIP modifications for additional IECR systems)	362,775	107,625	6,212	273,550	89,636	17,203		857,001
States 6-53 (remaining 48 State Agencies, with minor modifications to EBT system or reports)	13,059,886	2,583,003	149,090	4,878,626	4,302,525	412,879		25,386,009
Total State Agency costs	**15,599,308**	**3,336,378**	**192,575**	**7,074,102**	**4,750,704**	**533,302**		**31,486,370**
Retailer infrastructure								
Modification of IECR systems							53,221,600	53,221,600
Modification of commercial POS terminals							1,360,000	1,360,000
Modification of TPP systems							1,008,425	1,008,425
Total retailer infrastructure							55,590,025	55,590,025
FNS testing				2,700,000				2,700,000
National totals	**15,599,308**	**3,336,378**	**192,575**	**9,774,102**	**4,750,704**	**533,302**	**55,590,025**	**89,776,395**

Includes 50 states and DC, Virgin Islands and Guam. See text for assumptions. Detail may not sum to totals due to rounding.
[a] For salaries and wages, employee benefits, payroll tax, indirect/overhead, activities include: develop, design, test; retailer recruiting; training; general/admin; unassigned.
[b] Contractor costs include: EBT processor (system modifications, client training brochures, and production and mailing of retailer training brochures) and retailer systems specialist to coordinate and support retailer infrastructure modifications and testing.
[c] Supplies and ODCs include: retailer recruiting (travel), training (translation, travel, misc.), G&A (misc.), unassigned (misc.).
[d] Retailer infrastructure includes: modification and testing of proprietary and commercial off-the-shelf (COTS) IECR systems, commercial stand-beside POS terminals, and TPP platforms, Does not include costs of improvements to all variations of farmers markets technologies (other than EBT-only and commercial stand-beside POS terminals).
Sources: DTA time and expenditure reports; contractor time reports; stakeholder interviews.

State Agency Expansion Costs

Projected State Agency costs for HIP expansion include State agency personnel, contractors, and supplies and other direct costs, as described in this section.

State Agency Personnel

All expansion estimates for State personnel costs (including salaries and wages, employee benefits, payroll taxes, and indirect costs) are based on the DTA personnel costs for the pilot. We excluded several categories of pilot costs based on the assumption that they were specific to the HIP pilot and would likely not occur during a statewide rollout: household recruiting, community relations and evaluation.

Retailer recruiting costs from the pilot are included in the base used for estimating each stage of nationwide expansion costs. Clearly, a mandate that all SNAP retailers participate would obviate the need to recruit retailers. However, even in that case, the WIC-EBT experience suggests that there would likely be a significant outreach effort to educate retailers and support them through system changes.

For training, the assumed approach is that each State will design and distribute informational brochures for participants and retailers. Participant training brochures will be distributed through local SNAP offices or mailings for other purposes, so the projections do not include any distribution costs. Production of brochures and mailings for retailers are included in the contractor costs for expansion.[128] Existing communication and training channels will be used to prepare State and local staff for HIP. Although training was far more intensive in the pilot than expected for nationwide expansion, the State Agency labor cost for the pilot (spread over an entire State) is the best available proxy for these costs.

For statewide expansion in Massachusetts, the estimates are based on the assumption that DTA will need to replicate its labor hours from the pilot. Even though system changes have been made, there will still be a significant level of effort to oversee the expansion of the retailer infrastructure, train local office staff, and ensure the EBT system meets the guidelines, standards and operating rules that will likely be established by FNS for HIP expansion.

As noted above, State 2 represents the first State implementing HIP with the other major EBT processor, FIS. This State is assumed to incur costs similar to the pilot costs in Massachusetts (after excluding costs unique to the pilot). These include costs of system design, development, and testing; retailer outreach (similar to the process for expansion in Massachusetts); training (discussed below), and general administration. The focus of the retailer outreach effort would be the oversight of retailer infrastructure investment for systems that did not implement HIP as part of the Massachusetts pilot and its expansion. (Costs of retailer infrastructure are addressed in the next section.)

For States 3, 4 and 5, the estimates are based on the assumption that the EBT system will be ready for HIP but will need minor modifications for each State (such as new reports). However, it is assumed that the States will have a comparable effort to the Massachusetts expansion in preparing retailers, participants, and agency staff for HIP. In particular, these States will need to oversee the retailer

[128] The costs include a brochure for every SNAP retailer, but chain retailers might prefer to distribute their own training materials.

infrastructure investment for systems that have not already implemented HIP. Therefore it is assumed that State Agency personnel costs for States 3, 4 and 5 will be one-half of the cost per State as for State 2.[129]

Based on the experience with WIC EBT, it is assumed that, after five states have implemented HIP, the majority of retailers with proprietary IECRs and the majority of commercial off-the-shelf (COTS)[130] IECRs will have been enabled for HIP, thereby reducing the State effort related to retailer infrastructure investment. Therefore for the remaining 48 states (States 6-53) it is assumed that the State Agency personnel costs will be three-quarters of the cost per State for States 3, 4 and 5.

Contractors

The assumptions for contractor costs include EBT processors, technical consultants, and other contractors. The roles of these contractors and the assumptions for their costs are explained below.

For EBT processors, the assumptions are as follows:

- For Massachusetts expansion, the EBT processor (Xerox) will make minor modifications to system features and reports to meet the needs for non-pilot, statewide operations and national expansion. The modified system will be tested as it was in the pilot.
- One more EBT processor (FIS) will need to be enabled for HIP, as part of implementation in State 2. The projections for EBT processor costs are based on the Xerox costs for HIP, after excluding evaluation-related costs. These costs include modifications to the EBT-only terminals currently supported by this processor.[131]
- For the remaining 51 States and territories, the EBT processors will make minor state-specific system modifications and reports at the same per-State cost as the Massachusetts expansion.

The first five States implementing HIP, including the Massachusetts expansion, will require the technical support services of a contractor specializing in retailer systems, with capabilities similar to NDG. As in the pilot, a contractor of this type would support and coordinate the design, development, and testing of modifications to IECR and TPP systems. The retailer systems specialist would also oversee the design, development, and testing of modifications to commercial stand-beside POS

---

[129] As noted in the discussion of pilot costs, the DTA time-use data include a large amount of effort for general administration, part of which may be related to system design, development, and testing and therefore not needed in States 3, 4 and 5. Lacking more specific data to estimate the portion of DTA's pilot costs for State personnel that States 3, 4 and 5 would face, the assumption that their costs would be half of DTA's appears to be the most reasonable and defensible approach for this analysis. The same rationale applies to the projection of personnel costs for the remaining 51 State Agencies. All State Agencies would of course need to develop a detailed budget based on their specific requirements, using the Massachusetts data as appropriate.

[130] A COTS IECR system is a package of hardware and software marketed as a complete, standardized POS solution, rather than a custom system developed for or by the retailer (i.e., a proprietary system).

[131] The Agricultural Act of 2014 requires retailers to pay for EBT equipment and supplies, unless they are exempted by USDA. If exempt retailers that carry HIP-eligible foods, such as cooperatives and military commissaries, continue to have no-cost EBT-only terminals, then FIS will need to modify its software for these terminals.

terminals used for accepting credit, debit, and EBT in stores that do not have IECRs. (As discussed above, the EBT processor would modify EBT-only terminals.) Using WIC EBT as an example, after the first five States have implemented HIP, the need for these services will be eliminated as the great majority of IECR and POS systems will have been enabled for HIP.

Some states, such as California and New York, have multiple eligibility systems, but they contract with one EBT provider and all eligibility systems share a common EBT platform. County or regional participant data are provided to the EBT system in the same file formats. Thus, the HIP implementation cost associated with eligibility system changes for HIP in States such as California and New York will be similar to that of other States that maintain one eligibility system.

For each of the 53 states, the projections assume that the State will use a contractor to produce participant brochures and produce and mail retailer training brochures during the initial rollout of HIP. As noted above, it is assumed that States will use mailings for other purposes, hand-outs during in-person contacts, and existing websites to inform participants about HIP, so the States will not have separate costs for mailing participant brochures or other materials.

Supplies and Other Direct Costs

State expenses for supplies and other direct costs are based on the same categories of pilot costs as the personnel costs and include retailer recruiting, training, general and administration costs, and unassigned costs. The DTA pilot costs that are used as the basis for projected costs in this category include in-state travel, translation services, advertising and job related expenses. The per-state cost for Massachusetts expansion and each subsequent State is assumed to be the same as the applicable costs in the pilot. Development and production of training materials is included in the contractor cost column in Exhibit 9.7.

Retailer Infrastructure Expansion Costs

Exhibit 9.7 identifies three categories of retailer infrastructure costs for HIP expansion, as follows:

1. IECR systems, with a total cost of $53.2 million
2. Commercial POS terminals, with a total cost of $1.4 million
3. TPP systems, with a total cost of $1.0 million

These cost estimates are discussed below. As previously indicated, the estimates are intended to represent the cost of the resources required to implement HIP nationwide, without assuming how the retailer IECR costs for expansion are funded. These costs could be reimbursed directly by States, paid by or through EBT processors or another third party, or borne by the retailers. The cost estimates are based on the assumption that if HIP is implemented, all systems used by SNAP retailers will be modified to support HIP. (The question of which SNAP retailers would participate in the nationwide expansion of HIP is discussed in Section 9.4.)

IECR Systems

As in the pilot, two types of IECR systems will need to be modified and tested in order to support HIP expansion. A proprietary IECR is a system that has been developed specifically for one retail chain. A retail chain with a proprietary IECR system will likely modify its software and then make the enhanced software available to all of its retail locations in all States. One chain in the pilot has already enabled HIP functions in the proprietary system used in all of its stores in the U.S. Other retail chains use commercial off-the-shelf (COTS) IECR systems; for these systems, once the system is modified for the first State where the system is used, enhanced software can be made available to all stores that use that COTS system throughout the U.S.

As shown in Exhibit 9.8, the expansion cost estimates include a total of 224 proprietary IECR systems and 60 COTS IECR systems. Counts of retail chains by store type are based on FNS national retailer data. The estimated number of proprietary systems to be modified includes all 86 superstore/supermarket chains, 2 grocery store chains, 49 combination grocery/other store chains, and 87 convenience store chains. All other retailers with IECR systems are assumed to have one of the 60 COTS IECR systems identified by industry experts consulted for this report. The total cost of modifying and testing IECR systems is based on the counts of systems and the average cost per system in the pilot. The average cost per store for IECR system modifications and testing is estimated to be $386, with a range across store types from $181 per store for combination grocery/other stores to $1,855 per store for grocery stores. The variation is due to the mix of proprietary vs. COTS systems and the number of stores per chain.

Commercial POS Terminals

The second category of retailer infrastructure costs for HIP expansion is commercial POS terminals that are not integrated with cash registers (known as "stand-beside" terminals). As noted above, some retail chains and individual retailers use these terminals to accept credit, debit, and EBT transactions, which are processed through a TPP. Retailers with commercial stand-beside terminals were not included in the pilot test due to the time constraints of the pilot.

Based on the evaluation team's experience with WIC EBT implementation, it is assumed that 40 models of commercial stand-beside terminals will need to be enabled for HIP. The estimated average cost of $34,000 for each model of terminal is based on consultation with industry sources and includes testing with the retailer's TPP. (In some cases the terminal is provided to the retailer as part of the TPP agreement.) Once a particular model of commercial POS terminal is enabled for HIP, existing processes can be used to update the software for all users at no additional cost.

TPP Systems

TPPs are needed to route HIP transactions from retailers using IECR or commercial POS systems to EBT processors. Based on research into the TPPs active in EBT, an estimated 19 additional TPP systems will need to be modified to accept the HIP transaction for nationwide expansion. This estimate takes into account the number of TPPs and the number of different systems they operate. The estimated cost per TPP system is $53,075 based on pilot data. Whether TPPs charge their customers for HIP modifications would be a business decision for the TPPs.

Other Retailers

The total cost to enable retailers for a nationwide rollout does not include the calculated cost of modifying systems for specialty stores (e.g., bakers, meat markets, and fish markets). However, it is likely that most or all of these stores will be able to leverage the upgrades done to COTS systems, commercial POS terminals, and EBT-only terminals to include sales of HIP-eligible items.

Exhibit 9.8: Estimated Cost of Integrated Electronic Cash Register System Modifications for Nationwide Expansion

	Units		Cost calculation		
Retailers with IECR systems	Estimated number of proprietary systems	Estimated number of commercial-off-the-shelf systems	Estimated cost per system ($)	Estimated total cost for IECR system modifications ($)	Estimated average cost per store ($)
Supermarkets/superstore	86	0	187,400	16,116,400	577
Grocers	2	20	187,400	4,122,800	1,855
Combination grocery/other	49	20	187,400	12,930,600	181
Convenience stores	87	20	187,400	20,051,800	548
Nationwide total	**224**	**60**	187,400	53,221,600	**386**

Sources: DTA expenditure reports; FNS national retailer data.

FNS Oversight of Acceptance Testing

FNS normally uses a contractor with specialized expertise to oversee a user acceptance test (UAT) when a State implements a new EBT system. FNS indicated that a UAT will be required when each of the two EBT processors (FIS and Xerox) first implements HIP for nationwide roll-out, and this initial UAT will be more extensive and costly than in the pilot. Subsequent to the initial UATs, FNS will require UATs for all other States as they implement HIP. However, FNS will only incur HIP-specific contractor expenses for UATs in those States that implement HIP outside of their normal cycle of EBT contracts. States must conduct UATs each time they transition to a new EBT contractor. FNS estimated that 33 states will require a HIP-specific UAT; the first three UATs will cost approximately $150,000 each while the remaining UATs will cost approximately $75,000 each.[132]

Five-Year Expansion

If HIP is implemented nationally, the implementation will occur over a number of years; State Agency, EBT processor, TPP, and retailer systems would need to be modified. This section provides estimated costs based on a five-year scenario to implement HIP and the cost assumptions in the preceding section. While the scenario assumes that the five-year implementation period begins in 2014, in practice HIP regulations and HIP standard operating rules for HIP will need to be established, and the time to complete this process is uncertain (as discussed in the next section). Costs of nationwide expansion are presented in Exhibit 9.9. The exhibit spreads the total implementation costs in Exhibit 9.7 over five years, under the assumptions described below. Costs for each year include the State Agency, State contractors (including EBT processor), and the FNS contractor for a specified group of States, together with a share of the TPP, IECR, and stand-alone POS terminal modification costs based on the counts of these systems for each year shown in Exhibit 9.9.

Year One

Projected costs for the first year (2014) include State Agency, contractor, retailer infrastructure, and FNS contractor costs for Massachusetts and two other States (States 2 and 3 in Exhibit 9.7) to implement HIP, with State 2 being the first HIP State using FIS as its EBT processor and State 3 being the second HIP State using Xerox. For State 2, the costs include modifications to the State Agency eligibility system and design, development, and testing of modifications to the FIS EBT system for HIP. As discussed in the detailed assumptions for State Agency expansion costs, the State Agency and EBT processor effort for State 3 would be less than for Massachusetts. All three States will require the services of a retailer systems specialist contractor and an extensive UAT, supported by an FNS contractor. As these are the initial States, costs for retailer infrastructure will be considerable: 15 TPPs, 60 IECRs, and 11 stand-beside POS terminals will be modified for HIP.

Year Two

Projected costs for the second year cover the implementation of HIP in eight States: States 4 and 5, and six of the 48 remaining States (in the framework of Exhibit 9.7). States 4 and 5 will require the services of a retailer systems specialist contractor; the others will not. Five of the eight States will implement and test HIP as part of their normal transition to a new EBT processor; FNS will incur

---

[132] We assume that State Agency activities for HIP implementation will require the same level of effort whether the system changes are part of an EBT processor transition or a separate process, so this distinction does not affect the State cost projections.

contractor costs to oversee HIP-specific testing in the other three States. Four TPPs, 80 IECRs, and 11 stand-beside terminals will be modified for HIP.

Year Three

In the third year, five additional States will implement HIP as part of their normal transition to a new EBT processor, and seven additional States will implement HIP as a stand-alone project. The retailer systems specialist contractor will not be needed as most retailers with IECRs and all TPPs will have enhanced their systems in the first and second years. FNS will incur HIP-specific UAT costs for the seven States implementing HIP as a stand-alone project. In the third year, 59 IECRs and eight stand-beside terminals will require upgrades. (TPP implementation will have been completed in the second year, so no TPP costs appear in later years).

Year Four

In the fourth year, five additional States will implement HIP as part of their normal transition to a new EBT processor and 10 additional States will implement HIP as a stand-alone project. FNS will incur HIP-specific UAT costs for the 10 States implementing HIP as a stand-alone project. In the fourth year, 48 IECRs and seven stand-beside terminals will require upgrades.

Year Five

HIP implementation will be completed in the fifth year, when 5 additional States will implement HIP as part of their normal transition to a new EBT processor and 10 additional States will implement HIP as a stand-alone project. FNS will incur contractor costs for HIP-specific UATs for the 10 States implementing HIP as a stand-alone project. In the fifth year, 37 IECRs and three stand-beside terminals will require upgrades.

Assumed Quantities per Year

The top panel of Exhibit 9.9 summarizes the assumptions described above for each of the five years of the implementation period. Note that the number of States implementing increases during the second, third, and fourth years while the number of retailer system changes decreases. This aligns with the assumption that work performed on an EBT, TPP or IECR system or modifications to a POS terminal needs only be done once, and then the upgraded system or terminal is available to users in all States. As discussed previously, the major changes to EBT systems occur in Year 1 of HIP expansion, and the EBT modifications for other States would become smaller as expansion proceeds.

Projected Cost by Year

The bottom panel of Exhibit 9.9 shows that the projected cost of HIP expansion in each of the five years will be between $15.7 and $20.7 million (in 2013 dollars), with the cost peaking in Year 2 and declining each year thereafter. The annual costs could differ from projections if any of the assumptions does not hold, so the projections provide at best an approximate guide for the spread of costs over time. As previously noted, the projections make no assumptions as to which entity will bear the cost of TPP, IECR, and POS changes.

Exhibit 9.9: Assumptions and Projections of Annual Costs for HIP Expansion

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Assumptions						
Number of States implementing HIP as part of their SNAP transition (no incremental FNS costs for UAT)	.	5	5	5	5	20
Number of States implementing HIP independently (FNS incurs contractor costs to oversee UAT)	3	3	7	10	10	33
Total number of States implementing HIP	3	8	12	15	15	53
HIP-enablement of EBT processor systems	3					3
IECR system changes	60	80	59	48	37	284
TPP system changes	15	4				19
Stand-beside terminal changes	11	11	8	7	3	40
States needing retailer systems specialist contractor	3	2				5
Cost projections (in 2013 dollars)						
State Agency[a] ($)	2,737,983	3,730,325	5,126,846	6,408,557	6,408,557	24,412,268
State contractors[b] ($)	1,648,377	1,156,927	1,219,657	1,524,571	1,524,571	7,074,102
Third-party processors ($)	796,125	212,300	0	0	0	1,008,425
Proprietary and COTS IECRs ($)	11,244,000	14,992,000	11,056,600	8,995,200	6,933,800	53,221,600
Stand-beside POS terminals ($)	374,000	374,000	272,000	238,000	102,000	1,360,000
FNS testing contractor[c] ($)	450,000	225,000	525,000	750,000	750,000	2,700,000
Total ($)	17,250,485	20,690,552	18,200,102	17,916,328	15,718,928	89,776,395

[a] Includes salaries and wages, fringe benefits, payroll taxes, overhead, materials, and services.
[b] Includes EBT processor and retailer systems specialist contractor fees.
[c] Cost of contractor overseeing UAT on behalf of FNS.
Sources: DTA time and expenditure reports; contractor time reports; stakeholder interviews.

Undetermined Costs

A number of activities that are not included in the preceding cost estimates would have to occur prior to and during a nationwide HIP implementation. It is not feasible to estimate the costs of these activities, but they are described in this section.

HIP Regulations

If HIP is implemented, USDA FNS will need to establish new regulations that are specific to HIP. The regulations would establish the percentage of the cost of TFV that would be applied to calculate the incentive and the maximum dollar amount that could be earned within a given month.

Standard Operating Rules

Prior to requesting additional processors, retailers, and TPPs to change systems for HIP, USDA FNS will need to standardize the message formats and operating rules. Often rules and standards are established by committees composed of stakeholders that include State Agencies and system and industry experts.

HIP Marketing and Promotion

If HIP is implemented on a nationwide basis, costs for marketing and promotion to participants, retailers, and other stakeholders would be expected. The amount of these costs would depend on the types and intensity of marketing and promotion activities. A further unknown is the roles of FNS, States, retailers, and other stakeholders, as well as the feasibility of using free media (such as public service announcements). Therefore, it is not feasible to estimate the costs for these activities.

Monitoring Retailer and Participant Fraud and Abuse

Any new type of transaction will provide new avenues for fraud and abuse. FNS will need to create new ways to monitor data for potential evidence of fraud and abuse related to HIP, and FNS compliance units will need to incorporate HIP into their compliance activities. The costs for these efforts are not estimated for this assessment.

Establishing the UPC Database

The identification of the UPCs and product look-up codes (PLUs) for eligible fruits and vegetables is required for any corporation, chain or store that operates with an IECR. FNS currently relies on retailers to flag SNAP-eligible items in their systems and monitors errors, fraud and abuse through compliance activities; it is envisioned that this will be the same process followed for HIP. Nevertheless, there will be a considerable effort made for the initial identification of UPC and PLUs that are eligible for incentives. Retailers did not provide data on these or other "soft" costs of implementing the HIP pilot, so we did not attempt to estimate these costs for expansion. Retailers that were interviewed for the evaluation highly recommended that a national standard be set for eligible food items to lessen the burden of UPC and PLU identification. (Items or UPCs eligible for the WIC benefit purchase are identified at the State level, and each retailer therefore has a different list for each State.)

Farmers Markets

As part of HIP implementation in Hampden County, DTA made special efforts to include farmers markets (FM). Community Involved in Sustaining Agriculture Inc. (CISA) received funding for this effort, which included the programming, testing, and implementation of two electronic systems that facilitated regular SNAP transactions as well as HIP transactions. Thus, the funding for CISA combined the costs of HIP FM solutions with the costs of SNAP FM solutions, and the two cannot be separated. DTA provided management and oversight to the FM project but again, these labor hours were not reported separately and cannot be separated from overall DTA costs assigned to management and oversight.

In order to implement an electronic solution for HIP, a farmers market would need electrical and communications connectivity. We do not know what proportion of farmers markets nationwide have the infrastructure capability to support an electronic solution nor can we determine any basis with which to make an estimate of the cost of establishing connectivity in farmers markets where it is not already available. In addition, rapid changes in the availability and costs of such capabilities would likely alter any estimates we might make.

It is anticipated that if HIP were to be implemented, then a farmers market wanting to accept SNAP electronically would acquire one or more HIP-capable POS terminals. This would be the case regardless of whether the market operated seasonally or year round. There would be no additional costs for HIP for FMs that began to accept SNAP after they installed HIP-capable POS terminals, or for FMs using EBT-only terminals for which the EBT processor would provide the upgrade. Thus, only FMs using multi-purpose POS systems that are not already HIP-capable might incur an incremental cost for a system upgrade to support HIP. Therefore, while POS conversion costs for FMs cannot be estimated, it appears that only a minority of FMs might face such costs.[133]

Ongoing Costs

Stakeholders indicated that once HIP is operational there would be no additional fees from EBT processors or TPPs for processing HIP transactions. Ongoing costs for EBT processors would be covered by cost per case month (CPCM) fees paid by States. These fees cover participant and EBT-only retailer support (including training for new retailers) as well as transaction processing and settlement. Industry sources indicated that EBT processors are not likely to raise CPCM fees just to cover HIP-related costs. Further, it is expected that retailers' existing fee arrangements with IECR system vendors and TPPs will cover ongoing costs for support of HIP functions. Retailers might incur ongoing costs to maintain HIP information in their UPC and PLU databases, but these costs cannot be estimated with the available data. It is assumed that when a new item is sold by a store, a staff member must enter the UPC, product information and price into the IECR. and flag the item as a SNAP-eligible item, so identifying HIP items will be integrated into this process.

USDA FNS will need to establish a policy concerning HIP capability for retailers requesting SNAP authorization, including whether retailers are required to have HIP-capable systems and how they must demonstrate compliance with this requirement. Under FNS policy, the EBT processors will be responsible for assuring that the IECRs or POS terminals used by retailers have been certified for HIP, but FNS may need to confirm that new retailers use approved systems, or at least answer questions about HIP (including where to go to find out about certified IECR/POS systems) from retailers applying to participate in SNAP.

Costs to upgrade EBT processors and IECRs to support HIP functionality are included in our one-time implementation cost projections. While EBT processors and IECRs may make future updates to

---

133 For a more complete discussion, refer to *Lessons Learned from Implementing HIP at Farmers' Markets*, Community Involved in Sustaining Agriculture, 2013.

support changes to HIP, the scope of those modifications is impossible to predict. Costs of such updates would be difficult to estimate as the hourly rates, fringe benefits, and overhead of the information technology organizations modifying retailer systems are generally considered proprietary and are thus unknown.

In summary, there will be ongoing activities directly related to HIP, but the majority of these activities will not impact fees or staffing levels. The costs of activities that would represent ongoing expenses cannot be estimated with reasonable accuracy but are expected to be minor relative to the costs of expansion and HIP incentives.

9.4 Issues to Consider for HIP Expansion

With one important exception, all stakeholders indicated that expansion is technically and operationally feasible. Both DTA and Xerox indicated strong support for expansion, as did all of the participating supermarket and superstore firms that completed interviews or surveys for the evaluation. However, the convenience store chain indicated that HIP did not have benefits for them because their stores do not stock targeted fruits and vegetables (TFV). DTA was unable to convince one major supermarket chain to participate, despite substantial effort. While the deadlines for the pilot appeared to be the primary obstacle, the feasibility of including this chain in statewide implementation might also depend on terms of participation yet to be negotiated. The results of the retailer survey indicate that among retailers who participated in HIP, all would participate in HIP if they had to make the decision again, with the exception of some convenience stores. Results from the EBT analysis suggest that HIP does not increase sales for stores other than supermarkets and superstores, although in wider implementation HIP might increase sales for some other stores with particular niches, such as medium or large grocery stores in areas without good access to supermarkets and superstores, or fruit and vegetable specialty stores.

Stakeholders identified several areas in which there are challenges for HIP expansion and opportunities to facilitate success. These include the following:

- Legislation, regulations, and industry standards
- System development and testing
- Retailer participation and readiness
- Participant notification, outreach, and support
- Operations and compliance monitoring

The balance of this section discusses these challenges and opportunities.

Legislation, Regulations, and Industry Standards

Expansion of HIP would require a framework including legislation, regulations, and industry standards. Based on experiences with the establishment of SNAP and WIC EBT, stakeholders commented that establishing this framework would take several years, given the necessary consultation processes. Technical experts from FNS and industry emphasized that up-front effort to establish standards would be needed to ensure that all stakeholders understand the technical and functional requirements, and to provide coordination among the numerous systems involved in HIP (retailer, EBT processor, and TPP). This consultation process would also help synchronize development implementation schedules. An added dimension of the framework would be the agreements between States and EBT processors on State-specific HIP reporting requirements.

Perhaps the greatest issue for HIP expansion is funding. As indicated in the previous section, by far the largest cost of expansion would be the incentives themselves, which could amount to $1 billion or more per year. However, expansion would also require substantial one-time expenditures by States, EBT processors, retailers and TPPs totaling approximately $90 million. Thus, a key question is whether and how these stakeholders would be compensated for making changes for HIP.

Besides questions of funding, key elements of the framework for HIP expansion would include the following:

- Percentage of TFV purchases to be credited in incentives, and any cap on incentives
- Definition of what foods qualify as TFVs
- Whether incentives will be credits against regular SNAP benefits or funded, tracked, and settled separately
- Whether HIP participation would be mandatory or optional for retailers
- Rules for transaction types and messages, and for problem resolution (including crediting participants when HIP purchases are not identified by IECRs)
- Requirements for certification of EBT processors, TPPs, IECR systems, and commercial POS terminals

System Development and Testing

Regarding system development, the three key considerations for expansion emerging from stakeholder interviews were: (1) the need for agreement on standards up front; (2) allowing adequate time for design, development and testing; and (3) the substantial resources required (as discussed in Section 9.3). The EBT processor also noted that the pilot requirements (particularly the need to identify HIP participants and the separate funding stream) added complications to the design and development, and recommended taking a simpler approach for expansion.

An important issue for TPPs is the number of systems that would have to be modified. TPPs would be required to certify each of their retailers and may need to certify to one or both EBT processors. Those TPPs that provide terminal software would need to modify the software and deploy it to their retailers. One TPP indicated they support 40 terminal types. TPPs may also operate multiple transaction processing platforms, each requiring modification. TPPs expected that HIP expansion would not bring them additional revenue.

SNAP agencies typically have not been involved with changes to retailer systems, whereas WIC agencies have had this role with IECRs and TPPs. The initial states that implemented WIC EBT hired retailer system specialists to assist retailers and IECR system vendors in understanding the changes that had to be made to enable their systems for WIC EBT. This same type of activity was present in HIP.

All systems that are involved in HIP expansion will need to be tested to assure that they comply with standards and accurately process transactions. A key challenge for this process is limiting the role and burden for FNS, States, EBT processors, and TPPs. Stakeholders recommended an approach that would focus on one-time testing of key systems including TPPs, proprietary COTS IECR systems, and commercial POS terminals. Once each of these systems was certified, it would not be necessary to certify each retailer using the system. Even under this scenario, FNS and State resources for participating in tests would be critical to timely and successful implementation.

Retailer Participation and Readiness

The most fundamental question regarding retailer participation in HIP expansion is whether it will be completely voluntary, mandatory for some retailers, or mandatory for all retailers. Voluntary retailer participation would mean that participants' access to HIP incentives would depend on four factors: (1) retailers' cost-benefit calculations on whether to participate, (2) persuasion from FNS and other stakeholders, (3) any cost-sharing arrangements, and (4) individual retail firms' schedules for upgrading their systems to support HIP. Participants would need to know exactly which retailers were participating in HIP and would need to have access to those retailers in order to receive HIP incentives.

On the other hand, mandatory participation for all SNAP retailers would affect a large number of stores—both those that carry an extensive inventory of fruits and vegetables (primarily supermarkets and superstores) and others (such as specialty and convenience stores) that carry more limited eligible fruits and vegetables.[134] For supermarkets and superstores, the impact would be the one-time cost of modifying IECRs, which might be an issue for chains that have relatively few SNAP redemptions. The impact on smaller retailers, who generally do not use IECRs, would be the extra checkout time to calculate the amount of the HIP-eligible purchase separately from the remainder of the SNAP transaction. Other impacts would be time for staff training and possible sanctions for non-compliance with program rules (discussed below). Participating retailers did not generally identify these factors as major concerns, and there was no evidence that any retailer dropped out of HIP because of burden issues. On the other hand, DTA personnel indicated that, in their experience, the burden of participating in HIP was a barrier to voluntary participation for some non-IECR SNAP retailers, and thus would be a concern if HIP were mandatory. With mandatory participation, issues of enforcing compliance with HIP rules would likely increase. A particular concern is the accuracy of retailers in identifying HIP items and computing the HIP amount.

An intermediate solution would be to make HIP mandatory for some but not all retailers, such as superstores, supermarkets and grocery stores, the locations that currently account for the highest number of SNAP transactions and also accounted for the vast majority of HIP transactions in the pilot. For this solution, FNS and others would have to address the equity of imposing system modifications on some but not all of the SNAP retailers. However, the additional $1 billion or more in SNAP revenue could present an important motivator for major retailers.

Several secondary issues regarding retailer participation were identified by stakeholders, including the following:

---

[134] SNAP rules do not require retailers to carry any of HIP-eligible fruits and vegetables. The Agricultural Act of 2014 (Section 4002) establishes stricter stocking requirements: at last seven varieties of staple foods in each of the four categories and perishable foods in at least three categories. These requirements may increase the proportion of SNAP retailers carrying HIP-eligible fruits and vegetables. The Agricultural Act of 2014 also requires SNAP retailers to use scanning or product look-up systems, but FNS can exempt retailers in areas with limited access to food.

- If retailer incentives are provided, then the State Agency or FNS must develop a mechanism and process for computing the incentive and for paying retailers.
- Training would be needed for non-IECR retailers using EBT-only and commercial POS terminals.
- Retailers might encounter additional time in checkout lanes spent in disputes over what is HIP and non-HIP. IECRs help to reduce this problem but WIC EBT experience highlights the problems that arise when new items are introduced but the UPC database is not updated in a timely manner.

Participant Notification, Outreach, and Support

The HIP experience suggests that if HIP were expanded nationwide, considerable efforts would need to be devoted to ensuring that SNAP participants were aware of HIP and understood how HIP worked, particularly which fruits and vegetables earned incentives. DTA expended considerable resources on participant notifications, training materials, and training sessions, yet a sizeable minority of households reported confusion about HIP. The fact that HIP operated as a pilot, with less than 15 percent of a county's SNAP households participating, and was being rigorously evaluated, limited outreach and education efforts. The experiences of HIP participants as documented in surveys and focus groups will provide valuable lessons for any future expansion.

DTA staff at the State and local levels felt that HIP could readily be implemented as a regular part of SNAP. DTA and community-based organization (CBO) representatives felt that the constraints on communications during the pilot were a significant barrier to realizing the potential of HIP. Communications with participants would be important to the success of expansion. Staff suggested a variety of channels of communication and outreach, including the following:

- Explain HIP to clients verbally at intake and re-certification and giving them a flyer.
- Use a variety of media to promote HIP, including public service announcement (PSAs), public events, signage or videos in stores and local DTA offices, social media and word of mouth.
- Provide answers to questions and problem-solving via the State's hotline for SNAP participants and the EBT processor's customer service line.
- Combine HIP with other nutrition messages.
- Conduct periodic focus groups of clients to obtain feedback and determine how to optimize the use of the incentive.

DTA and CBO representatives also offered suggestions on how to make HIP easier and more appealing to participants. One suggestion was to simplify and expand the definition of eligible foods. Another was to increase the size of the incentive.

Monitoring Operations and Compliance

Many stakeholders identified both challenges and suggestions for monitoring HIP operations and assuring compliance. The most common theme was the importance of decisions about the lists of eligible foods. Other discussion focused on monitoring processors and retailers to assure that participants are getting the incentives they earn while no one is abusing the system.

Industry stakeholders (including the EBT processor and retailers) encouraged investment in a national database of HIP-eligible foods. National standards were seen as important, particularly by retailers who operate in numerous states. Retailers expressed concern with the effort to keep food lists updated, as their inventories change frequently. Another concern is confusion about which canned and frozen fruits and vegetables are eligible. Thus, they preferred to have FNS create and maintain a national HIP food list. This would be a major change from the current approach for SNAP, in which FNS identifies food items that are eligible, and retailers then must apply FNS rules to flag these items in the IECRs or identify them at the POS for stand-beside terminals. The list of foods eligible for HIP would be standardized by FNS but the specific UPCs related to that list would be identified by retailers. A possible solution for the dilemma posed by these different perspectives would be to build on food industry labeling initiatives, so that manufacturers would take responsibility for identifying products that meet HIP requirements.

FNS and other stakeholders suggested that retailer compliance with HIP rules would likely be managed in the same way that SNAP sales compliance is managed today, using a combination of participant complaints and observation. Data monitoring tools (an extension of the system used to detect trafficking in SNAP benefits) might also be used. Stakeholders noted that potential compliance issues for HIP include credits for ineligible foods, inflated sales amounts for TFV, and failure to identify eligible foods.

Stakeholders also suggested that system design for HIP expansion should provide enhanced capabilities to monitor operations. The experience with processing problems involving TPP and retailer systems underscored the need for functionality in the EBT system that would enable the processor to monitor transactions and detect system failures. Because of the way HIP was designed for the pilot, it was difficult to detect problems. The problems were identified by many but not all clients when they did not receive their HIP incentive. DTA staff recommended that FNS design reporting procedures for HIP so that problems could be detected. Monitoring responsibilities for FNS, States, and EBT processors would have to be defined, and additional resources might be needed to assure that HIP is operating as intended.

9.5 Discussion

Total costs for the pilot were $4.4 million. System changes accounted for a little over half of all costs. Incentive payments to HIP participants represented just 6 percent of total costs. Costs in support of the evaluation were roughly 10 percent. Retailer recruitment, participant notification and training, and expenses for management and oversight of HIP accounted for the remaining costs.

Projected start-up costs to expand HIP nationwide are $89.8 million. Three-fifths of these costs are for modifying retailer point-of-sale systems; the rest are for State Agency training and management costs, and for implementation by EBT processors and other State contractors. The projected value of incentives with nationwide expansion, based on plausible scenarios about SNAP households' fruit and vegetable spending, ranges from 6 to 31 cents per household per day, or $0.8 billion to $4.5 billion annually.

The experience in Hampden County demonstrated that HIP was both technically and operationally feasible. Most stakeholders indicated strong support for expanding HIP nationwide. For nationwide expansion of HIP, FNS and other stakeholders would need to consider whether retailer participation would be voluntary or mandatory for some or all categories of SNAP-authorized retailers. Other key considerations include: funding, rules defining a uniform framework for HIP, need for expertise in retailer point-of-sale systems to oversee implementation, outreach to SNAP participants and other stakeholders, and monitoring SNAP redemption operations and compliance.

10. Conclusions

U.S. consumers at all income levels fall short of the fruit and vegetable intake recommended in Federal dietary guidelines and health promotion objectives. Policymakers are particularly concerned about low intake of fruits and vegetables among low-income Americans and Supplemental Nutrition Assistance Program (SNAP) participants, for whom costs are thought to represent a substantial barrier.

To address this concern, some have suggested direct financial incentives as a promising approach to encourage fruit and vegetable consumption in this group (GAO, 2007; Dong and Lin, 2009). Because SNAP is the nation's largest nutrition assistance program and an important part of the social safety net for low-income Americans, the program presents a potentially favorable environment for such efforts. The Healthy Incentives Pilot (HIP) rigorously evaluated the potential for increasing fruit and vegetable intake via a financial incentive that operated directly through SNAP participants' electronic benefit transfer (EBT) cards.

In this pilot, 7,500 SNAP participant households in Hampden County, MA, were randomly selected to receive a financial incentive equal to 30 percent of eligible fruit and vegetable purchases when they used their EBT cards in participating retailers. Fruits and vegetables eligible to earn the incentive, termed "targeted fruits and vegetables," or "TFVs," included a wide variety of fresh, frozen, canned, and dried fruits and vegetables, in contrast to some previous efforts focused on fresh produce only. The HIP incentive could be earned in many types of retailers, including supermarkets/superstores, grocery and convenience stores, and farmers markets. The remaining 47,595 SNAP households in Hampden County who were not randomly selected to receive the financial incentive served as a control group for the HIP evaluation, receiving standard SNAP benefits with no additional HIP incentive through the duration of the pilot.

The HIP evaluation collected extensive information about HIP and non-HIP participants through SNAP case file records, EBT transaction data, and three rounds of participant surveys. The evaluation also conducted on-site visits with food retailers, focus groups with HIP participants, and interviewed many stakeholder groups. It gathered information about pilot costs and assessed the feasibility and costs of potential expansion of the pilot incentive. This Final Report is the third report from the HIP evaluation, addressing FNS's five research objectives and reporting the results of analyses using all data collected during the evaluation period.

The analysis in previous chapters showed that HIP participants had greater TFV intake than did non-participants. Secondary analyses showed that HIP also had positive impacts on spending on fruits and vegetables and on the household food environment. These secondary analyses provided suggestive evidence on mechanisms for the observed TFV increase, but they leave some unanswered questions.

In this concluding chapter, we do the following:

- Review key results for each of the five evaluation objectives, consolidating themes from across the preceding chapters (Section 10.1).
- Compare and contrast key estimates from earlier chapters related to food spending and food intake, to better understand the mechanisms through which HIP affected food intake (Section 10.2).

- Discuss limitations of the HIP evaluation (Section 10.3).
- Consider lessons for the future, reflecting on whether potential expansion of the pilot would generate costs and impacts that are smaller or larger than those that were observed in this HIP evaluation (Section 10.4).

10.1 Review of Key Results

FNS identified five research objectives for the HIP evaluation. This section briefly summarizes and discusses key results pertaining to each of these five objectives.

Objective 1: Assess the causal impact of HIP on fruit and vegetable consumption by SNAP participants, and on other key measures of dietary intake.

The primary goal of HIP was to assess whether direct financial incentives can increase fruit and vegetable consumption among SNAP participants. To examine this question, the evaluation specified a single confirmatory outcome prior to analyzing the data. This measure was TFV intake among adults in HIP participating households, as measured in the survey data (Chapter 8). We found that TFV intake was 0.24 cup-equivalent higher among HIP participants than among non-participants, representing an increase of 26 percent. Thus, HIP was successful in increasing targeted fruit and vegetable intake. The increase is substantively meaningful and clearly statistically significant.

To put our main finding into context, consider that the Federal government's Healthy People 2020 objectives recommend total daily fruit and vegetable intake of 3.59 cup-equivalents. We estimate total fruit and vegetable intakes of 2.29 cup-equivalents in our non-HIP sample.[135] Thus, we found that the HIP impact on TFVs of 0.24 cup-equivalent was sufficiently large to narrow the 1.30-cup-equivalents "total fruit and vegetable intake gap" by about 18 percent.

The study also found positive HIP impacts on many secondary consumption outcomes. However, with the large number of secondary analyses conducted, it is likely that some HIP/non-HIP differences would appear statistically significant by conventional measures even when no true impact was present, so these secondary results should be treated as exploratory. Nonetheless, when regular patterns emerge across findings, especially when they are broadly consistent with theoretical expectations, these secondary analyses can provide important corroborating evidence to assist with interpretation of primary results.

The bulk of the difference in impacts between TFV and total fruit and vegetable intake was attributable to higher intake of 100% fruit juice among HIP participants. The promotion of TFVs through HIP may have encouraged consumption of juices, because of their fruit content, even though juices did not earn the incentive. Or, alternatively, HIP participants may have been confused about which items qualified to earn the incentive, mistakenly believing that fruit juice qualified. The fact that impacts on 100% fruit juice declined between Round 2 and Round 3 of the participant survey would be consistent with improved HIP participant understanding of the details of HIP over time.

---

[135] *Healthy People 2020* recommends 2.0 cups of fruits and vegetables per 1,000 kilocalories of daily food energy. Mean daily food energy for the non-HIP group was 1,797 kilocalories. The national estimates and dietary guidelines for fruits and vegetables are broader than the narrower TFV measure; we use the TFV estimate as it is the evaluation's confirmatory outcome.

From a nutritional perspective, the HIP impact estimates were favorable. HIP had statistically significant positive impacts on intake of fruits separately, vegetables separately, and of several recommended subgroups of fruits (other fruits) and vegetables (dark green vegetables, red and orange vegetables, and other vegetables).[136] Increased intake of fruits and vegetables was accompanied by increases in the total variety of fruits and vegetables consumed and the proportion of individuals meeting Federal dietary guidelines related to fruits and vegetables and overall dietary quality as measured by the 2010 Healthy Eating Index.

Objective 2: Identify and assess factors that influence how HIP impacts participants.

The study's conceptual framework identified two key program components through which HIP could influence fruit and vegetable consumption (Chapter 1).

- *Price incentive.* The HIP incentive is equivalent to a 30 percent price discount on TFVs purchased with SNAP in participating retailers. The reduced price provides a financial incentive to increase fruit and vegetable spending.
- *Informational/promotional activities.* HIP did not include dedicated funding for social marketing or nutrition promotion. Yet, the very existence of the program and its informational materials (the EBT card sleeve, regular mailings, and the value of the incentive reported on store receipts) provided implicit nutritional education on the importance of consuming fruits and vegetables.

These two components mirror the two major hypothesized mechanisms through which HIP might influence fruit and vegetable intake:

- *Economic mechanism*, operating explicitly through the price incentive
- *Informational/attitudinal mechanism*, operating through implicit and explicit promotional activity

Food manufacturers and retailers have long believed that advertising and marketing, accompanied by a price discount or coupon with genuine economic value, is an effective strategy for influencing consumer choices. If this marketing principle is correct, the total impact of the program could be larger than what one would expect from the price incentive alone. On the other hand, if households had limited understanding of HIP or could not easily shop at participating retailers, the total impact of the program could be less than what one would expect from a uniformly lower price. With these two hypothesized mechanisms in mind, the HIP evaluation used multiple methods to understand factors that influenced HIP impacts.

First, the evaluation directly investigated impacts on intermediate outcomes for both retailers and participants, using the conceptual model presented in Chapter 1 as a guide. For retailers, we found few HIP impacts on the retail food environment, though there was some evidence of an increase in promotional activities related to fruits and vegetables consistent with HIP promotional efforts (Chapter 4). HIP participants also reported increased likelihood of having seen or heard messages

---

[136] The other fruits category includes all fruits except citrus fruits, melons, and berries. The other vegetables category includes vegetables other than dark green, red and orange, and starchy vegetables. Examples of other vegetables include celery, cucumbers, mushrooms, and asparagus.

about fruits and vegetables relative to non-participants. Nonetheless, there was little evidence that these promotional activities influenced attitudes about fruits and vegetables, which did not significantly differ between participants and non-participants after pilot implementation (Chapter 7).

We did, however, find evidence of some changes in shopping behavior due to HIP (Chapter 6). EBT transaction data showed that HIP households purchased more TFVs in participating supermarkets/superstores than did non-HIP households. In addition, analyses of self-reported participant survey data found evidence of increased overall spending on fruits and vegetables. Respondents in the HIP group additionally reported greater availability of fruits and vegetables in the home (Chapter 7). These results are broadly consistent with the program model that HIP caused increases in spending on fruits and vegetables among participants, which translated into increased availability of fruits and vegetables in the home, ultimately leading to greater intake of fruits and vegetables among household members.

To better understand the possible relationships between intermediate outcomes and intake, we conducted supplemental mediation analyses.[137] Mediation analyses combine multiple regression models to test pathways through which programs or processes may operate by looking at whether and how intermediate variables link with other variables. While most analyses in this Final Report rely on the random assignment research design to provide unbiased impact estimates, the mediation analysis requires additional strong statistical assumptions (which are unlikely to be exactly satisfied) to be considered unbiased.

With that caveat, the mediation analysis found statistically significant evidence that food spending served as a mediating variable between HIP participation and fruit and vegetable intake, and suggestive evidence that having fruits and vegetables in the home served as a mediating variable (consistent with the discussion above). Interestingly, although as noted above no direct HIP impacts on attitudes were observed, the mediation analysis did find suggestive evidence that favorable attitudes toward fruits and vegetables served as a mediating variable between HIP participation and fruit and vegetable intake. To the extent that the statistical assumptions required for these models are valid, the mediation analysis thus provides some additional support for both the economic and informational/attitudinal mechanisms for HIP impacts.

Finally, we conducted analyses for population subgroups, to assess whether particular types of individuals were more or less likely to be affected by the pilot. Given the sample sizes, the study could detect only relatively large differences in impacts across subgroups. With that caveat in mind, the results of the subgroup analysis provide no evidence of differences in HIP impacts on fruit and vegetable intake associated with demographic variables such as gender, age, race/ethnicity, disability status, employment status, and household composition. However, there was a large and statistically significant difference based on pre-implementation attitudes about fruits and vegetables. In households where respondents in the baseline survey had favorable attitudes toward fruits and vegetables, HIP impacts were much larger.

---

[137] Appendix I presents the detailed results from the mediation analyses.

In summary, our findings on HIP impacts on participants are as follows:

- HIP increased participant spending on fruits and vegetables and availability of fruits and vegetables at home, which appears to explain, in part, the ultimate increase in fruit and vegetable intake among HIP participants.
- While we found no direct evidence of HIP impacts on participant attitudes related to fruits and vegetables, there was some weak evidence that attitudes served as a mediator between HIP impacts and fruit and vegetable intake.
- Impacts were concentrated among those participants with more favorable attitudes about fruits and vegetables prior to implementation.

A puzzle remains in interpreting our findings. The observed increase in TFV spending captured in the EBT transaction data seems too small to explain most of the ultimate impact on fruit and vegetable intake purely through the price mechanism, suggesting that other mechanisms were important. Taken as a whole, our results provide evidence that HIP increased fruit and vegetable consumption through both the price mechanism and the informational/attitudinal mechanism. We revisit this issue in Section 10.2.

Objective 3: Describe the processes involved in implementing and operating HIP.

Understanding the process involved in implementing HIP and the challenges that arose are important for two reasons. First, implementation may influence the pilot's outcomes. As discussed in Chapter 1, HIP impacts depended on the project's success in recruiting and training retailers, implementing new EBT processing methods, and informing participants. During the pilot, many difficult aspects of implementation went smoothly, but some did not. Second, HIP provides valuable information for any future pilots or major roll-out of a HIP-like program.

As described in Chapter 3, HIP implementation was a complex undertaking, with many actors and stakeholders. Despite some technical systems issues, principally occurring early in the implementation period (late 2011 and early 2012), the pilot clearly demonstrated that issuing direct financial incentives through the SNAP EBT card is technically feasible under real-world conditions in all types of commercial food retail formats.

The two biggest implementation challenges were retailer recruitment and ensuring that participants fully understood how the pilot worked.

- DTA reached out to recruit as many authorized SNAP retailers in Hampden County as possible, at all scales of operation ranging from supermarkets/superstores to corner stores to farmers markets. Supermarkets/superstores accounted for approximately 80 percent of SNAP redemptions in Hampden County and therefore were particularly important to overall HIP impacts. One major supermarket/superstore chain with a large retail presence declined to participate despite vigorous recruitment efforts. In the end, only half of SNAP redemptions of HIP participant households took place in participating retailers (Chapter 5). In Section 10.2 we discuss the potential effects on HIP impacts of not having easy access to a participating supermarket/ superstore based on analysis of EBT spending patterns.
- DTA invested heavily in developing direct participant notification and training materials, working to design brochures and other information that were easy to understand. For communication through retail channels, using in-store signage and placards, DTA had to

> strike a difficult balance, designing signage that communicated clearly to HIP participants without confusing or contaminating the control group. While DTA offered more than 140 training sessions, only 1.3 percent of HIP participants reported attending one of them. Just over 10 percent of HIP participants called DTA's telephone assistance line. Stakeholder interviews (Chapter 3), as well as participant surveys and focus group interviews (Chapter 5) suggested that many participants had incomplete awareness and understanding of HIP. In the final round of the participant survey, nearly a quarter of HIP participants still reported that they had not heard of HIP. In addition, both survey and focus group data found that many participants appear to have misunderstood how HIP worked, including which retailers were participating, which foods were eligible, or how the incentive was earned.

The retailer recruitment challenge does not appear fundamental to the nature of the financial incentive. As we discuss below, it would probably be surmounted if a HIP-like incentive were expanded beyond the pilot scale or on a longer-term basis (Section 10.4). The participant awareness and understanding challenge is more subtle. Awareness and understanding are likely to improve with broad roll-out, but may remain quite imperfect, with potential implications for the impact of a broadly rolled-out program. DTA's attempts at in-person training were intensive and well designed. The very low attendance suggests that increasing awareness and understanding will require some other strategy.

Objective 4: Assess the impact on the HIP grantee (the State SNAP agency), the local SNAP agency, and their team of partners (including retailers, State EBT processor, and community organizations).

HIP involved extensive implementation efforts from Massachusetts DTA staff, the State EBT processor (Xerox), and third-party processors. Almost all their labor and non-labor costs were reimbursed by FNS through the pilot budget (Chapter 9). These stakeholders reported in interviews that HIP expansion would be technically and operationally feasible. DTA staff considered the pilot to be a successful innovation, enhancing the agency's efforts to promote health and nutrition through the Federal nutrition assistance programs.

For retailers in Hampden County, impacts were mixed. One convenience store chain reported that HIP offered little benefit, because the chain carried few fruits and vegetables. As noted earlier, one supermarket/superstore chain did not participate, but this was likely due to the temporary nature of the pilot and the relatively short implementation period. For the many Hampden County retailers that did participate, HIP had only modest effects on SNAP redemptions. Just 7,500 of the 55,095 SNAP households in Hampden County were randomly assigned to the HIP group, and the mean HIP purchase amounts for participating households were quite small. Presumably the benefits for retailers and for product suppliers in the fruit and vegetable industries would be considerably larger if the financial incentive were expanded into a permanent program for the full SNAP population.

HIP had relatively little effect on store operations. Over 90 percent of retailers reported that they experienced no change in check-out time due to HIP. Less than 20 percent of retailers reported that HIP purchases were hard to process or that training workers was a burden. Few retailers reported problems during the pilot and almost all supermarkets/superstores and grocery stores were satisfied with how HIP worked in their stores.

Objective 5: Quantify, to the extent possible, the Federal, State, and local administrative and benefit costs of the pilot.

HIP costs include variable costs that are proportional to the number of participants (primarily the costs of the actual incentive earned per participant household) and fixed costs that must be incurred just once during implementation (such as changes to software that processes EBT transactions). If a financial incentive were extended nationwide, the fixed costs would be spread over a much larger number of SNAP households, so the variable costs would be the most important cost consideration for Federal policymakers.

Total costs for implementing HIP, not counting the incentives earned by HIP participants, were $4.2 million. The largest component was $2.5 million for system design, development, and testing (including FNS' costs for testing consultant). General administration was $0.7 million. Other cost items were much smaller. Most of these costs are fixed costs. They substantially affected the total cost of implementing a pilot in a single county. Yet, even acknowledging that some of these costs would be multiplied by the number of State agencies, EBT processors, and retail chains across the country, our corresponding estimate of total national implementation costs is $89.8 million.

The most important variable cost is the value of the financial incentive itself. In the pilot, the mean monthly incentive earned (during March-October 2012) was $3.65 per HIP household. This was considerably smaller than anticipated, and resulted in total incentive payments of $263,043. In estimating incentive costs in a nationwide expansion, we considered several scenarios, based on different assumptions about participant behaviors, particularly related to improved client awareness and understanding and increased retailer participation. At the low end, assuming household incentive earnings are the same as in the pilot, annual national incentive costs would be $0.8 billion. At the high end, assuming that households purchase an amount of TFV worth 53 percent of USDA's Thrifty Food Plan (TFP) recommendation for fruits and vegetables, annual incentive costs would be $4.5 billion.

10.2 Comparing HIP Impacts on Spending and Intake

As noted above, the evaluation specified a single confirmatory outcome—targeted fruits and vegetables as measured in the 24-hour dietary recall interviews. Based on that confirmatory analysis, we conclude that HIP was successful in achieving its chief goal of increasing fruit and vegetable intake among participants. However, this evidence must be assessed in concert with secondary evidence from the evaluation—in particular, estimated impacts on TFV spending in participating stores (based on EBT data), which are lower than would be expected given the estimated impact on TFV intake.

In one sense, the magnitude of the HIP impact on TFV intake was only moderately higher than one would expect from a 30 percent price incentive working only through the economic mechanism (see Appendix A). The earlier literature reviewed in Chapter 1, based on elasticity estimates compiled by Andreyeva, Long, and Brownell (2012), led to a preliminary hypothesis that a 30 percent price reduction would imply approximately a 19 percent increase in TFV spending. For comparison, the HIP evaluation found that HIP increased targeted fruit and vegetable intake by 26 percent, which is moderately higher than the prediction based on mean elasticity estimates. A discrepancy of this magnitude could easily be explained by either the variability in the earlier elasticity estimates or by the sampling variability in the evaluation's impact estimates. [138]

In another sense, the HIP impact on self-reported fruit and vegetable spending and intake was much larger than can be explained under the assumption that HIP operated primarily through the economic mechanism (i.e., due to the direct effects of the price incentive). If HIP participants understood that they would earn the incentive only by making TFV purchases at HIP participating retailers using their SNAP benefits, and if no other factors caused their TFV purchasing behavior to differ from non-HIP households, then the impact on TFV purchases in participating retailers (as recorded in the EBT data) would be expected to closely correspond to ultimate impacts on TFV intake (as recorded in the household survey data). However, Section 6.1 noted that the HIP impact on self-reported total fruit and vegetable spending is roughly five times as large as the HIP impact on qualifying TFV purchases with EBT benefits in participating retailers. Similarly, Section 8.2 noted that the HIP impact on TFV intake is approximately four times higher than would be implied by the corresponding impact on TFV spending in participating retailers as estimated from the EBT transaction data.

Taken together, these results can be interpreted as indicating that HIP affected self-reported spending and intake for fruits and vegetables, including both fruits and vegetables that earned and did not earn the HIP incentive. The substantial estimated effect on fruits and vegetables that did not earn the incentive was surprising. Fruits and vegetables that did not earn incentives included those acquired in several ways, including:

- TFVs purchased at non-participating retailers (the incentive was earned only in participating retailers).
- TFVs purchased with cash or acquired for free (the incentive was earned only for purchases with the EBT card).
- Fruits and vegetables that did not qualify as TFVs, including white potatoes and 100% fruit juices (the incentive was earned only for purchases of qualifying TFVs.)

We have identified three possible reasons for HIP's impact on self-reported spending and intake for fruits and vegetables that did not earn the incentive. A combination of all three reasons likely explains the finding.

1. *An informational/attitudinal mechanism*. As noted in Section 10.1, HIP may have affected participant exposure to or preferences for fruits and vegetables. We found no direct evidence of this, but such effects are suggested by evidence from the mediator analysis and from non-experimental subgroup analyses (Appendix I). These effects could in turn have influenced future intake of fruits and vegetables, whether or not they earned the incentive. Some impact through this informational pathway was anticipated from the earliest stages of designing the

---

[138] The original estimates by Andreyeva, Long, and Brownell (2012) included a 90 percent confidence interval around the mean elasticities in the literature. Our estimated HIP impact of 26 percent is within the range of impacts that is consistent with earlier elasticity estimates (see Chapter 1). Intake estimates in Chapter 8 have a 95 percent confidence interval that ranges from 0.132 cups to 0.344 cup-equivalents, which suggests an elasticity of between 15 and 38 percent, clearly consistent with the literature on the price elasticity of fruit and vegetable purchase.

HIP evaluation and is part of the conceptual framework. However, it was expected that this pathway would be secondary to the price incentive mechanism.

2. *Misunderstanding how the pilot worked*. Some HIP participants may have thought they would earn the incentive in certain circumstances that did not in fact earn the incentive, such as purchases of non-qualifying fruits and vegetables or transactions in non-participating retailers. There is some evidence for this conjecture. Survey and focus group evidence presented in Chapter 5 is consistent with imperfect understanding. In addition, Section 8.1 noted that the HIP impact on 100% fruit juice was concentrated among respondents who also reported that the incentive was difficult to understand. Section 8.7 observed that the HIP impact on fruit juice intake shrank from Round 2 to Round 3, as would be expected if participants were still learning which foods and beverages qualified.

3. *Survey Response Bias*. Finally, there is some possibility of survey response bias. Social desirability bias could potentially have induced differential survey response error among HIP participants. In particular, the pilot may have caused HIP participants to become increasingly aware of the social desirability of fruit and vegetable intake, leading them to report higher spending on and intake of fruits and vegetables than non-HIP participants did. Alternatively, the pilot may have made HIP households more conscious of fruit and vegetable intake, leading to recall of more of the fruits and vegetables consumed (relative to the non-HIP group). As noted earlier (and discussed in detail in the next section), the procedures through which food intake was measured utilized a standard and well-accepted protocol, which would seem to limit the likelihood of substantial bias. In addition, we found that survey estimates of fruit and vegetable intake were consistent with survey estimates of spending on fruits and vegetables. However, we have no direct evidence either for or against the form of survey response bias that would lead to over-estimates of impact.

Absent other plausible explanations, it seems reasonable to explain the discrepancy in impacts by some combination of the three hypotheses and their underlying causes: attitudinal improvements, confusion about the HIP incentive, and/or survey response bias. As noted above, the impact on TFV intake is approximately four times higher than would be expected given estimated impacts on TFV spending with EBT benefits in participating retailers. This implies that mechanisms other than the economic incentive must explain approximately three-quarters of the total impact on TFV intake.

10.3 Limitations

The random-assignment research design used in the HIP evaluation offers what is considered the strongest available method for estimating program impacts without bias. In alternative, non-experimental regression-based approaches, bias commonly arises from unobserved confounding variables and reverse causation. Random assignment, when properly implemented, remedies both of these problems. There is no evidence that random assignment was improperly implemented in the HIP evaluation. Nevertheless, the research design used here does have limitations.

Incomplete Follow-Up

Random assignment yields causal estimates when outcomes for the treatment and control groups are compared for everyone randomized. In practice, this condition is almost never exactly satisfied. In the HIP evaluation there were two issues: survey non-response and a deliberate decision not to follow households that left SNAP. We discuss these two issues below.

First, when there is substantial non-response, the survey sample may not represent the underlying population without bias. This, in turn, can lead to the treatment and control groups not being otherwise identical. The response rates for the pre-implementation participant survey were 63 percent of HIP-eligible sampled households and 64 percent of non-HIP-eligible sampled households. In Rounds 2 and 3, the follow-on response rates were between 80 and 84 percent (among those who responded to the baseline survey). These response rates are consistent with other surveys of similar populations based on program lists (and the locating information in those program lists). Furthermore, we constructed weights to adjust for differential non-response with respect to information known to both respondents and non-respondents , mitigating concerns about bias from this source.

Second, while standard practice in random assignment studies is (to attempt) to interview (and then analyze) everyone randomized, budget considerations led the HIP evaluation to interview (and then analyze) only households who remained on SNAP. Households that left SNAP were not surveyed. Statistical tests indicated that the HIP and non-HIP groups remained balanced over time—both in terms of exit and retention rates and in terms of observable characteristics. It is therefore reasonable to interpret the evaluation results in the same way as for a study that followed everyone who had been randomized.

Dietary Recall Instrument

For the key food intake outcomes, there may be underreporting in the 24-hour dietary recall instrument. The Automated Multiple Pass Method (AMPM) is designed to enhance respondents' ability to recall food consumed during the previous day, and is thought to yield less underreporting than other assessment methods (Subar et al., 2003). In the participant survey, total daily food energy intake was 1,749 kilocalories (HIP) and 1,797 (non-HIP), which appears to be lower than typical food energy intake for adults. For example, in the Nutritional and Health Examination Survey (NHANES), mean daily food energy intake for U.S. male adults aged 20 years and older exceeds 2,600 kilocalories, and mean daily food energy intake for female adults aged 20 years and older was 1,785 kilocalories.[139] The relatively high proportions of females, elderly, and low-income respondents in our sample likely explain most of the discrepancy, but we cannot entirely dismiss the possibility of underreporting.

Inasmuch as there is underreporting of total intake, there is also likely to be underreporting of fruit and vegetable intake. The study's primary interest is in differential HIP/non-HIP fruit and vegetable intake, so differential HIP/non-HIP misreporting of fruit and vegetable intake would be problematic. Such differential reporting is possible, but there is no direct evidence that it occurred. Instead, the HIP evaluation relies on the plausible and conventional assumption that any underreporting is not related to program participation status, and hence unable to cause bias in key impact estimates. However, social desirability considerations might suggest that HIP participants would be more likely than non-HIP participants to overstate (or to understate to a lesser degree) their fruit and vegetable intake. Differential misreporting of this form would lead to overstating the true impact.

Although we cannot absolutely rule out the possibility of this type of bias, several features of the study design bolster our confidence that any such bias is likely to be small. The AMPM interview is

---

139 National Health and Nutrition Examination Study (NHANES): http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/0506/Table_2_NIF_05.pdf

considered the gold standard for assessing dietary intake, consisting of a complete itemization of foods consumed on the previous day. Relative to a simpler food frequency questionnaire or other short battery of survey questions, this data collection method should minimize respondents' ability to (consciously or subconsciously) over-report fruit and vegetable consumption relative to other types of consumption. In addition, there was no mention of HIP in Round 1 of the participant survey. In Round 2 and Round 3, the AMPM interview was conducted prior to mentions of HIP and other parts of the interview. When completing the AMPM interview, HIP participants were not therefore "primed" with exposure earlier in the same interview to questions about HIP or their attitudes about fruits and vegetables. (By Round 3, HIP participants had already experienced all sections of the interview, albeit several months earlier).

Statistical Power Considerations

The research design had sufficient statistical power to measure statistically significant HIP/non-HIP differences in the main confirmatory TFV intake outcome, but other outcomes should be treated as exploratory, as should our subgroup analyses.

Generalizability

In addition to these research design limitations, caution is needed when extrapolating from the pilot setting to a much broader roll-out. Our random assignment design offers the highest level of internal validity (providing great assurance that we correctly measure HIP impacts in the Hampden County pilot) but less external validity (providing less assurance that the HIP impacts would be the same for the whole United States). Also, a universal and permanent financial incentive would almost certainly generate different retailer and participant responses than did a partial and temporary pilot incentive. This study partially addressed this possibility by using two rounds of post-implementation surveys, one early and one later, but it remains possible that incentive impacts in a permanent program would either increase or decrease over a longer period of time. The design provides no direct evidence on the differential impact of a full versus partial program.

10.4 Conclusions

HIP was envisioned primarily as a financial inducement to increase fruit and vegetable intake among SNAP participants. A 30 percent incentive lowers the net price and standard economic theory predicts that this decrease in price would increase intake by roughly 20 percent. In addition, HIP's impact could plausibly be amplified by the implicit and explicit nutrition education and marketing provided by HIP—mailings, the EBT card sleeve, and register receipts summarizing incentive earnings—and by the very existence of a program that rewarded fruit and vegetable purchases.

The evaluation estimated that HIP increased TFV intake by 0.24 cup-equivalents, or about 26 percent, consistent with the projected magnitude of impacts based on economic theory. This increase is clearly statistically significant and substantively large—closing 18 percent of the gap between current and recommended fruit and vegetable intake. Thus, by our confirmatory measure, HIP was successful.

However, our impact estimates on TFV expenditures based on EBT transaction data are substantially smaller than would be expected given the observed impacts on TFV intake. Taken together, the two pieces of evidence suggest that economic mechanisms alone cannot fully explain the increase in survey-reported TFV intake induced by HIP. The principal alternative explanations for this divergence, which must explain a large fraction of the impact, likely include participant confusion about the pilot and informational and attitudinal effects.

The experience of implementing HIP and some of the secondary analyses conducted as part of the evaluation provide additional insights about what impacts might be seen in a larger roll out of a similar program and suggest avenues for future research. There are several reasons to think of the pilot as a work in progress, and therefore to expect larger incentive earnings in a universal and permanent program. Given our findings about the relative importance of economic, informational, and attitudinal mechanisms in understanding HIP's impact on TFV intake, it is unclear to what extent increased incentive use would lead to greater impacts on TFV intake. It is also unclear to what extent a larger incentive would lead to greater impacts on TFV intake or a smaller incentive would lead to smaller impacts on TFV.

First, with a permanent program and more participants, a larger fraction of retailers, and especially a larger fraction of supermarkets and superstores, would likely participate. We earlier described evidence that HIP purchases were somewhat larger for participants who did not need to alter their choice of retailer, because they already were patronizing a participating retailer before pilot implementation.

Second, with universal participation, there would be more public information about the incentives, more retailer signage, and more word-of-mouth about how the program worked. Together these mechanisms would likely lead to improved understanding of the operation of the incentive. Participants would thereby come to understand the savings from shifting any existing TFV purchases onto their EBT card rather than paying for fruits and vegetables with cash or other tenders. These dynamics could lead to increased costs for the financial incentive and perhaps to increased impacts on consumption.

The HIP evaluation analysis suggests a number of areas in which further research could help us understand the underlying mechanisms by which HIP impacted fruit and vegetable consumption. Understanding the underlying mechanisms could allow us to disentangle the possible explanations for the observed effects and thus better understand how to design an effective incentive program.

The evaluation clearly showed that households responded to the price incentive. One research question to pursue is how incentives earned and impacts on TFV intake would vary with the size of the incentive. Inasmuch as HIP worked through the non-price pathway, a smaller incentive, perhaps 20 percent or even 10 percent, might generate similar increases in fruit and vegetable consumption. Conversely, inasmuch as HIP worked through the price pathway, a larger incentive might generate larger impacts on TFV intake.

A second avenue to explore is how to increase information about the incentive and whether and how much increased information about the incentive program would lead to greater impacts. The evaluation showed that a substantial number of households were confused about HIP—about the program itself, about what fruits and vegetables earned the incentive, and in what stores incentives could be earned.

Finally, while messages about the importance of consuming fruits and vegetables as part of a healthy diet are fairly widespread, examining the combined effect of intensive nutrition education with a financial incentive program could provide valuable insights.

References

Anderson, J. V., Bybee, D. I., Brown, R. M., McLean, D. F., Garcia, E. M., Breer, M. L., and Schillo, B. A. (2001). 5 a day fruit and vegetable intervention improves consumption in a low income population. *Journal of the American Dietetic Association* 101(2), 195–202.

Andreyeva, T., Long, M. W., and Brownell, K. D. (2010). The impact of food prices on consumption: A systematic review of research on the price elasticity of demand for food. *American Journal of Public Health* 100, 216–222.

Andreyeva, T., Luedicke, J., Middleton, A. E., Long, M. W., and Schwartz, M. B. (2012). Positive influence of the Revised Special Supplemental Nutrition Program for Women, Infants, and Children food packages on access to healthy foods. *Journal of the Academy of Nutrition and Dietetics* 112, 850–858.

Angrist, J. D. (2001). Estimations of limited dependent variable models with dummy endogenous regressors: Simple strategies for empirical practice. *Journal of Business and Economic Statistics* 19(1), 2–16.

Angrist, J. D., and Pischke, J.-S. (2008). *Mostly harmless econometrics: An empiricist's companion.* Princeton, NJ: Princeton University Press.

Baron, R. M., and Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical consideration. *Journal of Personality and Social Psychology* 5(6), 1173–1182. Available at: http://www.public.asu.edu/~davidpm/classes/psy536/Baron.pdf.

Bartlett, S., Beauregard, M., Logan, C., Komarovsky, M., Wommack, T., Wilde, P., Owens, C., and Melhem, M. (2013). *Healthy Incentives Pilot (HIP) early implementation report.* Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support.

Bartlett, S., Klerman, J., Wilde, P., Olsho, L., Blocklin, M., Logan, C., and Enver, A. (2013). *Healthy Incentives Pilot (HIP) interim report.* Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support.

Blisard, W. N., and Stewart, H. (2006). *How low-income households allocate their food budget relative to the cost of the Thrifty Food Plan.* Washington, DC: U.S. Department of Agriculture, Economic Research Service.

Bowman, S. A., Friday, J. E., and Moshfegh, A. (2008). MyPyramid Equivalents Database, 2.0 for USDA Survey Foods, 2003-2004 [online document]. Food Surveys Research Group, Beltsville Human Nutrition Research Center, Agricultural Research Service. Beltsville, MD: U.S. Department of Agriculture. Retrieved from: http://www.ars.usda.gov/ba/bhnrc/fsrg.

Bullock, J. G., Green, D. P., and Ha, S. E. (2010). Yes, but what's the mechanism? (Don't expect an easy answer). *Journal of Personality and Social Psychology,* 98, 550–558. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1543925.

Carriquiry, A. L., and Camano-Garcia, G. (2006). Evaluation of dietary intake data using the tolerable upper intake levels. *Journal of Nutrition* 136, 507S–513S.

Casagrande, S., Wang, Y., Anderson, C., and Gary, T. (2007). Have Americans increased their fruit and vegetable intake? The trends between 1988 and 2002. *American Journal of Preventive Medicine* 32(4), 257–263.

Castner, L., and Henke, J. (2011). *Benefit Redemption Patterns in the Supplemental Nutrition Assistance Program.* Alexa Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service, Office of Research and Analysis.

Chu, A. (2013). *Healthy Incentives Pilot (HIP) interim report: Participant survey weighting methodology.* Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support.

Chung, C., and Myers, S. (1999). Do the poor pay more for food? An analysis of grocery store availability and food price disparities. *Journal of Consumer Affairs* 33, 276–296.

Cody, S., Castner, L. A., Mabli, J., and Sykes, J. (2007). *Dynamics of Food Stamp Program participation, 2001–2003.* Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service, Office of Research, Nutrition, and Analysis.

Cole, N., and Fox, M.K. (2008). *Diet quality of Americans by Food Stamp participation status: Data from the National Health and Nutrition Examination Survey, 1999–2004.* Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service, Office of Research, Nutrition and Analysis.

Congressional Budget Office (2014). Supplemental Nutrition Assistance Program CBO Baseline, April 2014. http://www.cbo.gov/sites/default/files/cbofiles/attachments/44211-2014-04-SNAP.pdf. Accessed May 1, 2014.

Cramér, H. (1946). *Mathematical models of statistics*. Princeton: Princeton University Press, p. 353.

Dong, D., and Lin, B. H. (2009). *Fruit and vegetable consumption by low-income Americans: Would a price reduction make a difference?* (ERS Report 70). Washington, DC: U.S. Department of Agriculture, Economic Research Service. Available at: http://www.ers.usda.gov/publications/err70/err70.pdf.

Erinosho, T. O., Moser, R. P., Oh, A. Y., Nebeling, L. C., and Yaroch, A. L. (2012). Awareness of the Fruits and Veggies—More Matters campaign, knowledge of the fruit and vegetable recommendation, and fruit and vegetable intake of adults in the 2007 Food Attitudes and Behaviors (FAB) Survey. *Appetite* 59, 155–160.

Fox, M. K., Hamilton, W., and Lin, B-H. (2004). *Effects of food assistance and nutrition programs on nutrition and health: Volume 3, literature review* (Food Assistance and Nutrition Research Report No. FANRR19-3). Washington, DC: U.S. Department of Agriculture, Economic Research Service.

Fraker, T. (1990). *The effects of food stamps on food consumption: A review of the literature.* Washington, DC: U.S. Department of Agriculture, Food and Nutrition Service.

Frazão, E., Andrews, M. S., Smallwood, D., and Prell, M.A. (2007). Food spending patterns of low-income households: Will increasing purchasing power result in healthier food choices? (Economic Information Bulletin Number 29-4). Washington, DC: U.S. Department of Agriculture, Economic Research Service.

Freedman, D. A., Choi, S. K., Hurley, T., Anadu, E., and Hébert, J.R. (2013). A farmers' market at a federally qualified health center improves fruit and vegetable intake among low-income diabetics. *Preventive Medicine* 56(5), 288–292. doi:10.1016/j.ypmed.2013.01.018.

Freedman, L. S., Guenther, P. M., Krebs-Smith, S. M., Dodd, K. W., and Midthune, D. (2010). A population's distribution of Healthy Eating Index-2005 component scores can be estimated when more than one 24-hour recall is available. *Journal of Nutrition* 140(8), 1529–1534. doi: 10.3945/jn.110.124594.

French, S.A. (2003). Pricing effects on food choices. *Journal of Nutrition* 133(3), 841S–843S.

French, S.A. (2005). Public health strategies for dietary change: schools and workplaces. *Journal of Nutrition* 135(4), 910–912.

French, S.A., and Wechsler, H. (2004). School-based research and initiatives: Fruit and vegetable environment, policy, and pricing workshop. *Preventive Medicine* 39(Suppl 2), S101–107.

French, S.A., Story, M., and Jeffery, R. W. (2001). Environmental influences on eating and physical activity. *Annual Review of Public Health* 22, 309–335.

French, S.A., Story, M., Jeffery, R. W., Snyder, P., Eisenberg, M., Sidebottom, A., and Murray, D. (1997). Pricing strategy to promote fruit and vegetable purchase in high school cafeterias. *Journal of the American Dietetic Association* 97(9), 1008–1010.

George, D., and Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update* (4th ed.). Boston: Allyn & Bacon.

Government Accountability Office. (2008). *Food Stamp Program: Options for delivering financial incentives to participants for purchasing targeted foods* (GAO-08-415). Washington, D.C.: Author. Available at: http://www.gao.gov/new.items/d08415.pdf.

Greene, W. H. (2003). *Econometric analysis* (5th ed.). New York: Prentice-Hall, p. 913f.

Grimm, K. A., Foltz, J. L., Blanck, H. M., and Scanlon, K. S. (2012). Household income disparities in fruit and vegetable consumption by state and territory: Results of the 2009 Behavioral Risk Factor Surveillance System. *Journal of the Academy of Nutrition and Dietetics* 112, 2014–2021.

Grindal, T., Schwartz, G., Klerman, J., Bartlett, S., and Wilde, P. (2014). *Healthy Incentives Pilot (HIP) spatial analysis.* Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support.

Guenther, P.M., Casavale, K.O., Kirkpatrick, S.I., Reedy, J., Hiza, H.A.B., Kuczynski, K.J., Kahle, L.L., and Krebs-Smith, S.M. (2013). "Diet Quality of Americans in 2001-02 and 2007-08 as Measured by the Healthy Eating Index-2010." *Nutrition Insight* 51. Available at: http://www.cnpp.usda.gov/Publications/NutritionInsights/Insight51.pdf.

Guthrie, J., Lin, B., Ver Ploeg, M., and Frazao, E. (2007). *Can food stamps do more to improve food choices?* (Economic Information Bulletin No. 29-1). Washington, DC: U.S. Department of Agriculture, Economic Research Service.

Hanson, K. (2010). *The Food Assistance National Input-Output Multiplier (FANIOM) Model and Stimulus Effects of SNAP (*Economic Research Report No. ERR-103). Washington, DC: U.S. Department of Agriculture, Economic Research Service.

He, K., Hu, F.B., Colditz, G.A., Manson, J.E., Willett, W.C., and Liu, S. (2004). Changes in intake of fruits and vegetables in relation to risk of obesity and weight gain among middle-aged women. *International Journal of Obesity Related Metabolic Disorders* 28(12), 1569-74.

He, F. J., Nowson, C. A., Lucas, M., and MacGregor, G. A. (2007). Increased consumption of fruit and vegetables is related to a reduced risk of coronary heart disease: Meta-analysis of cohort studies. *Journal of Human Hypertension* 21, 717–728.

He, F. J., Nowson, C. A., and MacGregor, G. A. (2006). Fruit and vegetable consumption and stroke: Meta-analysis of cohort studies. *Lancet* 367, 320–326.

Herman, D.R., Harrison, G.G., Afifi, A.A., and Jenks, E. (2008). Effect of a targeted subsidy on intake of fruits and vegetables among low-income women in the Special Supplemental Nutrition Program for Women, Infants, and Children. *American Journal of Public Health* 98(1), 98-105.

Horgen, K.B., and Brownell, K.D. (2002). Comparison of price change and health message interventions in promoting healthy food choices. *Health Psychology* 21, 505-12.

Imai, K., Keele, L., and Yamamoto, T. (2010). Identification, inference, and sensitivity analysis for causal mediation effects. *Statistical Science*, 25(1), 51-71.

Institute of Medicine (IOM). (2000a). *Dietary Reference Intakes: Applications in dietary assessment.* Washington, DC: National Academies Press.

Institute of Medicine (IOM). (2000b). *Dietary Reference Intakes for vitamin C, vitamin E, selenium, and carotenoids.* Washington, DC: National Academies Press.

Institute of Medicine and National Research Council. (2013). *Supplemental Nutrition Assistance Program: Examining the evidence to define benefit adequacy*. Washington, DC: The National Academies Press.

Jago, R., Baranowski, T., and Baranowski, J. C. (2007). Fruit and vegetable availability: A micro environmental mediating variable? *Public Health Nutrition* 10(7), 681–689.

Jeffery, R.W., French, S.A., Raether, D., and Baxter, J. E. (1994). An environmental intervention to increase fruit and salad purchases in a cafeteria. *Preventive Medicine* 23(6), 788–792.

Jha, P., Chaloupka, F.J., Corrao, M., and Jacob, B. (2006). Reducing the burden of smoking world-wide: Effectiveness of interventions and their coverage. *Drug Alcohol Review* 25(6), 597–609.

Kuchler, F., Tegene, A., and Harris, J. (2005). Taxing snack foods: manipulating diet quality or financing information program? *Review of Agricultural Economics* 27(1), 4−20.

Klerman, J. A. (2013). *Random assignment evidence on the Southworth Hypothesis.* Cambridge, MA: Abt Associates Inc., June.

Larson, N., and Story, M. (2009). A review of environmental influences on food choices. *Annals of Behavioral Medicine* 38, 56–73.

MacKinnon, D. (1994). Analysis of mediating variables in prevention and intervention research. In A. Cázares and L. Beatty (Eds.), *Scientific methods for prevention intervention research* (NIDA Monograph No. 139, pp. 127–153). Rockville, MD: National Institute on Drug Abuse.

MacKinnon, D.P. (2008). *Introduction to statistical mediation analysis.* Mahwah, NJ: Erlbaum.

Maddala, G.S. (1983). *Limited dependent and qualitative variables in econometrics.* Cambridge University Press.

Morland, K., Wing, S., Diez Roux, A., and Poole, C. (2002). Neighborhood characteristics associated with the location of food stores and food service places. *American Journal of Preventive Medicine* 22, 23–29.

Nunnally, J. (1978). *Psychometric theory.* New York: McGraw-Hill.

Nusser, S.M., Carriquiry, A. L., Dodd, K. W., and Fuller, W. A. (1996). A semi-parametric transformation approach to estimating usual nutrient intake distributions. *Journal of the American Statistical Association* 91, 1440–1449.

Oehlert, G.W. (1992). A note on the delta method. *The American Statistician*, 46(1), 27–29.

Pomerleau, J., Lock, K., Knai, C., and McKee, M. (2005). Interventions designed to increase adult fruit and vegetable intake can be effective: A systematic review of the literature. *The Journal of Nutrition* 135(10), 2486–2495.

Rose, D., and Richards, R. (2004). Food store access and household fruit and vegetable use among participants in the US Food Stamp Program. *Public Health Nutrition* 7(8), 1081–1088.

Schochet, P. Z. (2008). Statistical power for random assignment evaluations of education programs. *Journal of Educational and Behavioral Statistics* 33(1), 62–87.

Schochet, P. Z. (2009). An approach for addressing the multiple testing problem in social policy impact evaluations. *Evaluation Review* 33(6), 537–567.

Shapiro, J. M. (2005). Is there a daily discount rate? Evidence from the food stamp nutrition cycle. *Journal of Public Economics* 89(2), 303–325.

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology*, 13, 290–312.

Sorensen, G., Stoddard, A. M., Dubowitz, T., Barbeau, E. M., Bigby, J., Emmons, K. M., Berkman, L. F., and Peterson, K. E. (2007). The influence of social context on changes in fruit and vegetable consumption: Results of the Healthy Directions Studies. *American Journal of Public Health* 97(7), 1216–1227.

Southworth H. M. (1945). The economics of public measures to subsidize food consumption. *Journal of Farm Economics* 27, 38–66.

Stewart, H., and Blisard, N. (2008). *Are lower income households willing and able to budget for fruits and vegetables?* (ERS Report No. 54). Alexandria, VA: U.S. Department of Agriculture, Economic Research Service.

Stewart, H., Hyman, J., Buzby, J. C., Frazão, E., and Carlson, A. (2011). *How much do fruits and vegetables cost?* (EIB-71). Washington, DC: U.S. Department of Agriculture, Economic Research Service.

Subar, A.F., Kipnis, V., Troiano, R.P., Midthune, D., Schoeller, D.A., Bingham, S., Sharbaugh, C.O., Trabulsi, J., Runswick, S., Ballard-Barbash, R., Sunshine, J., and Schatzkin, A. (2003). Using intake biomarkers to evaluate the extent of dietary misreporting in a large sample of adults: The OPEN study. *American Journal of Epidemiology* 158, 1–13.

Subar A. F., Dodd, K. W., Guenther, P. M., Kipnis, V., Midthune, D., McDowell, M., Tooze, J. A., Freedman, L. S., and Krebs-Smith, S. M. (2006). The food propensity questionnaire: concept, development, and validation for use as a covariate in a model to estimate usual food intake. *Journal of the American Dietetic Association* 106(10), 1556–1563.

Thompson, F. E., Kipnis, V., Subar, A. F., Krebs-Smith, S. M., Kahle, L. L., Midthune, D., Potischman, N., and Schatzkin, A. (2000). Evaluation of 2 brief instruments and a food-frequency questionnaire to estimate daily number of servings of fruit and vegetables. *American Journal of Clinical Nutrition* 71(6), 1503–1510.

Tooze, J. A., Midthune. D., Dodd, K. W., Freedman, L. S., Krebs-Smith, S. M., Subar, A. F., Guenther, P. M., Carroll, R. J., and Kipnis, V. (2006). A new statistical method for estimating the usual intake of episodically consumed foods with applications to their distribution. *Journal of the American Dietetic Association* 106(10), 1575–1587.

U.S. Department of Agriculture and U.S. Department of Health and Human Services. (2010). *Dietary guidelines for Americans, 2010* (7th ed.). Washington, DC: U.S. Government Printing Office.

U.S. Department of Agriculture, Economic Research Service. (2009). Access to affordable and nutritious food: Measuring and understanding food deserts and their consequences, report to Congress. Washington, DC. Available at: www.ers.usda.gov/Publications/AP/AP036/.

U.S. Department of Agriculture. (2010). *Strategic Plan FY 2010-2015.* Washington, DC: Author. Available at: http://www.ocfo.usda.gov/sp2010/sp2010.pdf.

U.S. Department of Agriculture, Agricultural Research Service. (2012). *Nutrient intakes from food: mean amounts consumed per individual, by gender and age, what we eat in America, NHANES 2009-2010*. Washington, DC: Author. Available at: www.ars.usda.gov/ba/bhnrc/fsrg

U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. (2013a). Addendum to MyPyramid Equivalents Database, Version 2.0 [online document]. Alexandria, VA: Author. Available at: http://www.cnpp.usda.gov/OtherProjects.htm

U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. (2013b). Healthy Eating Index Support Files [online files]. Alexandria, VA: Author. Available at: http://www.cnpp.usda.gov/HealthyEatingIndexSupportFiles0102.htm

U.S. Department of Health and Human Services. (2010). *Healthy people 2020* (2nd ed.). Washington, DC: U.S. Government Printing Office.

Wilde, P. E., and Andrews, M. S. (2000). The food stamp program in an era of welfare reform: Electronic benefits and changing sources of cash income. *Journal of Consumer Affairs* 34(1), 31–46.

Wilde, P.E., McNamara, P. E., and Ranney, C. K. (2000). *The effect on dietary quality of participation in the Food Stamp and WIC Programs* (Food Assistance and Nutrition Research Report No 9). Washington, DC: U.S. Department of Agriculture, Economic Research Service.

Wilde, P. E., and Ranney, C. K. (2000). The monthly food stamp cycle: Shopping frequency and food intake decisions in an endogenous switching regression framework. *American Journal of Agricultural Economics* 82(1), 200–213.

Wilde, P., Troy, L., and Rogers, B. (2009). Food stamps and food spending: An Engel function approach. *American Journal of Agricultural Economics* 91(2), 416.

World Cancer Research Fund. (2007). *Food, nutrition, physical activity, and the prevention of cancer: A global perspective.* Washington DC: American Institute for Cancer Research.

Appendix A: Economic Theory

Chapter 1 briefly presents a conceptual model for HIP (Exhibit 1.1). That discussion emphasized that HIP might work through two distinct pathways: (i) an economic pathway, i.e., the HIP incentive lowers the net price of TFVs; and (ii) an informational/attitudinal pathway, i.e., HIP's educational and promotional materials, and/or the implicit messaging about the benefits of fruits and vegetables associated with provision of the incentive, might increase TFV intake, independent of the price effect.

This appendix develops the argument for the "economic pathway" in more detail. The additional detail serves two purposes. First, it provides a benchmark of the likely impact of HIP through that pathway—assuming participants perfectly understood how the incentive worked and responded according to theory. Second, it helps us to understand that the observed HIP/non-HIP difference in TFV expenditures in participating IECR supermarkets/superstores is probably an upper bound on (i.e., greater than) the total increase in TFV expenditure that can be attributed purely to the economic pathway.

This appendix proceeds in six sections. Section A.1 presents a basic elasticity analysis. The subsequent sections then consider how relaxing the assumptions of the basic elasticity analysis affects the conclusions. Section A.2 presents a more complete analysis incorporating potential income effects based on published Consumer Expenditure Survey data. Section A.3 considers the implications of the fact that some TFVs are paid for with cash—and that these purchases do not earn HIP incentives. Section A.4 considers the implications of the fact that some fruits and vegetables (prepared foods, white potatoes, fruit juices, mature legumes) are not covered by HIP. Section A.5 considers the implications of the fact that—measured by SNAP purchases—only about half of all retailers participated in HIP. Section A.6 considers the relation between the HIP/non-HIP difference in TFV expenditure in participating IECR retailers and the total increase in TFV expenditure.

A.1 A Basic Elasticity Analysis

Some of the motivation for HIP comes from the simple observation of economic theory that "demand curves slope down"; i.e., lowering the price will increase purchases (see Frazao et al., 2007; Dong and Lin, 2009; Guthrie et al., 2007; Kuchler, Tegene, and Harris, 2005; GAO, 2008). The magnitude of the decline is an empirical question which is usually represented by an "elasticity," which describes the percentage change in purchases with a percentage change in price.

Andreyeva, Long, and Brownell (2010) survey the literature on fruit and vegetable elasticities. They identified 20 estimates of the elasticity of fruit purchases; the mean estimate across those 20 studies was 0.70, with a range of 0.16 to 3.02. They also identified 20 estimates of the elasticity of vegetable purchases, with a mean of 0.58 with a range of 0.2 to 1.11. They also explore subgroup impacts, but find no consistent evidence that impacts vary by income or program participation. Dong and Lin (2009) provide elasticity estimates and a literature review that is broadly consistent with the Andreyeva et al. figures.

A simple extrapolation to HIP might proceed as follows. The simple average of the mean estimates for fruits and vegetables is very close to two-thirds (i.e., 0.64 vs. 0.67). HIP provides a 30 percent incentive for TFV purchases, so in rounded terms we would expect HIP's financial incentive to increase TFV spending by roughly 20 percent.

A.2 Incorporating Income Effects

The simple elasticity analysis assumes that the increase in TFV spending is entirely attributable to a pure price or substitution effect, where the participant increases HIP-eligible purchases in direct response to the price differential. If additional income generated by incentive earnings is sufficiently high, however, TFV spending could also increase simply because the household has more income to spend. Since the 30 percent change in price could plausibly generate a fairly substantial earned incentive amount, in this section we extend the previous analysis to take into account additional increases in TFV spending that might be attributable to an income effect.

Our data for this exercise come from the Consumer Expenditure Survey (CEX).[140] Taking CEX data for the lowest quintile of the income distribution as a rough proxy for the SNAP population and converting to a monthly basis suggests total household monthly expenditures of $1,833, total food expenditures of $296 (16 percent of total expenditures), and total fruit and vegetable expenditures of $37 (2 percent of total expenditures and 13 percent of food expenditures).

If the household understands the incentive and accordingly increases fruit and vegetable expenditures, elasticities from Andreyeva, Long, and Brownell (2010) as described above imply an increase of approximately $7 (20 percent of $37) due to the price effect alone, implying total fruit and vegetable spending of $44, and associated monthly incentive earnings of about $13. Note that this amount represents an upper bound relative to the case when some fruit and vegetable purchases do not in fact qualify to earn the HIP incentive.

The additional incentive income would be deposited into the household's SNAP EBT account. How the household would then spend the additional income is the subject of debate in the economics literature (the "Southworth Hypothesis"), but for our purposes it is sufficient to note that the fraction of the incentive that would be spent on fruit and vegetables is somewhere between the fraction of all income spent on fruit and vegetables (i.e., about 2 percent) and the fraction of food expenditures spent on fruit and vegetables (i.e., about 13 percent); or between well under a dollar and slightly less than two dollars, on top of the $7 increase attributable for the pure price effect. As an upper bound, then, we would expect HIP impacts of no more than $9 per month in a typical low-income household, if HIP operates only through economic pathways (price and income effects).[141] These impacts are small, under half a percent of baseline income.

---

140 The analysis here is drawn directly from published tabulations for 2011. See http://www.bls.gov/cex/csxstnd.htm.

141 Formally, this argument is about the "compensated elasticity." Andreyeva, Long, and Brownell (2010) report "uncompensated elasticities." The Slutsky Equation implies that the compensated elasticity equals the uncompensated elasticity plus the product of the share of fruit and vegetable consumption (2 percent) and the income elasticity of fruit and vegetable consumption. Tabulations from the CEX suggest that the income elasticity is small. Specifically, between the first and second quintiles, income increases from $22,001 to $32,092; i.e., 45 percent. Between those same quintiles, fruit and vegetable consumption increases from $448 to $556; i.e., 24 percent. We can roughly approximate the income elasticity (i.e., the percentage change in fruit and vegetable consumption with a percentage change in income) as the ratio of these two figures: 0.53=24 percent/45 percent. So, if the uncompensated elasticity (from Andreyeva, Long, and Brownell, 2010) is approximately 0.67, then the compensated elasticity is 0.68—a trivial difference.

A.3 Cash vs. SNAP

HIP only applies to purchases made with SNAP. The previous analysis implicitly assumes that all fruit and vegetable purchases are made at the lower net price—i.e., that they are made with SNAP. The SNAP benefit formula, in contrast, assumes that households with income will use some cash to purchase food.

Nevertheless, the previous analysis is approximately correct. HIP gives households an incentive to use SNAP to pay for fruits and vegetables. Thus, households that previously used cash to pay for some fruits and vegetables can simply shift the cash to non-fruits and vegetables, freeing up SNAP for fruits and vegetables.[142] Assuming households understand and appropriately react to HIP, then we can (approximately) treat its likely impacts as if all fruit and vegetable expenditure was made with SNAP (rather than cash). The previous analysis therefore stands as described.

A.4 Incomplete Coverage of Fruits and Vegetables

The previous analysis implicitly assumes that the HIP incentive applies to everything classified as part of "fruit and vegetable" expenditures by the CEX. In fact, HIP does not apply to prepared foods or to white potatoes, 100% fruit juice, or mature legumes. In the lowest quintile, total fruit and vegetable expenditures ($448 per year) are 17 percent processed fruits ($76) and 20 percent processed vegetables ($90). From the CEX, we do not have an estimate of dollar expenditures on white potatoes and legumes. Nevertheless, it seems plausible that less than half of all CEX fruits and vegetables actually qualify for the HIP incentive. Under this assumption, all of the estimates in the previous section should be halved; that is, a price elasticity of two-thirds implies an increase in TFV spending of about $4-5, and monthly earned incentives of about $7.

A.5 Incomplete Retailer Participation

The previous analysis also implicitly assumes that all retailers participate in HIP. In fact, when measured by SNAP expenditure, only about half of all SNAP retailers participated (see the discussion in Chapter 3). How would we expect HIP households to behave given incomplete retailer participation?

A simplifying assumption would be to treat household retailer choice as fixed. In that case, households that shop in participating retailers would face and react to the lower net price. Households that shop in non-participating retailers would not face the lower net price; we would expect their expenditures to be unchanged.

However, the assumption that retailer choice is fixed is arguably incorrect. HIP gives households an incentive to change where they shop—at least where they shop for fruits and vegetables. The previous analysis suggests that a household that used to shop in a non-participating retailer could earn another $7 per month simply by switching to a participating retailer, but not changing what was bought.

---

142 This discussion implicitly assumes that the SNAP benefit is greater than fruit and vegetable spending. Fruits and vegetables are a sufficiently small share of food expenditure that fruit and vegetable expenditures greater than the total SNAP benefit will be unusual.

Whether switching retailers was worthwhile would involve balancing the incentives that might be earned against the costs—including, but not limited to, out of pocket expenses and time—for switching retailers. It seems plausible that some households would do so, while others would not. For households already shopping at both participating and non-participating retailers, the costs of switching TFV purchases to participating retailers would be lower. This suggests that the appropriate estimate of the increase in TFVs and incentives earned that can be attributed to the pure financial pathway is somewhere between the earlier estimate and half the earlier estimate; i.e., $2 to $3 for increased TFV expenditure and $3 to $7 for incentive earned.

A.6 Measured TFV Purchases

The evaluation has available EBT transactions data from participating IECR retailers enabling us to measure TFV purchases for both HIP and non-HIP households. It is thus tempting to estimate the impact of HIP on TFV purchases as the difference between purchases by HIP and non-HIP households, since randomization implies that the households are otherwise identical. In practice, proprietary data considerations cause us to restrict our analysis to purchases in participating IECR supermarkets and superstores, excluding other, smaller, retailers such as groceries and convenience stores.

We discuss the strategy of using the difference in TFV purchases in participating supermarkets and superstores as an approximation to the impact of HIP on all TFV purchases in detail in Section 6.1. The obvious—but not directly addressable—difficulty with this strategy is that some TFV expenditures are not captured; i.e., expenditures (i) with cash (ii) in non-participating retailers (iii) in participating non-IECR retailers; and/or (iv) in participating IECR retailers that are not supermarkets or superstores. The third (in participating non-IECR retailers) and fourth (non-supermarket or superstore IECR retailers) sets of expenditures are unlikely to be a major issue. Those expenditures represent less than 5 percent of all expenditures at participating retailers.

The other two expenditure types are more problematic. As noted in Sections A.3 and A.5, HIP gives households a motivation to shift expenditures from cash and non-participating retailers to SNAP EBT at participating retailers. By doing so, households earn the incentive. Any such shift to participating retailers is likely to be overwhelmingly to IECR participating retailers. Thus, the HIP/non-HIP difference in TFV expenditure at participating IECR retailers is likely to be an over-estimate of the true difference in TFV expenditure that can be attributed purely to the financial pathway.

If such a shift had occurred, we would expect to see a decline in expenditures at non-participating retailers. At the very least, households would shift their TFV purchases from non-participating to participating retailers. Fixed costs of shopping might imply that they would also move (at least) some of their non-TFV purchases (see Section A.5). However, the analysis in Section 6.3 finds no evidence of such a decrease. It therefore seems plausible to assume that this source of over-estimate is small, and thus the bound on the HIP impact that can be attributed just to the economic pathway is relatively tight.

In practice, Chapter 6 shows that the magnitude of the estimated impact on TFV expenditures in participating IECR supermarkets and superstores is broadly consistent with the theoretical analysis described above. However, Chapter 8 shows that the HIP impact on TFV intake appeared to be much greater than can be explained by the pure economic pathway described and analyzed in this appendix.

Section 8.2 compares relevant HIP impacts on food spending and food intake, and Chapter 10 discusses several possible explanations.

Appendix B: Random Assignment and Sampling

A rigorous research design was critical to assessing the impact of HIP on participants' intake of fruits and vegetables. Random assignment was used to determine which SNAP households in Hampden County would participate in HIP. Then, random sampling was used to select respondents for the participant surveys. (Exhibit 2.1 in Chapter 2 provides a graphical overview of the evaluation design.) The first section of this appendix discusses random assignment to HIP/non-HIP status. The second section of this appendix discusses random sampling of participant survey respondents.

B.1 Random Assignment to HIP/non-HIP Status

The random assignment of eligible SNAP participant households to HIP and non-HIP status was central to the evaluation design and HIP operations. DTA provided administrative case file records containing all households and persons on SNAP in Hampden County as of mid-July, 2011.[143] We randomly selected 7,500 SNAP households (containing 9,286 persons) to participate in HIP. The remaining 47,595 eligible SNAP households in Hampden (containing 59,652 persons) were not selected to earn the HIP incentive.

To ensure that the HIP (treatment) and non-HIP (control) groups were balanced or similar, we used a blocked random assignment design. Tests on the samples after random assignment confirmed that they were similar with respect to key participant characteristics. Additionally, HIP households were randomly divided into three groups, corresponding to the three waves DTA established to enroll participants in HIP.[144] Non-HIP households were also divided into three waves to facilitate participant survey sampling.

The rest of this section provides a detailed description of the steps in the random assignment process.

Step 1: Review Data

To conduct random assignment, we used the July 2011 extract of households in Hampden County, Massachusetts that were eligible for HIP. We reviewed the file and the related documentation to ensure that all the eligible households, and only the eligible households, were included in the file. The evaluation sought to estimate the impact of HIP on adult food intake, so child-only cases were not eligible for HIP. Furthermore, only households that did their own shopping were eligible for the evaluation. SNAP participants who sign over their benefits to a residential or treatment facility were not eligible. Homeless participants who retained the use of their own benefits remained eligible for the study. DTA excluded ineligible households prior to providing the file.

We verified that the exclusion criteria applied to the extract was correct by reviewing the SQL query DTA used to extract the data and by verifying through tabulations that the cases to be excluded were not included in the file. We verified that all households in the file extract had:

---

143 Once DTA generated this Hampden County SNAP case extract file of HIP-eligible households, these households remained in the HIP evaluation sample for the duration of the pilot as long as they continued to participate in SNAP; no additional households were added to the pilot.

144 DTA staggered enrollment in HIP over three months for ease of implementation. Prior to each wave's start date, HIP households received several mailings describing HIP. See Chapter 3 for additional details.

- Active SNAP cases in July 2011
- Residential or mailing addresses in Hampden County
- An active grantee (head of household)
- At least one active member 16 years of age or older
- Benefit amount greater than $0 in June 2011

We also verified (using the 'residential facility type code' or res_type) that none of the households in the file extract were in the following excluded residential facilities:

- Approved Public Medical Institution
- Assessment Center
- Licensed Chronic Hospital
- Educational Residential Facility
- Hospital
- Licensed Intermediate Care Facility
- Penal Institution
- Licensed Residential Care Facility
- Long Term Care Facility
- Public Nonmedical Institution
- Private Psychiatric Residential Facility
- Public Psychiatric Residential Facility
- Residential Inpatient Treatment Center

Step 2: Create Blocking Variables and Per Block Sample Size Determination

We created 12 household-level blocking cells defined by completely cross-classifying the following three variables:

- Geography (3 levels): Springfield; Chicopee/Holyoke; and remainder of Hampden County;
- Household size (2 levels): 1-person and 2-or-more-persons; and
- Gender for head of household (2 levels): male-headed and female-headed.

Next, we calculated the proportion (P_h) of total households in each of the (h = 1 to 12) blocking cells, i.e. $P_h = Y_h/Y_T$ where Y_h is the number of households in the blocking cell h and Y_T is total number of households. This proportion is the "cell size."[145]

Then, we determined the number of households to select for HIP in each cell. First, we calculated $m_h = 7{,}500 * P_h$. The total number of households to select for HIP across all cells would be 7,500 (i.e.

[145] We planned to combine small blocking cells of cell size less than .01 and recalculate P_h if necessary. As Exhibit B.1 shows, none of the cell sizes were this small, so this step was not necessary.

$\sum m_h = 7{,}500$). However, since m_h's would be in decimals, we used stochastic rounding[146] to obtain integer cell sample sizes, n_h.

The source file contained 55,095 HIP-eligible households. For each of the 12 blocking cells, Exhibit B.1 presents the total number of households (Y_h), the proportion of households in each cell (p_h), the unrounded number of households to select from each cell (m_h), and the stochastically rounded number of households to select (n_h). The total number of households to be selected was exactly 7,500. [147]

Exhibit B.1: Description of the Blocking Cells

Blocking cells	Y_h	p_h	m_h	n_h
Springfield, HH Size 2+, Male Head	1,153	0.0209	157.0	157
Springfield, HH Size 2+, Female Head	11,608	0.2107	1,580.2	1,580
Springfield, HH Size 1, Male Head	8,651	0.1570	1,177.6	1,177
Springfield, HH Size 1, Female Head	7,580	0.1376	1,031.9	1,032
Chicopee & Holyoke, HH Size 2+, Male Head	591	0.0107	80.5	81
Chicopee & Holyoke, HH Size 2+, Female Head	5,578	0.1012	759.3	759
Chicopee & Holyoke, HH Size 1, Male Head	3,762	0.0683	512.1	512
Chicopee & Holyoke, HH Size 1, Female Head	3,702	0.0672	503.9	504
Hampden Balance, HH Size 2+, Male Head	998	0.0181	135.9	136
Hampden Balance, HH Size 2+, Female Head	4,366	0.0792	594.3	595
Hampden Balance, HH Size 1, Male Head	3,333	0.0605	453.7	454
Hampden Balance, HH Size 1, Female Head	3,773	0.0685	513.6	513
All Blocking Cells	55,095	1.0000	7,500.0	7,500

Step 3: Random Assignment and Proportion Verification

We randomly selected n_h households from each blocking cell h (e.g. Springfield, household size 1, female household head) to be in HIP. The remaining households were put in the non-HIP group. Thus, within blocks, we have simple random sampling without replacement which we implemented in SAS using PROC SURVEYSELECT.

The result of the random assignment by blocking cells is presented in Exhibit B.2. As would be expected if random assignment was properly conducted, the percentages of HIP and non-HIP households in each of the blocking cells are virtually identical to each other and the cell proportions, p_h, from Exhibit B.1 above (also replicated as the "All" column). This indicates that proportions by blocking cells were computed and applied correctly during random assignment.

---

146 We rounded the decimal sample size m_h to integer sample size n_h by rounding it up or down randomly. If the number we drew randomly from a uniform distribution on the interval [0, 1] was less than the decimal component of m_h, then m_h was rounded down to n_h. But if the random number was equal or greater to the decimal component m_h, then m_h was rounded up to n_h.

147 Due to stochastic rounding of blocking cells, the actual HIP households could be slightly different than 7,500. In a test simulation of 1,000 runs, the sample size ranged from 7,497 to 7,503.

Exhibit B.2: Blocking Cell Shares of HIP and Non-HIP Households

Blocking cells	HIP		Non-HIP		All	
	N	%	N	%	N	%
Springfield, HH Size 2+, Male Head	157	2.1	996	2.1	1,153	2.1
Springfield, HH Size 2+, Female Head	1,580	21.1	10,028	21.1	11,608	21.1
Springfield, HH Size 1, Male Head	1,177	15.7	7,474	15.7	8,651	15.7
Springfield, HH Size 1, Female Head	1,032	13.8	6,548	13.8	7,580	13.8
Chicopee & Holyoke, HH Size 2+, Male Head	81	1.1	510	1.1	591	1.1
Chicopee & Holyoke, HH Size 2+, Female Head	759	10.1	4,819	10.1	5,578	10.1
Chicopee & Holyoke, HH Size 1, Male Head	512	6.8	3,250	6.8	3,762	6.8
Chicopee & Holyoke, HH Size 1, Female Head	504	6.7	3,198	6.7	3,702	6.7
Hampden Balance, HH Size 2+, Male Head	136	1.8	862	1.8	998	1.8
Hampden Balance, HH Size 2+, Female Head	595	7.9	3,771	7.9	4,366	7.9
Hampden Balance, HH Size 1, Male Head	454	6.1	2,879	6.0	3,333	6.0
Hampden Balance, HH Size 1, Female Head	513	6.8	3,260	6.8	3,773	6.8
All Blocking Cells	7,500	100.0	47,595	100.0	55,095	100.0

Step 4: Balance Test and Sample Rejection

We tested balance on baseline characteristics between the HIP and non-HIP groups using variables provided in the case file extract. We used a robust global F-test on a linear regression[148] as the primary test for systematic differences between the HIP and non-HIP households. We tested on the following variables:

- Monthly SNAP Benefit (4 categories);
- Spanish Language Flag (2 categories);
- Recertification Type (3 categories);
- Monthly Income (4 categories);
- Bay State CAP Flag (2 categories);
- Homeless Status Flag (2 categories);
- Residence Type (3 categories);
- Age of Household Head (4 categories);
- Race/Ethnicity of Household Head (4 categories);
- Disability Flag (2 categories);
- U.S. Citizenship Flag (2 categories);
- TANF/AFDC Flag (2 categories);
- Unearned Income Flag (2 categories);
- SSI Flag (2 categories);
- RSDI Flag (2 categories);

---

148 We regressed a 0/1 indictor for non-HIP/HIP status on all the selected baseline characteristics (as binary or categorical variables) as well as the dummy variables indicating the blocking cells. Reference groups were omitted for variables with multiple categories, e.g. monthly SNAP benefit $1-$161 was excluded in the linear regression, while the rest of the SNAP benefit categories were included. The global F-test for the null hypothesis that the coefficients of all the baseline characteristics (excluding the dummy variables for the blocking cells) are zero was assessed at the 20 percent significance level to determine if there was a less than 20 percent chance that the groups were produced by a process in which all baseline characteristics are unrelated to non-HIP/HIP status. See the body of the appendix for a discussion of the 20 percent level.

- Unemployment Compensation Flag (2 categories); and
- Household Type (3 categories).

The purpose of this test was to determine if a chance "bad draw" was obtained from the random selection process, not to judge whether the process was in fact random; our knowledge of the randomization mechanism and the results of a previously conducted simulation of test randomizations lead us to infer that the procedure was random. A chance "bad draw" does not bias the random assignment result but it does create differences in baseline characteristics that needlessly increase the variance of the impact estimates to be produced by the study.

We planned to discard the selected sample if the global F-test failed (i.e. p-value < 0.20). Then we would select a replacement sample until an acceptable sample was obtained. We only expected 1 in 5 samples to fail this test and verified this using a simulation of 1,000 samples. This broader rejection standard (compared to a standard of p-value < .05 or p < .10) reflects the desire to more closely match the two groups on baseline characteristics than would be accomplished by the usual standards. More readily rejecting groups produced by initial tries assures that the eventual accepted groups more closely match on the examined characteristics.

Exhibit B.3, presents the results of these tests. The p-value of 0.536 for the global F-statistic, shown at the bottom of the exhibit, leads us to conclude that there is no evidence of systematic differences between the HIP and non-HIP households in this sample and accept the sample as the basis for the experiment.

As shown in Exhibit B.3, we also conducted individual t-tests on the 35 variables representing the baseline characteristics for the sample. With so many individual t-tests, a few are bound to appear statistically significant just by chance.[149] Therefore the t-tests *were not* used to accept (or discard) the sample but only for diagnostic purposes. In the sample drawn, there were no statistically significant differences between HIP and non-HIP households for any of the 35 characteristics tested. In fact, the smallest individual p-value for the t-test is 0.104 for the $1-$787 category of monthly income. Thus, these individual tests also provide no evidence of lack of randomness.

---

[149] For example, if the outcomes were uncorrelated (which they are not), we would expect 1 in 20 t-tests to be statistically significant just by chance at the significance level of 5 percent.

Exhibit B.3: Balance Test

Household characteristics	HIP (%)	Non-HIP (%)	P-value
N	7,500	47,595	
Monthly SNAP benefit			
$1-$160	25.7	25.0	0.201
$161–$200	39.3	39.6	0.631
$201–$349	10.8	10.4	0.254
$350 +	24.3	25.1	0.123
Spanish language	22.2	22.2	0.925
Recertification type			
Recertification	53.0	52.4	0.315
Semiannual reporting	32.0	32.2	0.708
Other reevaluation	15.0	15.4	0.364
Monthly income			
$0	23.4	24.0	0.321
$1–$787	26.5	25.7	0.104
$788–$1,083	25.3	25.3	0.941
$1,084 +	24.7	25.1	0.459
Baystate CAP	7.9	8.0	0.903
Homeless	6.8	6.8	0.990
Housing type			
Private	80.0	80.5	0.369
Public	13.9	13.5	0.358
Other	6.0	6.0	0.860
Household head age			
16–30	28.1	27.6	0.388
31–40	21.4	21.2	0.700
41–54	25.9	26.6	0.243
55 +	24.6	24.6	0.946
Household head race/ethnicity			
Hispanic	43.3	43.6	0.722
White	36.5	36.7	0.714
Black	13.3	12.9	0.325
Other	6.9	6.8	0.930
Disabled	49.6	49.6	0.974
US citizen	95.7	95.9	0.370
TANF/AFDC	13.4	13.4	0.905
Unearned income	60.2	59.5	0.241
SSI	32.4	32.5	0.823
RSDI	27.3	27.5	0.774
Unemployment compensation	5.0	4.6	0.167
Household type			
Household with elderly	12.1	12.5	0.352
Household with children (no elderly)	36.5	36.3	0.632
Other household	51.4	51.3	0.879
F statistic	**0.95**		**0.536**

Step 5: Divide Samples into 3 Waves

Having drawn a final sample, the HIP and non-HIP groups were randomly divided into 3 waves for HIP implementation and then for the fielding of the survey. As is discussed in Chapter 3, issuing and activating HIP was staggered; one wave of participants began HIP each month over the period November 2011 through January 2012.

B.2 Random Sampling for Participant Survey

The survey samples of respondents, equally distributed between the HIP and non-HIP household groups, were selected using a stratified random sampling design. The stratification variables were the same ones used in the random assignment of households to the HIP and non-HIP groups. Among the HIP and non-HIP groups, an equal number of respondents were selected from each of the three waves. Sampled respondents were aged 16 and older and only one respondent was selected per household.[150]

We randomly sampled 2,538 SNAP participants from both the HIP and non-HIP households to participate in the Round 1 survey (i.e., a total of 5,076). This sample size was chosen so that a large enough sample would remain for Rounds 2 and 3 to achieve the desired level of precision after accounting for participants who left SNAP, and thus were ineligible for the survey, or who became non-respondents in the later rounds. The target sample was designed to be able to detect a post-implementation HIP/non-HIP difference in targeted fruit and vegetable intake of 0.25 cup-equivalents of fruits and vegetables per day.[151]

The rest of the section describes the process for sampling persons for the participant surveys.

Create Sampling Frame

Using the DTA administrative case file data, we created two files for sampling purposes: (1) a household level file of eligible SNAP households in Hampden County Massachusetts that had been randomly assigned to HIP and non-HIP groups (referred to as the "AU file"); and (2) the corresponding person-level file of household members 16 years of age or older in the eligible SNAP households (referred to as the "AP file").

Three key variables were used to select the respondent sample:

1. HIP_IND: This household-level variable contained the preassigned codes for the treatment status of the SNAP household (H = HIP; K = non-HIP).
2. BLOCK: This variable designated the 12 household-level blocking cells defined by a cross-classification of three levels of geography, two levels of household size, and two levels of gender of head of household (as defined in the previous section).

[150] Approximately 6 percent of sampled respondents were aged 16-17 (as of the Round 2 survey). This group was included in the sample as they can be SNAP heads of households and the sample was intended to represent all types of households.

[151] Based on assumptions provided in FNS's RFP and discussed in Abt's proposal.

3. WAVE: This variable was created as part of the random assignment process and corresponded to the three waves DTA established to enroll participants in HIP (November 1, 2011, December 1, 2011, and January 1, 2012, respectively).

Exhibit B.4 presents the numbers of households and persons in the HIP evaluation sampling frames by treatment status and size of household. Exhibit B.5 summarizes the number persons in the sampling frames by treatment status, blocking cell, and wave. As expected, based on the random assignment of households discussed in the previous section, the populations of persons within households in the sampling frames were well balanced with respect to the blocking cells across the different treatment groups and waves.

Exhibit B.4: Frequencies of Households and Persons in the HIP and Non-HIP Sampling Frames by Size of Household

# persons at least 16 years old in HH	HIP				Non-HIP			
	Households		Persons		Households		Persons	
	No.	Percent (%)	No.	Percent (%)	No.	Percent (%)	No.	Percent (%)
1	6,054	80.72	6,054	65.19	38,107	80.07	38,107	63.88
2	1,167	15.56	2,334	25.13	7,479	15.71	14,958	25.08
3	230	3.07	690	7.43	1,559	3.28	4,677	7.84
4	39	0.52	156	1.68	361	0.76	1,444	2.42
5	8	0.11	40	0.43	75	0.16	375	0.63
6	2	0.03	12	0.13	9	0.02	54	0.09
7	0	0.00	0	0.00	3	0.01	21	0.04
8	0	0.00	0	0.00	2	<0.01	16	0.03
Total	7,500	100.00	9,286	100.00	47,595	100.00	59,652	100.00

Exhibit B.5: Frequencies of Persons in the HIP and Non-HIP Sampling Frames by Block and Wave

	HIP			Non-HIP		
Blocking Cells	Wave 1	Wave 2	Wave 3	Wave 1	Wave 2	Wave 3
Springfield, HH Size 2+, Male Head	93	98	93	635	613	641
Springfield, HH Size 2+, Female Head	781	764	787	5,040	5,054	5,081
Springfield, HH Size 1, Male Head	392	393	392	2,491	2,491	2,492
Springfield, HH Size 1, Female Head	344	344	344	2,183	2,183	2,182
Chicopee & Holyoke, HH Size 2+, Male Head	50	47	51	338	322	322
Chicopee & Holyoke, HH Size 2+, Female Head	366	370	364	2,424	2,403	2,410
Chicopee & Holyoke, HH Size 1, Male Head	171	170	171	1,084	1,083	1,083
Chicopee & Holyoke, HH Size 1, Female Head	168	168	168	1,066	1,066	1,066
Hampden Balance, HH Size 2+, Male Head	88	95	89	605	567	572
Hampden Balance, HH Size 2+, Female Head	316	319	323	2,040	1,964	2,012
Hampden Balance, HH Size 1, Male Head	151	151	152	960	959	960
Hampden Balance, HH Size 1, Female Head	171	171	171	1,086	1,087	1,087
Total	3,091	3,090	3,105	19,952	19,792	19,908

We prepared the sampling frame for sample selection in the following steps:

1. **Random number assigned to each household (RAND)**. We generated and assigned a uniform random number between 0 and 1 to each household in the AU file.

2. **Household-type variable created (HH_TYP).** At the same time, we created a household level variable that classified households into three types: households with persons 65 years or older; households with children 5 years or younger but no one 65 or older; and all other households.

3. **Person level file created**. We merged the two extract files to create a person-level file containing all of the household-level variables in the AU file.

4. **Number of adults in household variable created (NUMADLT34).** We created this dichotomous variable, indicating whether the household had fewer than four adults in the household or four or more adults in the household. We used this variable to adjust the sample sizes in order to achieve better control of the sample sizes across the treatment groups.

5. **Person-level file split into two sampling frames (HIP_IND)**. We divided the person level file created in step 3 into two sampling frames—HIP and non-HIP.

6. **Records in each frame sorted**. Prior to sampling, we sorted the records in each of the two sampling frames as follows:

   - by WAVE
   - by BLOCK within WAVE
   - by NUMADLT34 within BLOCK
   - by HH_TYP within NUMADLT34
   - by RAND within HH_TYPE
   - by AUID (unique household identifier) within RAND.

   We used HH_TYP and NUMADLT34 as sorting variables within the primary strata defined for sampling (i.e., the primary strata defined by BLOCK and WAVE) to achieve better balance with respect to household composition across the various waves.

   Sorting by AUID ensured that persons in the same household were listed together in the final sorted file. We used the variable WAVE as a stratification variable to permit the selection of equal numbers of sampled persons for each wave.

Select Round 1 Participant Survey Sample

Because of the small size of the HIP sampling frame, the desired sampling rate for the HIP sample was about 1 in 3.7, compared to 1 in 23 in the non-HIP sample. Therefore, it was possible to select more than one eligible person in HIP households consisting of four or more adults. To avoid this possibility, we lowered the sampling rates for households with four or more adults in the HIP sample and to achieve approximately equal sample sizes by size of household for the two treatment groups, made a corresponding downward adjustment in sampling rates in non-HIP households with four or more persons.

For the HIP sample we deviated slightly from equal-probability systematic sampling by (1) selecting households with 4 or more adults with certainty and then randomly selecting 1 person per household and (2) applying a small compensatory increase in the probability of selection in households with less than 4 adults in order to achieve the planned sample size of 2,538. For the non-HIP sample we selected approximately the same number of non-HIP persons in each household size class (less than 4 adults and more than 4 adults) as was previously noted for the HIP sample. Exhibit B.6 summarizes the intended sample sizes resulting from these adjustments.

Exhibit B.6: Intended Frequencies of Households and Persons in the HIP and Non-HIP Samples by Size of Household

# persons at least 16 years old in HH	HIP				Non-HIP			
	Households		Persons		Households		Persons	
	No.	Percent (%)	No.	Percent (%)	No.	Percent (%)	No.	Percent (%)
1	1,667	65.68	1,667	65.68	1,632	64.30	1,632	64.30
2	637	25.10	637	25.10	638	25.14	638	25.14
3	185	7.29	185	7.29	213	8.39	213	8.39
4	39	1.54	39	1.54	45	1.77	45	1.77
5	8	0.32	8	0.32	9	0.35	9	0.35
6	2	0.08	2	0.08	1	0.04	1	0.04
7	0	0.00	0	0.00	0	0.00	0	0.00
8	0	0.00	0	0.00	0	0.00	0	0.00
Total	2,538	100.00	2,538	100.00	2,538	100.00	2,538	100.00

Actual sample sizes will vary from these numbers.

Exhibit B.7 summarizes the distribution of the evaluation sample by treatment status, wave, and block. Despite the adjustments made in sampling to balance sample sizes, the sample sizes shown in this table are specified by design and are roughly proportional to the corresponding population counts shown in Exhibit B.5.

Exhibit B.7: Counts of Evaluation Sample by Treatment Status, Wave, and Block

Blocking Cells	HIP			Non-HIP		
	Wave 1	Wave 2	Wave 3	Wave 1	Wave 2	Wave 3
Springfield, HH Size 2+, Male Head	27	27	27	27	27	27
Springfield, HH Size 2+, Female Head	215	215	215	215	215	215
Springfield, HH Size 1, Male Head	106	106	106	106	106	106
Springfield, HH Size 1, Female Head	93	93	93	93	93	93
Chicopee & Holyoke, HH Size 2+, Male Head	14	14	14	14	14	14
Chicopee & Holyoke, HH Size 2+, Female Head	103	103	103	103	103	103
Chicopee & Holyoke, HH Size 1, Male Head	46	46	46	46	46	46
Chicopee & Holyoke, HH Size 1, Female Head	45	45	45	45	45	45
Hampden Balance, HH Size 2+, Male Head	26	26	26	26	26	26
Hampden Balance, HH Size 2+, Female Head	84	84	84	84	84	84
Hampden Balance, HH Size 1, Male Head	41	41	41	41	41	41
Hampden Balance, HH Size 1, Female Head	46	46	46	46	46	46
Total	846	846	846	846	846	846

After completion of participant sampling, we assigned each household a HIP flag or indicator identifying it as belonging to one of the following four groups:

- HIP household, non-survey group (Group H)
- HIP household, survey group (Group I)
- Non-HIP household, survey group (Group J)
- Non-HIP household, non-survey group (Group K)

We applied these flags to all members of the original households in the HIP evaluation sample.

Select Round 2 Participant Survey Sample

Eligible sample cases at Round 2 were defined as those who completed a Round 1 survey and were SNAP participants at the time of the interview.[152] To ensure the sample was on SNAP at the time of the interview, we compared each wave to the previous month's DTA SNAP file immediately before releasing it to determine if any cases had exited SNAP. We removed such cases before releasing the sample. We also excluded cases if the case file indicated that the respondent was institutionalized or did not meet the "following rules" determined by DTA. The SNAP case was tied to the head of household and therefore, the HIP status and the HIP incentives were also tied to this individual.[153]

Exhibit B.8 summarizes the numbers of respondents initially included in the Round 2 sampling frame based on the January, 2012 DTA file, by HIP treatment status, blocking group, and wave. Of the 1,388 Round 1 respondents in the HIP group, 88 percent were still active in January 2012 and eligible to participate in Round 2. Of the 1,396 Round 1 respondents in the non-HIP group, 89 percent were still active and eligible to participate in January 2012.[154]

---

152 Chapter 2, Section 2.11 discusses the reason for excluding cases no longer on SNAP.

153 If the original head of household (HoH) left the SNAP household, DTA closed that SNAP case. Other household members could form a new case, but that new case did not get the HIP flag and thus did not earn HIP incentives even if its prior flag was a HIP case. Similarly, if a member of a HIP household other than the original HoH left the household, that person was not given a HIP flag and was not eligible to earn HIP incentives. In such cases, the household with the original HoH retained the HIP flag and HIP incentives. The SNAP case also could close without any changes in household composition. Regardless of how a SNAP case closed, if the SNAP case reopened with the original HoH, the household once again received the HIP flag and resumed earning HIP incentives.

154 During data collection, we discovered that some additional respondents were "out of scope" because, for example, they moved out of state, were institutionalized, or were deceased.

Exhibit B.8: Number of Round 1 Respondents Sampled for Round 2 after Deleting Households no Longer on SNAP

	HIP				Non-HIP				
	Wave				Wave				Grand
Blocking group	1	2	3	Total	1	2	3	Total	total
Springfield, HH Size 1, Female Head	51	52	55	158	55	57	44	156	314
Springfield, HH Size 1, Male Head	41	52	34	127	40	49	42	131	258
Springfield, HH Size 2+, Female Head	101	119	96	316	110	131	97	338	654
Springfield, HH Size 2+, Male Head	11	13	7	31	14	14	11	39	70
Chicopee/Holyoke HH Size 1, Female Head	26	19	27	72	24	31	24	79	151
Chicopee/Holyoke HH Size 1, Male Head	19	21	20	60	17	21	15	53	113
Chicopee/Holyoke HH Size 2+, Female Head	51	66	44	161	53	66	49	168	329
Chicopee/Holyoke HH Size 2+, Male Head	7	8	10	25	5	4	8	17	42
Hampden Balance, HH Size 1, Female Head	26	24	25	75	17	27	14	58	133
Hampden Balance, HH Size 1, Male Head	15	20	14	49	20	16	15	51	100
Hampden Balance, HH Size 2+, Female Head	36	43	37	116	47	43	33	123	239
Hampden Balance, HH Size 2+, Male Head	13	13	10	36	12	9	9	30	66
Total	397	450	379	1226	414	468	361	1243	2469

Select Round 3 Participant Survey Sample

We selected the Round 3 sample from respondents who completed a Round 2 survey. At the end of Round 2, a total of 2,006 respondents had completed the AMPM interview and another 44 had completed the Respondent interview (but not the AMPM interview), for a total of 2,050 cases. Of these 2,050 cases, 157 were no longer study eligible cases according to the DTA case record files as they were either not receiving SNAP or did not meet the "following rules" (described in the previous section). We deleted these cases from the sample. Thus, the total number of cases fielded in Round 3 was 1,893.

This approach of only including cases in the Round 3 sampling frame if they had completed a Round 2 survey was based on two factors. First, it was unlikely that we would be able to find and interview many of the households who did not complete the Round 2 interview. The Round 3 interviews began soon after the Round 2 interviews were completed. We expended considerable effort to locate households in Round 2 and did not expect we would be any more successful locating them in Round 3. Second, our approach resulted in a true longitudinal data set, since all Round 3 completes also had a Round 2 interivew.

Exhibit B.9 presents the Round 3 sample.

Exhibit B.9: Number of Round 2 Respondents Sampled for Round 3 after Deleting Households no Longer on SNAP

Blocking Group	HIP Wave 1	HIP Wave 2	HIP Wave 3	HIP Total	Non-HIP Wave 1	Non-HIP Wave 2	Non-HIP Wave 3	Non-HIP Total	Grand Total
1. Springfield, HH Size 1, Female Head	42	46	43	131	46	45	33	124	255
2. Springfield, HH Size 1, Male Head	34	42	24	100	32	44	28	104	204
3. Springfield, HH Size 2+, Female Head	80	90	70	240	87	106	71	264	504
4. Springfield, HH Size 2+, Male Head	7	11	6	24	13	11	7	31	55
5. Chicopee/Holyoke HH Size 1, Female Head	25	16	24	65	18	25	19	62	127
6. Chicopee/Holyoke HH Size 1, Male Head	15	15	16	46	11	13	12	36	82
7. Chicopee/Holyoke HH Size 2+, Female Head	38	53	30	121	43	53	32	128	249
8. Chicopee/Holyoke HH Size 2+, Male Head	5	7	8	20	2	3	5	10	30
9. Hampden Balance, HH Size 1, Female Head	26	20	18	64	15	24	11	50	114
10. Hampden Balance, HH Size 1, Male Head	9	18	8	35	13	13	8	34	69
11. Hampden Balance, HH Size 2+, Female Head	30	33	20	83	34	30	19	83	166
12. Hampden Balance, HH Size 2+, Male Head	8	7	5	20	7	4	7	18	38
Total	319	358	272	949	322	373	255	944	1893

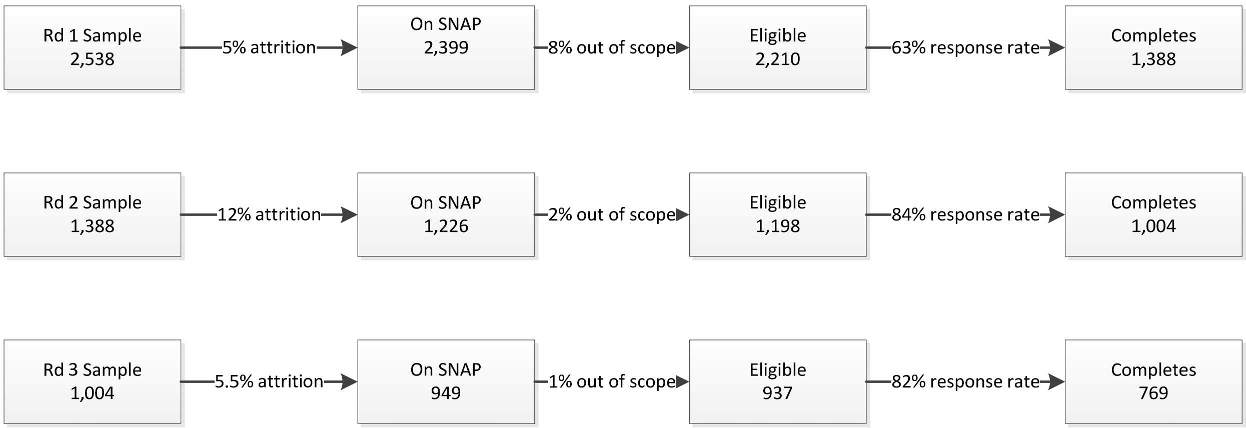
Summary of Sample Sizes

Exhibit B.10 summarizes the sample flow for the three rounds of the participant survey for the HIP and non-HIP groups separately. As shown, 2,538 participants in each group were initially sampled for Round 1. We assumed there would be 20.3 percent attrition in each group through the course of Round 1 data collection based on published national SNAP exit rates (Cody et al., 2007).[155] However, as shown, the attrition rate combined with cases that we determined were out of scope during data collection (i.e., deceased, institutionalized, out of state) resulted in 13 percent of the sample in the HIP Group and 14 percent in the non-HIP Group being ineligible for survey participation. As described above, all respondents that completed Round 1 were included in the Round 2 frame. Attrition and out of scope cases in Round 2 were similar to that in Round 1. All Round 2 completed cases were released for Round 3.

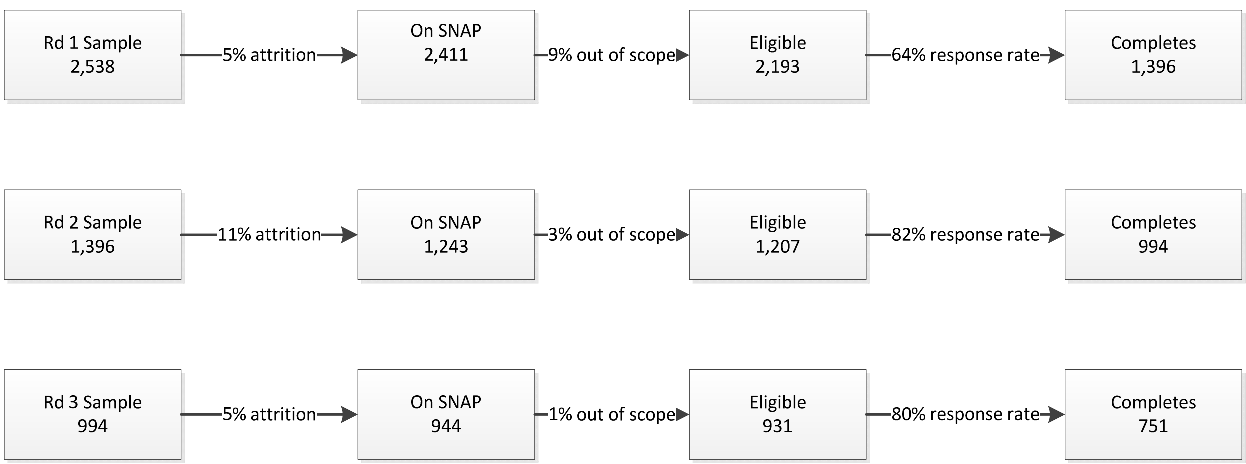
155 Massachusetts statewide exit rates provided by the Massachusetts DTA are broadly similar to the national rates. While analysis done by DTA indicated exit rates in Hampden County were less than national SNAP exit rates and also less than Massachusetts statewide exit rates, we did not change our estimated sample sizes because we assumed a higher sample size would allow us to achieve the desired number of completed interviews in Rounds 2 and 3.

Exhibit B.10: Actual Sample Sizes, by HIP and Non-HIP Status

HIP Group



Non-HIP Group



Appendix C: Weighting Methodology

This appendix summarizes the procedures used to weight the person-level survey data collected in the Healthy Incentives Pilot (HIP) evaluation; it also provides a non-response bias analysis for Round 1 of the participant survey. Survey weights are required to project the sample results to population levels. We therefore computed weights for the completed cases in the sample at the end of each data collection round. These weights are designed to (a) take account of the varying probabilities with which persons were selected for the study and (b) compensate for differential rates of survey non-response. Non-response adjustments were calculated to reflect the fact that non-response could occur either prior to or after ascertaining eligibility for the survey. Additional details of the weighting methodology can be found in the separate volume, Evaluation of the Healthy Incentives Pilot (HIP) Final Report, Technical Appendix: Participant Survey Weighting Methodology (Chu, 2014).

For each survey round, sampled-person weights were constructed for analysis of the sampled person interviews. A parallel set of primary-shopper weights were constructed for the primary shopper interviews. For many household-level variables, the primary-shopper weights serve as household weights, because there is only one primary shopper per household, and the corresponding questions appeared on the primary shopper portion of the survey. In addition to the two sets of full-sample weights, a series of replicate weights using a jackknife method was constructed for variance estimation purposes.

Specifically, the first three sections of this appendix discuss construction of weights for Round 1, Round 2, and Round 3, respectively. Because only cases interviewed at Round 1 were interviewed at Round 2 and only cases interviewed at Round 2 were interviewed at Round 3, there is no need for separate longitudinal weights. The Round 2 weights apply to longitudinal analyses of Round 1 and Round 2; the Round 3 weights apply to longitudinal analyses of Round 2 and Round 3 or all three waves. The fourth section provides a non-response bias analysis for Round 1 of the participant survey.

C.1 Round 1

This section describes the construction of Round 1 weights. The section begins with a discussion of wave-specific base weights and pooled base weights. It then describes ratio adjustments and non-response adjustments.

Wave-Specific Base Weights

Under the stratified sampling design employed for the HIP evaluation, the probability of selecting an eligible individual for the study depended on the (randomly-assigned) wave of data collection (corresponding to the three waves of implementation), “blocking groups” defined by location and selected characteristics of households, and on the size of the household expressed in terms of the number of eligible adults residing in the household. For brevity, we refer to each blocking group-by-size category combination as a “stratum.” The wave-specific base weight for person *i* in stratum s in wave *v* was computed as:

$$w_{vsi}^{base} = 1/P_{vs} \quad (1)$$

where P_{vs} = the probability of selecting persons in stratum s and wave v (v = 1, 2, 3). This probability generally equals the number of adults sampled in a given wave and stratum divided by the corresponding number of adults in the sampling frame.

Pooled Base Weights

The base weights defined by formula (1) are appropriate for analysis of each individual wave of data collection. To analyze the combined sample, the wave-specific base weights were adjusted to take account of differences in coverage by wave, and permit unbiased estimation based on all three waves of data.

The goal of this step of the weighting process was to adjust the wave-specific base weights in a manner that minimized the variation of the overall combined-sample weights (also referred to as "pooled" or "composite" weights), while at the same time providing unbiased weights for the combined sample.

These pooled base weights were created in two steps. First, the wave-specific base weights were scaled up or down by wave-specific scaling factors designed to align the resulting weighted sample counts to known population counts. That is, a rescaled base weight for the ith sample person in wave v and subgroup g was computed as:

$$w_{vgi}^{adj} = S_{vg}\, w_{vgi}^{base}\ , \qquad (2)$$

where S_{vg} is the appropriate wave-specific scaling factor. Next, approximately optimal composite estimation factors, A_{vg}, designed to minimize the variation of the resulting combined-sample weights were applied to the wave-specific adjusted weights to obtain the pooled weights, w_{vgi}^{pool}, as follows:

$$w_{vgi}^{pool} = A_{vg}\, w_{vgi}^{adj}\ . \qquad (3)$$

Ratio Adjustment of the Pooled Weights

Although the composite weights defined in formula (3) are theoretically unbiased, the corresponding weighted counts are subject to sampling variability, and consequently do not always match known population counts by blocking group. Therefore, a ratio adjustment was applied to the pooled weights so that weighted counts of the sample agreed with the corresponding population (frame) counts for each of 12 blocking groups. Using appropriate post-stratification factors, $F_s^{(ps)}$, the final poststratified pooled weight was computed as:

$$w_{si}^{ps} = F_s^{(ps)}\, w_{si}^{pool} \qquad (4)$$

Non-Response Adjustment

The final step in the weighting process for Round 1 was to adjust the post-stratified base weights defined by formula (4) to compensate for varying rates of non-response in the baseline survey. Since non-response could have occurred either (1) prior to determining eligibility (e.g., the sampled person could not be contacted or located); or (2) after determining eligibility (e.g., the person was located and eligibility was determined), the non-response adjustment was done in two phases.

The purpose of the first-phase adjustment was to distribute a portion of the weighted count of the unknown-eligibility cases to those cases for which eligibility was ascertained. A CHAID analysis

(Chi Square Automatic Interaction Detector) was conducted separately for each treatment group to identify cells within which the predicted probabilities of ascertaining eligibility were similar. The results of the CHAID analysis were used to define the cells (labeled r = 1, 2, ..., R) for the first-phase non-response adjustment. The weighted first-phase response rates varied from around 50 percent to over 95 percent across the final adjustment cells. The first-phase non-response adjustment factor, A_r , was computed as the inverse of the weighted first-phase response rate in final cell r. The first-phase adjusted weight for the ith sampled person in cell r for whom eligibility was determined was computed as:

$$w_{ri}^{NR1} = A_r \, w_{ri}^{ps} \tag{5}$$

The purpose of the second-phase adjustment was to distribute the weighted count of the known-eligible non-respondents to the Round 1 respondents. The results of a CHAID analysis were used to defined the cells (labeled s = 1, 2, ..., S) for the second-phase non-response adjustment. The second-phase non-response adjustment factor, B_s , was computed as the inverse of the weighted second-phase response rate in final cell s. The final non-response-adjusted weight for the ith responding person in cell s (i.e., cases in response status group 1) was then computed as:

$$w_{si}^{NR2} = B_s \, w_{si}^{NR1} \tag{6}$$

C.2 Round 2

This section discusses the construction of Round 2 weights. It first considers the initial weights and then the non-response adjustment. Finally, construction of second-day 24-hour dietary recall interview weights is discussed.

Initial Weights

The Round 2 sampling weights are constructed based on the set of final non-response-adjusted person weights, $w_{ri}^{Round\ 1}$, developed for analysis of respondents in the baseline survey (see Section C.1). These weights were designed to provide for substantially unbiased estimation of the characteristics of SNAP beneficiaries (by treatment group) in Hampden County, Massachusetts, who were active participants in the July 2011 case files provided by the Massachusetts DTA, and who remained eligible through the end of Round 1 data collection.

Since all of the still-eligible Round 1 respondents were carried over into (i.e., “sampled” for) Round 2, the final weights from Round 1 are the “initial” weights for Round 2. The “initial” weights are adjusted for non-response experienced in Round 2, as described in the following section.

Non-Response Adjustment

As in Round 1, non-response could have occurred either (1) prior to determining eligibility (e.g., the sampled person could not be contacted or located); or (2) after determining eligibility (e.g., the person was located and eligibility was determined). Therefore, as in Round 1, the non-response adjustment was done in two phases.

In the first phase of adjustment, a portion of the weighted count of the unknown-eligibility cases was distributed to the known-eligible cases. As in Round 1, CHAID was used to identify cells within which the predicted probabilities of ascertaining eligibility were similar. In addition to the classification variables used previously to weight the Round 1 sample, selected variables (responses) from the Round 1 interview were used as possible independent (predictor) variables in the CHAID analysis. For both HIP and non-HIP samples, the weighted (conditional) first-phase response rates were high, varying from around 87 percent to 100 percent over the final adjustment cells. The first-phase non-response adjustment factor, A_r , was computed as the inverse of the weighted first-phase response rate in final cell *r*. The (intermediate) first-phase adjusted weight for the *i*th sampled person in cell *r* for whom eligibility was determined was computed as:

$$w_{ri}^{NR1} = A_r \, w_{ri}^{Round\ 1} \tag{7}$$

The purpose of the second-phase adjustment was to distribute the weighted count of the known-eligible non-respondents in Round 2 to the Round 2 respondents. For the second-phase adjustment, the same set of independent variables used previously for the first-phase adjustment were specified as possible independent variables in a CHAID analysis. The output from the CHAID analysis was used to define the second-phase non-response-adjustment weighting cells (denoted by the subscript *s* = 1, 2, ..., *S*). The second-phase non-response adjustment factor, B_s , was computed as the inverse of the weighted second-phase response rate in final cell *s*. The final non-response-adjusted weight for the *i*th responding person in cell *s* was then computed as:

$$w_{si}^{Round\ 2} = B_s \, w_{si}^{NR1} \tag{8}$$

Second-Day Intake Weights

Approximately 10 percent of the Round 2 respondents completing the first 24-hour dietary recall interview also completed a second 24-hour dietary recall interview. Weights for analysis of the second intake were constructed by applying appropriate inflation factors to the final weights previously created for the first intake interview. Note that the second-day intake weights apply to those respondents that completed both the first and second intake interviews. In Round 2, three cases that completed the second intake did not have corresponding Day 1 intake data. These cases were excluded from the weighting process.

C.3 Round 3

This section discusses the construction of Round 3 weights. It first describes the initial weights, then the non-response adjustment and the second-day 24-hour dietary recall interview weights. The discussion is similar to that for Round 2. No new issues are raised.

Initial Weights

The Round 3 sampling weights are constructed based on the set of final non-response-adjusted person weights, $w_{ri}^{Round\ 2}$, developed for analysis of respondents in the Round 2 survey (see Section C.2). These weights were designed to provide for substantially unbiased estimation of the characteristics of SNAP beneficiaries in Hampden County, Massachusetts, who were active participants in the July 2011 case files provided by the Massachusetts DTA, and who remained eligible through the end of Round 2 data collection. Since all of the still-eligible Round 2 respondents were carried over into (i.e., “sampled” for) Round 3, the final weights from Round 2 are the “initial” weights for Round 3 weighting. The “initial” weights are adjusted for non-response experienced in Round 3, as described in the following section.

Non-Response Adjustment

Again, we used a two-phase adjustment for non-response. In the first phase of adjustment, a portion of the weighted count of the unknown-eligibility cases was distributed to the known-eligible cases. As in prior rounds, CHAID was used to identify cells within which the predicted probabilities of ascertaining eligibility were similar. In addition to the variables used previously to weight the Round 2 sample, selected variables (responses) from the Round 2 interview were used as possible independent (predictor) variables in the CHAID analysis. For both HIP and non-HIP samples, the weighted (conditional) first-phase response rates were high, varying from around 75 percent to 100 percent over the final adjustment cells. The first-phase non-response adjustment factor, A_r , was computed as the inverse of the weighted first-phase response rate in final cell *r*. The (intermediate) first-phase adjusted weight for the *i*th sampled person in cell *r* for whom eligibility was determined was computed as:

$$w_{ri}^{NR1} = A_r \, w_{ri}^{Round\ 2} \tag{9}$$

The purpose of the second-phase adjustment was to distribute the weighted count of the known-eligible non-respondents in Round 3 to the Round 3 respondents. For the second-phase adjustment, the same set of independent variables used previously for the first-phase adjustment were specified as possible independent variables in a CHAID analysis. The output from the CHAID analysis was used to define the second-phase non-response-adjustment weighting cells (denoted by the subscript s = 1, 2, ..., S). The second-phase non-response adjustment factor, B_s , was computed as the inverse of the weighted second-phase response rate in final cell *s*. The final non-response-adjusted weight for the *i*th responding person in cell *s* was then computed as:

$$w_{si}^{Round\ 3} = B_s \, w_{si}^{NR1} \ . \tag{10}$$

Second-Day Intake Weights

Approximately 10 percent of the Round 3 respondents completing the first 24-hour dietary recall interview also completed a second 24-hour dietary recall interview. Weights for analysis of the second intake were constructed by applying appropriate inflation factors to the final weights previously created for the first intake interview. Note that the second-day intake weights apply to those respondents that completed both the first and second intake interviews. In Round 3, one case that completed the second intake did not have corresponding Day 1 intake data. This case was excluded from the weighting process.

C4. Non-Response Bias Analysis

As specified in the Standards and Guidelines for Statistical Surveys published by the Office and Management and Budget (September 2006)[156], a non-response bias analysis is required if the overall unit response rate for a survey is less than 80 percent (Guideline 3.2.9). As summarized in Exhibit C.1, the overall unconditional (weighted) response rates for Round 1 of the SNAP participant surveys were 62 percent for the HIP group and 63 percent for the non-HIP group. For Round 2, the round-specific weighted response rate (conditional on completing Round 1) was 84 percent for the HIP group and 82 percent for the non-HIP group. The corresponding unconditional response rates were 52

[156] http://www.whitehouse.gov/sites/default/files/omb/inforeg/statpolicy/standards_stat_surveys.pdf

percent for both HIP and non-HIP groups. For Round 3, the round-specific response rate (conditional on completing Round 2) was 82 percent for the HIP group and 80 percent for the non-HIP group; unconditional response rates were 42 percent for the HIP group and 41 percent for the non-HIP group. The various components of the response rates achieved in the HIP evaluation study are summarized in Exhibit C.1 by round and treatment status. Although both unweighted and weighted response rates are shown, the weighted response rates are featured prominently in this discussion because they are used to adjust the sampling weights to compensate for differential rates of non-response.

Exhibit C.1: Response Rates by Round and Treatment Status

Round	Component	Unweighted		Weighted[a]	
		HIP	Non-HIP	HIP	Non-HIP
1	Phase 1 (prior to eligibility determination)	85.2	85.8	84.8	85.4
	Phase 2 (after eligibility determination)	74.0	74.5	73.1	73.5
	Round 1 response rate (unconditional)	63.0	64.0	62.0	62.8
2	Phase 1 (prior to eligibility determination)	97.6	97.5	97.4	97.2
	Phase 2 (after eligibility determination)	86.2	84.6	86.1	84.5
	Round 2 response rate (conditional on completing Round 1)	84.1	82.5	83.8	82.1
	Unconditional Round 2 response rate (Round 1*Round 2 conditional)	53.0	52.8	51.9	51.5
3	Phase 1 (prior to eligibility determination)	96.9	96.3	96.7	96.3
	Phase 2 (after eligibility determination)	84.3	83.4	84.3	83.2
	Round 3 response rate (conditional on completing Rounds 1 & 2)	81.7	80.3	81.5	80.2
	Unconditional Round 3 response rate (Round 2 unconditional*Round 3 conditional)	43.3	42.4	42.3	41.3

[a] For Round 1, weights are the (post-stratified) base weights. For Round 2, weights are the non-response-adjusted Round 1 weights. For Round 3, weights are the non-response-adjusted Round 2 weights.

Below we summarize the findings of an analysis of non-response in each of the three rounds of the SNAP participant surveys. The main goals of the analysis are to: (1) document the variation in response rates for selected subsets of the sample (2) evaluate the extent to which the final (non-response adjusted) sampling weights developed for analysis may be effective in countering the effects of the differential response rates on weighted distributions of the sample; and (3) assess the impact the differential response rates may have on estimates derived from the survey.

Analysis of Non-Response in Round 1

This section provides a non-response analysis for Round 1. The findings reported here are based on the detailed exhibits and analyses presented in Chu (2014).

Response Rates by Selected Characteristics (Round 1)

To examine the extent to which missing data resulting from non-response were "missing at random," we calculated response rates for subsets of the sample based on selected characteristics available in the sampling frame. We performed these calculations separately for the two phases where non-response could occur: (1) prior to determining eligibility (e.g., the sampled person could not be contacted or located); or (2) after determining eligibility (e.g., the sampled person was located and eligibility was determined, but the person did not complete in the survey). These characteristics include both household-level characteristics (e.g., size of household, presence of children or elderly, housing type, amount of SNAP benefit, income category, and others), and selected person-level characteristics (e.g., age, sex, race/ethnicity, disability status, and others).

Within the HIP sample, the first-phase response rates were found to vary significantly (using Rao-Scott chi-square test) by location, wave of sample release, monthly SNAP benefit, monthly income, homeless status, housing type, age of household head, race/ethnicity of household head, citizenship status of household head and of sampled respondent, household type, gender, age of sampled person, race/ethnicity of sampled person, and household size. Many of these same variables were also significantly associated with response status for the non-HIP sample with some exceptions (e.g., unlike the HIP sample, response rates for the non-HIP sample did not vary significantly by location or citizenship status of household head).

For the HIP sample, the second phase response rates varied significantly for nine of the characteristics included in the analysis (Exhibit C.2), compared with 15 characteristics for the corresponding first-phase response rates. For the non-HIP sample, the second phase response rates varied significantly for eight of the characteristics (Exhibit C.2), compared with 12 characteristics for the corresponding first-phase response rates.

Comparison of Respondents and Non-respondents (Round 1)

The overall weighted response rate is the product of the first- and second-phase response rate. To examine the combined effect of the first- and second-phase non-response on weighted distributions of the sample, we compared the (unadjusted) base-weighted distributions of the respondents and non-respondents for the selected characteristics. Overall, there were significant differences (based on tests of association between response status and each of the characteristics using Rao-Scott chi-square test) between the distributions of the respondents and non-respondents for nine of the characteristics for the HIP sample, and nine of the characteristics for the non-HIP sample, with wave of sample release, citizenship status, and gender common to both treatment groups. For both the HIP and non-HIP samples, relatively more persons in the respondent sample were in waves 2 and 3(corresponding to months 2 and 3 of survey fielding) than in the total sample and relatively fewer persons in the respondent sample were in wave 1 than in the total sample, reflecting the generally lower response rates achieved in wave 1. Similarly, the percentage of females in the respondent sample is higher than the percentage in the total sample for both HIP and non-HIP samples, indicating the generally higher response rates achieved for females. For those characteristics for which there are appreciable distributional differences between the respondents and the total sample, estimates for survey items that are correlated with these characteristics can potentially be biased unless weights are constructed to compensate for these differences.

As described in section C.1, adjustments were made to the (poststratified) base weights to compensate for any distributional differences resulting from differential response rates. These non-response-adjusted weights are the final weights used to derive the survey-based estimates from Round 1. While significant differences were observed for many characteristics prior to non-response adjustment, as expected, after non-response adjustment, the differences for all of these characteristics have essentially disappeared. In other words, for both HIP and non-HIP samples, the non-response adjustments used to develop the final weights for analysis are effective in realigning the weighted distributions of the respondent sample to the corresponding distributions of the total (selected) sample prior to losses resulting from non-response.

Comparisons Before and After Non-Response Adjustments for Selected Survey Results (Round 1)

The final set of comparisons conducted in the non-response bias analysis for Round 1 involved a comparison of weighted estimates of a limited number of survey items using the base weights and non-response-adjusted weights. The items chosen from the baseline survey included a few categorical variables related to opinions about enjoyment and accessibility of fruits and vegetables, and a few numeric variables related to the number of times certain fruits or vegetables were reported to have been consumed. Among the 18 statistics considered in the analysis, the difference between the unadjusted and non-response-adjusted estimates is generally small and differed significantly (using Rao-Scott chi-square test for categorical variables and tests reflecting the complex sample design for numeric variables) for only two of the items reported by the HIP sample and for only one item reported by the non-HIP sample. Despite the similarity of the estimates for both HIP and non-HIP samples, the potential for bias exists, and use of the non-response-adjusted weights to analyze the survey data is expected to help reduce biases that may occur for statistics not considered in this analysis.

Non-Response Bias Analysis for Round 2

This section provides a non-response analysis for Round 2. The findings reported here are based on the detailed exhibits and analyses presented in Chu (2014).

Response Rates by Selected Characteristics (Round 2)

Within the HIP sample, the first-phase response rates were found to vary significantly by age and race/ethnicity of the household head, and by gender, age, and race/ethnicity of the sampled person. Within the non-HIP sample, the first-phase response rates were found to vary significantly by wave of sample release, monthly income, homeless status, housing type, age of head of household, Social Security status, and age of the sampled person.

For the HIP sample, the second phase response rates varied significantly for four of the characteristics listed in the table (Exhibit C.2), compared with five characteristics for the corresponding first-phase response rates. Similarly, for the non-HIP sample, the second phase response rates varied significantly for only two of the characteristics (Exhibit C.2), compared with seven characteristics for the corresponding first-phase response rates.

Comparison of Respondents and Non-Respondents (Round 2)

To examine the combined effect of the first- and second phase non-response on weighted distributions of the sample, we compared the weighted distributions of the respondents and non-respondents for the selected characteristics. The weights used here are the final non-response-adjusted weights from Round 1 which act as “base weights” in this analysis. Overall, there were significant differences between the distributions of the respondents and non-respondents for four of the characteristics (two of which relate to citizenship status and are highly correlated) for the HIP sample, and only one of the characteristics for the non-HIP sample. For the HIP sample, relatively fewer persons in the respondent sample were semiannual reporters, noncitizens, and non-Social Security participants compared with the total sample. For the non-HIP sample, relatively more persons in the respondent sample were in wave 2 than in the total sample. The small number of significant differences in Round 2 suggests that much of the variation in response rates in Round 2 had been accounted for in the weighting adjustments from Round 1.

As described in section C.2, adjustments were made to the non-response-adjusted weights from Round 1 to compensate for any distributional differences resulting from differential response rates in Round 2. These non-response-adjusted weights (referred to as the final Round 2 weights) are the weights used to derive the survey-based estimates from Round 2. Somewhat surprisingly, for the HIP sample, Social Security status and the two citizenship variables remained significant after non-response adjustment; however, there seems to be little practical difference between the post-adjustment and unadjusted distributions despite the statistical significance. Recertification type, which was highly significant prior to adjustment, was no longer significant after non-response adjustment. For the non-HIP sample, none of the variables considered were significant after non-response adjustment.

Comparisons Before and After Non-Response Adjustments for Selected Survey Results (Round 2)

The final set of comparisons conducted in the non-response bias analysis for Round 2 involved a comparison of weighted estimates of a limited number of survey items using the final weights from the Round 1 and the corresponding non-response-adjusted weights developed for Round 2. The items chosen from the Round 2 surveys were the same as for Round 1 (i.e., a few categorical variables related to opinions about enjoyment and accessibility of fruits and vegetables and a few numeric variables related to the number of times certain fruits or vegetables were reported to have been consumed) as well as selected intake variables from the AMPM. Among the 28 statistics considered in this analysis, the difference between the unadjusted and non-response-adjusted estimates is generally small and differed significantly for only four of the items reported by the HIP sample and for none of the items reported by the non-HIP sample. The similarity of the estimates suggests that for many of the variables collected in the Round 2 survey, including many of the nutrient items derived from the AMPM, estimates may not be affected appreciably by the level of non-response experienced in Round 2 of the study. However, the potential for bias exists, and use of the non-response-adjusted weights to analyze the survey/AMPM data may help reduce biases that may occur for statistics not considered in this analysis.

Non-Response Bias Analysis for Round 3

This section provides a non-response analysis for Round 3. The findings reported here are based on the detailed exhibits and analyses presented in Chu (2014).

Response Rates by Selected Characteristics (Round 3)

Within the HIP sample in Round 3, the first-phase response rates were found to vary significantly by location, wave of sample release, Social Security status, and age of the sampled person. For non-HIP sample, the first-phase response rates were found to vary significantly only by SSI status.

For the HIP sample, the second-phase response rates varied significantly for only four of the characteristics considered (Exhibit C.2). For the non-HIP sample, the second phase response rates varied significantly only by citizenship status (Exhibit C.2).

Comparison of Respondents and Non-Respondents by Selected Characteristics (Round 3)

To examine the combined effect of the first- and second phase non-response on weighted distributions of the sample, we compared the weighted distributions of the respondents and non-respondents for the selected characteristics. The weights used here are the final non-response-adjusted weights from Round 2 which act as “base weights” in this analysis. Overall, there were significant differences between the distributions of the respondents and non-respondents for only four of the characteristics for the HIP sample, and the citizenship status variable(s) for the non-HIP sample. For the HIP sample, relatively more persons in the respondent sample resided in Chicopee/Holyoke, were homeless, received Social Security, or received unemployment compensation than in the total sample. For the non-HIP sample, relatively more persons in the respondent sample were US citizens than in the total sample. The small number of significant differences in Round 3 suggests that much of the variation in response rates in Round 3 may have been accounted for in the weighting adjustments from Rounds 1 and 2.

As described in section C.3, adjustments were made to the non-response-adjusted weights from Round 2 to compensate for any distributional differences resulting from differential response rates in Round 3. These non-response-adjusted weights (referred to as the final Round 3 weights) are the weights used to derive the survey-based estimates from Round 3. Although a small number of differences remained statistically significant after non-response adjustment, there was little practical difference between the unadjusted and post-adjustment estimates for the vast majority of characteristics included in the analysis.

Comparisons Before and After Non-Response Adjustments for Selected Survey Results (Round 3)

The final set of comparisons conducted in the non-response bias analysis for Round 3 involved a comparison of weighted estimates of a limited number of survey items using the final weights from Round 2 and the corresponding non-response-adjusted weights developed for Round 3. The items chosen from the Round 3 surveys were the same as those chosen for Round 2 (a few categorical variables related to opinions about enjoyment and accessibility of fruits and vegetables, a few numeric variables related to the number of times certain fruits or vegetables were reported to have been consumed, and selected intake variables from the AMPM). Among the 28 statistics considered in the analysis, the difference between the unadjusted and non-response-adjusted estimates is generally small and differed significantly for four of the items reported by the HIP sample and for two items reported by the non-HIP sample. All of the statistically significant results were for items pertaining to opinions and the number of times certain foods had been consumed. None of the differences between the unadjusted and adjusted estimates of the mean nutrient intakes from the AMPM were significantly different. While this could indicate that estimates may not be affected appreciably by the level of non-response experienced in Round 3 of the study, the potential for bias exists, and use of the non-response-adjusted weights to analyze the survey/AMPM data may help reduce biases that may occur for statistics not considered in this analysis.

Summary and Conclusions

The overall weighted response rate for the HIP evaluation samples in Round 1 was 62.0 percent for the HIP group and 62.8 percent for the non-HIP group (Exhibit C.2). For Round 2, the overall weighted (conditional) response rates were 83.8 percent for the HIP group and 82.1 percent for the non-HIP group. For Round 3, the overall weighted (conditional) response rates were 81.5 percent for the HIP group and 80.2 percent for the non-HIP group.

For the HIP sample, response rates varied significantly by wave of sample release, disability status of household head, citizenship status of household head, unearned income status, and other characteristics. For the non-HIP sample, response rates varied significantly by location, wave of sample release, race/ethnicity of household head, citizenship status of household head, TANF/AFDC status, and other characteristics. To compensate for the differential survey response rates in each round, weight adjustments were developed and used to derive final round-specific weights using a CHAID analysis to identify appropriate weight adjustment classes. In general, such weight adjustments will reduce non-response bias if the variables used in forming the weight adjustment classes are correlated with response propensity (the probability that a sampled person will respond to the survey) and with the characteristics obtained from the survey.

There are reasons to believe that the non-response-adjusted weights developed for the HIP evaluation surveys will be reasonably effective in reducing potential biases. First, the weight adjustments removed virtually all of the disparities between the weighted distributions of the respondents and the corresponding distributions of the total sample. Second, we compared unadjusted and adjusted estimates for a limited number of items collected in all three surveys, and found significant differences in only a small number of instances, suggesting a potential for bias reductions when the non-response-adjusted weights are used in analysis. Short of conducting a comprehensive follow-up study of the non-respondents, there is no direct way of assessing the potential biases arising from survey non-response. The types of indirect analyses conducted in this evaluation do suggest, however, that non-response biases can be reduced to some extent through the use of the non-response-adjusted weights developed for this study.

Exhibit C.2: Weighted Response Rates by Round, Treatment Status, and Selected Characteristics

Characteristic[a]	Round 1		Round 2[b]		Round 3[b]	
	HIP	Non-HIP	HIP	Non-HIP	HIP	non-HIP
Total sample	**61.95**	**62.76**	**83.83**	**82.08**	**81.53**	**80.15**
Location		***			**	
Springfield	60.96	62.87	84.53	82.74	80.90	79.77
Chicopee/Holyoke	63.34	66.52	84.37	82.94	83.54	80.49
Balance of Hampden	62.50	58.41	81.49	79.63	80.35	80.76
Wave of sample release	***	***	*	**	*	*
Wave 1	52.07	53.77	85.87	82.49	85.67	84.04
Wave 2	64.78	68.01	85.12	86.18	80.65	80.65
Wave 3	73.10	69.53	79.04	76.23	76.11	74.17
Monthly SNAP benefit			*			
$1-$161	68.18	67.58	84.92	83.64	85.82	81.74
$162–$200	57.66	54.95	87.48	82.70	81.51	83.68
$201–$349	62.90	68.26	84.55	82.64	78.00	78.83
$350 +	61.59	65.25	79.22	80.07	79.63	76.10
Spanish language						
Yes	62.05	59.59	84.10	80.95	83.62	81.18
No	61.92	63.74	83.76	82.40	80.93	79.85
Recertification type			***		*	
Recertification	61.95	63.33	84.39	82.70	84.33	82.30
Semiannual reporting	64.28	66.09	84.19	82.59	77.31	78.64
Other reevaluation	62.37	62.37	86.19	81.94	80.67	76.02
Monthly income						
$0	54.14	57.62	82.02	76.37	79.44	81.90
$1–$787	62.45	57.71	84.01	83.10	80.32	83.90
$788–$1,088	64.81	65.29	87.35	82.46	83.43	76.49
$1,089 +	65.17	68.18	82.26	84.59	82.18	79.32

Characteristic[a]	Round 1		Round 2[b]		Round 3[b]	
	HIP	Non-HIP	HIP	Non-HIP	HIP	non-HIP
Baystate cap						
Yes	65.54	61.38	84.46	81.48	78.79	76.88
No	61.68	62.87	83.78	82.13	81.78	80.46
Homeless					**	
Yes	36.71	42.10	73.28	70.73	82.83	75.64
No	63.67	64.25	84.27	82.77	81.48	80.34
Housing type						
Private	63.61	64.71	84.82	83.13	81.26	80.12
Public	66.14	68.83	85.17	83.65	81.55	81.12
Other	41.06	45.64	74.66	69.81	88.84	76.80
Household head age			*			
16–30	53.00	59.16	77.99	76.73	77.68	80.83
31–40	64.16	62.96	81.70	82.70	77.26	75.63
41–54	64.99	65.50	86.19	84.96	83.34	79.92
55+	66.65	63.11	88.75	83.50	86.74	83.86
Household head race/ethnicity		***		*		
Hispanic	60.04	63.15	80.99	79.91	78.90	78.25
White	63.94	61.04	84.91	82.46	84.07	80.94
Black	64.94	70.12	90.34	87.33	83.37	83.62
Other	57.21	56.20	83.20	83.62	80.20	81.52
Disabled household head	***		*			
Yes	65.04	62.63	85.79	84.56	83.64	80.85
No	59.11	62.87	81.75	79.56	79.11	79.39
US citizenship of household head	***	**	**			***
Yes	62.50	62.97	84.26	82.12	81.77	81.03
No	51.04	58.34	75.07	81.27	76.31	62.93
TANF/AFDC		***				
Yes	65.64	70.47	81.91	81.65	80.86	76.57
No	61.28	61.19	84.23	82.17	81.67	81.01
Unearned income	**		*			
Yes	64.87	62.27	85.46	83.22	82.92	81.45
No	57.78	63.42	81.11	80.41	79.02	78.16
SSI						
Yes	63.99	61.38	85.11	82.81	83.43	79.80
No	61.04	63.37	83.22	81.73	80.54	80.32
RSDI	**		***	*	***	
Yes	68.71	63.56	89.08	86.77	87.62	83.55
No	59.70	62.48	81.80	80.32	79.06	78.78
Unemployment compensation	*				**	
Yes	60.07	63.59	88.96	80.88	91.68	75.84
No	62.04	62.71	83.55	82.12	80.92	80.33
Household type		*	*	*		
Household with elderly	64.99	59.25	90.89	80.50	87.59	79.17
Household with children (no elderly)	61.83	67.82	81.53	79.83	78.48	77.93
Other household	61.27	59.21	84.27	84.62	82.85	82.45
Female	**	***			*	
Yes	65.71	67.47	84.81	81.55	83.45	79.95
No	55.73	55.02	81.99	83.12	77.58	80.55

Characteristic[a]	Round 1		Round 2[b]		Round 3[b]	
	HIP	Non-HIP	HIP	Non-HIP	HIP	non-HIP
Age of person	***					*
16–30	54.66	59.94	79.82	78.80	76.60	77.97
31–40	63.42	64.66	81.29	82.30	79.79	74.80
41–54	66.69	65.42	85.73	85.38	83.53	82.08
55+	67.94	63.29	89.28	83.46	86.56	84.95
Race/ethnicity	*	***				
Hispanic	60.08	62.88	81.14	80.15	78.71	78.13
White	63.61	61.29	85.11	81.94	84.34	81.03
Black	65.81	69.83	90.38	87.39	83.49	83.71
Other	57.36	56.69	81.02	84.79	80.06	81.81
US citizenship of sampled person	***	**	**			***
Yes	62.28	63.03	84.22	82.13	81.73	80.89
No	55.13	57.31	76.06	81.20	77.62	65.74
Disabled sampled person	***			**	*	
Yes	65.67	62.58	85.94	84.80	84.65	81.05
No	58.91	62.89	81.76	79.60	78.24	79.27
Unemployment compensation						
Yes	61.39	61.53	87.00	78.54	85.71	72.79
No	61.97	62.80	83.67	82.21	81.30	80.42
Household size (no. adults 16+)						
1	61.06	60.79	85.86	81.30	82.83	82.42
2	62.61	63.43	80.38	81.70	79.33	77.27
3	63.71	72.89	80.03	89.25	78.79	77.53
4 +	75.58	72.27	70.97	82.41	71.62	61.49

Rao-Scott chi-square test: *p<0.1, **p<0.05, ***p<0.01. Tests not corrected for multiple comparisons.
[a]Household and person characteristics reported in SNAP sampling frame.
[b]Response rates are conditional response rates.

Appendix D: Participant Data Preparation

This appendix discusses several facets of data preparation activities for the participant data used in the HIP evaluation. The first two sections describe coding of the participant survey data collected for the HIP evaluation. The first section describes coding of the 24-hour dietary recall data. The second section discusses other aspects of participant survey coding, including initial processing and construction of analytic outcomes and covariates. The third section describes processing of the EBT transaction data and construction of the analytic files.

D.1 Coding of Dietary Recall Data

AMPM Interview Data Entry/Standard SurveyNet Processing

Westat collected the 24-hour dietary recall data for the HIP study using the same system used in the National Health and Nutrition Examination Survey, What We Eat in America (NHANES, WWEIA) interview. This system consists of 3 components: the Automated Multiple Pass Method (AMPM) interview system, the Post Interview Processing System (PIPS), and the SurveyNet coding application.

Westat processed the recall data through PIPS and then created SurveyNet batches containing approximately 20 intake days each. The SurveyNet batches were entered into the online Coder Tracking System, which was used to track each batch through the various coding and review steps. Each batch was assigned to one of six dietary coders, with each coder completing the coding for all intake days within a single assigned batch.

Coding

Assigning Food Codes

The data collected in the AMPM was automatically imported into SurveyNet. SurveyNet displays a shorthand version of each question and the selected response for all food description and portion data in a text box at the top of the food coding screen. This interview data is reviewed by the dietary coder and used to select the appropriate food code and enter the quantity reported. During PIPS processing, approximately 70 percent of foods are auto-coded, meaning that a food code and/or a portion quantity is pre-assigned; in those cases, the dietary coder merely reviews the pre-filled fields to ensure that no changes need to be made. Changes to these pre-assigned data might have been required if the interviewer had entered a comment or a text response in any field that would cause the coder to change the pre-assigned code or quantity. For all foods not auto-coded during PIPS, the dietary coders reviewed all question responses to determine the most appropriate food code to apply.

Recipe Modifications

Coders had the ability to create recipe modifications to more closely match the reported food. Coders followed the same modification guidelines used in NHANES, which allowed modification of a recipe for the type of fat used in cooking, the type of milk used in preparing selected foods (e.g., beverages, pudding, cooked cereal), amount of liquid used to prepare condensed soup (when different from instructions), and the type of salad dressing used in salads such as coleslaw or chicken salad.

New Foods

The coders also flagged new food items that could not be linked to an acceptable food code in SurveyNet. Coding supervisors did additional research to determine if the food could be matched to an existing food code or if the food needed to be flagged for nutrient modification after analysis, because the nutrient profile of the foods differed too much from existing food codes. Two food items were handled in this way: quinoa and almond milk. Nutrient information for these products was obtained from USDA Database for Survey Research (quinoa) or product labels (almond milk) and corrected in the SurveyNet analysis files.

Coding Guidelines

Coding guidelines were used to resolve common coding problems and to establish consistent coding methods. NHANES coding guidelines were provided to the coders. These guidelines are organized by food category and contain rules for coding foods when not enough information is available (e.g., how much meat to code in a sandwich when the amount is not given, how to handle reports of nonstick spray, etc.). Additional guidelines were developed throughout the study as new issues were resolved. These guidelines were documented in a decision log maintained throughout the study.

Entering Quantities

Once the food code was assigned or reviewed (in the case of auto-coding), coders reviewed the auto-coded quantity or entered the amount of food reported. SurveyNet allows entry of portions using the same food models presented in the AMPM, and also provides predetermined food weights for foods in commonly eaten portions (e.g., one half grapefruit, one medium chicken leg). Food amounts that were entered as a shape, by dimensions (length, width, and height), volume, or weight were automatically converted to a weight in grams. Coders could also use SurveyNet to code imprecise measures, such as “handful,” “medium bowl,” or “swallow.” When respondents reported “Don’t know” for the quantity consumed, coders were instructed to first consult the coding guidelines, which provide default amounts for items in a sandwich, salad, added to coffee, and other common combinations. Should the coding guidelines not apply, coders selected the “quantity not specified” portion option presented in SurveyNet.

Combinations

Foods added to another food (e.g., cream added to coffee) or eaten in combination (e.g., the bread, meat, cheese, and spread on a sandwich) were flagged in SurveyNet using combination codes. The combinations were usually identified during data collection by AMPM and so a combination type code was pre-filled in SurveyNet. If coders needed to add additional food codes to represent the reported food, the coder used the combination type code to link the foods.

Review

After the dietary coders assigned food codes, coders and supervisors conducted quality control by verifying, adjudicating and editing the assigned food codes and portion amounts. Verifying involved a detailed review of coded intakes by a second coder. Any notepad entries made by the second coder highlighting questions or disagreement between coders were adjudicated by one of the four coding supervisors. All adjudicated records were reviewed by the supervisor, and decisions were made on notepad questions and unfound foods. Coded intakes that were adjudicated by one supervisor were edited by a second supervisor; thus each intake was reviewed by two supervisors. The adjudication process also allowed evaluation of the accuracy of each coder’s work. Two intakes from every batch were used for calculation of accuracy, so that 10 percent of each coder’s work was assessed. Coders were required to maintain 95 percent accuracy.

Analysis

Nutrient analysis was performed using SurveyNet's analysis system. The system automatically generates error reports that documented unresolved issues such as missing or invalid food codes, recipe modification, or portion codes. All errors were resolved and the analysis re-run. Two analysis data files were prepared: an "ANA" file, which contained one line of data for every food or supplement reported by the respondent on the intake day; and a "TOT" file, which contained one line of data for each respondent for a single intake day. The standard values provided included 65 nutrients from the Food and Nutrient Database for Dietary Studies (FNDDS). Additional variables were appended to these files (USDA Food Pattern food groups, MyPyramid food groups, Healthy Eating Index, and special outcomes for the HIP study). Construction of these variables is described at the end of the section (after the discussion of quality control procedures).

Quality Control Review

Standard quality control (QC) checks were performed on the analyzed data as a means of identifying errors. Outlier reports identified unusually high or low portions for key food items and high or low amounts of key nutrients. The outliers were reviewed and any deemed to be the result of coding errors were corrected. These outlier checks are explained in more detail below.

Portion Outliers

Portion outlier reports were used to identify errors for reported amount of foods consumed. In addition, they served as a check for intakes where an incorrect form of the food was applied[157] when specifying the amount. The USDA SurveyNet software used to code AMPM intakes identified intakes where the portion of the reported food was either below or above established portion size range for that food item; these portion size ranges were specific for the age and gender of the respondent.

The following criteria are used to triage which records identified by SurveyNet as outside the portion range should be checked for accuracy

- Beverages greater or equal to ½ gallon
- Meat, fish, poultry greater than or equal to 12 weighted ounces (WO) (342 grams)
- Mixed dishes greater than or equal to 6 cups
- Greater than or equal to 8 WO snack foods (chips, nut, etc.)
- Review coding of foods with yields from dry amounts rather than from cooked volume OR cooked weights that might have been from dry
  - Beans
  - Cooked cereals
  - Pasta
  - Rice
  - Other grains, such as bulgur, couscous
- Popcorn, as un-popped rather than popped volume
- Unreconstituted mixes, soups, drinks, etc.
- WO entry of ice cream

---

[157] For example, the coder entered 1 cup of rice as uncooked by mistake when it was reported as cooked.

- Less than or equal to 1/8 teaspoon

Intakes that included portions above or below identified limits were reviewed to ensure that no recording[158] or coding errors had been made. When the portion outlier reviews were completed and edits made, the data were re-analyzed prior to the next QC step so that nutrients would reflect the edited data.

AMPM Nutrient Outliers

Key nutrient values were reviewed as a means to identify errors or anomalies. These nutrients were calories, total protein, total fat, total beta-carotene, and total vitamin C. A review at the nutrient level was considered indicative of any biases due to database errors, routine coding decisions, editing resolutions, or coding guidelines. The 5th and 95th percentile of intakes for these five nutrients were determined for a specified age and gender group from the NHANES data, and cut points were then determined based on the percentiles.

The cut points used for the nutrient outlier review were as follows:

1. Kcal

Gender/Age	Low	High
Adult women >/=12 years old	600	4400
Adult males >/= 12 years old	650	5700

2. Protein (grams)

Gender/Age	Low	High
Adult women >/=12 years old	10	180
Adult males >/= 12 years old	25	240

3. Fat (grams)

Gender/Age	Low	High
Adult women >/=12 years old	15	185
Adult males >/= 12 years old	25	230

4. Vitamin C (mg)

Gender/Age	Low	High
Adult women >/=12 years old	5	350
Adult males >/= 12 years old	5	400

5. Beta-carotene (mcg)

Gender/Age	Low	High
Adult women >/=12 years old	15	7100
Adult males >/= 12 years old	15	8200

158 Errors were suspected when the amount entered was the same as the number for the unit and it was an odd combination (e.g., 23 G3 glasses, where 23 is the code for the G3 glass).

Prior to examining macro and micro-nutrient outliers, reports were generated for total calorie intake outliers. Records flagged as outliers for calories were examined and any interviewer or coding errors were corrected. The records were re-analyzed prior to generating outlier reports for the remaining nutrients.

Minimum Criteria for Inclusion in Dataset

When conducting reviews of the intakes identified in any of the outlier reports, a determination of whether or not the intake met minimum criteria was made. In general, an intake did not meet minimum criteria if any of the following situations were noted:

1. **Interview was broken off prior to completing the time and occasion pass.** If the breakoff happened before the time and occasion was recorded for every food in the intake, the intake failed the minimum criteria and was deleted from the dataset; without time and occasion information for each food, it was not possible to determine that the reported foods spanned an entire day's intake.

2. **Intake was judged as "unreliable."** Although interviewers did not provide feedback on whether or not a respondent was reliable, guidelines developed in previous studies were implemented.

3. **Meals with missing foods.** This flag was implemented when a respondent reported a meal, but could not recall foods eaten at the meal. For example, the respondent reported eating a meal at a friends' house but could not recall the foods.

USDA Food Pattern Food Groups, MyPyramid Food Groups, and Healthy Eating Index

After all dietary recall data files were edited and finalized, nutrient values, MyPyramid Equivalent (MPE) values, and Food Pattern Equivalent (FPE) values were appended to each record. Nutrient values were taken from the USDA Food and Nutrient Database for Dietary Studies, 4.1 (FNDDS4.1). FPE values were taken from the Food Pattern Equivalent Database (FPED) 09-10[159]; food codes that did not have a match in the FPED were reviewed and food group values were imputed. MPE values were taken from MyPyramid Equivalents Database (MPED) version 2.0 (Bowman, Friday, and Moshfegh, 2008) supplemented with the USDA Center for Nutrition Policy and Promotion (CNPP) MPED Addendum (2013a) to allow for compatibility with FNDDS4.1. The additional Whole Fruit equivalent for calculating Healthy Eating Index-2005 (HEI-2005) was taken from the CNPP Support Files (USDA CNPP, 2013b). As the CNPP MPED Addendum does not provide MPE values for all FNDDS4.1 food codes, additional MPE and HEI-2005 values were imputed by Westat, as needed, to attain complete MPE and HEI-2005 data.

The HEI-2005 and HEI-2010[160] was calculated for all intakes using the SAS code provided by CNPP;[161] the HEI-2005 and HEI-2010 component scores as well as the total HEI-2005 and HEI-2010

---

[159] U.S. Department of Agriculture, Agricultural Research Service. (2013) *Food Patterns Equivalents Database.* http://www.ars.usda.gov/Services/docs.htm?docid=23869

[160] U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. (2013). *Healthy Eating Index.* http://www.cnpp.usda.gov/HealthyEatingIndexSupportFiles0708.htm

[161] http://www.cnpp.usda.gov/HealthyEatingIndex-2005report.htm

scores were provided for each intake day. The density components provided with the CNPP SAS code for HEI-2010 were also provided for each intake day.

Special Outcomes for This Study

Additional variables included in the analysis are described below.

Targeted Fruit and Vegetable (TFV) intake (preferred restrictive measure and alternative inclusive measure)

One of the goals of HIP was to increase consumption of targeted fruits and vegetables (TFVs), defined as those eligible for the financial incentive, which are the same foods that are eligible for WIC fruit and vegetable vouchers. These include fresh, canned, frozen, and dried fruits and vegetables without added sugars, fats, or oils. Fruits may not have added salt and fruit juices are excluded. Vegetables may be regular or lower sodium, and white potatoes are excluded. No foods prepared away from home or served ready to eat are included.

The AMPM documents the source of the food or most of the ingredients of the food; for the TFV intake measure, only food items where the source was "store" were included. Because not all survey respondents were able to separately report individual ingredients and quantities for food prepared from multiple ingredients ("mixed foods"), coding of the AMPM interview does not always allow us to distinguish if a food item with added sugar was purchased already prepared (and therefore not eligible) or prepared at home from an eligible food item. Two versions of the TFV measure were developed: a preferred, restrictive measure, which excluded fruits and vegetables in mixed foods when the respondent was not able to identify individual ingredients and their sources, and an alternative, inclusive measure, which included fruits and vegetables in both mixed foods as well as single items.

Food codes included in the preferred restrictive TFV intake measure included food codes for individual fruits and vegetables, and mixtures of just fruits and vegetables, such as broccoli cooked with fat added, sweetened frozen strawberries, or frozen mixed vegetables. These simple mixtures were included in the restrictive measure because if the source of the food was the store, it was highly likely that the fruit or vegetable was an eligible purchase. The goal of the restrictive TFV measure was to exclude fruits and vegetables contained in mixed foods like soups or lasagna, which contained non-fruit, non-vegetable ingredients. The alternative inclusive TFV measure summed the cup equivalents for whole fruit and whole vegetables (i.e., no juices were included), and then subtracted the cup equivalents for white potatoes.

Other ingredients in foods with fruits & vegetables

In addition to the TFV values, Westat calculated amounts of two nutrients (total sugar and sodium) and three USDA Food Pattern food groups (oils, solid fats, and added sugars) in foods containing fruits and vegetables. This was done by identifying all foods with any fruit or vegetable content and summing up nutrient and USDA Food Pattern food group equivalent amounts for each respondent within those foods only.

Form of preservation (fresh/canned/frozen/dried)

In order to assess the form of preservation for fruits and vegetables consumed in the study, Westat categorized FNDDS food codes containing fruits and vegetables by the form specified in the food code description. Note that form of preservation is usually only specified when the food contains either a single fruit of vegetable (e.g., fresh apple, raw carrots), or a fruit or vegetable with simple preparation, such as those that would fall into the restrictive TFV measure described above (e.g., carrots cooked from frozen with fat added). Cup-equivalents were summed by form of preservation for the food codes able to be categorized.

Store and other purchases

The TFV values described above total the fruits and vegetables reported as being obtained from a store. In addition to these, Westat calculated similar TFV values for fruits and vegetables obtained from a source other than a store. The other sources include restaurants, cafeterias, community food programs, etc. A complete list of the sources offered in the AMPM interview is presented in Exhibit D.1.

Exhibit D.1: Source of Foods Reported in AMPM

Code	Source
1	Store
2	Restaurant with waiter/waitress
3	Restaurant fast food/pizza
4	Bar/tavern/lounge
5	Restaurant no additional info
6	Cafeteria not at school
7	Cafeteria at school
8	Child care center
9	Family/adult day care center
10	Soup kitchen/shelter/food pantry
11	Meals on wheels
12	Community food program—other
14	Vending machine
15	Common coffee pot or snack tray
16	From someone else/gift
17	Mail order purchase
18	Residential dining facility
19	Grown or caught by you or someone you know
24	Sport recreation, or entertainment facility
25	Street vendor, vending truck
26	Fundraiser sales
91	Other, Specify

Alternate measures: fats

The MPE and FPE discretionary oils and solid fats are provided as grams of fat in the databases. The MPE and FPE components were converted to teaspoons of fat, using the conversion of 4.53 g/teaspoon for oils and 4/27 g/teaspoons for solid fats. Additional variables of discretionary oils and solid fats in teaspoon measures were added to each intake day.

SoFAS

The Dietary Guidelines for Americans (DGA)[162] specifies limits of calories from solid fats and added sugars, called SoFAS. The MPE and FPE components for solid fats and added sugar were used to generate SoFAS variables, using the conversion of 9 kcal/g for solid fats and 16 kcal/teaspoon for the added sugars. The new SoFAS variables were added to each intake day.

Legumes

We computed variables to allocate legumes properly to either the protein group or the vegetable group, based on the recommended intake specified in the USDA Meal Patterns provided by the DGA. In this calculation, legumes (as ounce equivalents) are added to the protein foods total until the recommended amount of protein foods is met; any amount of legumes that remains is converted to cup equivalents and added to the total vegetable amount (1 ounce equivalent of legumes equals ¼ cup). The protein foods recommendation is based on the recommended calorie needs per day by age, gender and physical activity level. For this calculation, calories for the moderately active physical activity level were used. The new total protein foods and total vegetables variables were added to each intake day.

Dietary Supplement Data

A dietary supplement module (DSM) was programmed that utilized the questions from the NHANES dietary supplement interview. Dietary supplement data files were converted from the Manipula files to text files using the program provided by USDA. The text file was converted into Excel and coded within Excel by matching a supplement code from the NHANES Dietary Supplement Database (DSD).[163] Once the coding was finished, Westat used the nutrients provided in the DSD to analyze the coded records for the 65 nutrients provided in FNDDS.

D.2 Coding of Other Participant Survey Data

Initial Processing of Participant Survey Data

Participant survey data were collected using a computer-assisted telephone interview (CATI) system, developed and programmed in Blaise. With Westat's CATI system, the initial data collection, receipt control, coding and editing, and data entry were performed as a single operation. Most edit checks were performed online as the interviewer entered responses into the computer. Range checks prevented interviewers from entering impossible responses for precoded and numerical items. Consistency checks between items were performed during the interview, so that inconsistent responses were clarified immediately with the respondent.

CATI will accept open-ended data, though interviewers were trained to perform as much coding as possible while the telephone interview was in progress. Westat conducted post-data collection processing, which included review of text entries for "Other, specify" fields and interviewer comments recorded in the CATI interviews. Review of text entries resulted in either "upcoding" the

162 U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2010.* 7th Edition, Washington, DC: U.S. Government Printing Office, December 2010. Available at http://www.health.gov/dietaryguidelines/dga2010/DietaryGuidelines2010.pdf

163 http://www.cdc.gov/nchs/nhanes/nhanes1999-2000/DSPI.htm

text responses to an existing code or the creation of a new code. All new codes were incorporated into the codebook. Interviewer comments were reviewed to look for possible data problems (e.g., difficulty in categorizing the respondent's answer into the precoded choices on CATI). Data management staff conferred with project staff to determine if data changes were needed; all changes were documented in a data change spreadsheet. This spreadsheet was then used to perform quality-control checks on the data set to verify changes. The Data Manager reviewed response frequencies and cross-tabulations during and at the end of data collection to check for outliers (values that were too large or small). Outlier checks performed during the interview allowed interviewers to confirm or correct the response immediately with the respondent. Outliers identified during processing were discussed with project staff and any changes were documented on the data change spreadsheet.

Construction of Analytic Outcomes and Covariates

Creation of Composite Scales

In order to improve measurement precision and reliability, we created scales based on multiple survey items. Scales were created to reflect 1) positive attitudes toward food, fruits, and vegetables; 2) barriers to fruit and vegetable consumption; 3) barriers to grocery shopping; and 4) availability of fruits and vegetables in the home.

To create scales, we first selected the survey items relevant to each scale. To ensure that all selected items for each scale measured the same construct, and that each scale was internally consistent, we examined the reliability coefficient (alpha, α) of the items related to each scale. We used an approximate cutoff of $\alpha = 0.70$ or higher for adequate reliability and internal consistency.[164] If α was below 0.70, we removed items with the lowest correlation with the total from the scale until we achieved an α of 0.70 or higher. Once the final items for each scale were determined, all items were coded so that higher scores indicated "more." Scales were then created by taking the mean of all items when at least 75 percent of the items were non-missing. Below, we describe each of the four scales in detail.

The ***positive attitudes toward food, fruits, and vegetables*** scale was created using the following 6 survey items which asked respondents to indicate their agreement on a scale from 1 (strongly disagree) to 5 (strongly agree):

1. I enjoy trying new foods.
2. I enjoy trying new fruits.
3. I enjoy trying new vegetables.
4. I eat enough fruits to keep me healthy.
5. I eat enough vegetables to keep me healthy.
6. I often encourage my family and friends to eat fruits and vegetables.

---

[164] The following citations suggest that a reliability coefficient of 0.70 and above is adequate: Nunnally (1978), George and Mallery (2003).

If at least 5 of the 6 items were non-missing, items were averaged to create the scale (α = 0.68[165] for round 1, α = .73 for round 2, and α = .74 for round 3).

The ***barriers to fruit and vegetable consumption*** scale was created using the following 7 items which asked respondents to indicate their agreement on a scale from 1 (strongly disagree) to 5 (strongly agree):

1. It's hard for me to eat more vegetables because I don't know how to prepare them.
2. It's hard for me to eat more vegetables because they are hard to find where I shop for food.
3. It's hard for me to eat more fruits because they are hard to find where I shop for food.
4. I don't eat fruits and vegetables as much as I like to because they cost too much.
5. I don't eat fruits and vegetables as much as I like to because they often spoil before I get a chance to eat them.
6. I don't eat fruits and vegetables as much as I like to because my family doesn't like them.
7. I don't eat fruits and vegetables because I don't like them.

If at least 7 of the 8 items were non-missing, items were averaged to create the scale (α = 0.73 for round 1, α =.73 for round 2, and α = .74 for round 3).

The ***barriers to grocery shopping*** scale was created using the following 2 items which asked respondents to indicate frequency on a scale from 1 (always) to 5 (never):

1. How often does limited transportation keep you from shopping for groceries?
2. How often does distance to grocery store keep you from shopping for groceries?

If both items were non-missing, the items were reverse-coded and then averaged to create the scale (α = 0.80 for round 1, α = .84 for round 2, and α = .81 for round 3).

The ***availability of fruits and vegetables in the home*** scale was created using the following 4 items[166] which asked respondents to indicate frequency on a scale from 1 (always) to 5 (never):

1. How often do you have fruits available at home? This includes fresh, dried, canned and frozen fruits.
2. How often do you have fruits in the refrigerator or on the kitchen counter?[167]

---

165 Although the α did not reach the 0.70 cutoff for Round 1, it is very close. Removing items or splitting the items into two scales further decreased the α, thus indicating that all six items work best together as one scale. (The α is also above 0.70 for Rounds 2 and 3.)

166 There are 5 additional items included on the family food environment section of the survey that do not focus specifically on fruits and vegetables, which when included in the scale lowered the reliability to an inadequate level. Principal components analysis confirmed that these items do not load strongly onto any one factor, and thus they will not be included in the scale.

3. How often do you have vegetables available at home? This includes fresh, dried, canned, and frozen vegetables.[168]

4. How often do you have ready to eat vegetables such as baby carrots, cherry tomatoes, or vegetables that you have sliced to make them ready to eat in the refrigerator or on the kitchen counter?

If at least 3 of the 4 items were non-missing, items were reverse-coded and averaged to create the scale ($\alpha = 0.75$ for round 1, $\alpha = .75$ for round 2, and $\alpha = .76$ for round 3).

D.3 EBT Transaction Data Processing Methods

The EBT transaction data were processed for the full pool of HIP and non-HIP participants in Hampden County. The analysis in this report used transaction data beginning in November 2011, when HIP began. Key outcome analyses focused on transactions beginning in January 2012 when all participants were active.

The EBT data were analyzed through the end of the pilot, focusing on expenditures in the two periods coinciding with the participant surveys and when all HIP households were eligible to earn incentives (March-July 2012 and August-October 2012).

The EBT data were received in the form of daily HIP activity files that included information on the time, location, amount and type of each SNAP transaction. The data were cleaned and combined into monthly analysis files with variables for total household SNAP issuances, SNAP purchases, HIP-eligible TFV purchases and HIP incentive earnings, as well as purchases by store type. The following sections describe the data cleaning and variable construction process, which also required merging the EBT data with additional sources of data, such as the Retailer EBT Data Exchange (REDE) files and administrative case file data.

Initial Construction of Raw Monthly Transaction-Level Files from HIP Daily Activity Files and Monthly Missing Data Files

The EBT processor for Massachusetts, Xerox, collects and maintains data pertaining to the SNAP EBT transactions. These data show the date and amount that SNAP benefits were credited, and they show the date, time, amount, and location for each shopping transaction using SNAP benefits. In addition, transaction data for the evaluation period provide information (date, time, amount, store) on HIP-eligible purchases and HIP incentives earned. Only purchases made with SNAP benefits are included; purchases made with other forms of payment, such as cash or WIC vouchers are not captured. EBT transaction data were transmitted for the full pool of HIP and non-HIP participants in Hampden County without social security numbers, but case file identification numbers were included to allow linking of EBT transaction data to administrative case file data and survey data.

---

167 Respondents were also given the option of "Don't have a refrigerator" for this item. These responses were recoded to "Never."

168 Respondents were incorrectly given the option of "Don't have a refrigerator" for this item. These responses were recoded to missing.

EBT data were first received in the form of daily HIP activity files. Initial checks revealed that these files were missing transactions for approximately four percent of SNAP participants in the HIP universe. Xerox ascertained that these cases were left out from the source table of HIP and non-HIP households used to generate the HIP daily activity files. After correcting the source table, Xerox provided monthly files with the missing transactions. These files were merged with the original HIP daily activity files to produce complete transaction files.

Cleaning of Raw Monthly Transaction-Level Files

The daily raw transaction data were combined to produce a transaction-level file for each month of the pilot. Each month's transaction-level file included records for the issuance of benefits made available during that month and cancellations, client initiated transactions and adjustments initiated during the month. The following checks and data-cleaning steps were performed on the complete monthly transaction-level files:

- Duplicate transactions, defined as extra records with identical values in each field, were removed from the files.
- Denied transactions and balance inquiries were removed from the files.
- Voucher settlement records corresponding to a previous transaction record were removed so that the value of the voucher transaction would not be counted twice in the analysis.
- The HIP household flag was corrected to be current with the date of the transaction. The HIP flag provided in the EBT data did not match the household's current HIP flag for some transactions in the first few months of the pilot. The correct HIP flag was determined from the household's assigned status during random assignment and then merged to the transaction data. The flag was also updated for fifteen households that were originally assigned to HIP, but opted out of the program during the pilot. The flag for these households was switched to 'non-HIP' status.

Construction of the Monthly Household-Level Analysis Files

Outcome Variables

Household-level analysis files for each month of the pilot were created from the clean monthly transaction-level files by aggregating transaction records for each household. Transaction amounts were summed to compute net credits and debits for SNAP issuance, SNAP purchase, HIP-eligible TFV purchase and HIP incentive earnings transactions for each household that had SNAP activity during the month. The following household analysis variables were created by taking the difference between net credits and debits for the various types of transactions:

- Net issued SNAP benefits
- Net available SNAP benefits for the month, which included benefits carried forward from the previous month
- Net SNAP purchases
- Net HIP-eligible TFV purchases
- Net HIP incentives earned

The computation of the SNAP benefit and SNAP purchase variables were checked by comparing the household's calculated account balance (Net available SNAP benefits – SNAP purchases) to the account balance given in the transaction data on the last day of the month. Likewise, computations of household HIP-eligible TFV purchases and HIP incentives earnings were checked by comparing the calculated HIP incentives earnings variable (0.3*HIP-eligible TFV purchases) to the "HIP incentives earned to date" variable given in the data on the last day of the month.

A total of 14 household-level analysis files were created corresponding to each month of the pilot. Exhibit D.2 shows the number of households in each monthly analysis file, and the number of households that received a SNAP benefit). Our analysis was conducted on the households that received a benefit during the month.

Exhibit D.2: Number of Observations in Monthly Household-Level Analysis Files

Month	Total number of households in file	Number of active households (received a SNAP benefit)
November 2011	50,788	50,156
December 2011	49,933	49,079
January 2012	49,123	48,378
February 2012	48,541	47,982
March 2012	48,104	47,507
April 2012	47,511	46,822
May 2012	47,166	46,517
June 2012	46,820	46,157
July 2012	46,698	45,730
August 2012	46,568	45,444
September 2012	46,120	44,833
October 2012	45,544	44,289
November 2012	44,979	43,845
December 2012	44,554	43,421
Average across all pilot months	**47,318**	**46,440**

Store Type and Participating Retailer Variables

In addition to the outcome variables listed above, net SNAP purchase variables were constructed for each store type and HIP participating retailer classification, and for combinations of these classifications. HIP-eligible TFV purchase variables were constructed for participating stores only. HIP-eligible TFV purchases at participating integrated electronic cash register (IECR) stores were identified for both HIP and non-HIP households. HIP-eligible TFV purchases at participating non-IECR stores such as grocery and convenience stores and farmers markets were calculated for HIP households that identified themselves as HIP participants and separated HIP-eligible items during check-out.

The construction of purchase variables by store type involved merging the monthly transaction-level files with a cumulative FNS REDE file that included information on all SNAP-authorized retailers, including store type. The cumulative file was constructed by combining monthly Massachusetts REDE files[169] to identify a patronized retailer's store type[170]. Retailers were grouped into the following store types:

---

169 We received monthly REDE files for October 2011 to June 2012, and September 2012 to January 2013.

- Supermarkets and Superstores
- Grocery and specialty stores
- Convenience stores
- Farmers Markets
- Other stores[171]
- Unknown stores if the retailer was not found in the Massachusetts REDE file

Retailers were classified as participating in HIP during the month if any of the following criteria were met:

- The retailer was on the final list of participating retailers within and outside Hampden County provided by FNS and started participating in HIP that month or earlier [172]
- The transaction data showed HIP-eligible TFV purchases at that retailer by a HIP or non-HIP household during the month.

Exhibit D.3 lists the store types and participating retailer classification combinations for which SNAP and HIP-eligible TFV purchase variables were constructed.

Exhibit D.3: SNAP Purchases and HIP-Eligible TFV Purchases Variables by Store Type

SNAP purchases	HIP-eligible TFV purchases
All supermarkets and superstores	Participating supermarkets and superstores
All IECR and non-IECR convenience stores	Participating IECR and non-IECR convenience stores
All grocery stores	Participating grocery stores
All farmers markets	Participating farmers markets
All other stores	Participating other stores
Participating supermarkets and superstores	
Participating IECR and non-IECR convenience stores	
Participating grocery stores	
Participating farmers markets	
Participating other stores	
Nonparticipating supermarkets and superstores	
Nonparticipating IECR and non-IECR convenience stores	
Nonparticipating grocery stores	
Nonparticipating farmers markets	
Nonparticipating other stores	
Unknown store type (out of State)	

170 There were 20 stores that were classified differently across the months. For the analysis, the retailer was classified using the most recent store type.

171 Other store types include: alcohol or drug treatment program, bakery specialty, non-profit food buying co-op, shelter for battered women, communal dining facility, delivery route, group living arrangement, homeless meal provider, military commissary, meal delivery service, and senior citizens center/residential building.

172 One chain retailer implemented HIP nationwide and thus all its stores were classified as participating.

Demographic Subgroup Variables

For the analysis of EBT purchase patterns by household characteristics, the monthly household-level analysis files were merged with July 2011 case variables from the administrative case file data. The following demographic information was derived from the case files:

- SNAP benefit amount
- Monthly household income
- Spanish speaking
- Race and ethnicity of household head
- Disability status of household head
- Age of head of household
- Household composition (presence of children/elderly)
- Household size and gender of household head
- Location of residence

Pre-HIP Shopping Pattern Indicators

One of the analyses presented in this report is the impact of HIP on TFV purchases during the March to October 2012 period for households that primarily shopped at HIP participating stores before the pilot began. Similar analyses were conducted for households that primarily shopped at nonparticipating stores before the pilot. To classify pre-HIP participating and nonparticipating store shoppers, November 2011 transaction data were analyzed for Wave 2 and Wave 3 households (which were not yet eligible to earn HIP incentives). The evaluation research design intended that EBT transaction data would be available beginning two months prior to the HIP implementation. However, it proved difficult to compile EBT data files during the period that preparations for implementation were being completed; transaction-level files for the pre-implementation period could not be reconstructed in time for this report. Therefore the pre-HIP shopping pattern analysis in this report is restricted to Wave 2 and 3 households that had transaction activity in November 2011.

A Wave 2 or Wave 3 household was classified as a pre-HIP participating store shopper if more than 50 percent of their November 2011 SNAP purchases were made at stores that were participating in HIP during the period of the main analysis, i.e., March to October 2012. A household was classified as a pre-HIP nonparticipating store shopper if at least 50 percent of their November 2011 SNAP purchases were made at stores that were not participating during March to October 2012. Based on these criteria, an indicator was constructed for the classification of households as pre-HIP participating and nonparticipating store shoppers. This indicator was merged with the March to October 2012 monthly household-level analysis files to estimate the impact of HIP on HIP-eligible TFV purchases by pre-HIP shopper type.

Appendix E: Analytic Methods

The appendix discusses eight analytic issues: (1) regression models for estimating impact; (2) the treatment of limited dependent variable models; (3) regression models for subgroup analyses; (4) the computation of standard errors; (5) estimation of inter-round change; (6) multiple comparisons and the single confirmatory outcome—TFV; (7) sensitivity to outliers; and (8) usual intake estimation.

E.1 Multivariate Models

As noted in Chapter 2, our primary estimates of HIP impacts are regression-adjusted, as opposed to simple differences in treatment and control group means. Regression adjustment improves the comparability of the treatment and control groups and increases the precision of our estimators. For continuous outcomes, we use a model of the form:

(E.1) $$y_{h,r,i} = \beta_0 + \beta_1 HIP_h + \beta_2 ControlVars_{h,r,i} + \varepsilon_{h,r,i}$$

Where the subscripts are h for household, r for round (Round 2 or Round 3), and i for interview (at Round 2 and Round 3, 10 percent of the sample was interviewed a second time to support analysis of usual intake); and the variables are as follows: y is an outcome of interest, *HIP* is a binary variable that identifies the treatment group, *ControlVars* is a vector of characteristics measured as of the Round 1 (baseline) survey or at baseline from administrative data, and ε is a regression residual, representing unmeasured factors. Random assignment assures that ε is uncorrelated with HIP.

In this specification, β_1 gives the impact of HIP, and H_0: $\beta_1=0$ is a test for any impact of HIP.

Exhibit E.1 lists the included *ControlVars* and tabulates simple descriptive statistics (mean and standard error). As Exhibit E.1 shows, *ControlVars* includes all variables used in blocking and stratification (geography within Hampden county, household composition, survey wave, and gender of household head), as well as respondent demographic characteristics (age group, gender, race/ethnicity), measures related to baseline consumption according to the Fruit and Vegetable Screener, and baseline composite scales derived from questions about the home food environment, barriers to grocery shopping, and attitudes about and barriers to consumption of fruits and vegetables. For regressions based on the dietary recall interview only, we additionally included covariates about the AMPM interview itself, including day of interview (first or second) and the respondent's assessment of the prior day's consumption relative to usual levels (more, less, or the same as usual). Finally, for all variables in which baseline outcome data were collected, the baseline outcome was also included as a final covariate. These control variables were selected as likely to be strong predictors of the confirmatory outcome.

Exhibit E.1: Included Analytic Covariates, Final Analytic Sample

	Total	Treatment	Control	P-value
Stratification variables				
Geography				
Springfield	0.53 (1030)	0.52 (505)	0.53 (525)	[0.647]
Chicopee or Holyoke	0.25 (505)	0.27 (255)	0.25 (250)	
Hampden balance (omitted category)	0.22 (419)	0.21 (220)	0.22 (199)	
Persons in household				
One person in household	0.45 (872)	0.45 (450)	0.45 (422)	[0.916]
Multiple persons in household (omitted category)	0.55 (1082)	0.55 (530)	0.55 (552)	
Adults in household				
3 or fewer adults in household (omitted category)	0.97 (1918)	0.98 (965)	0.97 (953)	[0.067]*
4 or more adults in household	0.03 (36)	0.02 (15)	0.03 (21)	
Household composition				
Elderly (with/without children) in household	0.11 (238)	0.11 (129)	0.11 (109)	[0.975]
Children (no elderly) in household	0.42 (827)	0.42 (398)	0.42 (429)	
No children/elderly (omitted category)	0.46 (889)	0.46 (453)	0.46 (436)	
Household head gender				
Male (omitted category)	0.27 (503)	0.27 (257)	0.27 (246)	[0.861]
Female	0.73 (1451)	0.73 (723)	0.73 (728)	
Wave				
HIP start date Nov. 1, 2011 (omitted category)	0.37 (660)	0.39 (329)	0.37 (331)	[0.507]
HIP start date Dec. 1, 2011	0.36 (749)	0.36 (370)	0.36 (379)	
HIP start date Jan. 1, 2012	0.26 (545)	0.25 (281)	0.27 (264)	
AMPM interview characteristics (N=3955)[a]				
Recall interview				
First or only recall interview (omitted category)	0.89 (3521)	0.89 (1778)	0.89 (1743)	[0.996]
Second recall interview	0.11 (434)	0.11 (201)	0.11 (233)	
Day of intake				
Weekday recall interview (omitted category)	0.86 (3379)	0.85 (1680)	0.86 (1699)	[0.449]
Weekend recall interview	0.14 (576)	0.15 (299)	0.14 (277)	
Intake described relative to usual levels				
Same as usual (omitted category)	0.09 (368)	0.09 (175)	0.10 (193)	[0.020]**
More than usual	0.60 (2420)	0.62 (1226)	0.60 (1194)	
Less than usual	0.27 (1029)	0.26 (511)	0.27 (518)	
Missing (don't know or break-off)	0.04 (136)	0.03 (65)	0.04 (71)	
Respondent demographics				
Age group				
16-30 years	0.34 (585)	0.31 (278)	0.34 (307)	[0.466]
31-40 years	0.18 (373)	0.19 (182)	0.18 (191)	
41-54 years	0.24 (505)	0.26 (257)	0.24 (248)	
55+ years (omitted category)	0.24 (491)	0.24 (263)	0.24 (228)	
Gender				
Male (omitted category)	0.34 (618)	0.34 (307)	0.34 (311)	[0.780]
Female	0.66 (1336)	0.66 (673)	0.66 (663)	

	Total	Treatment	Control	P-value
Race/ethnicity				
Hispanic	0.43 (823)	0.42 (407)	0.43 (416)	[0.781]
Non-Hispanic white (omitted category)	0.37 (727)	0.38 (381)	0.37 (346)	
Non-Hispanic black	0.14 (279)	0.14 (134)	0.14 (145)	
Non-Hispanic other	0.07 (125)	0.06 (58)	0.07 (67)	
Baseline fruit & vegetable screener				
100% juice	1.58 (0.07)	1.45 (0.07)	1.60 (0.09)	[0.180]
Fruit	0.84 (0.04)	0.79 (0.04)	0.84 (0.04)	[0.355]
Salad	0.38 (0.02)	0.36 (0.02)	0.38 (0.02)	[0.368]
Fried potatoes	0.10 (0.01)	0.10 (0.01)	0.10 (0.01)	[0.688]
Other potatoes	0.28 (0.01)	0.27 (0.01)	0.28 (0.01)	[0.688]
Beans	0.26 (0.01)	0.26 (0.02)	0.25 (0.01)	[0.676]
Other vegetables	0.61 (0.02)	0.61 (0.03)	0.61 (0.03)	[0.988]
Tomato sauce	0.15 (0.01)	0.16 (0.01)	0.15 (0.01)	[0.564]
Salsa	0.01 (<0.01)	0.02 (<0.01)	0.01 (0.01)	[0.416]
Composite scales				
Fruits & vegetables available at home	4.01 (0.02)	3.97 (0.02)	4.02 (0.02)	[0.135]
Positive attitudes about food, fruits, & vegetables	3.88 (0.02)	3.87 (0.02)	3.88 (0.02)	[0.744]
Barriers to eating fruits & vegetables	2.42 (0.02)	2.44 (0.02)	2.41 (0.02)	[0.318]
Barriers to grocery shopping	2.15 (0.03)	2.17 (0.04)	2.15 (0.04)	[0.698]

Weighted proportions and unweighted Ns for categorical variables; means and standard deviations for continuous variables (fruit and vegetable screener and composite scales).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported proportions may not sum to one.
[a]Descriptive statistics for sample including both first and second day interviews. AMPM test statistics are adjusted for clustering at the individual respondent level.
Source: DTA SNAP Caseload Data; Participant Survey (respondent module) (unweighted N=1,954).

Ordinary least squares (OLS) regressions were performed in Stata using the standard **svy** suite of commands and respondent weights to account for the complex sampling structure. (We discuss the estimation of standard errors below in Section E.4.) Following the regression, the **margins** command was used to estimate regression-adjusted means and standard errors.

E.2 Limited Dependent Variables

Equation (E.1) presents our multivariate model for continuous outcomes—in particular, our single confirmatory outcome, TFV. However, some of our outcome variables are not continuous. For example, respondent reports of whether they had seen or heard messages about fruits and vegetables in the past three months yield a binary outcome (responses equal to either "yes" or "no"). In addition, many questions about attitudes and preferences (e.g., degree of agreement with statements like "I enjoy trying new foods") are Likert scales, coded 1 to 5 (with 1 indicating "strongly disagree" and 5 indicating "strongly agree," for this example). Likert scales are ordinal (i.e., ordered), but not interval (i.e., the number itself is not meaningful). Complete distributions of our binary and ordered scale outcomes at baseline are reported in Appendix F.

By analogy with our approach to the estimation of the impact of HIP for continuous outcomes, we also want a multivariate specification for binary and ordered outcomes. With respect to binary variables, there is some controversy in the literature about how to estimate impact in the random assignment context. Related issues are raised by ordered scales. Our preference is to use linear regression for both binary and ordered scale outcomes (Angrist, 2001; Angrist and Pischke, 2008). This is our preference because we report impacts in terms of percentage points and thus prefer to do estimation in terms of percentage points. Failure to do so can result in a range of anomalous results (especially with subgroup analyses).

Our primary specification thus simply treats binary and ordered scale outcomes as if they were continuous and applies linear regression. (In the case of binary outcomes, this approach is known as a "linear probability model" specification.) As is always true, this gives the best linear predictor—where best is defined in a least squares sense, given the outcome (e.g., treating the ordinal outcomes as if they were interval). This approach gives a simple summary measure for whether HIP shifts the distribution. Again, we use robust standard errors to address deviations from distributional assumptions.

Another approach is to estimate the corresponding canonical limited dependent variable models (Maddala, 1983). The argument for using the corresponding canonical limited dependent variable models is that the linear probability model cannot be the correct specification because it does not model the limited dependent variable nature of the data and that it can yield predictions out of the range of the dependent variable.

For a binary outcome, the canonical model is logistic regression; i.e.,

$$\text{(E.2)} \quad \ln\left[odds\left(y_{h,r,i}\right)\right] = \beta_0 + \beta_1 HIP_h + \beta_2 ControlVars_{h,r,i} + \varepsilon_{h,r,i}$$

where odds(y=1) indicates the odds that the binary outcome happened, ln is the natural logarithm operator, and ε is assumed to have an extreme value distribution. Estimation proceeds by maximum likelihood. For ordered outcomes, the equivalent model is ordered logistic regression (see Maddala, 1983, for a formal specification). In Appendix F of this report, we provided estimates using the canonical limited dependent variable models for non-continuous outcomes. Results using the corresponding canonicial limited dependent variable model were qualitatively similar to those using linear regression.

E.3 Subgroup Analyses

We performed subgroup analyses to test whether outcomes varied by baseline demographics, attitudes, and behaviors. All subgroup analyses are considered exploratory. Specifically, subgroup analyses proceed using a generalization of our earlier regression model:

$$\text{(E.3)} \quad \begin{aligned} y_{h,r,i} &= \beta_0 + \beta_2 ControlVars_{h,r,i} \\ &+ \beta_3 HIP_h Subgroup\_1\_Dummy_h + \beta_4 HIP_h Subgroup\_2\_Dummy_h + \varepsilon_{h,r,i} \end{aligned}$$

Unless explicitly noted in the discussion, each of the subgroups is defined using only Round 1 characteristics, so there is no endogenous selection (i.e., subgroup membership was not itself affected by HIP). In particular, *Subgroup_1_Dummy* is a binary variable (e.g., =1 if the primary shopper is employed, =0 otherwise), and *Subgroup_2_Dummy* is the reverse (e.g., =0 if the primary shopper is employed, =1 otherwise). Testing for $\beta_3=\beta_4$ provides a test for differences across subgroups.

In practice, we discuss sub-group results as follows. We begin by examining the results of the test for $\beta_3=\beta_4$. If we fail to reject (i.e., impacts do not significantly differ by subgroups), then we simply report that there was no difference in impact across this subgroup. If we reject, we conclude that there was a difference in impact across the subgroups. We then discuss the estimated impact in each of the subgroups.

E.4 Survey Weights, Standard Errors, and Confidence Intervals

Unless otherwise noted, all analyses of survey data use person-level or household-level survey weights depending on the unit of analysis. As a result, the sample estimates provide unbiased estimates of the corresponding population statistics (for those who consent and complete the Round 1 survey) in the pilot site. Construction of those survey weights was discussed in Appendix C.

Standard errors and confidence intervals take account of the survey design, using the replicate sampling weights. All standard error estimates are robust to heteroscedasticity.[173]

The analysis uses all available interviews. For approximately 10 percent of the sample, there was a second interview at Round 2. For a different approximately 10 percent of the sample, there was a second interview at Round 3. For about 1 percent of the sample, there was a second interview at both Round 2 and Round 3, yielding a total of five interviews (baseline, two at Round 2 and two at Round 3). As discussed below in Section E.8, this second interview in a given round of the survey allows the estimation of “usual intake.”

Even analyses of non-usual intake use all of the available interviews. Specifically, the analyses reported here pool the first and (where available) second interviews from Round 2 and Round 3. Multiple interviews for a given household introduce non-independence into the reported outcomes. To address this non-independence, analysis proceeds by clustering on household, using the appropriate survey commands in Stata, with household specified as the clustering variable.

E.5 Testing for Inter-Round Change

We use a slightly different method to test for and estimate inter-round change. It is possible to test for inter-round change in the framework provided by Equation (E.3); i.e., to treat Round 2 and Round 3 as subgroups. However, this approach ignores the fact that we have observations on the same households at Round 2 and Round 3. Given that we have observations on the same households at Round 2 and Round 3, a within estimator will be more efficient. By analogy to simple univariate statistics, Equation (E.3) is the equivalent of a simple t-test, with correct standard errors; however, it would be preferable to use a paired t-test.

Specifically, we estimate equations of the form:

$$\text{(E.4)} \quad \begin{aligned} y_{h,r,i} &= \beta_0 + \beta_2 ControlVars_{h,r,i} \\ &+ \beta_3 HIP_h Round\_2\_Dummy_h + \beta_4 HIP_h Round\_3\_Dummy_h + \mu_h + \varepsilon_{h,r,i} \end{aligned}$$

Where the only change is that we specify the subgroup as Round 2/Round 3 and include a fixed effect, μ, that is common for all of the observations for a given household. Rather than estimating all of the fixed effects, estimation proceeds via a within transformation.

173 Randomization does not guarantee homoscedasticity, and the linear probability model on binary outcomes induces heteroscedasticity.

E.6 Multiple Comparisons

Having a large number of hypothesis tests creates a danger of finding "false positives," seemingly significant impacts when in fact the true impact of HIP is zero. For each hypothesis test, a conventional approach allows a 5 percent chance of incorrectly rejecting the null hypothesis (a Type I error) and concluding that an impact has occurred where none has. With more than one test, and especially with a large number of tests as is true in this evaluation, the risk of Type I error increases. Hence, it is recommended to identify a single confirmatory outcome ahead of time (Schochet, 2008).

To address this multiple-comparisons problem, we have specified one "confirmatory" outcome for a study: ***the HIP/non-HIP difference in TFV intake, pooling on data from Rounds 2 and 3 of the participant survey***, using regression adjustment for control variables.

The Updated Study Plan described the following strategy for using the result of the test for significance of the confirmatory outcome in writing up all of the results:

> If the main confirmatory HIP/non-HIP difference is statistically significant at the 5 percent level, we will use the conventional approach to testing HIP/non-HIP differences for all outcomes and subgroups. In presenting results, we will describe analyses other than the main confirmatory outcome as "exploratory," pointing out that occasional "significant" differences could appear simply due to sampling variation in multiple hypothesis tests.
>
> If the main confirmatory HIP/non-HIP difference is statistically insignificant at the 5 percent level, we will still use the conventional approach to testing differences for all outcomes and subgroups, but the accompanying discussion will warn that seemingly significant differences for particular outcomes and subgroups could be spurious. As before, the discussion will describe the analysis of these other outcomes and subgroups as exploratory. The Executive Summary and other summary documents will simply report that the HIP evaluation found no significant impact on the main outcome and not mention any of the exploratory results.

E.7 Sensitivity to Outliers

We conducted further analysis in order to confirm that significant findings were not due to the presence of outliers. We ran frequencies and univariate statistics for continuous outcomes on which HIP had a significant impact (29 variables total). Outliers were identified by examining the distributions and considering reasonable values for each outcome. Models were then re-run with outliers excluded. The vast majority of impacts were robust to the exclusion of outliers. However, the exclusion of outliers did alter the results in three cases (see Exhibits 8.5, 8.6, and 8.13).

E.8 Usual Intake Estimation

A single 24-hour dietary recall measures consumption at one point in time. However, intake estimates calculated based on a single day of recall data may not accurately represent long-term average intake for that individual, referred to as "usual intake." The distribution of single-day intake has a larger variance than the distribution of usual intake because there is substantial variation in consumption patterns from day to day.

For estimating impacts on mean intake levels, large day-to-day within-person variation does not pose a problem, as a simple comparison of means across subgroups is sufficient to obtain unbiased estimates. However, estimating the *proportion* of the population with intake above or below some standard (e.g. USDA Food Pattern food group serving guidelines for fruit and vegetable intakes) based on a single day of recall data (or even a two-day average) will lead to biased estimates. The large day-to-day within-person variation will also lead to loss of statistical power in regression-based analyses. While multiple days of intake tend to be more representative of usual intakes of individuals, it is not practical to collect more than one day of intake on the entire sample proposed (without either dramatically increasing the cost of the study and/or reducing the sample size and power to detect differences in intake).

There are, however, statistical methods for estimating usual intake for samples in which a subset of respondents report a second day of recall data (IOM, 2000a). Usual intake in these models is conceptualized as the *probability* of consumption on a given day times the average *amount* consumed on a "consumption day."

Our study incorporated collection of a second, nonconsecutive day of diary-assisted 24-hour dietary recall data for a 10 percent subsample of respondents. This strategy allowed us to employ standard statistical dietary assessment methodology to estimate the distribution of usual intake for our study population, yielding valid estimates of the prevalence of inadequate intake.

According to current IOM dietary assessment guidance, for estimation of usual intake the *number* of replicate observations is more important than the *proportion* of replicate observations relative to the full sample. Nusser et al. (1996) recommend that replicate data be collected on not fewer than about 50 or 60 subjects. IOM guidance notes that replicate subsamples consisting of fewer than 70 to 80 individuals have been successfully used in the past to obtain usual intake estimates (IOM, 2000b).

Our proposed representative second-day replicate 10 percent sample was intended to include at least 200 respondents per round, 100 HIP participants and 100 non-HIP participants, far exceeding the recommended IOM recommendations for the number of replicate observations for obtaining usual intake estimates. In fact, by standard IOM guidance this replicate sample would be adequate for estimating usual intake for subgroups comprising ~38 percent or more of respondents completing second-day interviews, or approximately 75 respondents in the intervention group and 75 respondents in the control group.

We estimated usual intake distributions based on the coded first- and second-day 24-hour dietary recall data employing methodology recently developed by the National Cancer Institute (NCI) in collaboration with staff at the USDA Center for Nutrition Policy and Promotion. The NCI method models usual intake as the product of the probability of consumption on a given day and the average amount consumed per consumption day. See Tooze et al. (2006) for a detailed description of the NCI method.

Advantages of the NCI Method

Like the Iowa State University (ISU) method, the previous standard for estimating usual intake (Nusser et al., 1996; Carriquiry, 2003), the NCI method takes into account reported zero-consumption days and reported consumption-day amounts that are positively skewed, and distinguishes between within-person and between-person variation in consumption. The NCI method has two advantages over the ISU method. First, it allows for correlation between amount and frequency of consumption, and permits the incorporation of covariates such as weekend indicators or supplementary information on frequency of fruit and vegetable consumption from a food frequency questionnaire (FFQ) or similar instrument, which in some cases can improve the power to detect relationships between dietary intake and other variables (Subar et al., 2006).

Second, unlike the ISU method, the NCI method allows for efficient estimation of usual intake for subgroups. Instead of stratifying the sample by subpopulation and estimating usual intake separately for each subgroup, we include covariates defining subgroups in the NCI model, such that covariate values differ across the subgroups, but the (harder to estimate) variance components are assumed common, and estimated from the full sample. For subgroups of respondents comprising a relatively small proportion of the full sample, the efficiency gains from this capability are likely to be substantial.

Regularly and Episodically Consumed Dietary Components

We produced usual intake estimates for two broad types of dietary components: 1) nutrients, including beta carotene, vitamin A, vitamin C, and fiber; and 2) foods and food groups, such as fruits, vegetables, and corresponding subgroups, and other food groups of interest, including those used to compute HEI-2010 scores.

Nutrients are consumed by nearly every individual in the population on a daily basis. In contrast, some foods and food groups of interest may be consumed on only an episodic basis. For example, a respondent may not eat dark-green vegetables or citrus fruits every day. To estimate usual intake distributions for nutrients and other dietary components that are consumed regularly (non-zero consumption for at least 90 percent of sample respondents), we employed a version of the NCI method in which only the amount of consumption is estimated. To estimate usual intake distributions for episodically consumed dietary components such as fruits and vegetables, we employed a two-part model, in which both probability and amount of consumption are estimated.

Estimation Procedures

Our estimation procedures followed Tooze et al. (2006), using SAS macros supplied on the NCI website. In both the amount-only and the two-part models, the amount data were first transformed to approximate normality using the Box-Cox transformation. Then, using the transformed data, for each individual in the sample, we estimated a linear predictor of amount of consumption. Estimation proceeded via a generalized linear model with model covariates including respondent gender and age group, and measures of baseline consumption levels of fruits, leafy greens, and other vegetables from the EATS fruit and vegetable screener.[174] Parameter estimates from this model were then used as starting values in a nonlinear mixed model with person-specific random effects.

In the two-part models for episodically consumed dietary components (non-zero consumption for 10 percent or more of the sample), probability of any consumption was additionally estimated via

---

174 As a sensitivity check, we additionally performed test runs for one outcome with the full set of covariates used in the main impact analyses (respondent gender, race/ethnicity, age group; household characteristics including geographic location of residence, household size and composition, and gender of household head; AMPM interview characteristics (weekend vs. weekday; respondent assessment of intake relative to usual levels); measures of baseline consumption levels from the EATS fruit and vegetable screener; and baseline composite scales derived from questions about the home food environment, barriers to grocery shopping, and attitudes about and barriers to consumption of fruits and vegetables). As these runs did not result in any material differences in findings, we used the more limited set of covariates to improve processing speed.

logistic regression, with the same set of model covariates as in the amount specification. Parameter estimates from the logistic regression were then used as starting values in a nonlinear mixed model with person-specific random effects. The probability model was then linked with the amount model by using the parameter estimates from the two uncorrelated specifications as starting values for a model in which the two person-specific random effects are permitted to be correlated.

Next, Monte Carlo simulation was used to generate random effects for 100 pseudo-persons for each respondent in the original sample. The random effect was then added to the linear predictor for each pseudo-person, and the amount estimates were back-transformed to the original scale with Taylor linearization. Means and percentiles were estimated empirically from the resulting distribution.

Assessing Overall Dietary Quality

The 2010 Dietary Guidelines for Americans (DGA) establish recommendations for daily consumption by food group and subgroup, including fruits and vegetables. Standard usual intake procedures allowed us to estimate the proportion of respondents meeting these recommendations, in both the HIP and non-HIP groups. Comparing these two estimates allowed us to determine the impact of HIP on compliance with DGA recommendations.

Appendix F: Baseline Outcomes, Alternative Models, and Other Supplemental Tables

This appendix contains supplemental tables, alternative models, and baseline differences on outcome variables. Exhibits are organized by the report chapter to which they correspond.

F.1 Chapter 1 Supplemental Table: Definition of TFVs

Exhibit F1.1: Minimum Requirements and Specifications for WIC Fruits and Vegetables

Any variety of fresh whole or cut fruit without added sugars.[a]
Any variety of fresh whole or cut vegetable, except white potatoes, without added sugars, fats, or oils (orange yams and sweet potatoes are allowed). [a]
Any variety of canned[b] fruits (must conform to FDA standard of identity (21 CFR Part 145); including applesauce, juice pack or water pack without added sugars, fats, oils, or salt (i.e. sodium). Any variety of frozen fruits without added sugars.[c]
Any variety of canned[b] or frozen vegetables (must conform to FDA standard of identity (21 CFR Part 155)) except white potatoes (orange yams and sweet potatoes are allowed); without added sugars, fats, or oils. May be regular or lower in sodium.[c]
Any type of dried fruits or dried vegetable without added sugars, fats, oils, or salt (i.e., sodium).[a]

[a]Herbs or spices; edible blossoms and flowers, e.g., squash blossoms (broccoli, cauliflower and artichokes are allowed); creamed or sauced vegetables; vegetable-grain (pasta or rice) mixtures; fruit-nut mixtures; breaded vegetables; fruits and vegetables for purchase on salad bars; peanuts; ornamental and decorative fruits and vegetables such as chili peppers on a string; garlic on a string; gourds; painted pumpkins; fruit baskets and party vegetable trays; and items such as blueberry muffins and other baked goods are not authorized. Mature legumes (dry beans and peas) and juices are not authorized.
[b]"Canned" refers to processed food items in cans or other shelf-stable containers, e.g., jars, pouches. Home canned fruits and vegetables, such as those sold at Farmers Markets, are not allowable.
[c]Excludes white potatoes; catsup or other condiments; pickled vegetables, olives; soups; juices; and fruit leathers and fruit roll-ups.
Source: Reproduced from FNS Request for Application, Supplemental Nutrition Assistance Program (SNAP), Healthy Incentives Pilot (HIP), CFDA #:10.580, Figure 1.

F.2 Chapter 2 Supplemental Tables: Baseline Characteristics and Balance Tests

Chapter 2 supplemental tables include additional baseline characteristics of respondents completing follow-up surveys (Exhibits F2.1–F2.3) and additional HIP/non-HIP balance tests (Exhibit F2.4–F2.8).

Exhibit F2.1: Baseline Characteristics of Respondents Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

	Total	Treatment	Control	P-value
Age group				
16–30 years	0.34 (585)	0.31 (278)	0.34 (307)	[0.466]
31–40 years	0.18 (373)	0.19 (182)	0.18 (191)	
41–54 years	0.24 (505)	0.26 (257)	0.24 (248)	
55+ years	0.24 (491)	0.24 (263)	0.24 (228)	
Gender				
Male	0.34 (618)	0.34 (307)	0.34 (311)	[0.780]
Female	0.66 (1336)	0.66 (673)	0.66 (663)	
Race/ethnicity				
Hispanic	0.43 (823)	0.42 (407)	0.43 (416)	[0.781]
Non-Hispanic white	0.37 (727)	0.38 (381)	0.36 (346)	
Non-Hispanic black	0.14 (279)	0.14 (134)	0.14 (145)	
Non-Hispanic other	0.07 (125)	0.06 (58)	0.07 (67)	
Disability status				
Disabled	0.49 (999)	0.50 (520)	0.49 (479)	[0.721]
Not disabled	0.51 (955)	0.50 (460)	0.51 (495)	
Citizenship				
US citizen	0.95 (1874)	0.96 (944)	0.95 (930)	[0.435]
Not a US citizen	0.05 (80)	0.04 (36)	0.05 (44)	
Unemployment compensation				
Receiving unemployment compensation	0.04 (84)	0.05 (50)	0.03 (34)	[0.021]**
Not receiving unemployment compensation	0.96 (1870)	0.95 (930)	0.97 (940)	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported proportions may not sum to one.
Source: DTA SNAP Caseload Data (unweighted N=1954).

Exhibit F2.2: Self-Reported Baseline Characteristics of Respondents Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

	Total	Treatment	Control	P-value
Ethnicity (N=1947)				
Hispanic/Latino	0.51 (1023)	0.53 (523)	0.51 (500)	[0.510]
Not Hispanic/Latino	0.49 (924)	0.47 (452)	0.49 (472)	
Race (N=1904) [a]				
White	0.47 (891)	0.47 (458)	0.47 (433)	[0.998]
Black or African American	0.16 (324)	0.17 (158)	0.16 (166)	[0.514]
Asian	0.01 (18)	0.01 (11)	0.01 (7)	[0.346]
Native Hawaiian or Pacific Islander	0.01 (17)	0.01 (12)	0.01 (5)	[0.147]
American Indian or Alaskan Native	0.06 (98)	0.05 (44)	0.06 (54)	[0.358]
Other race	<0.01 (2)	0.00 (0)	<0.01 (2)	[0.575]
Reports race as Hispanic only	0.34 (644)	0.34 (318)	0.34 (326)	[0.848]
Marital status (N=1953)				
Married	0.15 (285)	0.13 (134)	0.16 (151)	[0.797]
Not married but living with partner	0.08 (162)	0.08 (82)	0.08 (80)	
Widowed	0.07 (145)	0.07 (80)	0.06 (65)	
Divorced	0.16 (332)	0.17 (172)	0.16 (160)	
Separated	0.09 (189)	0.10 (97)	0.09 (92)	
Never Married	0.44 (840)	0.44 (414)	0.44 (426)	
Education level (N=1945)				
Never attended/kindergarten only	0.01 (24)	0.02 (14)	0.01 (10)	[0.363]
1st grade	<0.01 (7)	<0.01 (3)	<0.01 (4)	
2nd grade	<0.01 (10)	<0.01 (5)	<0.01 (5)	
3rd grade	0.01 (24)	0.01 (10)	0.02 (14)	
4th grade	0.02 (42)	0.03 (29)	0.01 (13)	
5th grade	0.01 (22)	0.01 (9)	0.01 (13)	
6th grade	0.02 (43)	0.02 (24)	0.02 (19)	
7th grade	0.02 (40)	0.02 (17)	0.02 (23)	
8th grade	0.03 (70)	0.04 (37)	0.03 (33)	
9th grade	0.07 (153)	0.09 (85)	0.07 (68)	
10th grade	0.07 (144)	0.08 (78)	0.07 (66)	
11th grade	0.11 (199)	0.09 (83)	0.11 (116)	
12th grade, no diploma	0.04 (87)	0.05 (50)	0.04 (37)	
High school graduate	0.20 (381)	0.18 (178)	0.21 (203)	
GED or equivalent	0.08 (158)	0.08 (74)	0.09 (84)	
Some college, no degree	0.14 (273)	0.14 (140)	0.13 (133)	
Associate degree: occ/tech/voc	0.06 (114)	0.06 (56)	0.06 (58)	
Associate degree: academic program	0.02 (50)	0.03 (28)	0.02 (22)	
Bachelor's degree	0.04 (71)	0.04 (36)	0.04 (35)	
Master's degree	0.01 (19)	0.01 (11)	0.01 (8)	
Professional school degree	<0.01 (11)	<0.01 (6)	<0.01 (5)	
Doctoral degree	<0.01 (3)	<0.01 (1)	<0.01 (2)	
Language spoken at home (N=1954) [a]				
English	0.82 (1605)	0.83 (807)	0.82 (798)	[0.679]
Spanish	0.42 (808)	0.41 (402)	0.42 (406)	[0.894]
Other	0.06 (110)	0.05 (52)	0.06 (58)	[0.270]
Respondent interview language (N=1954)				
English	0.76 (1480)	0.75 (738)	0.76 (742)	[0.444]
Spanish	0.24 (474)	0.25 (242)	0.24 (232)	

	Total	Treatment	Control	P-value
Proxy needed for interview (N=1954)				
Proxy needed	0.02 (41)	0.02 (21)	0.02 (20)	[0.840]
No proxy needed	0.98 (1913)	0.98 (959)	0.98 (954)	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" and "refused" responses coded as missing.
Due to rounding, reported proportions may not sum to one.
[a]Respondents selected all options that applied; proportions therefore sum to more than one.
Source: Participant Survey (respondent module, AMPM dietary recall module).

Exhibit F2.3: Self-Reported Baseline Characteristics of Primary Shoppers Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

	Total	Treatment	Control	P-value
Employment status (N=1845)				
Working full-time	0.11 (190)	0.10 (87)	0.11 (103)	[0.608]
Working part-time	0.11 (189)	0.10 (89)	0.11 (100)	
Temporarily laid off	0.01 (15)	0.01 (6)	0.01 (9)	
Sick or maternity leave	<0.01 (8)	<0.01 (4)	<0.01 (4)	
Looking for work	0.13 (233)	0.13 (118)	0.13 (115)	
Unemployed	0.06 (111)	0.06 (57)	0.06 (54)	
Retired	0.10 (199)	0.10 (101)	0.11 (98)	
Disabled, permanently or temporarily	0.30 (570)	0.31 (295)	0.29 (275)	
Keeping house	0.12 (227)	0.12 (116)	0.12 (111)	
Student	0.05 (103)	0.07 (60)	0.05 (43)	
Primary shopper interview language (N=1851)				
English	0.77 (1430)	0.77 (726)	0.77 (704)	[0.944]
Spanish	0.23 (421)	0.23 (211)	0.23 (210)	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know," "refused," and "not ascertained" responses coded as missing.
Due to rounding, reported proportions may not sum to one.
Source: Participant Survey (primary shopper module).

Exhibit F2.4: HIP/Non-HIP Balance from the SNAP Caseload Files, Disaggregated by Survey and Non-Survey Samples

	Number of households				Retention rate				Ratio (HIP/Non-HIP)	
	HIP, non-survey (1)	HIP, survey (2)	Non-HIP, survey (3)	Non-HIP, non-survey (4)	HIP, non-survey (%) (5)	HIP, survey (%) (6)	Non-HIP, survey (%) (7)	Non-HIP, non-survey (%) (8)	Survey (%)	Non-Survey (%)
September 2011	4,596	2,356	2,326	41,780	100.0	100.0	100.0	100.0	100.0	100.0
October 2011	4,462	2,270	2,266	40,855	97.1	96.3	97.4	97.8	98.9	99.6
November 2011	4,375	2,228	2,234	40,087	95.2	94.6	96.0	95.9	98.5	100.1
December 2011	4,302	2,192	2,210	39,311	93.6	93.0	95.0	94.1	97.9	101.0
January 2012	4,264	2,190	2,209	39,273	92.8	93.0	95.0	94.0	97.9	101.1
February 2012	4,220	2,175	2,187	38,865	91.8	92.3	94.0	93.0	98.2	101.1
March 2012	4,142	2,145	2,150	38,397	90.1	91.0	92.4	91.9	98.5	100.5
April 2012	4,137	2,112	2,118	37,958	90.0	89.6	91.1	90.9	98.4	100.2
May 2012	4,120	2,091	2,093	37,695	89.6	88.8	90.0	90.2	98.7	99.8
June 2012	4,078	2,075	2,082	37,404	88.7	88.1	89.5	89.5	98.4	100.0
July 2012	4,053	2,059	2,068	37,055	88.2	87.4	88.9	88.7	98.3	100.2
August 2012	3,994	2,039	2,003	36,358	86.9	86.5	86.1	87.0	100.5	99.0
September 2012	3,961	2,029	2,013	36,106	86.2	86.1	86.5	86.4	99.5	100.1
October 2012	3,889	1,962	1,964	35,445	84.6	83.3	84.4	84.8	98.7	99.5

Source: DTA SNAP Caseload Data.

Exhibit F2.5: HIP/Non-HIP Balance: Baseline Characteristics (July 2011) for Study Participants on SNAP in May 2012

Variable	Total (proportion)	Treatment (proportion)	Control (proportion)	P-value
Race/ethnicity of head				
Hispanic	0.44	0.45	0.44	[0.378]
Non-Hispanic white	0.36	0.36	0.36	[0.176]
Non-Hispanic black	0.13	0.13	0.13	[0.525]
Non-Hispanic other	0.07	0.07	0.07	[0.998]
Spanish spoken in household	0.23	0.23	0.23	[0.455]
Age of head				
16-30	0.26	0.26	0.26	[0.372]
31-40	0.21	0.21	0.21	[0.489]
41-54	0.27	0.26	0.27	[0.167]
Over 54	0.27	0.26	0.27	[0.895]
Household head disabled	0.53	0.54	0.53	[0.635]
Household head U.S. citizen	0.96	0.96	0.96	[0.331]
Household composition				
Elderly (with or without children) in household	0.13	0.13	0.13	[0.524]
Children (no elderly) in household	0.38	0.38	0.38	[0.892]
No elderly or children in household	0.49	0.49	0.49	[0.763]
Housing type				
Private	0.80	0.80	0.80	[0.521]
Public	0.15	0.15	0.15	[0.275]
Other	0.05	0.05	0.05	[0.546]
Household is homeless	0.06	0.05	0.06	[0.806]
Monthly household gross income				
$0	0.21	0.21	0.21	[0.495]
$1-787	0.27	0.28	0.27*	[0.067]*
$788-1,082	0.27	0.27	0.27	[0.936]
$1,083 or higher	0.25	0.24	0.25	[0.190]
Types of income received by head				
SSI	0.36	0.36	0.36	[0.906]
Social Security	0.30	0.30	0.30	[0.962]
TANF	0.14	0.14	0.14	[0.929]
Unemployment compensation	0.04	0.04	0.04	[0.357]
Other unearned income	0.63	0.64	0.63	[0.203]
SNAP monthly benefit amount				
$160 or less	0.25	0.26	0.25	[0.234]
$161-$200	0.38	0.38	0.38	[0.538]
$201-$349	0.11	0.11	0.11	[0.454]
$350 or higher	0.26	0.25	0.26	[0.301]
Sample size	45,955	6,204	39,751	
F-value[a]		0.87		
P-value[a]		0.658		

Two-sided t-test: *p<0.1, **p<0.05, ***p<0.01.
[a]Variables included in F-test, but not shown in table: Baystate combined application project (CAP) status for SSI recipients; recertification type (semiannual reporting, recertification, other).
Source: DTA SNAP Caseload Data.

Exhibit F2.6: HIP/Non-HIP Balance: Baseline Characteristics (July 2011) for Study Participants on SNAP in October 2012

Variable	Total (proportion)	Treatment (proportion)	Control (proportion)	P-value
Race/ethnicity of head				
Hispanic	0.44	0.45	0.44	[0.827]
Non-Hispanic white	0.36	0.36	0.36	[0.485]
Non-Hispanic black	0.13	0.13	0.13	[0.757]
Non-Hispanic other	0.07	0.07	0.07	[0.621]
Spanish spoken in household	0.23	0.24	0.23	[0.730]
Age of head				
16-30	0.25	0.26	0.25	[0.605]
31-40	0.21	0.21	0.21	[0.434]
41-54	0.27	0.27	0.27	[0.377]
Over 54	0.27	0.27	0.27	[0.734]
Household head disabled	0.54	0.55	0.54	[0.287]
Household head U.S. citizen	0.96	0.96	0.96	[0.259]
Household composition				
Elderly (with or without children) in household	0.13	0.13	0.14	[0.253]
Children (no elderly) in household	0.39	0.38	0.39	[0.713]
No elderly or children in household	0.48	0.49	0.48	[0.255]
Housing type				
Private	0.80	0.80	0.80	[0.645]
Public	0.15	0.15	0.15	[0.415]
Other	0.05	0.05	0.05	[0.621]
Household is homeless	0.05	0.05	0.05	[0.800]
Monthly household gross income				
$0	0.21	0.20	0.21	[0.593]
$1-787	0.27	0.28	0.27	[0.039]**
$788-1,082	0.28	0.28	0.28	[0.942]
$1,083 or higher	0.25	0.24	0.25	[0.090]*
Types of income received by head				
SSI	0.37	0.37	0.37	[0.787]
Social Security	0.30	0.30	0.30	[0.739]
TANF	0.15	0.15	0.15	[0.942]
Unemployment compensation	0.04	0.04	0.04	[0.231]
Other unearned income	0.64	0.65	0.64	[0.156]
SNAP monthly benefit amount				
$160 or less	0.26	0.26	0.25	[0.316]
$161-$200	0.38	0.37	0.38	[0.547]
$201-$349	0.11	0.11	0.11	[0.247]
$350 or higher	0.26	0.25	0.26	[0.251]
Sample size	43,207	5,842	37,365	
F-value[a]		0.95		
P-value[a]		0.542		

Two-sided t-test: *p<0.1, **p<0.05, ***p<0.01.
[a]Variables included in F-test, but not shown in table: Baystate combined application project (CAP) status for SSI recipients; recertification type (semiannual reporting, recertification, other).
Source: DTA SNAP Caseload Data.

Exhibit F2.7: HIP/Non-HIP Balance: May 2012 Characteristics for Study Participants on SNAP in May 2012

Variable	Total (proportion)	Treatment (proportion)	Control (proportion)	P-value
Race/ethnicity of head				
Hispanic	0.44	0.45	0.44	[0.333]
Non-Hispanic white	0.36	0.35	0.36	[0.158]
Non-Hispanic black	0.13	0.13	0.13	[0.408]
Non-Hispanic other	0.07	0.07	0.07	[0.755]
Spanish spoken in household	0.23	0.23	0.23	[0.522]
Age of head				
16-30	0.23	0.24	0.23	[0.368]
31-40	0.21	0.22	0.21	[0.282]
41-54	0.27	0.26	0.27	[0.046]**
Over 54	0.28	0.28	0.28	[0.878]
Household head disabled	0.56	0.56	0.56	[0.749]
Household head U.S. citizen	0.96	0.96	0.96	[0.619]
Household composition				
Elderly (with or without children) in household	0.15	0.15	0.15	[0.890]
Children (no elderly) in household	0.37	0.37	0.37	[0.899]
No elderly or children in household	0.49	0.49	0.49	[0.980]
Housing type				
Private	0.80	0.80	0.80	[0.340]
Public	0.16	0.16	0.15	[0.410]
Other	0.04	0.04	0.04	[0.683]
Household is homeless	0.05	0.05	0.05	[0.404]
Monthly household gross income				
$0	0.19	0.19	0.19	[0.919]
$1-787	0.25	0.26	0.25	[0.034]**
$788-1,082	0.29	0.29	0.29	[0.766]
$1,083 or higher	0.27	0.26	0.27	[0.023]**
Types of income received by head				
SSI	0.37	0.37	0.37	[0.758]
Social Security	0.31	0.31	0.31	[0.990]
TANF	0.13	0.13	0.13	[0.435]
Unemployment compensation	0.03	0.03	0.03	[0.264]
Other unearned income	0.65	0.65	0.65	[0.606]
SNAP monthly benefit amount				
$160 or less	0.27	0.28	0.27	[0.219]
$161-$200	0.37	0.37	0.37	[0.302]
$201-$349	0.10	0.10	0.11	[0.366]
$350 or higher	0.25	0.25	0.25	[0.600]
Sample size	45,955	6,204	39,751	
F-value[a]		0.95		
P-value[a]		0.533		

Two-sided t-test: *p<0.1, **p<0.05, ***p<0.01.
[a]Variables included in F-test, but not shown in table: Baystate combined application project (CAP) status for SSI recipients; recertification type (semiannual reporting, recertification, other).
Source: DTA SNAP Caseload Data.

Exhibit F2.8 HIP/Non-HIP Balance: October 2012 Characteristics for Study Participants on SNAP in October 2012

Variable	Total (proportion)	Treatment (proportion)	Control (proportion)	P-value
Race/ethnicity of head				
Hispanic	0.44	0.45	0.44	[0.741]
Non-Hispanic white	0.36	0.36	0.36	[0.419]
Non-Hispanic black	0.13	0.13	0.13	[0.721]
Non-Hispanic other	0.07	0.07	0.07	[0.678]
Spanish spoken in household	0.23	0.23	0.23	[0.761]
Age of head				
16-30	0.22	0.22	0.22	[0.503]
31-40	0.21	0.22	0.21	[0.464]
41-54	0.27	0.27	0.27	[0.385]
Over 54	0.29	0.29	0.29	[0.675]
Household head disabled	0.57	0.58	0.57	[0.242]
Household head U.S. citizen	0.96	0.96	0.96	[0.210]
Household composition				
Elderly (with or without children) in household	0.15	0.15	0.15	[0.751]
Children (no elderly) in household	0.37	0.37	0.37	[0.922]
No elderly or children in household	0.48	0.49	0.48	[0.748]
Housing type				
Private	0.80	0.79	0.80	[0.489]
Public	0.16	0.17	0.16	[0.336]
Other	0.04	0.04	0.04	[0.696]
Household is homeless	0.05	0.05	0.05	[0.840]
Monthly household gross income				
$0	0.17	0.18	0.17	[0.555]
$1-787	0.25	0.26	0.25	[0.395]
$788-1,082	0.30	0.30	0.30	[0.597]
$1,083 or higher	0.28	0.27	0.28	[0.062]*
Types of income received by head				
SSI	0.39	0.39	0.39	[0.536]
Social Security	0.32	0.33	0.32	[0.582]
TANF	0.13	0.14	0.13	[0.147]
Unemployment compensation	0.03	0.03	0.03	[0.539]
Other unearned income	0.66	0.66	0.66	[0.334]
SNAP monthly benefit amount				
$160 or less	0.28	0.28	0.28	[0.655]
$161-$200	0.37	0.36	0.37	[0.707]
$201-$349	0.10	0.10	0.10	[0.536]
$350 or higher	0.25	0.25	0.25	[0.694]
Sample size	43,207	5,842	37,365	
F-value[a]		0.65		
P-value[a]		0.921		

Two-sided t-test: *p<0.1, **p<0.05, ***p<0.01.
[a]Variables included in F-test, but not shown in table: Baystate combined application project (CAP) status for SSI recipients; recertification type (semiannual reporting, recertification, other).
Source: DTA SNAP Caseload Data.

F.3 Chapter 4 Supplemental Tables: Early and Late HIP Implementation Retailer Experiences

Chapter 4 supplemental tables include tests for change between early and late HIP implementation in retailer experiences (Exhibits F4.1-F4.4) and more detailed reporting on problems and questions regarding HIP (Exhibits F4.5-F4.7).

Exhibit F4.1: Retailer Promotion of Fruits and Vegetables, Overall and by Store Type, Early and Late HIP Implementation Periods

How often does your store promote fruits and/or vegetables using these activities?	Overall				Supermarket				Grocery				Convenience			
	Early (%)	Late (%)	Change	P-value	Early (%)	Late (%)	Change	P-value	Early (%)	Late (%)	Change	P-value	Early (%)	Late (%)	Change	P-value
Posters or signs inside the store																
Once a month or more	35.0	54.4	19.4		82.8	72.0	-10.9		54.5	30.0	-24.5		0.0	51.2	51.2	
Less than once a month	37.1	18.0	-19.1		9.1	16.7	7.6		0.0	40.0	40.0		70.0	10.9	-59.1	
Never	27.9	27.7	-0.2	[0.031]**	8.1	11.4	3.3	[0.722]	45.5	30.0	-15.5	[0.026]**	30.0	37.9	7.9	[<0.001]***
Shelf tags																
Once a month or more	39.3	53.1	13.8		91.9	72.0	-19.9		41.7	37.5	-4.2		10.0	45.0	35.0	
Less than once a month	33.0	8.7	-24.3		8.1	9.8	1.8		16.7	37.5	20.8		55.0	0.0	-55.0	
Never	27.6	38.2	10.5	[0.003]***	0.0	18.2	18.2	[0.174]	41.7	25.0	-16.7	[0.461]	35.0	55.0	20.0	[<0.001]***
Posters or signs in store window or outside																
Once a month or more	22.9	45.1	22.2		55.6	57.6	2.0		33.3	12.5	-20.8		0.0	46.0	46.0	
Less than once a month	11.2	17.9	6.7		8.1	19.7	11.6		16.7	37.5	20.8		10.0	10.9	0.9	
Never	65.9	37.0	-28.8	[0.005]***	36.4	22.7	-13.6	[0.476]	50.0	50.0	0.0	[0.357]	90.0	43.0	-47.0	[<0.001]***
Fliers/ads in newspaper or direct mail																
Once a month or more	19.7	25.5	5.8		63.9	69.7	5.8		8.3	0.0	-8.3		0.0	0.0	0.0	
Less than once a month	16.2	16.4	0.2		36.1	23.5	-12.6		25.0	37.5	12.5		0.0	4.1	4.1	
Never	64.1	58.1	-6.0	[0.723]	0.0	6.8	6.8	[0.403]	66.7	62.5	-4.2	[0.575]	100.0	95.9	-4.1	[0.256]
Recipes or fliers in store																
Once a month or more	14.5	19.3	4.8		45.5	56.3	10.8		0.0	0.0	0.0		5.0	0.0	-5.0	
Less than once a month	17.0	7.5	-9.5		38.4	10.1	-28.3		18.2	12.5	-5.7		5.0	4.1	-0.9	
Never	68.5	73.2	4.7	[0.262]	16.2	33.6	17.5	[0.110]	81.8	87.5	5.7	[0.710]	90.0	95.9	5.9	[0.467]
Price or volume promotions																
Once a month or more	18.4	24.4	6.0		23.2	53.8	30.6		46.2	0.0	-46.2		0.0	9.9	9.9	
Less than once a month	50.1	25.0	-25.2		60.6	23.5	-37.1		23.1	62.5	39.4		60.0	13.9	-46.1	
Never	31.5	50.6	19.2	[0.014]**	16.2	22.7	6.6	[0.059]*	30.8	37.5	6.7	[0.031]**	40.0	76.2	36.2	[0.001]***
Food samples																
Once a month or more	22.3	21.3	-1.0		63.9	62.2	-1.7		18.2	0.0	-18.2		0.0	0.0	0.0	
Less than once a month	7.9	11.2	3.3		13.0	15.1	2.2		18.2	25.0	6.8		0.0	4.1	4.1	
Never	69.8	67.5	-2.4	[0.822]	23.1	22.7	-0.5	[0.982]	63.6	75.0	11.4	[0.380]	100.0	95.9	-4.1	[0.256]
Coupons																
Once a month or more	18.4	17.7	-0.7		69.7	43.7	-26.0		0.0	0.0	0.0		0.0	4.3	4.3	
Less than once a month	6.0	4.2	-1.8		6.1	0.0	0.0		18.2	28.6	10.4		0.0	0.0	0.0	
Never	75.6	78.1	2.5	[0.900]	24.2	56.3	32.1	[0.105]	81.8	71.4	-10.4	[0.564]	100.0	95.7	-4.3	[0.246]
Unweighted number of stores[a]	*39*	*49*			*8*	*14*			*14*	*12*			*17*	*23*		

Weighted percents and unweighted total Ns.

Chi-square test for categorical variables; *p<0.1, **p<0.05, ***p<0.01.
Unpaired tests were conducted due to limited overlap in the early and late implementation samples.
[a]N varies by question due to item non-response.
Source: Early and Late Implementation Retailer Surveys.

Exhibit F4.2: Retailer Fresh Fruit and Vegetable Inventory and Average Price/Lb, Overall and by Store Type, Early and Late HIP Implementation Periods

	Percent available (%) and mean price per pound ($)			
	Early Implementation	Late Implementation	Change	P-value
Apple				
Overall				
Available	81.0	80.6	-0.3	[0.961]
Price per pound	1.64	1.57	-0.07	[0.603]
Supermarket				
Available	100.0	95.5	-4.5	[0.360]
Price per pound	1.48	1.45	-0.03	[0.319]
Grocery				
Available	61.5	75.0	13.5	[0.422]
Price per pound	1.26	1.16	-0.10	[0.469]
Convenience				
Available	81.0	73.7	-7.2	[0.478]
Price per pound	1.90	1.82	-0.09	[0.254]
Banana				
Overall				
Available	85.2	88.6	3.4	[0.550]
Price per pound	1.10	1.06	-0.04	[0.618]
Supermarket				
Available	100.0	95.5	-4.5	[0.360]
Price per pound	0.64	0.65	0.01	[0.726]
Grocery				
Available	69.2	75.0	5.8	[0.720]
Price per pound	0.83	0.89	0.06	[0.765]
Convenience				
Available	85.7	89.8	4.1	[0.608]
Price per pound	1.50	1.40	-0.10	[0.527]
Orange				
Overall				
Available	76.4	74.1	-2.3	[0.750]
Price per pound	1.33	1.35	0.02	[0.704]
Supermarket				
Available	100.0	95.5	-4.5	[0.360]
Price per pound	1.46	1.32	-0.14	[0.791]
Grocery				
Available	61.5	66.7	5.1	[0.766]
Price per pound	0.86	1.08	0.22	[0.195]
Convenience				
Available	71.4	63.9	-7.6	[0.506]
Price per pound	1.45	1.47	0.02	[0.918]
Grape				
Overall				
Available	40.9	49.3	8.4	[0.320]
Price per pound	2.45	2.68	0.23	[0.380]

	Percent available (%) and mean price per pound ($)			
	Early Implementation	Late Implementation	Change	P-value
Supermarket				
Available	100.0	100.0	0.0	
Price per pound	2.63	3.01	0.38	[0.249]
Grocery				
Available	38.5	66.7	28.2	[0.115]
Price per pound	2.39	2.05	-0.34	[0.466]
Convenience				
Available	9.5	10.2	0.7	[0.927]
Price per pound	1.49	2.34	0.85	[0.249]
Carrot				
Overall				
Available	45.2	43.9	-1.3	[0.877]
Price per pound	1.48	1.42	-0.07	[0.763]
Supermarket				
Available	100.0	95.5	-4.5	[0.360]
Price per pound	1.43	1.40	-0.04	[0.978]
Grocery				
Available	46.2	50.0	3.8	[0.830]
Price per pound	1.69	1.28	-0.41	[0.340]
Convenience				
Available	14.3	9.9	-4.4	[0.573]
Price per pound	1.24	2.00	0.76	[0.145]
Tomato				
Overall				
Available	53.7	57.9	4.2	[0.618]
Price per pound	1.91	2.28	0.37	[0.200]
Supermarket				
Available	100.0	95.5	-4.5	[0.360]
Price per pound	2.41	2.75	0.34	[0.651]
Grocery				
Available	61.5	66.7	5.1	[0.766]
Price per pound	1.32	1.62	0.31	[0.053]*
Convenience				
Available	23.8	30.6	6.8	[0.535]
Price per pound	1.57	1.90	0.32	[0.447]
Broccoli				
Overall				
Available	38.9	40.6	1.7	[0.838]
Price per pound	1.83	1.53	-0.31	[0.144]
Supermarket				
Available	100.0	95.5	-4.5	[0.360]
Price per pound	1.85	1.54	-0.31	[0.310]
Grocery				
Available	30.8	41.7	10.9	[0.525]
Price per pound	1.86	1.49	-0.37	[0.402]

	Percent available (%) and mean price per pound ($)			
	Early Implementation	Late Implementation	Change	P-value
Convenience				
Available	9.5	6.6	-3.0	[0.653]
Price per pound	1.69	1.49	-0.20	[0.766]
Lettuce				
Overall				
Available	51.7	57.7	5.9	[0.483]
Price per pound	1.29	1.19	-0.10	[0.524]
Supermarket				
Available	100.0	100.0	0.0	
Price per pound	1.31	1.14	-0.18	[0.513]
Grocery				
Available	53.8	75.0	21.2	[0.220]
Price per pound	1.25	1.25	0.00	[0.997]
Convenience				
Available	23.8	23.8	0.0	[0.997]
Price per pound	1.3	1.27	-0.03	[0.886]
Unweighted number of stores[a]				
Overall	*39*	*49*		
Supermarket	*8*	*14*		
Grocery	*14*	*12*		
Convenience	*17*	*23*		

Weighted percents and means; unweighted total Ns.
Chi-square test for categorical variables, t-test for continuous variables; *p<0.1, **p<0.05, ***p<0.01.
Unpaired tests were conducted due to limited overlap in the early and late implementation samples.
Early Implementation Survey conducted from October-December 2011; Late Implementation Survey conducted from November 2012-January 2013.
[a]N varies by question due to skip patterns and item non-response.
Source: Early and Late Implementation Retailer Surveys.

Exhibit F4.3: Retailer Canned Fruit and Vegetable Inventory and Average Price/Lb, Overall and by Store Type, Early and Late HIP Implementation Periods

	Percent available (%) and mean price per pound ($)			
	Early Implementation	Late Implementation	Change	P-value
Tomato				
Overall				
Available	62.2	52.3	-9.9	[0.237]
Price per pound	1.36	1.28	-0.08	[0.259]
Supermarket				
Available	100.0	90.9	-9.1	[0.189]
Price per pound	0.91	1.28	0.38	[0.214]
Grocery				
Available	76.9	41.7	-35.3	[0.043]**
Price per pound	1.82	1.00	-0.82	[0.006]***
Convenience				
Available	33.3	32.8	-0.5	[0.966]
Price per pound	1.65	1.39	-0.26	[0.397]
Corn				
Overall				
Available	62.5	74.6	12.1	[0.122]
Price per pound	1.27	1.71	0.45	[0.044]**
Supermarket				
Available	100.0	90.9	-9.1	[0.189]
Price per pound	1.01	1.26	0.25	[0.080]*
Grocery				
Available	69.2	66.7	-2.6	[0.878]
Price per pound	1.30	1.37	0.08	[0.665]
Convenience				
Available	38.1	67.8	29.7	[0.014]**
Price per pound	1.61	2.18	0.57	[0.169]
Pea				
Overall				
Available	62.5	60.5	-2.0	[0.807]
Price per pound	1.27	1.44	0.17	[0.209]
Supermarket				
Available	100.0	90.9	-9.1	[0.189]
Price per pound	1.02	1.24	0.21	[0.155]
Grocery				
Available	69.2	58.3	-10.9	[0.525]
Price per pound	1.31	1.53	0.22	[0.184]
Convenience				
Available	38.1	42.7	4.6	[0.699]
Price per pound	1.59	1.66	0.07	[0.801]
Applesauce				
Overall				
Available	45.5	63.2	17.8	[0.035]**
Price per pound	1.21	1.54	0.33	[0.064]*

	Percent available (%) and mean price per pound ($)			
	Early Implementation	Late Implementation	Change	P-value
Supermarket				
Available	100.0	90.9	-9.1	[0.189]
Price per pound	1.13	1.16	0.04	[0.945]
Grocery				
Available	38.5	33.3	-5.1	[0.766]
Price per pound	1.41	1.77	0.36	[0.284]
Convenience				
Available	19.0	57.9	38.9	[0.001]***
Price per pound	1.24	1.92	0.68	[0.011]**
Pineapple				
Overall				
Available	51.7	54.0	2.2	[0.791]
Price per pound	1.34	1.49	0.14	[0.387]
Supermarket				
Available	100.0	90.9	-9.1	[0.189]
Price per pound	1.15	1.19	0.04	[0.973]
Grocery				
Available	53.8	50.0	-3.8	[0.830]
Price per pound	1.65	1.83	0.18	[0.407]
Convenience				
Available	23.8	32.8	9.0	[0.409]
Price per pound	1.41	1.76	0.35	[0.163]
Raisins				
Overall				
Available	49.2	47.4	-1.8	[0.836]
Price per pound	3.15	3.60	0.46	[0.384]
Supermarket				
Available	100.0	90.9	-9.1	[0.189]
Price per pound	2.63	3.53	0.90	[0.058]*
Grocery				
Available	61.5	41.7	-19.9	[0.266]
Price per pound	3.25	3.10	-0.15	[0.811]
Convenience				
Available	14.3	23.0	8.7	[0.359]
Price per pound	4.94	4.23	-0.71	[0.535]
Unweighted number of stores[a]				
Overall	*39*	*49*		
Supermarket	*8*	*14*		
Grocery	*14*	*12*		
Convenience	*17*	*23*		

Weighted percents and means; unweighted total Ns.
Chi-square test for categorical variables, t-test for continuous variables; *p<0.1, **p<0.05, ***p<0.01.
Unpaired tests were conducted due to limited overlap in the early and late implementation samples.
Early Implementation Survey conducted from October-December 2011; Late Implementation Survey conducted from November 2012-January 2013.
[a]N varies by question due to skip patterns and item non-response.
Source: Early and Late Implementation Retailer Surveys.

Exhibit F4.4: Retailer Frozen Fruit and Vegetable Inventory and Average Price/Lb, Overall and by Store Type, Early and Late HIP Implementation Periods

	Percent available (%) and mean price per pound ($)			
	Early Implementation	Late Implementation	Change	P-value
Strawberries				
Overall				
Available	30.5	29.5	-1.0	[0.892]
Price per pound	2.98	2.77	-0.20	[0.903]
Supermarket				
Available	84.3	90.9	6.6	[0.521]
Price per pound	2.78	2.76	-0.02	[0.299]
Grocery				
Available	23.1	8.3	-14.7	[0.268]
Price per pound	3.69	2.99	-0.70	[0.647]
Convenience				
Available	4.8	0.0	-4.8	[0.186]
Price per pound	2.99	NA	NA	NA
Peaches				
Overall				
Available	20.3	18.6	-1.8	[0.790]
Price per pound	3.45	3.25	-0.20	[0.795]
Supermarket				
Available	69.4	60.6	-8.8	[0.561]
Price per pound	3.59	3.25	-0.34	[0.762]
Grocery				
Available	7.7	0.0	-7.7	[0.289]
Price per pound	2.16	NA	NA	NA
Convenience				
Available	0.0	0.0	0.0	NA
Price per pound	NA	NA	NA	NA
Beans				
Overall				
Available	37.0	35.7	-1.2	[0.883]
Price per pound	1.78	1.48	-0.31	[0.084]*
Supermarket				
Available	100.0	95.5	-4.5	[0.360]
Price per pound	1.51	1.46	-0.05	[0.876]
Grocery				
Available	23.1	25.0	1.9	[0.900]
Price per pound	2.59	1.87	-0.72	[0.250]
Convenience				
Available	9.5	3.3	-6.2	[0.287]
Price per pound	2.32	0.99	-1.33	[0.385]
Corn				
Overall				
Available	38.7	40.6	2.0	[0.811]
Price per pound	1.67	1.60	-0.07	[0.595]

	Percent available (%) and mean price per pound ($)			
	Early Implementation	Late Implementation	Change	P-value
Supermarket				
Available	100.0	95.5	-4.5	[0.360]
Price per pound	1.44	1.55	0.11	[0.356]
Grocery				
Available	38.5	33.3	-5.1	[0.766]
Price per pound	2.27	1.96	-0.31	[0.427]
Convenience				
Available	4.8	9.9	5.1	[0.423]
Price per pound	1.79	1.49	-0.30	[0.788]
Unweighted number of stores[a]				
Overall	*39*	*49*		
Supermarket	*8*	*14*		
Grocery	*14*	*12*		
Convenience	*17*	*23*		

Weighted percents and means; unweighted total Ns.
Chi-square test for categorical variables, t-test for continuous variables; *p<0.1, **p<0.05, ***p<0.01.
Unpaired tests were conducted due to limited overlap in the early and late implementation samples.
NA = all data was missing due to non-response or skip patterns; p-values could not be calculated.
Early Implementation Survey conducted from October-December 2011; Late Implementation Survey conducted from November 2012-January 2013.
[a]N varies by question due to skip patterns and item non-response.
Source: Early and Late Implementation Retailer Surveys.

Exhibit F4.5: Retailer Problems with HIP in the Prior 3 Months, by Grocery and Convenience Stores, Late HIP Implementation Period

	Grocery (%)	Convenience (%)
Problems knowing what foods are HIP-eligible?		
Never	83.3	64.7
Once	8.3	5.9
A few times	8.3	29.4
Frequently	0.0	0.0
Problems knowing HIP-eligible foods resolved?		
Yes, resolved	16.7	29.4
No, not resolved	0.0	5.9
No problem	83.3	64.7
Problems having current list of HIP-eligible items in cash registers?		
Never	100.0	93.8
Once	0.0	0.0
A few times	0.0	6.3
Frequently	0.0	0.0
Problems having current list of HIP-eligible items resolved?		
Yes, resolved	0.0	6.3
No, not resolved	0.0	0.0
No problem	100.0	93.8

	Grocery (%)	Convenience (%)
Problems separating HIP-eligible from non-HIP-eligible foods?		
Never	91.7	81.3
Once	0.0	0.0
A few times	8.3	18.8
Frequently	0.0	0.0
Problems separating HIP-eligible from non-HIP eligible resolved?		
Yes, resolved	8.3	12.5
No, not resolved	0.0	0.0
Missing resolution	0.0	6.3
No problem	91.7	81.3
Problems identifying HIP customers?		
Never	75.0	64.7
Once	0.0	5.9
A few times	16.7	11.8
Frequently	8.3	17.6
Problems identifying HIP customers resolved?		
Yes, resolved	8.3	17.6
No, not resolved	8.3	11.8
Missing resolution	8.3	5.9
No problem	75.0	64.7
Problems computing the purchase amount for HIP items?		
Never	100.0	100.0
Once	0.0	0.0
A few times	0.0	0.0
Frequently	0.0	0.0
Problems computing the amount for HIP items resolved?		
Yes, resolved	0.0	0.0
No, not resolved	0.0	0.0
No problem	100.0	100.0
Problems processing sales of HIP items?		
Never	100.0	94.1
Once	0.0	0.0
A few times	0.0	5.9
Frequently	0.0	0.0
Problems processing sales resolved?		
Yes, resolved	0.0	0.0
No, not resolved	0.0	0.0
Missing resolution	0.0	5.9
No problem	100.0	94.1
Problems processing returns with HIP items?		
Never	91.7	100.0
Once	0.0	0.0
A few times	8.3	0.0
Frequently	0.0	0.0

	Grocery (%)	Convenience (%)
Problems processing returns resolved?		
Yes, resolved	0.0	0.0
No, not resolved	0.0	0.0
Missing resolution	8.3	0.0
No problem	91.7	100.0
Problems processing manual vouchers with HIP items?		
Never	100.0	54.5
Once	0.0	0.0
A few times	0.0	0.0
Frequently	0.0	0.0
Not applicable	0.0	45.5
Problems processing manual vouchers resolved?		
Yes, resolved	0.0	0.0
No, not resolved	0.0	0.0
No problem	100.0	54.5
Not applicable	0.0	45.5
Problems getting information about SNAP/EBT sales and settlement?		
Never	83.3	64.7
Once	0.0	0.0
A few times	0.0	0.0
Frequently	0.0	0.0
Missing frequency	8.3	0.0
Don't know	8.3	35.3
Problems getting information about sales and settlement resolved?		
Yes, resolved	8.3	0.0
No, not resolved	0.0	0.0
No problem	83.3	64.7
Don't know	8.3	35.3
Problems responding to customer questions about HIP?		
Never	100.0	100.0
Once	0.0	0.0
A few times	0.0	0.0
Frequently	0.0	0.0
Problems responding to customer questions resolved?		
Yes, resolved	0.0	0.0
No, not resolved	0.0	0.0
No problem	100.0	100.0
Unweighted number of stores [a]	*12*	*17*

Weighted percents.
[a] N varies by question due to item non-response and skip patterns.
Source: Late Implementation Retailer Survey (Independent stores only).

Exhibit F4.6: Retailer Requests for Information from Others, Overall and by Store Type, Late HIP Implementation Period

How often have you asked for information from another employee in your store or outside your store in the past 3 months…?	Overall (%)	Supermarket (%)	Grocery (%)	Convenience (%)
Knowing what food items are eligible for HIP				
Never in the past 3 months	62.2	75.8	50.0	58.5
1-2 times in the past 3 months	18.0	0.0	25.0	26.5
3 or more times in the past 3 months	9.5	14.4	16.7	3.4
Don't know	10.4	9.8	8.3	11.6
Having a current list of HIP eligible items in cash registers				
Never in the past 3 months	64.4	73.1	50.0	65.3
1-2 times in the past 3 months	16.6	5.0	16.7	23.1
3 or more times in the past 3 months	8.3	10.9	25.0	0.0
Don't know	10.7	10.9	8.3	11.6
Separating HIP food items from non-HIP food items				
Never in the past 3 months	58.5	75.8	50.0	50.3
1-2 times in the past 3 months	21.8	4.5	33.3	28.5
3 or more times in the past 3 months	10.7	9.8	16.7	8.8
Don't know	9.0	9.8	0.0	12.4
How to identify HIP customers				
Never in the past 3 months	59.8	75.8	58.3	50.0
1-2 times in the past 3 months	18.3	0.0	16.7	31.0
3 or more times in the past 3 months	9.9	9.8	25.0	3.5
Don't know	12.0	14.4	0.0	15.5
Computing subtotal for HIP items				
Never in the past 3 months	67.4	71.2	66.7	65.3
1-2 times in the past 3 months	17.5	9.1	25.0	19.8
3 or more times in the past 3 months	4.7	9.8	8.3	0.0
Don't know	10.4	9.8	0.0	15.0
Processing sales with HIP items				
Never in the past 3 months	64.8	75.8	66.7	57.1
1-2 times in the past 3 months	16.1	4.5	25.0	19.8
3 or more times in the past 3 months	10.4	9.8	8.3	11.6
Don't know	8.7	9.8	0.0	11.6
Processing returns of HIP items				
Never in the past 3 months	68.3	75.8	66.7	64.1
1-2 times in the past 3 months	14.9	0.0	25.0	20.4
3 or more times in the past 3 months	4.8	9.8	0.0	3.5
Don't know	12.0	14.4	8.3	12.0
Processing manual vouchers with HIP items				
Never in the past 3 months	68.3	75.8	66.7	64.1
1-2 times in the past 3 months	13.2	0.0	25.0	16.9
3 or more times in the past 3 months	3.1	9.8	0.0	0.0
Don't know	15.4	14.4	8.3	19.0

How often have you asked for information from another employee in your store or outside your store in the past 3 months…?	Overall (%)	Supermarket (%)	Grocery (%)	Convenience (%)
Getting information about SNAP/EBT sales				
Never in the past 3 months	70.0	75.8	75.0	64.1
1-2 times in the past 3 months	16.3	4.5	25.0	20.4
3 or more times in the past 3 months	3.1	9.8	0.0	0.0
Don't know	10.6	9.8	0.0	15.5
Responding to customer questions about HIP				
Never in the past 3 months	50.4	40.2	66.7	50.3
1-2 times in the past 3 months	29.8	30.3	25.0	31.3
3 or more times in the past 3 months	11.1	19.7	8.3	6.8
Don't know	8.7	9.8	0.0	11.6
Unweighted number of stores [a]	*49*	*14*	*12*	*23*

Weighted percents and unweighted total Ns.
[a] N varies by question due to item non-response.
Source: Late Implementation Retailer Survey.

Exhibit F4.7: Questions to Retailers from Other Employees, Overall and by Store Type, Late HIP Implementation Period

How often other employees asked you questions in the past 3 months…?	Overall (%)	Supermarket (%)	Grocery (%)	Convenience (%)
Knowing what food items are eligible for HIP				
Never in the past 3 months	60.9	90.9	41.7	50.0
1-2 times in the past 3 months	28.6	9.1	50.0	32.2
3 or more times in the past 3 months	3.3	0.0	8.3	3.3
Don't know	7.2	0.0	0.0	14.5
Having a current list of HIP eligible items in cash registers				
Never in the past 3 months	72.1	88.6	50.0	70.4
1-2 times in the past 3 months	14.0	6.8	25.0	14.1
3 or more times in the past 3 months	5.1	0.0	16.7	3.5
Don't know	8.9	4.5	8.3	12.0
Separating HIP food items from non-HIP food items				
Never in the past 3 months	75.2	95.5	58.3	69.0
1-2 times in the past 3 months	17.3	4.5	33.3	19.0
3 or more times in the past 3 months	1.7	0.0	8.3	0.0
Don't know	5.8	0.0	0.0	12.0
How to identify HIP customers				
Never in the past 3 months	75.0	100.0	58.3	65.5
1-2 times in the past 3 months	14.2	0.0	33.3	15.5
3 or more times in the past 3 months	3.4	0.0	8.3	3.5
Don't know	7.5	0.0	0.0	15.5
Computing subtotal for HIP items				
Never in the past 3 months	79.3	95.5	66.7	74.0
1-2 times in the past 3 months	11.6	4.5	25.0	10.5
3 or more times in the past 3 months	3.4	0.0	8.3	3.5
Don't know	5.8	0.0	0.0	12.0

How often other employees asked you questions in the past 3 months…?	Overall (%)	Supermarket (%)	Grocery (%)	Convenience (%)
Processing sales with HIP items				
Never in the past 3 months	71.2	95.5	58.3	60.5
1-2 times in the past 3 months	13.9	4.5	25.0	15.5
3 or more times in the past 3 months	9.1	0.0	16.7	12.0
Don't know	5.8	0.0	0.0	12.0
Processing returns of HIP items				
Never in the past 3 months	79.1	100.0	50.0	77.5
1-2 times in the past 3 months	11.8	0.0	41.7	7.0
3 or more times in the past 3 months	1.7	0.0	0.0	3.5
Don't know	7.5	0.0	8.3	12.0
Processing manual vouchers with HIP items				
Never in the past 3 months	77.6	95.5	50.0	77.5
1-2 times in the past 3 months	11.8	0.0	41.7	7.0
3 or more times in the past 3 months	1.7	0.0	0.0	3.5
Don't know	8.9	4.5	8.3	12.0
Getting information about SNAP/EBT sales				
Never in the past 3 months	81.0	90.2	66.7	81.0
1-2 times in the past 3 months	13.2	9.8	33.3	7.0
3 or more times in the past 3 months	0.0	0.0	0.0	0.0
Don't know	5.8	0.0	0.0	12.0
Responding to customer questions about HIP				
Never in the past 3 months	63.2	75.8	58.3	57.0
1-2 times in the past 3 months	24.5	14.4	33.3	27.5
3 or more times in the past 3 months	6.5	9.8	8.3	3.5
Don't know	5.8	0.0	0.0	12.0
Unweighted number of stores [a]	*49*	*14*	*12*	*23*

Weighted percents and unweighted total Ns.
[a] N varies by question due to item non-response.
Source: Late Implementation Retailer Survey.

F.4 Chapter 5 Supplemental Table: TFV Purchases by Store Type

Exhibit F5.1: Distribution of HIP Households by TFV Purchases

Retailer type	Never shopped at participating stores (%)	HIP households that shopped at participating stores				Total (%)
		TFV = $0 (%)	$0<TFV<=$6 (%)	$6<TFV<=$12 (%)	TFV > $12 (%)	
Pooled (March–October 2012)						
All participating retailers	17.00	17.36	15.00	14.63	36.01	100.00
Supermarkets and superstores	23.20	11.65	14.94	14.67	35.56	100.00
Convenience	84.63	14.74	0.38	0.13	0.10	100.00
Grocery	84.86	14.32	0.32	0.17	0.33	100.00
Other	99.55	0.28	0.02	0.05	0.12	100.00
Round 2 (March–July 2012)						
All participating retailers	17.45	16.97	14.99	14.60	36.01	100.00
Supermarkets and superstores	24.05	10.80	14.85	14.63	35.69	100.00
Convenience	84.13	15.19	0.45	0.10	0.11	100.00
Grocery	85.06	14.43	0.18	0.12	0.21	100.00
Other	99.84	0.08	<0.01	0.03	0.05	100.00
Round 3 (August–November 2012)						
All participating retailers	16.55	17.75	15.02	14.66	36.01	100.00
Supermarkets and superstores	22.36	12.50	15.03	14.70%	35.43	100.00
Convenience	85.13	14.28	0.32	0.16	0.08	100.00
Grocery	84.67	14.20	0.45	0.22	0.45	100.00
Other	99.25	0.48	0.03	0.06	0.18	100.00
Change: Round 3 – Round 2 [P-value]						
All retailers	-0.90 [0.004]***	0.78 [0.021]**	0.03 [0.923]	0.06 [0.860]	0.01 [0.987]	
Supermarkets and superstores	-1.69 [<0.001]***	1.70 [<0.001]***	0.17 [0.601]	0.07 [0.832]	-0.26 [0.499]	
Convenience—IECR and non-IECR	1.00 [0.001]***	-0.91 [0.002]***	-0.13 [0.026]**	0.06 [0.121]	-0.03 [0.357]	
Grocery	-0.38 [0.163]	-0.23 [0.408]	0.26 [<0.001]***	0.10 [0.011]**	0.24 [<0.001]***	
Other	-0.58 [<0.001]***	0.40 [<0.001]***	0.03 [0.057]*	0.03 [0.203]	0.13 [0.001]***	

F-test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported percentages may not sum to 100 and reported changes may differ from the differences between the means for Round 2 and Round 3.
Source: EBT Transaction Data (6,214 HIP participant households).

F.5 Chapter 6 Supplemental Tables: Baseline Outcomes, Alternative Models, Farmers Market Purchases

Chapter 6 supplemental tables include baseline differences in outcome variables, alternative models (e.g., logistic regression models), and impacts on purchases at farmers markets. Tables are ordered according to the order of the tables in the main body of the report to which they correspond.

Exhibit F6.1: Baseline Self-Reported Monthly Expenditures of Primary Shoppers Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

Usual monthly spending for...	Total	Treatment	Control	P-value
Groceries using only SNAP (N=1786)	278.33 (5.38)	273.12 (5.84)	279.14 (6.26)	[0.506]
Groceries not using SNAP (N=1753)	158.72 (4.97)	155.62 (5.03)	159.21 (5.71)	[0.640]
Food items [a] (N=1718)	110.24 (4.58)	104.39 (4.28)	111.16 (5.26)	[0.320]
Nonfood items (N=1718)	49.53 (1.85)	50.75 (2.78)	49.34 (2.10)	[0.686]
Restaurants (N=1776)	36.60 (1.59)	36.22 (1.67)	36.66 (1.83)	[0.859]
All fruits and vegetables[b] (N=1667)	71.19 (2.11)	71.20 (2.15)	71.19 (2.43)	[0.997]

Weighted means (standard errors).
Two-sided t-test: *p<0.1, **p<0.05, ***p<0.01.
Continuous outcomes: self-reported expenses in dollars per month; “don’t know” and “refused” responses coded as missing.
[a]Calculated as grocery expenditures not using SNAP minus expenditures on nonfood items. Due to missing data, the weighted means of expenditures on food and nonfood items do not total to the weighted mean of expenditures on groceries not using SNAP.
[b]Purchased with SNAP and with other forms of payment.
Source: Participant Survey (primary shopper module).

Exhibit F6.2: Baseline Usual Grocery Shopping Store Type of Primary Shoppers Completing Follow-Up Participant Surveys (Round 2 or 3) by Treatment and Control Status

	Total	Treatment	Control	P-value
Large chain grocery store or supermarket	0.80 (1473)	0.81 (749)	0.80 (724)	[0.478]
Natural or organic supermarket (such as Whole Foods Market)	0.01 (10)	0.01 (5)	0.01 (5)	
Small local store or corner store	0.03 (47)	0.03 (25)	0.03 (22)	
Convenience store (such as 7-11 or mini market)	<0.01 (5)	<0.01 (2)	<0.01 (3)	
Warehouse or club store (such as Sam’s Club or Costco)	0.01 (29)	0.02 (20)	0.01 (9)	
Discount superstore (such as Walmart)	0.14 (256)	0.13 (121)	0.14 (135)	
Ethnic market	0.01 (10)	<0.01 (4)	0.01 (6)	
Farmers market/co-op	<0.01 (6)	<0.01 (4)	<0.01 (2)	
Other	<0.01 (3)	<0.01 (2)	<0.01 (1)	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don’t know” responses coded as missing.
Due to rounding, reported proportions may not sum to one.
Source: Participant Survey (primary shopper module); (unweighted N=1,839).

Exhibit F6.3: Impact of HIP on Usual Grocery Store Type, Logistic Regression Model

	Predicted Probability (S.E.)		Impact			
Usual place to shop	Treatment	Control	Odds Ratio	[S.E.]	{t-statistic}	(P-value)
Large chain grocery store or supermarket	0.840 (0.012)	0.842 (0.011)	0.988	[0.111]	{-0.111}	(0.912)
Natural or organic supermarket (such as Whole Foods Market)	0.001 (0.001)	<0.001 (<0.001)	1.259	[0.813]	{0.357}	(0.721)
Small local store or corner store	0.009 (0.003)	0.012 (0.003)	0.733	[0.217]	{-1.047}	(0.295)
Convenience store (such as 7-11 or mini market)[a]	N/A	N/A	N/A	N/A	N/A	N/A
Warehouse club store (such as Sam"s Club or Costco	0.010 (0.003)	0.013 (0.003)	0.773	[0.223]	{-0.892}	(0.372)
Discount superstore (such as Walmart)	0.095 (0.009)	0.086 (0.008)	1.104	[0.146]	{0.744}	(0.457)
Ethnic market	<0.001 (<0.001)	<0.001 (<0.001)	0.725	[0.505]	{-0.462}	(0.644)
Farmers market/co-op [a]	N/A	N/A	N/A	N/A	N/A	N/A
Some other location [a]	N/A	N/A	N/A	N/A	N/A	N/A

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]Inestimable (covariates perfectly predict success or failure within one or more stratum).
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (unweighted N=3,298).

Exhibit F6.4: Baseline Reasons for Choice of Usual Grocery Shopping Place of Primary Shoppers Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

	Total	Treatment	Control	P-value
Close to home	0.32 (617)	0.36 (335)	0.31 (282)	[0.032]**
Close to work	0.01 (12)	0.01 (5)	0.01 (7)	[0.617]
Close to some other location	0.01 (8)	<0.01 (2)	0.01 (6)	[0.174]
Easy to get there	0.02 (29)	0.01 (14)	0.02 (15)	[0.781]
Disability accessible	0.01 (8)	<0.01 (3)	0.01 (5)	[0.305]
Hours of operation convenient	<0.01 (5)	<0.01 (4)	<0.01 (1)	[0.188]
One stop shopping	0.01 (18)	0.01 (5)	0.01 (13)	[0.096]*
Bulk purchases	0.01 (28)	0.02 (15)	0.01 (13)	[0.923]
Prices/affordability	0.59 (1061)	0.56 (519)	0.60 (542)	[0.109]
Sales/promotions in store	0.17 (322)	0.18 (170)	0.17 (152)	[0.547]
EBT card accepted	0.01 (13)	0.01 (8)	0.01 (5)	[0.498]
Variety of products	0.27 (490)	0.26 (239)	0.28 (251)	[0.494]
Ethnic foods are available	0.02 (38)	0.02 (16)	0.02 (22)	[0.460]
Preferred products are available	0.13 (234)	0.12 (114)	0.13 (120)	[0.569]
Quality	0.03 (42)	0.02 (17)	0.03 (25)	[0.083]*
Produce better or fresher	0.19 (342)	0.19 (170)	0.19 (172)	[0.807]
Good service	0.03 (64)	0.04 (35)	0.03 (29)	[0.610]
Clean	0.02 (37)	0.02 (16)	0.02 (21)	[0.353]
Familiarity with store	0.07 (130)	0.08 (70)	0.06 (60)	[0.288]
Some other reason	0.02 (32)	0.02 (17)	0.02 (15)	[0.840]

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don’t know,” “refused,” and “inapplicable” responses coded as missing.
Respondents could choose multiple reasons, so proportions may not add to one.
Source: Participant Survey (primary shopper module); (unweighted N=1,831).

Exhibit F6.5: Impact of HIP on Reasons for Choice of Usual Grocery Store Type, Logistic Regression Model

	Predicted Probability (S.E.)		Impact			
Usually shop there because…	Treatment	Control	Odds Ratio	[S.E.]	{t-statistic}	(P-value)
Close to home	0.288 (0.014)	0.304 (0.014)	0.928	[0.087]	{-0.790}	(0.430)
Close to work	0.001 (0.001)	<0.001 (<0.001)	1.413	[1.086]	{0.450}	(0.653)
Close to some other location	<0.001 (<0.001)	<0.001 (<0.001)	0.840	[0.699]	{-0.209}	(0.834)
Easy to get there	0.010 (0.003)	0.009 (0.002)	1.216	[0.354]	{0.674}	(0.500)
Disability accessible [a]	N/A	N/A	N/A	N/A	N/A	N/A
Hours of operation convenient	0.001 (0.001)	0.001 (0.001)	0.792	[0.357]	{-0.517}	(0.605)
One stop shopping	0.050 (0.006)	0.049 (0.006)	1.035	[0.171]	{0.207}	(0.836)
Bulk purchases	0.013 (0.004)	0.015 (0.003)	0.888	[0.256]	{-0.413}	(0.679)
Prices/affordability	0.479 (0.016)	0.513 (0.015)	0.874	[0.076]	{-1.544}	(0.123)
Sales/promotions in store	0.086 (0.008)	0.113 (0.009)	0.737	[0.092]	{-2.438}	(0.015)**
EBT card accepted	0.013 (0.004)	0.007 (0.002)	1.952	[0.569]	{2.294}	(0.022)**
Variety of products	0.233 (0.012)	0.189 (0.011)	1.308	[0.125]	{2.803}	(0.005)***
Ethnic foods are available	<0.001 (<0.001)	<0.001 (<0.001)	0.956	[0.457]	{-0.094}	(0.925)
Preferred products are available	0.075 (0.008)	0.108 (0.008)	0.676	[0.087]	{-3.040}	(0.002)***
Quality	0.033 (0.005)	0.041 (0.005)	0.805	[0.146]	{-1.196}	(0.232)
Produce better or fresher	0.136 (0.010)	0.112 (0.009)	1.257	[0.151]	{1.904}	(0.057)*
Good service	0.016 (0.004)	0.010 (0.003)	1.508	[0.412]	{1.501}	(0.134)
Clean	0.010 (0.003)	0.009 (0.002)	1.118	[0.386]	{0.324}	(0.746)
Familiarity with store	0.054 (0.008)	0.043 (0.006)	1.267	[0.233]	{1.287}	(0.198)
Some other reason	0.001 (0.001)	0.001 (0.001)	1.094	[0.648]	{0.151}	(0.880)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=Yes, 0=No; “don’t know” responses coded as missing.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]Inestimable (covariates perfectly predict success or failure within one or more stratum).
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (unweighted N=3281).

Exhibit F6.6: Baseline Grocery Shopping Frequency of Primary Shoppers Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

	Total	Treatment	Control	P-value
Yearly or not at all	<0.01 (1)	<0.01 (1)	0.00 (0)	[0.522]
2-3 times a year	<0.01 (2)	0.00 (0)	<0.01 (2)	
Every other month	<0.01 (6)	<0.01 (4)	<0.01 (2)	
Once a month	0.28 (534)	0.29 (273)	0.28 (261)	
Every other week	0.36 (639)	0.34 (319)	0.36 (320)	
Once a week	0.22 (413)	0.23 (219)	0.21 (194)	
More than once a week	0.14 (253)	0.13 (121)	0.14 (132)	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" responses coded as missing.
Due to rounding, reported proportions may not sum to one.
Source: Participant Survey (primary shopper module); (unweighted N=1,848).

Exhibit F6.7: Baseline Probability of Going Out of Way/Making Special Effort to Shop at Particular Store for Fruits and Vegetables of Primary Shoppers Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

	Total	Treatment	Control	P-value
Go out of way to shop for FV at particular store	0.51 (945)	0.52 (485)	0.51 (460)	[0.685]

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" and "refused" responses coded as missing.
Source: Participant Survey (primary shopper module); (unweighted N=1,834).

Exhibit F6.8: Impact of HIP on Grocery Shopping Frequency, Logistic Regression

	Predicted probability (S.E.)		Impact			
	Treatment	Control	Odds Ratio	[S.E.]	{t-statistic}	(P-value)
Grocery shopping frequency	0.332 (0.017)	0.330 (0.016)	1.009	[0.106]	{0.087}	(0.930)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcome, 1=Once a week or more, 0=less than once a week; "don't know" and "refused" responses coded as missing.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (unweighted N=3,311).

Exhibit F6.9: Impact of HIP on Grocery Shopping Frequency, Ordered Logistic Regression

	Regression-adjusted mean (S.E.)		Impact			
	Treatment	Control	T-C	[S.E.]	{t-statistic}	(P-value)
Grocery shopping frequency	5.197 (0.705)	5.188 (0.705)	0.009	[0.078]	{0.115}	(0.909)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcome, 1=yearly or not at all, 2=2 to 3 times a year, 3=every other month, 4=once a month, 5=every other week, 6=once a week, 7=more than once a week; "don't know" and "refused" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (unweighted N=3,311).

Exhibit F6.10: Impact of HIP on Going Out of Way/Making Special Effort to Shop at Particular Store for Fruits and Vegetables, Logistic Regression Model

	Predicted Probability (S.E.)		Impact			
	Treatment	Control	Odds Ratio	[S.E.]	{t-statistic}	(P-value)
Go out of way to shop for FV at particular store	0.378 (0.015)	0.391 (0.014)	0.947	[0.082]	{-0.634}	(0.526)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcome, 1=yes, 0=no; "don't know" and "refused" responses coded as missing.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (unweighted N=3,279).

Exhibit F6.11: Descriptive Results for EBT Analysis After Implementation, Disaggregated According to November 2011 (Pre-Implementation) Shopping Behavior

Variable	HIP	Non-HIP	Difference	P-value
Average number of households				
Pre-HIP participating store shoppers	2342	15028		
Pre-HIP non-participating store shoppers	1,674	10,802		
Mean household size				
Pre-HIP participating store shoppers	2.00	2.04	-0.04	[0.199]
Pre-HIP non-participating store shoppers	1.89	1.90	-0.01	[0.862]
Location: Springfield				
Pre-HIP participating store shoppers (%)	51.89	52.29	-0.42	[0.713]
Pre-HIP non-participating store shoppers (%)	53.42	53.41	0.01	[0.995]
Location: Chicopee & Holyoke				
Pre-HIP participating store shoppers (%)	29.92	29.66	0.26	[0.792]
Pre-HIP non-participating store shoppers (%)	18.57	18.56	0.02	[0.988]
Location: Other				
Pre-HIP participating store shoppers (%)	18.19	18.05	0.14	[0.870]
Pre-HIP non-participating store shoppers (%)	28.01	28.03	-0.02	[0.984]
SNAP benefits				
Pre-HIP participating store shoppers ($)	264.01	265.21	-1.20	[0.742]
Pre-HIP non-participating store shoppers ($)	255.25	253.97	1.29	[0.768]
SNAP purchases				
Pre-HIP participating store shoppers ($)	268.59	264.96	3.63	[0.328]
Pre-HIP non-participating store shoppers ($)	257.55	252.80	4.74	[0.282]

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported differences may differ from differences between means for the treatment and control groups.
Pre-HIP participating store shoppers are Wave 2 and Wave 3 households who spent at least 50 percent of their November 2011 (pre-implementation) SNAP benefits in retailers that later participated in HIP during Round 2 (post-implementation). Pre-HIP non-participating store shoppers are Wave 2 and Wave 3 households who spent less than 50 percent of their November 2011 (pre-implementation) SNAP benefits in retailers that later participated in HIP during Round 2 (post-implementation).
Source: EBT Transaction Data, pooled across March-October 2012 (average of 29,846 households per month).

Exhibit F6.12: Impact of HIP on Mean Monthly SNAP Purchases at Farmers Markets

	Regression-adjusted mean (SE)		Impact			
Purchases ($)	Treatment (T) ($)	Control (C) ($)	T-C ($)	[S.E.] ($)	{t-statistic}	(P-value)
All farmers markets	0.03 (0.01)	0.03 (<0.01)	<0.01	0.01	(0.123)	(0.902)
Participating farmers markets	0.03 (0.01)	0.02 (<0.01)	<0.01	0.01	(0.442)	(0.659)
Non-participating farmers markets	0.01 (<0.01)	0.01 (<0.01)	<0.01	<0.01	(-0.619)	(0.536)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the household level.
Means include households that made no SNAP purchases at farmers markets.
Source: EBT Transaction Data, pooled across March-October 2012 (average of 45,912 households per month).

F.6 Chapter 7 Supplemental Tables: Baseline Outcomes and Alternative Models

Chapter 7 supplemental tables include baseline differences between treatment and control groups on the outcome variables (Exhibits F7.1-F7.4), followed by alternative models (i.e., logistic regression and ordered logistic regression models; Exhibits F7.5-F7.13).

Exhibit F7.1: Baseline Food Preferences and Beliefs of Respondents Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

How much do you agree or disagree that…	Total	Treatment	Control	P-value
I enjoy trying new foods (N=1946)				
Strongly disagree	0.01 (24)	0.01 (14)	0.01 (10)	[0.628]
Disagree	0.09 (177)	0.09 (90)	0.09 (87)	
Neither disagree nor agree	0.05 (110)	0.06 (62)	0.05 (48)	
Agree	0.65 (1269)	0.64 (636)	0.66 (633)	
Strongly agree	0.19 (366)	0.18 (176)	0.19 (190)	
I enjoy trying new fruits (N=1949)				
Strongly disagree	0.01 (21)	0.01 (8)	0.01 (13)	[0.098]*
Disagree	0.07 (154)	0.09 (88)	0.07 (66)	
Neither disagree nor agree	0.05 (87)	0.04 (37)	0.05 (50)	
Agree	0.64 (1245)	0.64 (627)	0.64 (618)	
Strongly agree	0.23 (442)	0.23 (219)	0.23 (223)	
I enjoy trying new vegetables (N=1950)				
Strongly disagree	0.03 (41)	0.01 (15)	0.03 (26)	[0.109]
Disagree	0.16 (304)	0.19 (158)	0.15 (146)	
Neither disagree nor agree	0.04 (70)	0.03 (26)	0.05 (44)	
Agree	0.61 (1214)	0.61 (619)	0.61 (595)	
Strongly agree	0.16 (321)	0.16 (162)	0.16 (159)	
I eat enough fruits to keep my healthy (N=1951)				
Strongly disagree	0.01 (21)	0.01 (7)	0.01 (14)	[0.478]
Disagree	0.13 (257)	0.13 (130)	0.13 (127)	
Neither disagree nor agree	0.04 (75)	0.04 (41)	0.03 (34)	
Agree	0.64 (1247)	0.65 (631)	0.64 (616)	
Strongly agree	0.18 (351)	0.17 (169)	0.18 (182)	
I eat enough vegetables to keep me healthy (N=1949)				
Strongly disagree	0.02 (36)	0.01 (13)	0.02 (23)	[0.391]
Disagree	0.13 (265)	0.14 (136)	0.13 (129)	
Neither disagree nor agree	0.04 (75)	0.03 (31)	0.04 (44)	
Agree	0.63 (1228)	0.63 (624)	0.63 (604)	
Strongly agree	0.18 (345)	0.17 (174)	0.18 (171)	
I often encourage family/friends to eat fruits and vegetables (N=1933)				
Strongly disagree	0.02 (29)	0.02 (15)	0.02 (14)	[0.924]
Disagree	0.10 (181)	0.10 (88)	0.10 (93)	
Neither disagree nor agree	0.03 (69)	0.04 (38)	0.03 (31)	
Agree	0.61 (1170)	0.60 (582)	0.61 (588)	
Strongly agree	0.24 (484)	0.25 (247)	0.24 (237)	
Composite scale—positive attitudes about food, fruits, & vegetables (N=1954)	3.88 (0.02)	3.87 (0.02)	3.88 (0.02)	[0.744]

Weighted proportions and unweighted Ns for categorical variables; mean and standard deviation for composite scale.
Two-sided chi-square test for categorical variables, t-test for composite scale: *p<0.1, **p<0.05, ***p<0.01.

"Don't know," "refused," and "does not apply" responses coded as missing.
Due to rounding, reported proportions may not sum to one.
Source: Participant Survey (respondent module).

Exhibit F7.2: Baseline Perceived Barriers to Fruit & Vegetable Consumption of Respondents Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

How much do you agree or disagree that…	Total	Treatment	Control	P-value
It's hard for me to eat more vegetables because I don't know how to prepare them (N=1939)				
Strongly disagree	0.18 (349)	0.17 (179)	0.18 (170)	[0.878]
Disagree	0.50 (969)	0.50 (487)	0.50 (482)	
Neither disagree nor agree	0.04 (87)	0.05 (46)	0.04 (41)	
Agree	0.23 (434)	0.22 (211)	0.23 (223)	
Strongly agree	0.05 (100)	0.06 (53)	0.05 (47)	
It's hard for me to eat more vegetables because they are hard to find where I shop for food (N=1940)				
Strongly disagree	0.19 (348)	0.17 (163)	0.19 (185)	[0.089]*
Disagree	0.62 (1186)	0.61 (590)	0.62 (596)	
Neither disagree nor agree	0.02 (38)	0.02 (15)	0.02 (23)	
Agree	0.15 (324)	0.18 (182)	0.14 (142)	
Strongly agree	0.02 (44)	0.03 (26)	0.02 (18)	
It's hard for me to eat more fruits because they are hard to find where I shop for food (N=1940)				
Strongly disagree	0.19 (353)	0.17 (164)	0.19 (189)	[0.044]**
Disagree	0.63 (1219)	0.63 (615)	0.63 (604)	
Neither disagree nor agree	0.02 (34)	0.01 (13)	0.02 (21)	
Agree	0.14 (286)	0.15 (152)	0.14 (134)	
Strongly agree	0.02 (48)	0.03 (31)	0.02 (17)	
I don't eat fruits and vegetables as much as I like to because they cost too much (N=1944)				
Strongly disagree	0.09 (158)	0.08 (73)	0.09 (85)	[0.704]
Disagree	0.39 (758)	0.41 (390)	0.39 (368)	
Neither disagree nor agree	0.04 (71)	0.03 (30)	0.04 (41)	
Agree	0.38 (751)	0.38 (380)	0.38 (371)	
Strongly agree	0.10 (206)	0.11 (105)	0.10 (101)	
I don't eat fruits and vegetables as much as I like to because they often spoil before I get a chance to eat them (N=1941)				
Strongly disagree	0.07 (137)	0.07 (72)	0.07 (65)	[0.590]
Disagree	0.45 (877)	0.46 (445)	0.45 (432)	
Neither disagree nor agree	0.05 (85)	0.04 (35)	0.05 (50)	
Agree	0.37 (720)	0.37 (360)	0.37 (360)	
Strongly agree	0.06 (122)	0.07 (61)	0.06 (61)	
I don't eat fruits and vegetables as much as I like to because my family doesn't like them (N=1886)				
Strongly disagree	0.15 (288)	0.15 (142)	0.16 (146)	[0.969]
Disagree	0.69 (1304)	0.70 (669)	0.68 (635)	
Neither disagree nor agree	0.02 (39)	0.02 (19)	0.02 (20)	
Agree	0.12 (219)	0.11 (106)	0.12 (113)	
Strongly agree	0.02 (36)	0.02 (18)	0.02 (18)	
I don't eat fruits and vegetables because I don't like them (N=1947)				
Strongly disagree	0.23 (434)	0.21 (204)	0.24 (230)	[0.355]
Disagree	0.64 (1292)	0.68 (669)	0.64 (623)	
Neither disagree nor agree	0.02 (30)	0.02 (15)	0.02 (15)	
Agree	0.09 (165)	0.08 (76)	0.09 (89)	
Strongly agree	0.01 (26)	0.01 (11)	0.01 (15)	
Composite scale—barriers to eating fruits & vegetables (N=1954)	2.42 (0.02)	2.44 (0.02)	2.41 (0.02)	[0.318]

Weighted proportions and unweighted Ns for categorical variables; mean and standard deviation for composite scale.
Two-sided chi-square test for categorical variables, t-test for composite scale: *p<0.1, **p<0.05, ***p<0.01.

"Don't know," "refused," and "does not apply" responses coded as missing.
Due to rounding, reported proportions may not sum to one.
Source: Participant Survey (respondent module).

Exhibit F7.3: Baseline Barriers to Grocery Shopping of Primary Shoppers Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

How often kept from grocery shopping by...	Total	Treatment	Control	P-value
Limited transportation (N=1831)				
Never	0.42 (765)	0.42 (383)	0.42 (382)	[0.415]
Rarely	0.17 (288)	0.15 (143)	0.17 (145)	
Sometimes	0.24 (444)	0.24 (227)	0.24 (217)	
Most of the time	0.11 (193)	0.10 (95)	0.11 (98)	
Always	0.07 (141)	0.09 (80)	0.07 (61)	
Distance to grocery store (N=1819)				
Never	0.50 (905)	0.49 (452)	0.50 (453)	[0.150]
Rarely	0.13 (252)	0.15 (141)	0.12 (111)	
Sometimes	0.24 (401)	0.20 (187)	0.24 (214)	
Most of the time	0.08 (157)	0.09 (84)	0.08 (73)	
Always	0.06 (104)	0.06 (57)	0.06 (47)	
Composite scale—Barriers to grocery shopping (N=1933)	2.15 (0.03)	2.17 (0.04)	2.15 (0.04)	[0.698]

Weighted proportions and unweighted Ns for categorical variables; mean and standard deviation for composite scale.
Two-sided chi-square test for categorical variables, t-test for composite scale: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" and "refused" responses coded as missing.
Due to rounding, reported proportions may not sum to one.
Source: Participant Survey (primary shopper module).

Exhibit F7.4: Baseline Family Food Environment of Primary Shoppers Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

How often do you have…	Total	Treatment	Control	P-value
Fruits available at home (N=1845)				
Never	0.01 (18)	0.01 (12)	0.01 (6)	[0.116]
Rarely	0.04 (68)	0.04 (34)	0.04 (34)	
Sometimes	0.20 (389)	0.23 (219)	0.19 (170)	
Most of the time	0.34 (622)	0.33 (308)	0.34 (314)	
Always	0.42 (748)	0.39 (361)	0.43 (387)	
Fruits in the refrigerator or on the kitchen counter (N=1844)				
Never/No refrigerator	0.02 (44)	0.02 (24)	0.02 (20)	[0.141]
Rarely	0.05 (101)	0.06 (60)	0.04 (41)	
Sometimes	0.27 (516)	0.29 (278)	0.26 (238)	
Most of the time	0.36 (633)	0.33 (301)	0.37 (332)	
Always	0.30 (550)	0.29 (272)	0.30 (278)	
Vegetables available at home (N=1844) [a]				
Never	0.01 (21)	0.01 (12)	0.01 (9)	[0.854]
Rarely	0.02 (38)	0.02 (16)	0.02 (22)	
Sometimes	0.12 (227)	0.13 (119)	0.12 (108)	
Most of the time	0.24 (430)	0.23 (215)	0.24 (215)	
Always	0.61 (1128)	0.61 (572)	0.61 (556)	
Ready to eat vegetables in the refrigerator or on the kitchen counter (N=1845)				
Never	0.06 (113)	0.06 (57)	0.06 (56)	[0.638]
Rarely	0.08 (151)	0.09 (82)	0.07 (69)	

How often do you have…	Total	Treatment	Control	P-value
Sometimes	0.29 (527)	0.27 (261)	0.29 (266)	
Most of the time	0.28 (511)	0.28 (261)	0.28 (250)	
Always	0.29 (543)	0.29 (274)	0.29 (269)	
Composite scale—fruits & vegetables available at home (N=1933)	4.01 (0.02)	3.97 (0.02)	4.02 (0.02)	[0.135]
Salty snacks such as chips and crackers available at home (N=1848)				
Never	0.07 (150)	0.08 (81)	0.07 (69)	[0.631]
Rarely	0.17 (311)	0.17 (160)	0.17 (151)	
Sometimes	0.37 (659)	0.35 (323)	0.38 (336)	
Most of the time	0.16 (313)	0.17 (160)	0.16 (153)	
Always	0.22 (415)	0.23 (211)	0.22 (204)	
1% fat, skim or fat-free milk available at home (N=1838)				
Never	0.32 (566)	0.29 (276)	0.32 (290)	[0.200]
Rarely	0.05 (95)	0.06 (55)	0.05 (40)	
Sometimes	0.11 (191)	0.10 (91)	0.11 (100)	
Most of the time	0.09 (160)	0.08 (72)	0.09 (88)	
Always	0.44 (826)	0.48 (434)	0.44 (392)	
Soft drinks, fruit-flavored drinks, or fruit punch available at home (N=1845)				
Never	0.15 (289)	0.15 (152)	0.15 (137)	[0.276]
Rarely	0.15 (283)	0.17 (157)	0.14 (126)	
Sometimes	0.31 (536)	0.27 (251)	0.31 (285)	
Most of the time	0.15 (275)	0.15 (141)	0.15 (134)	
Always	0.25 (462)	0.25 (232)	0.25 (230)	
All or most of your family sit down and eat evening meals together at home during the past month (N=1354) [b]				
Never	0.03(49)	0.04 (26)	0.03 (23)	[0.199]
Rarely	0.08 (105)	0.07 (49)	0.09 (56)	
Sometimes	0.20 (293)	0.23 (157)	0.19 (136)	
Most of the time	0.31 (429)	0.32 (221)	0.30 (208)	
Always	0.38 (478)	0.33 (226)	0.38 (252)	
Evening meals cooked at home during the past month (N=1845)				
Never	0.01 (16)	0.01 (7)	0.01 (9)	[0.882]
Rarely	0.02 (26)	0.01 (12)	0.02 (14)	
Sometimes	0.09 (170)	0.10 (91)	0.09 (79)	
Most of the time	0.30 (576)	0.31 (297)	0.30 (279)	
Always	0.58 (1057)	0.57 (526)	0.58 (531)	

Weighted proportions and unweighted Ns for categorical variables; mean and standard deviation for composite scale.
Two-sided chi-square test for categorical variables, t-test for composite scale: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" and "refused" responses coded as missing.
Due to rounding, reported proportions may not sum to one.
[a]"No refrigerator or freezer" responses coded as missing.
[b]Asked only in households with more than one member.
Source: Participant Survey (primary shopper module).

Exhibit F7.5: Impact of HIP on Self-Reported Exposure to Nutrition Education and Promotion in Past 3 Months, Logistic Regression Model

	Predicted probability (S.E.)		Impact			
	Treatment (T)	Control (C)	Odds Ratio	[S.E.]	{t-statistic}	(P-value)
Heard or seen messages about fruits & vegetables (N=3387)	0.768 (0.013)	0.690 (0.013)	1.490	[0.139]	{4.282}	(<0.001)***
Attended nutrition education class or program (N=3363)	0.086 (0.009)	0.093 (0.008)	0.921	[0.127]	{-0.600}	(0.549)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample.

Exhibit F7.6: Impact of HIP on Food Preferences & Beliefs, Ordered Logistic Regression Model

	Regression-adjusted mean (S.E.)		Impact			
How much do you agree or disagree that…?	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
I enjoy trying new foods (N=3381)	5.921 (0.610)	5.815 (0.601)	0.106	[0.084]	{1.272}	(0.204)*
I enjoy trying new fruits (N=3388)	5.907 (0.678)	6.013 (0.665)	-0.107	[0.086]	{-1.245}	(0.213)
I enjoy trying new vegetables (N=3392)	6.432 (0.629)	6.417 (0.619)	0.015	[0.084]	{0.178}	(0.859)
I eat enough fruits to keep me healthy (N=3383)	5.567 (0.603)	5.515 (0.597)	0.052	[0.085]	{0.618}	(0.537)
I eat enough vegetables to keep me healthy (N=3393)	5.336 (0.631)	5.267 (0.619)	0.069	[0.087]	{0.794}	(0.427)
I often encourage family/friends to eat fruits & veg. (N=3346)	5.443 (0.627)	5.385 (0.618)	0.058	[0.083]	{0.703}	(0.482)
Composite scale—Positive attitudes about food, fruits, & vegetables (N=3480)	8.727 (0.592)	8.607 (0.583)	0.120	[0.076]	{1.579}	(0.115)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=strongly agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample.

Exhibit F7.7: Impact of HIP on Food Preferences & Beliefs, Logistic Regression Model

How much do you agree or disagree that…?	Predicted probability (S.E.)		Impact			
	Treatment (T)	Control (C)	Odds Ratio	[S.E.]	{t-statistic}	(P-value)
I enjoy trying new foods (N=3381)	0.862 (0.011)	0.840 (0.012)	1.189	[0.144]	{1.427}	(0.154)
I enjoy trying new fruits (N=3386)	0.870 (0.011)	0.877 (0.010)	0.935	[0.113]	{-0.556}	(0.579)
I enjoy trying new vegetables (N=3388)	0.799 (0.013)	0.777 (0.013)	1.145	[0.125]	{1.239}	(0.216)
I eat enough fruits to keep me healthy (N=3383)	0.838 (0.012)	0.813 (0.012)	1.189	[0.131]	{1.571}	(0.116)
I eat enough vegetables to keep me healthy (N=3393)	0.840 (0.013)	0.821 (0.012)	1.141	[0.134]	{1.121}	(0.262)
I often encourage family/friends to eat fruits & veg. (N=3346)	0.863 (0.011)	0.852 (0.011)	1.090	[0.132]	{0.718}	(0.473)
Composite scale—Positive attitudes about food, fruits, & vegetables (N=3480)	0.517 (0.016)	0.468 (0.015)	1.218	[0.109]	{2.204}	(0.028)**

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes: 1=strongly agree or agree, 0=neither agree nor disagree, disagree, or strongly disagree; “don’t know” and “does not apply” responses coded as missing.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample.

Exhibit F7.8: Impact of HIP on Perceived Barriers to Fruit & Vegetable Consumption, Ordered Logistic Regression Model

How much do you agree or disagree that…?	Regression-adjusted mean (S.E.)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Hard to eat vegetables because don't know how to prepare (N=3366)	1.478 (0.524)	1.475 (0.512)	0.003	[0.079]	{0.040}	(0.968)
Hard to eat vegetables because hard to find where I shop (N=3369)	3.392 (0.573)	3.459 (0.569)	-0.067	[0.085]	{-0.792}	(0.428)
Hard to eat fruits because hard to find where I shop (N=3372)	3.097 (0.610)	3.069 (0.604)	0.028	[0.089]	{0.315}	(0.753)
Don't eat FV as much as would like because cost too much (N=3379)	0.682 (0.643)	0.747 (0.633)	-0.065	[0.081]	{-0.803}	(0.422)
Don't eat FV as much as would like because they spoil (N=3372)	1.354 (0.625)	1.527 (0.616)	-0.173	[0.082]	{-2.122}	(0.034)**
Don't eat FV as much as would like because family dislikes (N=3230)	0.996 (0.656)	0.927 (0.646)	0.068	[0.094]	{0.728}	(0.467)
Don't eat FV as much because I don't like (N=3379)	0.385 (0.653)	0.427 (0.643)	-0.041	[0.088]	{-0.472}	(0.637)
Composite scale—barriers to eating fruits & vegetables (N=3358)	2.472 (0.515)	2.585 (0.514)	-0.114	[0.075]	{-1.511}	(0.131)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=strongly agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample.

Exhibit F7.9: Impact of HIP on Perceived Barriers to Fruit & Vegetable Consumption, Logistic Regression Model

How much do you agree or disagree that…?	Predicted Probability (S.E.)		Impact			
	Treatment (T)	Control (C)	Odds Ratio	[S.E.]	{t-statistic}	(P-value)
Hard to eat vegetables because don't know how to prepare (N=3366)	0.194 (0.013)	0.201 (0.012)	0.961	[0.100]	{-0.381}	(0.703)
Hard to eat vegetables because hard to find where I shop (N=3369)	0.104 (0.010)	0.115 (0.009)	0.889	[0.110]	{-0.944}	(0.345)
Hard to eat fruits because hard to find where I shop (N=3372)	0.091 (0.010)	0.085 (0.009)	1.073	[0.141]	{0.534}	(0.594)
Don't eat FV as much as would like because cost too much (N=3379)	0.427 (0.017)	0.436 (0.016)	0.962	[0.092]	{-0.399}	(0.690)
Don't eat FV as much as would like because they spoil (N=3372)	0.374 (0.015)	0.420 (0.016)	0.826	[0.076]	{-2.076}	(0.038)**
Don't eat FV as much as would like because family dislikes (N=3225)	0.096 (0.010)	0.083 (0.008)	1.164	[0.155]	{1.145}	(0.252)
Don't eat FV as much because I don't like (N=3379)	0.053 (0.007)	0.064 (0.007)	0.822	[0.122]	{-1.321}	(0.187)
Composite scale – barriers to eating fruits & vegetables (N=3480)	0.445 (0.017)	0.487 (0.016)	0.843	[0.080]	{-1.803}	(0.072)*

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes: 1=strongly agree or agree, 0=neither agree nor disagree, disagree, or strongly disagree; “don't know” and “does not apply” responses coded as missing.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample.

Exhibit F7.10: Impact of HIP on Barriers to Grocery Shopping, Ordered Logistic Regression Model

How often kept from grocery shopping by...	Regression-adjusted mean (S.E.)		Impact			
	Treatment	Control	T-C	[S.E.]	{t-statistic}	(P-value)
Limited transportation (N=3186)	1.297 (0.579)	1.147 (0.572)	0.150	[0.083]	{1.800}	(0.072)*
Distance to grocery store (N=3164)	1.882 (0.616)	1.864 (0.612)	0.018	[0.086]	{0.212}	(0.832)
Composite scale – barriers to grocery shopping (N=3141)	1.714 (0.569)	1.609 (0.564)	0.105	[0.082]	{1.287}	(0.198)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always; "don't know" and "refused" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit F7.11: Impact of HIP on Barriers to Grocery Shopping, Logistic Regression Model

How often kept from grocery shopping by...	Predicted probability (S.E.)		Impact			
	Treatment	Control	Odds Ratio	[S.E.]	{t-statistic}	(P-value)
Limited transportation (N=3163)	0.147 (0.011)	0.119 (0.009)	1.274	[0.149]	{2.075}	(0.038)**
Distance to grocery store (N=3160)	0.102 (0.010)	0.101 (0.009)	1.011	[0.130]	{0.085}	(0.932)
Composite scale—barriers to grocery shopping (N=3480)	0.393 (0.015)	0.367 (0.015)	1.116	[0.100]	{1.224}	(0.221)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes: 0=Never, rarely, or sometimes, 1=most of the time or always; "don't know" and "refused" responses coded as missing.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit F7.12: Impact of HIP on Family Food Environment, Ordered Logistic Regression Model

	Regression-adjusted mean (S.E.)		Impact			
How often do you…?	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Have fruit available at home (N=3314)	5.767 (0.615)	5.522 (0.603)	0.245	[0.084]	{2.913}	(0.004)***
Have fruit in refrigerator or on counter (N=3311)	5.316 (0.583)	5.213 (0.572)	0.102	[0.079]	{1.300}	(0.194)
Have vegetables available at home (N=3315)[a]	5.130 (0.738)	4.894 (0.720)	0.236	[0.096]	{2.451}	(0.014)**
Have ready-to-eat vegetables in fridge or on counter (N=3284)	4.690 (0.598)	4.545 (0.586)	0.146	[0.079]	{1.835}	(0.067)*
Composite scale – Fruits & veg. available at home (N=3318)	6.724 (0.625)	6.518 (0.613)	0.206	[0.078]	{2.638}	(0.008)***
Have salty snacks at home (chips, crackers) (N=3312)	2.235 (0.583)	2.237 (0.577)	-0.002	[0.074]	{-0.025}	(0.980)
Have lowfat/nonfat milk at home (N=3292)	3.385 (0.580)	3.295 (0.573)	0.091	[0.082]	{1.103}	(0.270)
Have soft drinks/fruit drinks (not juice) at home (N=3312)	1.874 (0.557)	1.997 (0.546)	-0.124	[0.076]	{-1.625}	(0.104)*
Sit down with family at home for evening meals (N=2306)[b]	4.443 (0.778)	4.504 (0.771)	-0.060	[0.093]	{-0.649}	(0.516)
Cook evening meals at home (N=3311)	3.783 (0.666)	3.758 (0.652)	0.025	[0.085]	{0.292}	(0.771)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never/no refrigerator or freezer, 2=rarely, 3=sometimes, 4=most of the time, 5=always; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]"No refrigerator or freezer" responses coded as missing.
[b]Asked only in households with more than one member.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit F7.13: Impact of HIP on Family Food Environment, Logistic Regression Model

How often do you…?	Predicted probability (S.E.)		Impact			
	Treatment (T)	Control (C)	Odds Ratio	[S.E.]	{t-statistic}	(P-value)
Have fruit available at home (N=3309)	0.881 (0.011)	0.829 (0.012)	1.527	[0.183]	{3.530}	(<0.001)***
Have fruit in refrigerator or on counter (N=3310)	0.756 (0.014)	0.711 (0.015)	1.264	[0.127]	{2.331}	(0.020)**
Have vegetables available at home (N=3309)[a]	0.917 (0.009)	0.891 (0.009)	1.346	[0.190]	{2.104}	(0.035)**
Have ready-to-eat vegetables in fridge or on counter (N=3284)	0.675 (0.016)	0.654 (0.015)	1.102	[0.104]	{1.035}	(0.301)
Composite scale – Fruits & veg. available at home (N=3456)	0.563 (0.017)	0.526 (0.016)	1.161	[0.108]	{1.612}	(0.107)
Have salty snacks at home (chips, crackers) (N=3312)	0.349 (0.015)	0.350 (0.014)	0.996	[0.088]	{-0.041}	(0.967)
Have lowfat/nonfat milk at home (N=3292)	0.560 (0.018)	0.541 (0.016)	1.081	[0.103]	{0.816}	(0.415)
Have soft drinks/fruit drinks (not juice) at home (N=3312)	0.385 (0.016)	0.428 (0.016)	0.837	[0.079]	{-1.895}	(0.058)*
Sit down with family at home for evening meals (N=2304)[b]	0.753 (0.019)	0.726 (0.017)	1.149	[0.143]	{1.122}	(0.262)
Cook evening meals at home (N=3300)	0.930 (0.008)	0.914 (0.008)	1.251	[0.180]	{1.559}	(0.119)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes: 1=Always or most of the time, 0=Sometimes, rarely, never, or no refrigerator/freezer; "don't know" responses coded as missing.
[a]"No refrigerator or freezer" responses coded as missing.
[b]Asked only in households with more than one member.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

F.7 Chapter 8 Supplemental Tables: Full Regression Results, Additional Outcomes, Baseline Fruit and Vegetable Screener

Chapter 8 supplemental tables include full regression results (Exhibit F8.1), results for inclusive TFV measure (Exhibit F8.2) and total fruits and vegetables by USDA Food Pattern food group (Exhibit F8.3), and baseline usual daily intake from fruit and vegetable screener differences (Exhibit F8.4).

Exhibit F8.1: Impact of HIP on Consumption of Fruits & Vegetables and Disaggregated Components, Restrictive and Inclusive Targeted Fruits and Vegetables (TFV) and All Fruits and Vegetables, Cup-Equivalents, Full Regression Results Including Coefficients for All Covariates

	Restrictive TFV	TFV from mixed foods	Inclusive TFV	100% fruit juice	White potatoes	Legumes	Other fruits & vegetables acquired outside stores	All fruits and vegetables
Treatment status	0.238***	0.002	0.241***	0.095***	-0.023	-0.008	0.018	0.323***
	(0.054)	(0.019)	(0.059)	(0.036)	(0.024)	(0.010)	(0.023)	(0.080)
Respondent gender indicator – female	-0.011	0.007	-0.004	-0.060	-0.114*	-0.002	-0.053	-0.233
	(0.102)	(0.040)	(0.111)	(0.071)	(0.064)	(0.021)	(0.051)	(0.160)
Respondent gender indicator – male	--	--	--	--	--		--	--
(EXCLUDED category)	--	--	--	--	--		--	--
Respondent race/ethnicity indicator—non-Hispanic black	0.164	-0.025	0.140	0.270***	-0.084*	0.025	-0.030	0.321*
	(0.108)	(0.043)	(0.123)	(0.088)	(0.048)	(0.016)	(0.045)	(0.192)
Respondent race/ethnicity indicator—Hispanic	0.170**	-0.082**	0.089	0.103**	-0.161***	0.129***	-0.167***	-0.008
	(0.075)	(0.034)	(0.085)	(0.053)	(0.038)	(0.016)	(0.042)	(0.123)
Respondent race/ethnicity indicator—non-Hispanic other race	0.492**	0.084	0.577**	0.045	-0.148**	0.072**	-0.110*	0.436
	(0.196)	(0.074)	(0.224)	(0.089)	(0.059)	(0.029)	(0.065)	(0.278)
Respondent race/ethnicity indicator—non-Hispanic white	--	--	--	--	--		--	--
(EXCLUDED category)	--	--	--	--	--		--	--
Respondent age indicator—16;ln 30 years	-0.613***	-0.014	-0.627***	0.040	-0.010	0.021	0.007	-0.568***
	(0.129)	(0.045)	(0.144)	(0.084)	(0.071)	(0.020)	(0.047)	(0.216)
Respondent age indicator—31–40 years	-0.418***	0.010	-0.408**	-0.091	-0.045	0.034*	-0.003	-0.507**
	(0.145)	(0.058)	(0.166)	(0.082)	(0.072)	(0.023)	(0.056)	(0.235)
Respondent age indicator—41–54 years	-0.382***	-0.013	-0.395***	-0.109	-0.086	0.016	-0.035	-0.609***
	(0.130)	(0.036)	(0.144)	(0.077)	(0.066)	(0.019)	(0.044)	(0.206)
Respondent age indicator—55+ years	--	--	--	--	--		--	--
(EXCLUDED category)	--	--	--	--	--		--	--
Geography indicator—Springfield	-0.133	-0.017	-0.151	0.0486	-0.040	0.008	0.040	-0.095
	(0.087)	(0.037)	(0.099)	(0.055)	(0.047)	(0.015)	(0.036)	(0.134)
Geography indicator—Chicopee/Holyoke	-0.051	-0.055	-0.106	-0.018	-0.042	0.027	0.091*	-0.048
	(0.094)	(0.034)	(0.105)	(0.059)	(0.048)	(0.017)	(0.053)	(0.143)
Geography indicator—Hampden county balance	--	--	--	--	--		--	--
(EXCLUDED category)	--	--	--	--	--		--	--
Household size indicator—1 household member	0.300***	0.022	0.322***	-0.114	-0.105	-0.002	-0.058	0.043
	(0.090)	(0.031)	(0.099)	(0.067)	(0.072)	(0.023)	(0.050)	(0.153)

	Restrictive TFV	TFV from mixed foods	Inclusive TFV	100% fruit juice	White potatoes	Legumes	Other fruits & vegetables acquired outside stores	All fruits and vegetables
Household size indicator—more than one household member	--	--	--	--	--		--	--
(EXCLUDED category)	--	--	--	--	--		--	--
Household head gender indicator—female	-0.103	-0.089**	-0.192	-0.167**	0.033	-0.004	-0.0253	-0.355*
	(0.135)	(0.044)	(0.144)	(0.077)	(0.064)	(0.021)	(0.056)	(0.192)
Household head gender indicator—male	--	--	--	--	--		--	--
(EXCLUDED category)	--	--	--	--	--		--	--
Elderly (with/without children) in household indicator	-0.035	-0.030	-0.065	-0.135*	0.057	-0.006	0.066	-0.083
	(0.140)	(0.039)	(0.153)	(0.071)	(0.073)	(0.020)	(0.060)	(0.219)
Children (no elderly) in household indicator	0.218**	0.036	0.254***	-0.005	-0.093	-0.0280	-0.009	0.120
	(0.090)	(0.032)	(0.098)	(0.075)	(0.063)	(0.024)	(0.046)	(0.154)
No children or elderly in household indicator	--	--	--	--	--		--	--
(EXCLUDED category)	--	--	--	--	--		--	--
Household # of adults indicator—four or more adults in household	0.501*	0.049	0.549*	-0.229**	-0.087	0.078	-0.183***	0.129
	(0.294)	(0.065)	(0.284)	(0.104)	(0.082)	(0.050)	(0.057)	(0.356)
Household # of adults indicator—three or fewer adults in household	--	--	--	--	--		--	--
(EXCLUDED category)	--	--	--	--	--		--	--
Sampling wave indicator—Wave 2 (HIP start date Dec. 1, 2011)	-0.035	-0.036	-0.071	0.013	<0.001	-0.008	0.076**	0.012
	(0.074)	(0.030)	(0.084)	(0.048)	(0.034)	(0.014)	(0.033)	(0.118)
Sampling wave indicator—Wave 3 (HIP start date Jan. 1, 2012)	-0.076	-0.057*	-0.133*	-0.024	-0.063*	-0.001	0.021	-0.201*
	(0.071)	(0.030)	(0.079)	(0.050)	(0.036)	(0.015)	(0.030)	(0.113)
Sampling wave indicator—Wave 1 (HIP start date Nov. 1, 2011)	--	--	--	--	--		--	--
(EXCLUDED category)	--	--	--	--	--		--	--
Second recall interview (binary)	-0.046	0.006	-0.040	-0.062	-0.048	0.026	-0.013	-0.134
	(0.071)	(0.033)	(0.077)	(0.042)	(0.053)	(0.021)	(0.042)	(0.110)
First recall interview (binary)	--	--	--	--	--		--	--
(EXCLUDED category)	--	--	--	--	--		--	--
Weekend intake day (binary)	-0.078	0.031	-0.047	-0.033	0.030	>-0.001	-0.022	-0.072
	(0.079)	(0.028)	(0.084)	(0.053)	(0.047)	(0.018)	(0.038)	(0.119)
Weekday intake day (binary)	--	--	--	--	--		--	--
(EXCLUDED category)	--	--	--	--	--		--	--

	Restrictive TFV	TFV from mixed foods	Inclusive TFV	100% fruit juice	White potatoes	Legumes	Other fruits & vegetables acquired outside stores	All fruits and vegetables
Intake level more than usual (binary)								
Intake level less than usual (binary)								
Usual intake level assessment missing due to “don't know” or break-off (binary)	-0.090	-0.043	-0.133	-0.065	-0.058	-0.025	-0.139**	-0.420***
	(0.092)	(0.039)	(0.103)	(0.073)	(0.052)	(0.022)	(0.058)	(0.150)
Intake level same as usual	--	--	--	--	--		--	--
(EXCLUDED category)	--	--	--	--	--		--	--
Estimated daily servings—juice (baseline)	0.019	0.003	0.022	0.061***	0.008	0.003	-0.007	0.086***
	(0.016)	(0.005)	(0.016)	(0.019)	(0.006)	(0.003)	(0.006)	(0.026)
Estimated daily servings—fruit (baseline)	0.029	-0.014	0.015	-0.026	-0.019*	>-0.001	0.007	-0.023
	(0.029)	(0.009)	(0.029)	(0.017)	(0.010)	(0.005)	(0.018)	(0.042)
Estimated daily servings—leafy green salad (baseline)	0.102	-0.015	0.087	-0.026	0.008	0.008	-0.004	0.073
	(0.072)	(0.017)	(0.074)	(0.037)	(0.031)	(0.010)	(0.024)	(0.123)
Estimated daily servings—fried potatoes (baseline)	0.082	-0.086**	-0.004	0.381***	0.090	0.032	0.006	0.504***
	(0.136)	(0.036)	(0.140)	(0.088)	(0.062)	(0.039)	(0.058)	(0.174)
Estimated daily servings—other potatoes (baseline)	-0.035	0.023	-0.012	0.003	0.054*	-0.007	-0.017	0.022
	(0.076)	(0.026)	(0.086)	(0.045)	(0.031)	(0.012)	(0.022)	(0.106)
Estimated daily servings—beans (baseline)	0.018	0.023	0.041	-0.049	-0.045*	0.012	0.007	-0.031
	(0.074)	(0.025)	(0.077)	(0.041)	(0.028)	(0.017)	(0.042)	(0.109)
Estimated daily servings—other vegetables (baseline)	0.138**	-0.006	0.132**	0.019	-0.019	-0.013*	0.067***	0.186**
	(0.054)	(0.014)	(0.058)	(0.034)	(0.023)	(0.008)	(0.022)	(0.088
Estimated daily servings—tomato sauce (baseline)	0.220	0.123	0.343*	-0.179***	0.094	0.028	->-0.001	0.287
	(0.144)	(0.103)	(0.189)	(0.058)	(0.073)	(0.032)	(0.064)	(0.239)
Estimated daily servings—salsa (baseline)	-0.034	0.181	0.146	-0.044	0.981	0.401*	-0.612**	0.872
	(0.582)	(0.207)	(0.549)	(0.413)	(0.877)	(0.242)	(0.310)	(1.275)
Imputation indicator for estimated daily servings—juice (baseline)	0.116	-0.137**	-0.021	-0.258*	-0.131	-0.055	0.065	-0.400
	(0.344)	(0.066)	(0.368)	(0.133)	(0.107)	(0.037)	(0.134)	(0.379)
Imputation indicator for estimated daily servings—fruit (baseline)	-0.274	-0.053	-0.327	0.210	0.057	-0.016	-0.022	-0.099
	(0.193)	(0.085)	(0.231)	(0.205)	(0.131)	(0.045)	(0.072)	(0.428)

	Restrictive TFV	TFV from mixed foods	Inclusive TFV	100% fruit juice	White potatoes	Legumes	Other fruits & vegetables acquired outside stores	All fruits and vegetables
Imputation indicator for estimated daily servings—leafy green salad (baseline)	-0.257	0.113	-0.144	-0.368*	0.026	-0.025	-0.194**	-0.705
	(0.301)	(0.153)	(0.331)	(0.196)	(0.100)	(0.049)	(0.083)	(0.456)
Imputation indicator for estimated daily servings—fried potatoes (baseline)	-0.031	0.191	0.159	0.588	0.373**	0.028	0.223*	1.370**
	(0.282)	(0.200)	(0.392)	(0.410)	(0.152)	(0.042)	(0.126)	(0.553)
Imputation indicator for estimated daily servings—other potatoes (baseline)	-0.294	0.025	-0.269	-0.241	-0.122	-0.071*	0.134	-0.568
	(0.284)	(0.113)	(0.337)	(0.220)	(0.104)	(0.041)	(0.145)	(0.471)
Imputation indicator for estimated daily servings—beans (baseline)	-0.033	0.234*	0.201	-0.064	-0.100	0.137*	-0.208*	-0.034
	(0.233)	(0.136)	(0.266)	(0.142)	(0.105)	(0.078)	(0.122)	(0.401)
Imputation indicator for estimated daily servings—other vegetables (baseline)	-0.316	0.0525	-0.264	0.021	-0.006	-0.011	-0.025	-0.285
	(0.210)	(0.069)	(0.226)	(0.153)	(0.085)	(0.028)	(0.082)	(0.312)
Imputation indicator for estimated daily servings—tomato sauce (baseline)	-0.198	0.060	-0.137	0.036	0.062	-0.058**	0.018	-0.079
	(0.175)	(0.117)	(0.209)	(0.171)	(0.129)	(0.028)	(0.072)	(0.357)
Imputation indicator for estimated daily servings—salsa (baseline)	0.137	-0.059	0.078	0.286	-0.016	-0.014	-0.096	0.239
	(0.380)	(0.091)	(0.385)	(0.219)	(0.101)	(0.039)	(0.081)	(0.468)
Constructed scale—attitudes about food, fruits, and vegetables (baseline)	0.215***	0.044	0.259***	0.017	0.073**	0.012	-0.031	0.331***
	(0.057)	(0.031)	(0.069)	(0.037)	(0.029)	(0.011)	(0.026)	(0.093)
Constructed scale—barriers to eating fruits and vegetables (baseline)	0.009	-0.004	0.005	-0.015	0.021	0.003	-0.001	0.004
	(0.030)	(0.013)	(0.033)	(0.018)	(0.016)	(0.005)	(0.010)	(0.046)
Constructed scale—barriers to grocery shopping (baseline)	-0.012	0.002	-0.009	-0.009	<0.001	0.004	-0.022	-0.028
	(0.054)	(0.022)	(0.061)	(0.031)	(0.025)	(0.011)	(0.022)	(0.083)
Constructed scale—fruits and vegetables at home (baseline)	0.142***	0.010	0.152***	0.034	-0.012	0.001	0.034*	0.210***
	(0.043)	(0.018)	(0.048)	(0.033)	(0.021)	(<0.001)	(0.010)	(0.066)

	Restrictive TFV	TFV from mixed foods	Inclusive TFV	100% fruit juice	White potatoes	Legumes	Other fruits & vegetables acquired outside stores	All fruits and vegetables
Imputation indicator for constructed scale—attitudes about food, fruits, and vegetables (baseline)	-0.954***	-0.389***	-1.344***	0.124	0.022	-0.117***	0.145*	-1.169***
	(0.246)	(0.083)	(0.283)	(0.144)	(0.118)	(0.044)	(0.080)	(0.308)
Imputation indicator for constructed scale—barriers to eating fruits and vegetables (baseline)	0.508	-0.042	0.466	0.309	0.018	-0.033	0.119	0.878
	(0.424)	(0.074)	(0.483)	(0.291)	(0.110)	(0.028)	(0.136)	(0.810)
Imputation indicator for constructed scale—barriers to grocery shopping (baseline)	0.212	0.103	0.315	0.227	-0.178**	0.032	-0.175	0.222
	(0.272)	(0.092)	(0.291)	(0.233)	(0.085)	(0.047)	(0.138)	(0.448)
Imputation indicator for constructed scale—fruits and vegetables at home (baseline)	-0.320	-0.007	-0.327	-0.315	-0.123	0.072*	-0.223	-0.917
	(0.489)	(0.086)	(0.550)	(0.298)	(0.115)	(0.040)	(0.145)	(0.860)
Constant	-0.296	0.249*	-0.048	0.480**	0.421**	-0.010	0.406***	1.249**
	(0.319)	(0.142)	(0.364)	(0.226)	(0.164)	(0.070)	(0.157)	(0.506)
Observations	3,913	3,913	3,913	3,913	3,913	3,913	3,913	3,913
R-squared	0.114	0.038	0.115	0.077	0.045	0.077	0.060	0.102

Standard errors in parentheses.
Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
TFV=Intake of fruits and vegetables acquired from the store, excluding white potatoes, legumes, and 100% juice.
Inclusive measure includes fruit & vegetable intake from mixed foods, restrictive measure excludes mixed foods.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 sample (unweighted N=3913 recalls from 2009 respondents).

Exhibit F8.2: Impact of HIP on Consumption of Targeted Fruits & Vegetables (TFV), Inclusive Measure, by USDA Food Pattern Food Group

TFV, Inclusive Measure	Regression-adjusted mean (SE)		Impact			
	Treatment (T)	Control (C)	T-C	[S.E.]	{t-statistic}	(P-value)
Total fruits and vegetables	1.455 (0.045)	1.215 (0.039)	0.241	[0.059]	{4.082}	<(0.001)***
Total fruits	0.644 (0.030)	0.530 (0.025)	0.114	[0.039]	{2.940}	(0.003)***
Citrus fruits, melons, & berries	0.148 (0.011)	0.134 (0.012)	0.014	[0.016]	{0.857}	(0.392)
Other fruits (e.g. apples, pears, bananas, grapes, peaches)	0.495 (0.026)	0.396 (0.019)	0.100	[0.032]	{3.116}	(0.002)***
Total vegetables	0.811 (0.028)	0.685 (0.025)	0.127	[0.037]	{3.404}	(0.001)***
Dark green vegetables	0.085 (0.007)	0.048 (0.006)	0.037	[0.009]	{4.085}	<(0.001)***
Red and orange vegetables	0.266 (0.012)	0.236 (0.010)	0.030	[0.016]	{1.928}	(0.054)*
Tomatoes	0.201 (0.009)	0.186 (0.009)	0.016	[0.013]	{1.223}	(0.221)
Other red and orange vegetables	0.065 (0.007)	0.051 (0.004)	0.015	[0.008]	{1.788}	(0.074)*
Other starchy vegetables	0.106 (0.009)	0.100 (0.007)	0.006	[0.011]	{0.544}	(0.586)
Other vegetables (e.g. celery, cucumbers, mushrooms, green beans, onions, asparagus)	0.354 (0.016)	0.300 (0.016)	0.054	[0.023]	{2.348}	(0.019)**

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
TFV=Intake of fruits and vegetables acquired from the store, excluding white potatoes and 100% juice.
Inclusive measure includes fruit and vegetable intake from mixed foods.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 sample (unweighted N=3913 recalls from 2009 respondents).

Exhibit F8.3: Impact of HIP on Consumption of Total Fruits & Vegetables, by USDA Food Pattern Food Group

Fruits and Vegetables	Regression-adjusted mean (SE) Treatment (T)	Control (C)	Impact T-C	[S.E.]	{t-statistic}	(P-value)
Total fruits and vegetables	2.616 (0.060)	2.294 (0.055)	0.323	[0.080]	{4.016}	<(0.001)***
Total fruits	1.259 (0.044)	1.031 (0.037)	0.228	[0.057]	{3.977}	<(0.001)***
Citrus fruits, melons, & berries	0.171 (0.012)	0.145 (0.013)	0.026	[0.017]	{1.512}	(0.131)
Other fruits (e.g. apples, pears, bananas, grapes, peaches)	0.539 (0.026)	0.433 (0.020)	0.106	[0.033]	{3.238}	(0.001)***
100% fruit juice	0.549 (0.029)	0.453 (0.023)	0.095	[0.036]	{2.617}	(0.009)***
Total vegetables	1.357 (0.034)	1.262 (0.034)	0.095	[0.048]	{1.965}	(0.050)**
Dark green vegetables	0.102 (0.008)	0.063 (0.006)	0.039	[0.010]	{3.910}	<(0.001)***
Red and orange vegetables	0.338 (0.013)	0.320 (0.012)	0.018	[0.017]	{1.026}	(0.305)
Tomatoes	0.264 (0.011)	0.257 (0.010)	0.008	[0.015]	{0.510}	(0.610)
Other red and orange vegetables	0.240 (0.011)	0.217 (0.010)	0.023	[0.015]	{1.553}	(0.121)
Starchy vegetables	0.452 (0.019)	0.469 (0.018)	-0.016	[0.027]	{-0.613}	(0.540)
White potatoes	0.336 (0.017)	0.359 (0.017)	-0.023	[0.024]	{-0.963}	(0.336)
Other starchy vegetables	0.116 (0.009)	0.109 (0.007)	0.007	[0.012]	{0.607}	(0.544)
Legumes	0.106 (0.007)	0.114 (0.007)	-0.008	[0.010]	{-0.858}	(0.391)
Other vegetables (e.g. celery, cucumbers, mushrooms, green beans, onions, asparagus)	0.423 (0.017)	0.367 (0.017)	0.055	[0.024]	{2.324}	(0.020)**

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 sample (unweighted N=3913 recalls from 2009 respondents).

Exhibit F8.4: Baseline Estimated Usual Daily Intake in Cup-Equivalents from Fruit & Vegetable Screener of Respondents Completing Follow-Up Participant Surveys (Round 2 or 3), by Treatment and Control Status

	Total	Treatment	Control	P-value
100% juice (N=1954)	1.58 (0.07)	1.45 (0.07)	1.60 (0.09)	[0.180]
Fruit (N=1954)	0.84 (0.04)	0.79 (0.04)	0.84 (0.04)	[0.355]
Salad (N=1954)	0.38 (0.02)	0.36 (0.02)	0.38 (0.02)	[0.368]
Fried potatoes (N=1954)	0.10 (0.01)	0.10 (0.01)	0.10 (0.01)	[0.688]
Other potatoes (N=1954)	0.28 (0.01)	0.27 (0.01)	0.28 (0.01)	[0.688]
Beans (N=1954)	0.26 (0.01)	0.26 (0.02)	0.25 (0.01)	[0.676]
Other vegetables (N=1954)	0.61 (0.02)	0.61 (0.03)	0.61 (0.03)	[0.988]
Tomato sauce (N=1954)	0.15 (0.01)	0.16 (0.01)	0.15 (0.01)	[0.564]
Salsa (N=1954)	0.01 (<0.01)	0.02 (<0.01)	0.01 (<0.01)	[0.416]

Weighted means (standard error).
Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
“Don't know,” “refused,” and “inapplicable” responses on frequency or amount items coded as missing.
Source: Modified EATS Fruit and Vegetable Screener, Participant Survey (respondent module).

Appendix G: Analyses by Follow-Up Survey Round

Exhibit G6.1: Differences in Impact of HIP on Mean Monthly SNAP and TFV Purchases, by Follow-Up Round

Usual place to shop	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
SNAP purchases at supermarkets and superstores ($)				
Pooled (Rounds 2 & 3)	126.87 (1.08)	122.64 (0.41)	4.23 (<0.001)***	
Round 2	124.08 (1.12)	119.78 (0.43)	4.31 (<0.001)***	
Round 3	130.93 (1.22)	127.35 (0.46)	3.58 (0.006)***	
Change: Round 3 - Round 2				-0.51 (0.583)
Eligible TFV purchases at supermarkets and superstores ($)				
Pooled (Rounds 2 & 3)	12.04 (0.15)	10.89 (0.05)	1.16 (<0.001)***	
Round 2	12.08 (0.16)	10.98 (0.06)	1.10 (<0.001)***	
Round 3	11.92 (0.16)	10.72 (0.06)	1.20 (<0.001)***	
Change: Round 3 – Round 2				0.10 (0.440)
Eligible mean household TFV purchase as % of SNAP purchases at supermarkets and superstores (computed)				
Pooled (Rounds 2 & 3)	9.94 (0.12)	9.27 (0.04)	0.67 (<0.001)***	
Round 2	10.25 (0.13)	9.56 (0.05)	0.69 (<0.001)***	
Round 3	9.45 (0.13)	8.87 (0.05)	0.58 (<0.001)***	
Change: Round 3 – Round 2				-0.03 (0.811)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the household level for the separate Round 2 and Round 3 results.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. The same demographic covariates, which include a mix of time-variant and time-invariant variables, are included in both models. These alternative models would produce identical point estimates of the Round 2/3 difference if the change model included the Round 2/3 change in demographic covariates instead of the levels.
Source: EBT Transaction Data, 45,854 households that received SNAP benefits in every month from March to October 2012.

Exhibit G6.2: Differences in Impacts of HIP on Self-Reported Monthly Expenditures, by Follow-Up Round

Usual monthly spending ($) for…	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
SNAP (N=2641)				
Pooled (Rounds 2 & 3)	273.981 (4.976)	279.201 (4.130)	-5.220 (0.425)	
Round 2	276.576 (5.612)	279.038 (4.995)	-2.463 (0.747)	
Round 3	271.339 (5.615)	279.368 (4.857)	-8.029 (0.282)	
Change: Round 3 – Round 2				-5.289 (0.489)
Groceries (N=2570)				
Pooled (Rounds 2 & 3)	148.332 (4.126)	143.232 (4.110)	5.100 (0.358)	
Round 2	149.051 (5.151)	139.705 (4.909)	9.346 (0.176)	
Round 3	147.578 (5.023)	146.839 (5.120)	0.739 (0.916)	
Change: Round 3 – Round 2				-10.131 (0.218)
Groceries—food items[a] (N=2481)				
Pooled (Rounds 2 & 3)	103.595 (3.601)	102.927 (3.569)	0.669 (0.889)	
Round 2	104.472 (4.522)	100.446 (4.366)	4.026 (0.507)	
Round 3	102.693 (4.541)	105.462 (4.278)	-2.769 (0.647)	
Change: Round 3 – Round 2				-7.952 (0.287)
Groceries—nonfood items (N=2841)				
Pooled (Rounds 2 & 3)	44.594 (1.799)	39.962 (1.556)	4.633 (0.049)**	
Round 2	44.291 (2.210)	40.171 (2.157)	4.120 (0.176)	
Round 3	44.903 (2.535)	39.747 (1.934)	5.156 (0.106)	
Change: Round 3 – Round 2				0.427 (0.920)
Restaurants (N=2613)				
Pooled (Rounds 2 & 3)	33.142 (1.330)	34.057 (1.394)	-0.916 (0.640)	
Round 2	32.740 (1.563)	35.140 (1.673)	-2.400 (0.305)	
Round 3	33.567 (1.772)	32.933 (1.685)	0.634 (0.796)	
Change: Round 3 – Round 2				3.986 (0.167)
Fruits and vegetables[b] (N=2271)				
Pooled (Rounds 2 & 3)	77.578 (2.137)	71.201 (2.104)	6.377 (0.027)**	
Round 2	78.547 (2.714)	70.141 (2.359)	8.406 (0.016)**	
Round 3	76.586 (2.544)	72.266 (2.634)	4.319 (0.227)	
Change: Round 3 – Round 2				-4.364 (0.283)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Continuous outcomes: self-reported expenses in dollars per month; “don’t know” and “refused” responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted; inclusion of weights results in the observed difference in point estimates.
Pooled standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]Calculated as total grocery expenditures minus expenditures on nonfood items.
[b]Purchased with SNAP and with other forms of payment.
Source: Participant Survey (primary shopper module).

Exhibit G6.3: Differences in Impact of HIP on Mean Monthly SNAP Purchases by Retailer Type, by Follow-Up Round

Usual place to shop	Regression-adjusted treatment mean (SE) ($)	Regression-adjusted control mean (SE) ($)	Treatment-control impact (P-value) ($)	Difference in impacts (P-value)
All retailers				
Pooled (Rounds 2 & 3)	265.04 (1.13)	260.79 (0.44)	4.30 (<.001)***	
Round 2	265.46 (1.18)	262.02 (0.46)	3.44 (0.007)***	
Round 3	263.61 (1.27)	258.81 (0.50)	4.79 (<.001)***	
Change: Round 3 – Round 2				1.66 (0.093)*
Supermarkets and superstores				
Pooled (Rounds 2 & 3)	211.79 (1.14)	207.21 (0.44)	4.58 (<.001)***	
Round 2	212.42 (1.19)	208.12 (0.46)	4.30 (<.001)***	
Round 3	210.05 (1.29)	205.62 (0.50)	4.42 (0.001)***	
Change: Round 3 – Round 2				0.36 (0.718)
Convenience				
Pooled (Rounds 2 & 3)	26.42 (0.46)	26.32 (0.18)	0.09 (0.848)	
Round 2	26.43 (0.47)	26.68 (0.20)	-0.25 (0.621)	
Round 3	26.32 (0.51)	25.68 (0.20)	0.64 (0.242)	
Change: Round 3 – Round 2				0.92 (0.017)**
Grocery				
Pooled (Rounds 2 & 3)	20.35 (0.46)	19.90 (0.18)	0.45 (0.354)	
Round 2	20.49 (0.48)	20.24 (0.19)	0.25 (0.627)	
Round 3	20.04 (0.49)	19.31 (0.19)	0.73 (0.164)	
Change: Round 3 – Round 2				0.49 (0.168)
Other				
Pooled (Rounds 2 & 3)	2.39 (0.19)	2.48 (0.08)	-0.09 (0.651)	
Round 2	2.31 (0.19)	2.43 (0.08)	-0.11 (0.598)	
Round 3	2.46 (0.19)	2.59 (0.08)	-0.12 (0.551)	
Change: Round 3 – Round 2				<.01 (0.968)
Out of state				
Pooled (Rounds 2 & 3)	4.09 (0.28)	4.87 (0.12)	-0.78 (0.009)***	
Round 2	3.81 (0.28)	4.56 (0.12)	-0.75 (0.014)**	
Round 3	4.74 (0.36)	5.62 (0.16)	-0.87 (0.027)**	
Change: Round 3 – Round 2				-0.11 (0.715)
HIP participating				
Pooled (Rounds 2 & 3)	137.18 (1.09)	132.92 (0.42)	4.26 (<.001)***	
Round 2	134.29 (1.14)	130.10 (0.44)	4.19 (<.001)***	
Round 3	141.45 (1.23)	137.57 (0.47)	3.88 (0.003)***	
Change: Round 3 – Round 2				-0.07 (0.939)
Non-HIP participating				
Pooled (Rounds 2 & 3)	127.86 (1.06)	127.87 (0.43)	-0.01 (0.995)	
Round 2	131.17 (1.13)	131.92 (0.45)	-0.75 (0.538)	
Round 3	122.16 (1.16)	121.25 (0.47)	0.91 (0.465)	
Change: Round 3 – Round 2				1.73 (0.057)*

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the household level for the separate Round 2 and Round 3 results.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in

outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. The same demographic covariates, which include a mix of time-variant and time-invariant variables, are included in both models. These alternative models would produce identical point estimates of the Round 2/3 change if the model that regressed the Round 2/3 change in outcomes included the Round 2/3 change in demographic covariates instead of the levels.
Source: EBT Transaction Data, 45,854 households that received SNAP benefits in every month from March to October 2012.

Exhibit G6.4: Differences in Impacts of HIP on Usual Grocery Store Type, by Follow-Up Round

Usual place to shop	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Large chain grocery store or supermarket				
Pooled (Rounds 2 & 3)	0.817 (0.012)	0.818 (0.011)	-0.001 (0.970)	
Round 2	0.796 (0.015)	0.803 (0.015)	-0.006 (0.761)	
Round 3	0.839 (0.014)	0.833 (0.013)	0.006 (0.776)	
Change: Round 3 – Round 2				0.013 (0.580)
Natural or organic supermarket (such as Whole Foods Market)				
Pooled (Rounds 2 & 3)	0.005 (0.002)	0.006 (0.002)	-0.001 (0.763)	
Round 2	0.005 (0.003)	0.009 (0.004)	-0.003 (0.471)	
Round 3	0.004 (0.003)	0.003 (0.002)	0.002 (0.640)	
Change: Round 3 – Round 2				0.004 (0.470)
Small local store or corner store				
Pooled (Rounds 2 & 3)	0.021 (0.004)	0.024 (0.004)	-0.002 (0.711)	
Round 2	0.022 (0.006)	0.028 (0.006)	-0.006 (0.475)	
Round 3	0.021 (0.005)	0.020 (0.005)	0.001 (0.872)	
Change: Round 3 – Round 2				0.002 (0.861)
Convenience store (such as 7-11 or mini market)				
Pooled (Rounds 2 & 3)	0.001 (0.001)	0.001 (0.001)	0.001 (0.529)	
Round 2	0.002 (0.002)	0.002 (0.001)	<0.001 (0.880)	
Round 3	0.001 (0.001)	<0.001 (<0.001)	0.001 (0.373)	
Change: Round 3 – Round 2				<0.001 (0.830)
Warehouse club store (such as Sam's Club or Costco)				
Pooled (Rounds 2 & 3)	0.020 (0.004)	0.023 (0.005)	-0.004 (0.571)	
Round 2	0.019 (0.005)	0.023 (0.006)	-0.004 (0.583)	
Round 3	0.020 (0.006)	0.024 (0.006)	-0.003 (0.714)	
Change: Round 3 – Round 2				0.004 (0.636)
Discount superstore (such as Wal-Mart)				
Pooled (Rounds 2 & 3)	0.124 (0.010)	0.119 (0.009)	0.005 (0.710)	
Round 2	0.143 (0.013)	0.128 (0.012)	0.015 (0.418)	
Round 3	0.105 (0.012)	0.109 (0.011)	-0.005 (0.766)	
Change: Round 3 – Round 2				-0.017 (0.408)
Ethnic market				
Pooled (Rounds 2 & 3)	0.004 (0.002)	0.005 (0.002)	-0.001 (0.653)	
Round 2	0.004 (0.002)	0.007 (0.003)	-0.003 (0.480)	
Round 3	0.004 (0.002)	0.003 (0.002)	0.001 (0.851)	
Change: Round 3 – Round 2				0.004 (0.308)
Farmers market/co-op				
Pooled (Rounds 2 & 3)	0.003 (0.002)	0.001 (0.001)	0.001 (0.580)	
Round 2	0.005 (0.003)	0.001 (0.001)	0.003 (0.333)	
Round 3	<0.001 (0.001)	0.001 (0.001)	-0.001 (0.306)	
Change: Round 3 – Round 2				-0.005 (0.175)
Some other location				
Pooled (Rounds 2 & 3)	0.002 (0.001)	0.003 (0.001)	-0.001 (0.673)	
Round 2	0.003 (0.002)	<0.001 (0.001)	0.003 (0.215)	
Round 3	0.002 (0.001)	0.007 (0.003)	-0.005 (0.129)	
Change: Round 3 – Round 2				-0.008 (0.052)*

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=Yes, 0=No; “don’t know” responses coded as missing.

Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted; inclusion of weights results in the observed difference in point estimates.
Pooled standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module); (unweighted N=2,777).

Exhibit G6.5: Differences in Impacts of HIP on Reasons for Choice of Usual Grocery Shopping Place, by Follow-Up Round

Usually shop there because…	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Prices/affordability				
Pooled (Rounds 2 & 3)	0.489 (0.016)	0.520 (0.015)	-0.031 (0.156)	
Round 2	0.502 (0.019)	0.540 (0.018)	-0.039 (0.145)	
Round 3	0.476 (0.020)	0.499 (0.018)	-0.023 (0.401)	
Change: Round 3 – Round 2				0.004 (0.912)
Close to home				
Pooled (Rounds 2 & 3)	0.301 (0.015)	0.323 (0.013)	-0.022 (0.266)	
Round 2	0.298 (0.018)	0.316 (0.017)	-0.018 (0.471)	
Round 3	0.304 (0.018)	0.330 (0.017)	-0.027 (0.285)	
Change: Round 3 – Round 2				-0.006 (0.846)
Variety of products				
Pooled (Rounds 2 & 3)	0.243 (0.013)	0.202 (0.011)	0.041 (0.015)**	
Round 2	0.219 (0.016)	0.207 (0.015)	0.011 (0.604)	
Round 3	0.269 (0.018)	0.197 (0.015)	0.072 (0.002)***	
Change: Round 3 – Round 2				0.064 (0.032)**
Produce better or fresher				
Pooled (Rounds 2 & 3)	0.168 (0.011)	0.137 (0.010)	0.030 (0.035)**	
Round 2	0.179 (0.015)	0.161 (0.014)	0.019 (0.351)	
Round 3	0.156 (0.014)	0.114 (0.012)	0.042 (0.018)**	
Change: Round 3 – Round 2				0.022 (0.369)
Sales/promotions in store				
Pooled (Rounds 2 & 3)	0.099 (0.009)	0.131 (0.010)	-0.032 (0.018)**	
Round 2	0.127 (0.013)	0.123 (0.012)	0.004 (0.814)	
Round 3	0.069 (0.011)	0.139 (0.013)	-0.070 (<0.001)***	
Change: Round 3 – Round 2				-0.074 (0.002)**
Preferred products are available				
Pooled (Rounds 2 & 3)	0.093 (0.009)	0.123 (0.009)	-0.030 (0.013)**	
Round 2	0.091 (0.011)	0.122 (0.012)	-0.030 (0.066)*	
Round 3	0.095 (0.011)	0.125 (0.013)	-0.030 (0.071)*	
Change: Round 3 – Round 2				0.002 (0.917)
Familiarity with store				
Pooled (Rounds 2 & 3)	0.071 (0.008)	0.058 (0.008)	0.013 (0.249)	
Round 2	0.060 (0.009)	0.066 (0.010)	-0.006 (0.663)	
Round 3	0.083 (0.011)	0.051 (0.009)	0.032 (0.028)**	
Change: Round 3 – Round 2				0.042 (0.013)**
One stop shopping				
Pooled (Rounds 2 & 3)	0.059 (0.007)	0.057 (0.006)	0.001 (0.868)	
Round 2	0.046 (0.008)	0.046 (0.008)	0.001 (0.963)	
Round 3	0.072 (0.010)	0.070 (0.010)	0.003 (0.846)	
Change: Round 3 – Round 2				0.008 (0.656)
Easy to get there				
Pooled (Rounds 2 & 3)	0.023 (0.004)	0.015 (0.003)	0.008 (0.140)	
Round 2	0.019 (0.005)	0.015 (0.004)	0.004 (0.542)	
Round 3	0.028 (0.006)	0.015 (0.005)	0.013 (0.100)*	
Change: Round 3 – Round 2				0.007 (0.451)

Usually shop there because…	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Quality				
Pooled (Rounds 2 & 3)	0.042 (0.005)	0.048 (0.006)	-0.005 (0.512)	
Round 2	0.040 (0.007)	0.055 (0.009)	-0.015 (0.199)	
Round 3	0.045 (0.008)	0.040 (0.008)	0.005 (0.679)	
Change: Round 3 – Round 2				0.025 (0.097)*
Close to work				
Pooled (Rounds 2 & 3)	0.005 (0.002)	0.003 (0.001)	0.003 (0.376)	
Round 2	0.009 (0.005)	0.004 (0.002)	0.005 (0.357)	
Round 3	0.002 (0.002)	0.002 (0.002)	<0.001 (0.997)	
Change: Round 3 – Round 2				-0.006 (0.375)
Close to some other location				
Pooled (Rounds 2 & 3)	0.002 (0.001)	0.004 (0.002)	-0.001 (0.485)	
Round 2	0.002 (0.002)	0.007 (0.003)	-0.005 (0.157)	
Round 3	0.002 (0.002)	<0.001 (<0.001)	0.002 (0.207)	
Change: Round 3 – Round 2				0.008 (0.041)**
Disability accessible				
Pooled (Rounds 2 & 3)	0.003 (0.002)	0.002 (0.001)	0.002 (0.272)	
Round 2	0.003 (0.002)	<0.001 (0.001)	0.003 (0.125)	
Round 3	0.004 (0.002)	0.003 (0.002)	0.001 (0.810)	
Change: Round 3 – Round 2				-0.001 (0.684)
Hours of operation convenient				
Pooled (Rounds 2 & 3)	0.005 (0.002)	0.009 (0.003)	-0.003 (0.352)	
Round 2	0.005 (0.003)	0.010 (0.004)	-0.005 (0.301)	
Round 3	0.006 (0.003)	0.007 (0.004)	-0.001 (0.777)	
Change: Round 3 – Round 2				0.003 (0.648)
EBT card accepted				
Pooled (Rounds 2 & 3)	0.029 (0.005)	0.015 (0.003)	0.014 (0.031)**	
Round 2	0.035 (0.007)	0.025 (0.006)	0.010 (0.296)	
Round 3	0.023 (0.006)	0.006 (0.003)	0.017 (0.010)***	
Change: Round 3 – Round 2				0.006 (0.552)
Ethnic foods are available				
Pooled (Rounds 2 & 3)	0.007 (0.002)	0.007 (0.002)	>-0.001 (0.990)	
Round 2	0.007 (0.003)	0.008 (0.003)	-0.001 (0.782)	
Round 3	0.007 (0.003)	0.006 (0.003)	0.001 (0.815)	
Change: Round 3 – Round 2				-0.001 (0.823)
Good service				
Pooled (Rounds 2 & 3)	0.028 (0.005)	0.019 (0.004)	0.008 (0.182)	
Round 2	0.026 (0.006)	0.024 (0.006)	0.003 (0.747)	
Round 3	0.029 (0.007)	0.015 (0.005)	0.014 (0.082)*	
Change: Round 3 – Round 2				0.012 (0.290)
Bulk purchases				
Pooled (Rounds 2 & 3)	0.022 (0.005)	0.025 (0.005)	-0.004 (0.606)	
Round 2	0.024 (0.006)	0.025 (0.006)	-0.001 (0.928)	
Round 3	0.019 (0.006)	0.025 (0.006)	-0.006 (0.444)	
Change: Round 3 – Round 2				-0.005 (0.614)
Clean				
Pooled (Rounds 2 & 3)	0.022 (0.004)	0.018 (0.004)	0.004 (0.477)	
Round 2	0.026 (0.006)	0.021 (0.006)	0.005 (0.541)	
Round 3	0.018 (0.005)	0.015 (0.005)	0.003 (0.661)	
Change: Round 3 – Round 2				-0.004 (0.693)

Usually shop there because…	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Some other reason				
Pooled (Rounds 2 & 3)	0.010 (0.003)	0.007 (0.002)	0.003 (0.517)	
Round 2	0.009 (0.004)	0.006 (0.003)	0.003 (0.499)	
Round 3	0.010 (0.004)	0.008 (0.003)	0.002 (0.689)	
Change: Round 3 – Round 2				>-0.001 (0.990)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted; inclusion of weights results in the observed difference in point estimates.
Pooled standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module); (unweighted N=2,763).

Exhibit G6.6: Differences in Impacts of HIP on Grocery Shopping Behavior, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Grocery shopping frequency (N=2789)[a]				
Pooled (Rounds 2 & 3)	5.234 (0.028)	5.208 (0.026)	0.026 (0.504)	
Round 2	5.229 (0.033)	5.207 (0.032)	0.022 (0.625)	
Round 3	5.238 (0.035)	5.210 (0.031)	0.029 (0.537)	
Change: Round 3 – Round 2				0.033 (0.531)
Go out of way to shop for FV at particular store (N=2765)[b]				
Pooled (Rounds 2 & 3)	0.384 (0.015)	0.403 (0.014)	-0.020 (0.335)	
Round 2	0.401 (0.019)	0.411 (0.018)	-0.010 (0.713)	
Round 3	0.366 (0.018)	0.396 (0.018)	-0.030 (0.245)	
Change: Round 3 – Round 2				-0.027 (0.395)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted; inclusion of weights results in the observed difference in point estimates.
Pooled standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]Categorical outcome: 1=yearly or not at all, 2=2 to 3 times a year, 3=every other month, 4=once a month, 5=every other week, 6=once a week, 7=more than once a week; “don’t know” and “refused” responses coded as missing.
[b]Binary outcome: 1=yes, 0=no; “don’t know” and “refused” responses coded as missing.
Source: Participant Survey (primary shopper module).

Exhibit G6.7: Primary Shopper Self-Reported Changes in Shopping Location Due to HIP: Round 2 and 3 Participant Surveys, HIP-Eligible Households

	Proportion (N)			Change (P-value)
	Pooled	Round 2	Round 3	
Because of HIP, have you changed which stores you go to, to buy fruits and vegetables? (N=1377)				
Yes	0.28 (389)	0.27 (179)	0.29 (210)	0.02 (0.258)
No	0.72 (988)	0.73 (481)	0.71 (507)	
If yes, why have you changed which stores you go to?[a]				
Other store has greater variety of fruits & vegetables (N=388)	0.62 (244)	0.62 (111)	0.63 (133)	0.03 (.)[b]
Price of fruits & vegetables more affordable at other store (N=386)	0.76 (295)	0.77 (136)	0.75 (159)	-0.08 (.)[b]
Other store has fresh fruits & vegetables (N=386)	0.74 (288)	0.76 (136)	0.72 (152)	-0.02 (.)[b]
Other store participates in HIP (N=388)	0.24 (94)	0.23 (42)	0.24 (52)	0.03 (.)[b]
Other reason (N=388)	0.04 (16)	0.06 (11)	0.02 (5)	-0.06 (.)[b]

Weighted proportions (unweighted Ns).
Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" and "refused" responses coded as missing.
Due to rounding, reported Round 2/3 change may differ from differences between reported proportions for Rounds 2 and 3.
[a]Respondents could choose multiple reasons, so proportions do not add to one.
[b]Test statistics cannot be computed because of stratum with single sampling unit.
Source: Participant Survey (primary shopper module).

Exhibit G6.8: Differences in Impact of HIP on Mean Monthly SNAP and TFV Purchases at Participating Supermarkets and Superstores by Pre-Implementation Shopping Behavior, by Follow-Up Round

	Pre-HIP participating store shoppers				Pre-HIP non-participating store shoppers			
Usual place to shop	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
SNAP purchases at supermarkets and superstores ($)								
Pooled (Rounds 2 & 3)	159.05 (1.67)	153.24 (0.65)	5.81 (0.001)***		84.13 (1.77)	80.60 (0.65)	3.53 (0.061)*	
Round 2	156.28 (1.74)	150.28 (0.69)	5.99 (0.001)***		82.34 (1.83)	77.78 (0.68)	4.57 (0.019)**	
Round 3	163.07 (1.96)	158.11 (0.74)	4.96 (0.018)**		87.02 (2.05)	85.46 (0.76)	1.56 (0.475)	
Change: Round 3 – Round 2				-0.49 (0.762)				- 2.84 (0.067)*
Eligible TFV purchases at supermarkets and superstores ($)								
Pooled (Rounds 2 & 3)	14.62 (0.25)	13.39 (0.09)	1.24 (<0.001)***		9.25 (0.27)	7.57 (0.08)	1.68 (<0.001)***	
Round 2	14.69 (0.27)	13.49 (0.10)	1.21 (<0.001)***		9.31 (0.30)	7.63 (0.09)	1.68 (<0.001)***	
Round 3	14.43 (0.28)	13.22 (0.10)	1.21 (<0.001)***		9.09 (0.30)	7.43 (0.09)	1.65 (<0.001)***	
Change: Round 3 – Round 2				0.03 (0.876)				-0.02 (0.933)
Eligible mean household TFV purchase as % of SNAP purchases at supermarkets and superstores (computed)								
Pooled (Rounds 2 & 3)	9.66 (0.16)	9.16 (0.06)	0.51 (0.003)***		10.90 (0.28)	9.64 (0.11)	1.26 (<0.001)***	
Round 2	9.95 (0.18)	9.42 (0.07)	0.52 (0.007)***		11.28 (0.31)	10.05 (0.12)	1.23 (<0.001)***	
Round 3	9.16 (0.17)	8.78 (0.07)	0.38 (0.042)***		10.36 (0.31)	9.08 (0.12)	1.29 (<0.001)***	
Change: Round 3 – Round 2				>-0.01 (0.313)				0.17 (0.597)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. The same demographic covariates, which include a mix of time-variant and time-invariant variables, are included in both models. These alternative models would produce identical point estimates of the Round 2/3 difference if the change model included the Round 2/3 change in demographic covariates instead of the levels.
Pre-HIP participating store shoppers are Wave 2 and Wave 3 households who spent at least 50 percent of their November 2011 (pre-implementation) SNAP benefits in retailers that later participated in HIP during March-October 2012 (post-implementation). Pre-HIP non-participating store shoppers are Wave 2 and Wave 3 households who spent less than 50 percent of their November 2011 (pre-implementation) SNAP benefits in retailers that later participated in HIP during March-October 2012 (post-implementation).
Source: EBT Transaction Data, 29,799 households that received SNAP benefits in every month from March to October 2012.

Exhibit G6.9: Differences in Impact of HIP on Mean Monthly SNAP Purchases at Farmers Markets, by Follow-Up Round

Usual place to shop	Regression-adjusted treatment mean[a](SE) ($)	Regression-adjusted control mean[a] (SE) ($)	Treatment-control impact (P-value) ($)	Difference in impacts (P-value) ($)
All farmers markets				
Pooled (Rounds 2 & 3)	0.03 (0.01)	0.03 (<0.01)	<0.01 (0.866)	
Round 2	0.02 (<0.01)	0.02 (0.01)	-0.01 (0.470)	
Round 3	0.06 (0.01)	0.04 (<0.01)	0.01 (0.363)	
Change: Round 3 – Round 2				0.02 (0.144)
Participating farmers markets				
Pooled (Rounds 2 & 3)	0.03 (0.01)	0.02 (<0.01)	<0.01 (0.598)	
Round 2	0.01 (<0.01)	0.01 (<0.01)	>-0.01 (0.549)	
Round 3	0.05 (0.01)	0.04 (<0.01)	0.01 (0.291)	
Change: Round 3 – Round 2				0.02 (0.139)
Non-participating farmers markets				
Pooled (Rounds 2 & 3)	0.01 (<0.01)	0.01 (<0.01)	>-0.01 (0.498)	
Round 2	0.01 (<0.01)	0.01 (<0.01)	>-0.01 (0.572)	
Round 3	<0.01 (<0.01)	0.01 (<0.01)	>-0.01 (0.671)	
Change: Round 3 – Round 2				>-0.01 (0.824)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. The same demographic covariates, which include a mix of time-variant and time-invariant variables, are included in both models. These alternative models would produce identical point estimates of the Round 2/3 difference if the change model included the Round 2/3 change in demographic covariates instead of the levels.
[a]Means include households that made no SNAP purchases at farmers markets.
Source: EBT Transaction Data, 45,854 households that received SNAP benefits in every month from March to October 2012.

Exhibit G7.1: Differences in Impacts of HIP on Self-Reported Exposure to Nutrition Education and Promotion in Past 3 Months, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Heard or seen messages about fruits & vegetables (N=2898)				
Pooled (Rounds 2 & 3)	0.767 (0.014)	0.686 (0.013)	0.081 (<0.001) ***	
Round 2	0.780 (0.016)	0.707 (0.017)	0.073 (0.002)***	
Round 3	0.754 (0.017)	0.665 (0.017)	0.089 (<0.001) ***	
Change: Round 3 – Round 2				0.018 (0.537)
Attended nutrition education class or program (N=2911)				
Pooled (Rounds 2 & 3)	0.101 (0.010)	0.108 (0.009)	-0.007 (0.613)	
Round 2	0.098 (0.012)	0.101 (0.011)	-0.003 (0.837)	
Round 3	0.104 (0.013)	0.115 (0.012)	-0.010 (0.548)	
Change: Round 3 – Round 2				-0.008 (0.669)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=Yes, 0=No; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted; inclusion of weights results in the observed difference in point estimates.
Pooled standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module).

Exhibit G7.2: Differences in Impacts of HIP on Food Preferences & Beliefs, by Follow-Up Round

How much do you agree or disagree that…?	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
I enjoy trying new foods (N=2887)				
Pooled (Rounds 2 & 3)	3.905 (0.025)	3.840 (0.027)	0.065 (0.082)*	
Round 2	3.903 (0.029)	3.833 (0.030)	0.070 (0.099)*	
Round 3	3.907 (0.032)	3.846 (0.034)	0.060 (0.197)	
Change: Round 3 – Round 2				-0.058 (0.233)
I enjoy trying new fruits (N=2894)				
Pooled (Rounds 2 & 3)	3.896 (0.026)	3.940 (0.025)	-0.044 (0.222)	
Round 2	3.942 (0.029)	3.950 (0.029)	-0.008 (0.850)	
Round 3	3.849 (0.033)	3.931 (0.032)	-0.082 (0.077)*	
Change: Round 3 – Round 2				-0.090 (0.077)*
I enjoy trying new vegetables (N=2898)				
Pooled (Rounds 2 & 3)	3.687 (0.028)	3.654 (0.028)	0.033 (0.403)	
Round 2	3.709 (0.033)	3.649 (0.034)	0.059 (0.214)	
Round 3	3.664 (0.033)	3.658 (0.032)	0.006 (0.890)	
Change: Round 3 – Round 2				-0.081 (0.119)
I eat enough fruits to keep me healthy (N=2894)				
Pooled (Rounds 2 & 3)	3.724 (0.028)	3.682 (0.027)	0.041 (0.293)	
Round 2	3.746 (0.034)	3.642 (0.034)	0.104 (0.033)**	
Round 3	3.701 (0.034)	3.723 (0.032)	-0.022 (0.635)	
Change: Round 3 – Round 2				-0.148 (0.008)***
I eat enough vegetables to keep me healthy (N=2903)				
Pooled (Rounds 2 & 3)	3.738 (0.028)	3.703 (0.025)	0.035 (0.363)	
Round 2	3.737 (0.034)	3.700 (0.031)	0.037 (0.432)	
Round 3	3.739 (0.031)	3.706 (0.031)	0.032 (0.464)	
Change: Round 3 – Round 2				-0.003 (0.953)
I often encourage family/friends to eat fruits & veg. (N=2857)				
Pooled (Rounds 2 & 3)	3.876 (0.026)	3.820 (0.027)	0.056 (0.132)	
Round 2	3.873 (0.032)	3.831 (0.032)	0.043 (0.350)	
Round 3	3.879 (0.030)	3.809 (0.032)	0.070 (0.115)	
Change: Round 3 – Round 2				0.001 (0.988)
Composite scale—Positive attitudes about food, fruits, and vegetables (N=2902)				
Pooled (Rounds 2 & 3)	3.803 (0.016)	3.771 (0.016)	0.033 (0.159)	
Round 2	3.818 (0.019)	3.764 (0.019)	0.054 (0.044)**	
Round 3	3.788 (0.019)	3.777 (0.019)	0.011 (0.686)	
Change: Round 3 – Round 2				-0.062 (0.027)**

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=strongly agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted; inclusion of weights results in the observed difference in point estimates.
Pooled standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module).

Exhibit G7.3: Differences in Impacts of HIP on Perceived Barriers to Fruit & Vegetable Consumption, by Follow-Up Round

How much do you agree or disagree that…?	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Hard to eat vegetables because don't know how to prepare (N=2876)				
Pooled (Rounds 2 & 3)	2.406 (0.032)	2.400 (0.028)	0.006 (0.882)	
Round 2	2.434 (0.041)	2.392 (0.037)	0.042 (0.454)	
Round 3	2.378 (0.037)	2.408 (0.036)	-0.030 (0.568)	
Change: Round 3 – Round 2				-0.086 (0.190)
Hard to eat vegetables because hard to find where I shop (N=2878)				
Pooled (Rounds 2 & 3)	2.196 (0.026)	2.222 (0.024)	-0.025 (0.480)	
Round 2	2.236 (0.034)	2.204 (0.031)	0.032 (0.498)	
Round 3	2.155 (0.032)	2.239 (0.031)	-0.083 (0.061)*	
Change: Round 3 – Round 2				-0.120 (0.035)**
Hard to eat fruits because hard to find where I shop (N=2880)				
Pooled (Rounds 2 & 3)	2.164 (0.025)	2.162 (0.024)	0.002 (0.948)	
Round 2	2.192 (0.031)	2.150 (0.031)	0.041 (0.349)	
Round 3	2.136 (0.031)	2.173 (0.030)	-0.037 (0.378)	
Change: Round 3 – Round 2				-0.067 (0.219)
Don't eat fruits and vegetables as much as would like because cost too much (N=2889)				
Pooled (Rounds 2 & 3)	2.927 (0.035)	2.957 (0.033)	-0.030 (0.529)	
Round 2	2.913 (0.041)	2.937 (0.039)	-0.024 (0.674)	
Round 3	2.940 (0.042)	2.976 (0.040)	-0.036 (0.531)	
Change: Round 3 – Round 2				-0.042 (0.508)
Don't eat fruits and vegetables as much as would like because they spoil (N=2881)				
Pooled (Rounds 2 & 3)	2.815 (0.033)	2.918 (0.032)	-0.103 (0.025)**	
Round 2	2.795 (0.041)	2.932 (0.038)	-0.137 (0.014)**	
Round 3	2.835 (0.040)	2.903 (0.038)	-0.068 (0.217)	
Change: Round 3 – Round 2				0.045 (0.477)
Don't eat fruits and vegetables as much as would like because family dislikes (N=2749)				
Pooled (Rounds 2 & 3)	2.149 (0.026)	2.115 (0.023)	0.034 (0.327)	
Round 2	2.168 (0.033)	2.144 (0.030)	0.024 (0.597)	
Round 3	2.131 (0.033)	2.087 (0.028)	0.044 (0.306)	
Change: Round 3 – Round 2				0.004 (0.947)
Don't eat fruits and vegetables as much because I don't like (N=2888)				
Pooled (Rounds 2 & 3)	2.026 (0.022)	2.068 (0.023)	-0.041 (0.191)	
Round 2	2.033 (0.029)	2.052 (0.028)	-0.018 (0.649)	
Round 3	2.019 (0.028)	2.084 (0.028)	-0.065 (0.100)	
Change: Round 3 – Round 2				-0.058 (0.235)
Composite scale—barriers to eating fruits & vegetables (N=2869)				
Pooled (Rounds 2 & 3)	2.380 (0.017)	2.406 (0.016)	-0.026 (0.249)	
Round 2	2.393 (0.021)	2.404 (0.018)	-0.011 (0.689)	
Round 3	2.367 (0.020)	2.409 (0.018)	-0.042 (0.118)	
Change: Round 3 – Round 2				-0.046 (0.132)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=strongly agree; “don’t know” and “does not apply” responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in

outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted; inclusion of weights results in the observed difference in point estimates.
Pooled standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module).

Exhibit G7.4: Differences in Impacts of HIP on Grocery Shopping Barriers, by Follow-Up Round

How often kept from grocery shopping by…	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Limited transportation (N=2745)				
Pooled (Rounds 2 & 3)	2.178 (0.038)	2.098 (0.035)	0.080 (0.127)	
Round 2	2.172 (0.046)	2.123 (0.042)	0.048 (0.442)	
Round 3	2.185 (0.046)	2.073 (0.045)	0.112 (0.085)*	
Change: Round 3 – Round 2				0.079 (0.276)
Distance to grocery store (N=32726)				
Pooled (Rounds 2 & 3)	1.961 (0.037)	1.956 (0.035)	0.006 (0.912)	
Round 2	1.927 (0.043)	2.033 (0.044)	-0.106 (0.085)*	
Round 3	1.996 (0.046)	1.878 (0.043)	0.119 (0.062)*	
Change: Round 3 – Round 2				0.231 (0.001)***
Composite scale—barriers to grocery shopping (N=2706)				
Pooled (Rounds 2 & 3)	2.064 (0.034)	2.019 (0.032)	0.045 (0.347)	
Round 2	2.042 (0.040)	2.073 (0.039)	-0.032 (0.573)	
Round 3	2.087 (0.041)	1.965 (0.039)	0.122 (0.033)**	
Change: Round 3 – Round 2				0.163 (0.008)***

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always; "don't know" and "refused" responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted; inclusion of weights results in the observed difference in point estimates.
Pooled standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module).

Exhibit G7.5: Differences in Impacts of HIP on Family Food Environment, by Follow-Up Round

How often do you…?	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Have fruit available at home (N=2794)				
Pooled (Rounds 2 & 3)	4.295 (0.025)	4.188 (0.026)	0.107 (0.003)***	
Round 2	4.333 (0.029)	4.180 (0.031)	0.154 (<0.001) ***	
Round 3	4.255 (0.032)	4.197 (0.031)	0.058 (0.199)	
Change: Round 3 – Round 2				-0.104 (0.035)**
Have fruit in refrigerator or on counter (N=2789)[a]				
Pooled (Rounds 2 & 3)	4.000 (0.028)	3.950 (0.027)	0.049 (0.209)	
Round 2	4.021 (0.033)	3.964 (0.032)	0.057 (0.215)	
Round 3	3.977 (0.036)	3.937 (0.034)	0.041 (0.409)	
Change: Round 3 – Round 2				-0.010 (0.857)
Have vegetables available at home (N=2794)[a]				
Pooled (Rounds 2 & 3)	4.499 (0.025)	4.424 (0.025)	0.076 (0.031)**	
Round 2	4.508 (0.029)	4.417 (0.031)	0.091 (0.031)**	
Round 3	4.490 (0.032)	4.430 (0.029)	0.060 (0.164)	
Change: Round 3 – Round 2				-0.053 (0.281)
Have ready-to-eat vegetables in fridge or on counter (N=2769)				
Pooled (Rounds 2 & 3)	3.901 (0.034)	3.828 (0.033)	0.073 (0.126)	
Round 2	3.862 (0.043)	3.808 (0.041)	0.054 (0.359)	
Round 3	3.942 (0.041)	3.848 (0.040)	0.094 (0.104)	
Change: Round 3 – Round 2				0.031 (0.640)
Composite scale—barriers to eating fruits & vegetables (N=2796)				
Pooled (Rounds 2 & 3)	4.171 (0.021)	4.093 (0.021)	0.079 (0.009)***	
Round 2	4.179 (0.023)	4.085 (0.025)	0.094 (0.006)***	
Round 3	4.163 (0.026)	4.100 (0.025)	0.063 (0.079)*	
Change: Round 3 – Round 2				-0.037 (0.305)
Have salty snacks at home (chips, crackers) (N=2789)				
Pooled (Rounds 2 & 3)	3.193 (0.035)	3.206 (0.034)	-0.013 (0.791)	
Round 2	3.245 (0.043)	3.228 (0.041)	0.018 (0.769)	
Round 3	3.139 (0.044)	3.184 (0.044)	-0.045 (0.470)	
Change: Round 3 – Round 2				-0.060 (0.405)
Have lowfat/nonfat milk at home (N=2775)				
Pooled (Rounds 2 & 3)	3.348 (0.051)	3.297 (0.047)	0.050 (0.462)	
Round 2	3.362 (0.060)	3.305 (0.057)	0.057 (0.488)	
Round 3	3.333 (0.063)	3.290 (0.061)	0.044 (0.616)	
Change: Round 3 – Round 2				0.040 (0.687)
Have soft drinks/fruit drinks (not juice) at home (N=2790)				
Pooled (Rounds 2 & 3)	3.151 (0.042)	3.233 (0.040)	-0.082 (0.161)	
Round 2	3.135 (0.049)	3.177 (0.049)	-0.042 (0.544)	
Round 3	3.167 (0.051)	3.290 (0.050)	-0.122 (0.090)*	
Change: Round 3 – Round 2				-0.095 (0.228)
Sit down with family at home for evening meals (N=1900)[b]				
Pooled (Rounds 2 & 3)	3.911 (0.039)	3.935 (0.034)	-0.024 (0.640)	
Round 2	3.940 (0.049)	3.961 (0.039)	-0.021 (0.733)	
Round 3	3.882 (0.050)	3.908 (0.045)	-0.026 (0.698)	
Change: Round 3 – Round 2				-0.028 (0.712)

How often do you…?	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Cook evening meals at home (N=2790)				
Pooled (Rounds 2 & 3)	4.442 (0.024)	4.429 (0.024)	0.013 (0.710)	
Round 2	4.461 (0.028)	4.410 (0.031)	0.051 (0.229)	
Round 3	4.422 (0.030)	4.448 (0.028)	-0.027 (0.518)	
Change: Round 3 – Round 2				-0.077 (0.108)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Never, 2=Rarely, 3=Sometimes, 4=Most of the time, 5=Always; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted; inclusion of weights results in the observed difference in point estimates.
Pooled standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]”No refrigerator or freezer” responses coded as missing.
[b]Asked only in households with more than one member.
Source: Participant Survey (primary shopper module).

Exhibit G8.1: Differences in Impacts of HIP on Consumption of Fruits and Vegetables, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Targeted fruits & vegetables				
Pooled (Rounds 2 & 3)	1.138 (0.045)	0.932 (0.040)	0.206 (0.001)***	
Round 2	1.179 (0.058)	1.003 (0.051)	0.176 (0.020)**	
Round 3	1.097 (0.055)	0.862 (0.049)	0.235 (0.001)***	
Change: Round 3 – Round 2				0.040 (0.653)
Plus TFV from mixed foods				
Pooled (Rounds 2 & 3)	0.298 (0.015)	0.301 (0.015)	-0.003 (0.898)	
Round 2	0.301 (0.020)	0.316 (0.021)	-0.015 (0.627)	
Round 3	0.295 (0.020)	0.286 (0.018)	0.009 (0.749)	
Change: Round 3 – Round 2				0.015 (0.684)
Targeted fruits & vegetables (alternative inclusive proxy measure)				
Pooled (Rounds 2 & 3)	1.437 (0.049)	1.233 (0.044)	0.204 (0.002)***	
Round 2	1.481 (0.061)	1.319 (0.055)	0.162 (0.048)**	
Round 3	1.392 (0.059)	1.148 (0.053)	0.244 (0.002)***	
Change: Round 3 – Round 2				0.055 (0.555)
100% juice				
Pooled (Rounds 2 & 3)	0.544 (0.029)	0.477 (0.026)	0.068 (0.071)*	
Round 2	0.569 (0.039)	0.500 (0.038)	0.069 (0.196)	
Round 3	0.519 (0.034)	0.454 (0.033)	0.066 (0.160)	
Change: Round 3 – Round 2				-0.028 (0.672)
White potatoes				
Pooled (Rounds 2 & 3)	0.332 (0.018)	0.368 (0.019)	-0.036 (0.185)	
Round 2	0.358 (0.026)	0.350 (0.023)	0.008 (0.815)	
Round 3	0.307 (0.023)	0.387 (0.030)	-0.080 (0.037)**	
Change: Round 3 – Round 2				-0.094 (0.063)*
Legumes				
Pooled (Rounds 2 & 3)	0.103 (0.008)	0.113 (0.007)	-0.010 (0.338)	
Round 2	0.106 (0.010)	0.110 (0.010)	-0.004 (0.776)	
Round 3	0.101 (0.010)	0.117 (0.011)	-0.016 (0.275)	
Change: Round 3 – Round 2				-0.013 (0.518)
Other fruits & vegetables acquired outside stores				
Pooled (Rounds 2 & 3)	0.176 (0.019)	0.147 (0.017)	0.029 (0.282)	
Round 2	0.183 (0.025)	0.154 (0.026)	0.029 (0.439)	
Round 3	0.169 (0.024)	0.140 (0.022)	0.029 (0.378)	
Change: Round 3 – Round 2				-0.002 (0.971)
All fruits & vegetables				
Pooled (Rounds 2 & 3)	2.592 (0.066)	2.338 (0.064)	0.254 (0.005)***	
Round 2	2.696 (0.084)	2.432 (0.083)	0.264 (0.023)**	
Round 3	2.488 (0.080)	2.246 (0.077)	0.242 (0.027)**	
Change: Round 3 – Round 2				-0.081 (0.551)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point

estimates of the Round 2/3 change if they were unweighted and included identical covariates; inclusion of weights and slightly different covariates for interview-level characteristics results in the observed difference in point estimates.
Targeted fruit and vegetable (TFV) intake proxy measures include intake of fruits and vegetables acquired from the store, excluding white potatoes, legumes, and 100% juice. The preferred restrictive proxy measure additionally excludes fruit and vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent, while the alternative inclusive proxy measure includes fruit and vegetable intake from all mixed foods.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), including 10% second-day subsamples for each round (unweighted N=2959 recalls from 1484 respondents).

Exhibit G8.2a: Differences in Impacts of HIP on Consumption of Targeted Fruits & Vegetables (TFV), Preferred Restrictive Proxy Measure, Cup-Equivalents, by Food Pattern Equivalent Group, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Total fruits & vegetables				
Pooled (Rounds 2 & 3)	1.138 (0.045)	0.932 (0.040)	0.206 (0.001)***	
Round 2	1.179 (0.058)	1.003 (0.051)	0.176 (0.020)**	
Round 3	1.097 (0.055)	0.862 (0.049)	0.235 (0.001)***	
Change: Round 3 – Round 2				0.040 (0.653)
Total fruits				
Pooled (Rounds 2 & 3)	0.554 (0.028)	0.492 (0.028)	0.062 (0.121)	
Round 2	0.593 (0.035)	0.533 (0.036)	0.060 (0.234)	
Round 3	0.514 (0.034)	0.452 (0.035)	0.063 (0.201)	
Change: Round 3 – Round 2				0.003 (0.966)
Citrus fruits, melons, & berries				
Pooled (Rounds 2 & 3)	0.125 (0.011)	0.127 (0.015)	-0.003 (0.891)	
Round 2	0.164 (0.016)	0.138 (0.017)	0.026 (0.265)	
Round 3	0.085 (0.013)	0.116 (0.024)	-0.031 (0.256)	
Change: Round 3 – Round 2				-0.053 (0.131)
Other fruits (e.g., apples, pears, bananas, grapes, peaches)				
Pooled (Rounds 2 & 3)	0.429 (0.024)	0.365 (0.022)	0.064 (0.050)**	
Round 2	0.429 (0.030)	0.395 (0.030)	0.034 (0.417)	
Round 3	0.429 (0.030)	0.335 (0.025)	0.094 (0.017)**	
Change: Round 3 – Round 2				0.056 (0.243)
Total vegetables				
Pooled (Rounds 2 & 3)	0.584 (0.029)	0.440 (0.023)	0.145 (<0.001) ***	
Round 2	0.586 (0.037)	0.470 (0.030)	0.116 (0.013)**	
Round 3	0.583 (0.039)	0.410 (0.031)	0.172 (<0.001) ***	
Change: Round 3 – Round 2				0.038 (0.543)
Dark green vegetables				
Pooled (Rounds 2 & 3)	0.072 (0.008)	0.044 (0.006)	0.028 (0.004)***	
Round 2	0.081 (0.010)	0.049 (0.008)	0.032 (0.014)**	
Round 3	0.063 (0.010)	0.039 (0.007)	0.024 (0.061)*	
Change: Round 3 – Round 2				-0.007 (0.687)
Red & orange vegetables				
Pooled (Rounds 2 & 3)	0.141 (0.011)	0.104 (0.008)	0.037 (0.007)***	
Round 2	0.157 (0.018)	0.106 (0.010)	0.051 (0.014)**	
Round 3	0.124 (0.011)	0.102 (0.011)	0.023 (0.160)	
Change: Round 3 – Round 2				-0.041 (0.115)
Tomatoes				
Pooled (Rounds 2 & 3)	0.087 (0.007)	0.070 (0.006)	0.016 (0.070)*	
Round 2	0.086 (0.010)	0.069 (0.007)	0.017 (0.150)	
Round 3	0.087 (0.009)	0.072 (0.009)	0.016 (0.219)	
Change: Round 3 – Round 2				-0.011 (0.497)
Other red & orange vegetables				
Pooled (Rounds 2 & 3)	0.054 (0.008)	0.034 (0.004)	0.020 (0.030)**	
Round 2	0.071 (0.015)	0.037 (0.007)	0.034 (0.042)**	
Round 3	0.037 (0.006)	0.030 (0.006)	0.007 (0.394)	
Change: Round 3 – Round 2				-0.030 (0.119)

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Starchy vegetables				
Pooled (Rounds 2 & 3)	0.100 (0.010)	0.086 (0.008)	0.015 (0.263)	
Round 2	0.088 (0.011)	0.099 (0.012)	-0.012 (0.484)	
Round 3	0.113 (0.018)	0.072 (0.010)	0.040 (0.047)**	
Change: Round 3 – Round 2				0.053 (0.043)**
Other vegetables (e.g., celery, cucumbers, mushrooms, green beans, onions, asparagus)				
Pooled (Rounds 2 & 3)	0.272 (0.017)	0.206 (0.016)	0.066 (0.003)***	
Round 2	0.261 (0.022)	0.216 (0.021)	0.045 (0.127)	
Round 3	0.283 (0.024)	0.197 (0.021)	0.086 (0.007)***	
Change: Round 3 – Round 2				0.033 (0.417)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted and included identical covariates; inclusion of weights and slightly different covariates for interview-level characteristics results in the observed difference in point estimates.
Targeted fruit and vegetable (TFV) intake proxy measures include intake of fruits and vegetables acquired from the store, excluding white potatoes, legumes, and 100% juice. The preferred restrictive proxy measure additionally excludes fruit and vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent, while the alternative inclusive proxy measure includes fruit and vegetable intake from all mixed foods.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), including 10% second-day subsamples for each round (unweighted N=2959 recalls from 1484 respondents).

Exhibit G8.2b: Differences in Impacts of HIP on Consumption of Targeted Fruits & Vegetables (TFV), Alternative Inclusive Proxy Measure, Cup-Equivalents, by Food Pattern Equivalent Group, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Total fruits & vegetables				
Pooled (Rounds 2 & 3)		1.233 (0.044)	0.204 (0.002)***	
Round 2	1.481 (0.061)	1.319 (0.055)	0.162 (0.048)**	
Round 3	1.392 (0.059)	1.148 (0.053)	0.244 (0.002)***	
Change: Round 3 – Round 2				0.055 (0.555)
Total fruits				
Pooled (Rounds 2 & 3)	0.626 (0.030)	0.558 (0.029)	0.068 (0.103)	
Round 2	0.667 (0.038)	0.604 (0.037)	0.063 (0.236)	
Round 3	0.585 (0.036)	0.514 (0.036)	0.072 (0.160)	
Change: Round 3 – Round 2				0.012 (0.843)
Citrus fruits, melons, & berries				
Pooled (Rounds 2 & 3)	0.143 (0.011)	0.142 (0.015)	0.001 (0.960)	
Round 2	0.179 (0.016)	0.155 (0.017)	0.024 (0.310)	
Round 3	0.107 (0.014)	0.129 (0.024)	-0.022 (0.431)	
Change: Round 3 – Round 2				-0.042 (0.248)
Other fruits (e.g., apples, pears, bananas, grapes, peaches)				
Pooled (Rounds 2 & 3)	0.483 (0.026)	0.416 (0.023)	0.067 (0.051)*	
Round 2	0.488 (0.033)	0.449 (0.031)	0.039 (0.389)	
Round 3	0.478 (0.031)	0.384 (0.026)	0.094 (0.021)**	
Change: Round 3 – Round 2				0.054 (0.292)
Total vegetables				
Pooled (Rounds 2 & 3)	0.810 (0.032)	0.675 (0.028)	0.136 (0.001)***	
Round 2	0.814 (0.040)	0.715 (0.035)	0.099 (0.061)*	
Round 3	0.807 (0.042)	0.635 (0.035)	0.172 (0.002)***	
Change: Round 3 – Round 2				0.043 (0.512)
Dark green vegetables				
Pooled (Rounds 2 & 3)	0.079 (0.008)	0.050 (0.006)	0.029 (0.004)***	
Round 2	0.089 (0.010)	0.057 (0.009)	0.032 (0.018)**	
Round 3	0.070 (0.011)	0.044 (0.007)	0.026 (0.041)**	
Change: Round 3 – Round 2				-0.003 (0.864)
Red & orange vegetables				
Pooled (Rounds 2 & 3)	0.268 (0.014)	0.229 (0.011)	0.039 (0.024)**	
Round 2	0.277 (0.021)	0.232 (0.015)	0.044 (0.083)*	
Round 3	0.260 (0.016)	0.226 (0.014)	0.034 (0.119)	
Change: Round 3 – Round 2				-0.028 (0.379)
Tomatoes				
Pooled (Rounds 2 & 3)	0.200 (0.010)	0.179 (0.009)	0.021 (0.134)	
Round 2	0.191 (0.014)	0.182 (0.013)	0.009 (0.626)	
Round 3	0.209 (0.015)	0.176 (0.012)	0.033 (0.096)*	
Change: Round 3 – Round 2				0.009 (0.723)
Other red & orange vegetables				
Pooled (Rounds 2 & 3)	0.069 (0.009)	0.050 (0.005)	0.018 (0.063)*	
Round 2	0.085 (0.016)	0.050 (0.007)	0.035 (0.043)**	
Round 3	0.052 (0.006)	0.050 (0.006)	0.002 (0.844)	
Change: Round 3 – Round 2				-0.037 (0.063)*

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Starchy vegetables				
Pooled (Rounds 2 & 3)	0.115 (0.011)	0.100 (0.008)	0.015 (0.256)	
Round 2	0.104 (0.011)	0.115 (0.013)	-0.012 (0.485)	
Round 3	0.126 (0.018)	0.084 (0.010)	0.042 (0.044)**	
Change: Round 3 – Round 2				0.053 (0.048)**
Other vegetables (e.g., celery, cucumbers, mushrooms, green beans, onions, asparagus)				
Pooled (Rounds 2 & 3)	0.348 (0.019)	0.296 (0.019)	0.052 (0.046)**	
Round 2	0.345 (0.023)	0.310 (0.024)	0.035 (0.299)	
Round 3	0.351 (0.026)	0.281 (0.024)	0.070 (0.044)**	
Change: Round 3 – Round 2				0.021 (0.610)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted and included identical covariates; inclusion of weights and slightly different covariates for interview-level characteristics results in the observed difference in point estimates.
Targeted fruit and vegetable (TFV) intake proxy measures include intake of fruits and vegetables acquired from the store, excluding white potatoes, legumes, and 100% juice. The preferred restrictive proxy measure additionally excludes fruit and vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent, while the alternative inclusive proxy measure includes fruit and vegetable intake from all mixed foods.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), including 10% second-day subsamples for each round (unweighted N=2959 recalls from 1484 respondents).

Exhibit G8.2c: Differences in Impacts of HIP on Consumption of All Fruits & Vegetables, Cup-Equivalents, by Food Pattern Equivalent Group, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Total fruits & vegetables				
Pooled (Rounds 2 & 3)	2.592 (0.066)	2.338 (0.064)	0.254 (0.005)***	
Round 2	2.696 (0.084)	2.432 (0.083)	0.264 (0.023)**	
Round 3	2.488 (0.080)	2.246 (0.077)	0.242 (0.027)**	
Change: Round 3 – Round 2				-0.081 (0.551)
Total fruits				
Pooled (Rounds 2 & 3)	1.244 (0.044)	1.080 (0.043)	0.164 (0.007)***	
Round 2	1.320 (0.058)	1.140 (0.058)	0.180 (0.027)**	
Round 3	1.168 (0.053)	1.021 (0.052)	0.147 (0.046)**	
Change: Round 3 – Round 2				-0.057 (0.557)
Citrus fruits, melons, & berries				
Pooled (Rounds 2 & 3)	0.169 (0.013)	0.152 (0.015)	0.017 (0.417)	
Round 2	0.206 (0.018)	0.163 (0.017)	0.043 (0.086)*	
Round 3	0.131 (0.015)	0.141 (0.025)	-0.010 (0.736)	
Change: Round 3 – Round 2				0.040 (0.653)
Other fruits (e.g., apples, pears, bananas, grapes, peaches)				
Pooled (Rounds 2 & 3)	0.531 (0.026)	0.451 (0.023)	0.080 (0.022)**	
Round 2	0.545 (0.034)	0.477 (0.031)	0.068 (0.140)	
Round 3	0.518 (0.032)	0.426 (0.027)	0.091 (0.029)**	
Change: Round 3 – Round 2				0.022 (0.678)
100% fruit juice				
Pooled (Rounds 2 & 3)	0.544 (0.029)	0.477 (0.026)	0.068 (0.071)*	
Round 2	0.569 (0.039)	0.500 (0.038)	0.069 (0.196)	
Round 3	0.519 (0.034)	0.454 (0.033)	0.066 (0.160)	
Change: Round 3 – Round 2				-0.028 (0.672)
Total vegetables				
Pooled (Rounds 2 & 3)	1.348 (0.039)	1.258 (0.039)	0.090 (0.107)	
Round 2	1.376 (0.050)	1.292 (0.050)	0.084 (0.232)	
Round 3	1.320 (0.052)	1.225 (0.051)	0.095 (0.194)	
Change: Round 3 – Round 2				-0.025 (0.783)
Dark green vegetables				
Pooled (Rounds 2 & 3)	0.095 (0.009)	0.067 (0.007)	0.028 (0.011)**	
Round 2	0.102 (0.011)	0.077 (0.010)	0.026 (0.092)*	
Round 3	0.088 (0.012)	0.057 (0.008)	0.031 (0.030)**	
Change: Round 3 – Round 2				0.009 (0.662)
Red & orange vegetables				
Pooled (Rounds 2 & 3)	0.337 (0.015)	0.313 (0.012)	0.025 (0.212)	
Round 2	0.344 (0.022)	0.323 (0.018)	0.022 (0.446)	
Round 3	0.330 (0.020)	0.303 (0.016)	0.028 (0.277)	
Change: Round 3 – Round 2				-0.012 (0.734)
Tomatoes				
Pooled (Rounds 2 & 3)	0.261 (0.013)	0.250 (0.011)	0.011 (0.507)	
Round 2	0.252 (0.016)	0.258 (0.016)	-0.006 (0.786)	
Round 3	0.270 (0.018)	0.241 (0.014)	0.028 (0.217)	
Change: Round 3 – Round 2				0.020 (0.491)

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Other red & orange vegetables				
Pooled (Rounds 2 & 3)	0.076 (0.009)	0.063 (0.005)	0.014 (0.187)	
Round 2	0.092 (0.016)	0.064 (0.008)	0.028 (0.119)	
Round 3	0.061 (0.007)	0.061 (0.007)	-0.001 (0.939)	
Change: Round 3 – Round 2				-0.033 (0.118)
Starchy vegetables				
Pooled (Rounds 2 & 3)	0.458 (0.021)	0.477 (0.021)	-0.019 (0.535)	
Round 2	0.475 (0.029)	0.472 (0.027)	0.003 (0.949)	
Round 3	0.441 (0.029)	0.481 (0.031)	-0.040 (0.354)	
Change: Round 3 – Round 2				-0.048 (0.414)
White potatoes				
Pooled (Rounds 2 & 3)	0.332 (0.018)	0.368 (0.019)	-0.036 (0.185)	
Round 2	0.358 (0.026)	0.350 (0.023)	0.008 (0.815)	
Round 3	0.307 (0.023)	0.387 (0.030)	-0.080 (0.037)**	
Change: Round 3 – Round 2				-0.094 (0.063)*
Other starchy vegetables				
Pooled (Rounds 2 & 3)	0.126 (0.011)	0.108 (0.008)	0.017 (0.197)	
Round 2	0.117 (0.012)	0.122 (0.013)	-0.006 (0.746)	
Round 3	0.134 (0.018)	0.094 (0.011)	0.040 (0.055)*	
Change: Round 3 – Round 2				0.046 (0.088)*
Legumes				
Pooled (Rounds 2 & 3)	0.103 (0.008)	0.113 (0.007)	-0.010 (0.338)	
Round 2	0.106 (0.010)	0.110 (0.010)	-0.004 (0.776)	
Round 3	0.101 (0.010)	0.117 (0.011)	-0.016 (0.275)	
Change: Round 3 – Round 2				-0.013 (0.518)
Other vegetables (e.g., celery, cucumbers, mushrooms, green beans, onions, asparagus)				
Pooled (Rounds 2 & 3)	0.416 (0.019)	0.359 (0.020)	0.057 (0.037)**	
Round 2	0.411 (0.024)	0.373 (0.026)	0.038 (0.292)	
Round 3	0.422 (0.027)	0.345 (0.024)	0.077 (0.033)**	
Change: Round 3 – Round 2				0.024 (0.589)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted and included identical covariates; inclusion of weights and slightly different covariates for interview-level characteristics results in the observed difference in point estimates.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), including 10% second-day subsamples for each round (unweighted N=2959 recalls from 1484 respondents)

Exhibit G8.3: Differences in Impacts of HIP on Estimated Usual Daily Intake from Fruit & Vegetable Screener, Cups, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
100% juice (N=3692)				
Pooled (Rounds 2 & 3)	1.009 (0.041)	0.930 (0.040)	0.079 (0.154)	
Round 2	1.020 (0.048)	0.937 (0.045)	0.083 (0.200)	
Round 3	0.994 (0.059)	0.921 (0.063)	0.073 (0.386)	
Change: Round 3 – Round 2				-0.045 (0.656)
Fruit (N=3697)				
Pooled (Rounds 2 & 3)	0.675 (0.026)	0.608 (0.022)	0.067 (0.042)**	
Round 2	0.714 (0.031)	0.626 (0.027)	0.088 (0.029)**	
Round 3	0.624 (0.038)	0.584 (0.033)	0.039 (0.433)	
Change: Round 3 – Round 2				-0.100 (0.096)*
Salad (N=3713)				
Pooled (Rounds 2 & 3)	0.306 (0.010)	0.281 (0.010)	0.025 (0.079)*	
Round 2	0.329 (0.013)	0.290 (0.014)	0.039 (0.038)**	
Round 3	0.275 (0.012)	0.269 (0.012)	0.006 (0.709)	
Change: Round 3 – Round 2				-0.046 (0.059)*
Fried potatoes (N=3731)				
Pooled (Rounds 2 & 3)	0.055 (0.003)	0.072 (0.007)	-0.017 (0.052)*	
Round 2	0.057 (0.004)	0.075 (0.012)	-0.018 (0.151)	
Round 3	0.053 (0.005)	0.068 (0.005)	-0.015 (0.047)**	
Change: Round 3 – Round 2				0.018 (0.368)
Other potatoes (N=3721)				
Pooled (Rounds 2 & 3)	0.215 (0.010)	0.206 (0.008)	0.010 (0.446)	
Round 2	0.222 (0.011)	0.194 (0.009)	0.028 (0.061)*	
Round 3	0.207 (0.016)	0.221 (0.013)	-0.014 (0.489)	
Change: Round 3 – Round 2				-0.034 (0.159)
Beans (N=3718)				
Pooled (Rounds 2 & 3)	0.193 (0.010)	0.187 (0.008)	0.005 (0.672)	
Round 2	0.197 (0.014)	0.189 (0.010)	0.008 (0.654)	
Round 3	0.187 (0.012)	0.185 (0.010)	0.002 (0.881)	
Change: Round 3 – Round 2				0.007 (0.718)
Other vegetables (N=3692)				
Pooled (Rounds 2 & 3)	0.506 (0.018)	0.476 (0.016)	0.030 (0.211)	
Round 2	0.519 (0.023)	0.480 (0.019)	0.039 (0.187)	
Round 3	0.489 (0.025)	0.471 (0.023)	0.019 (0.584)	
Change: Round 3 – Round 2				-0.037 (0.380)
Tomato sauce (N=3673)				
Pooled (Rounds 2 & 3)	0.102 (0.005)	0.107 (0.005)	-0.005 (0.467)	
Round 2	0.103 (0.006)	0.111 (0.006)	-0.007 (0.427)	
Round 3	0.099 (0.007)	0.102 (0.006)	-0.003 (0.761)	
Change: Round 3 – Round 2				0.004 (0.752)

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Salsa (N=3725)				
Pooled (Rounds 2 & 3)	0.009 (0.001)	0.009 (0.001)	<0.001 (0.980)	
Round 2	0.008 (0.001)	0.009 (0.001)	>-0.001 (0.853)	
Round 3	0.009 (0.002)	0.008 (0.001)	<0.001 (0.805)	
Change: Round 3 – Round 2				0.002 (0.434)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
"Refused" and "don't know" responses on frequency or amount items coded as missing
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted and included identical covariates; inclusion of weights and slightly different covariates for interview-level characteristics results in the observed difference in point estimates.
Pooled standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module, Modified Eating at America's Table Study (EATS) Fruit and Vegetable Screener).

Exhibit G8.4: Differences in Impacts of HIP on Threshold Measures of Fruit & Vegetable Intake in the Past 24 Hours, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Consumed any fruits & vegetables				
Pooled (Rounds 2 & 3)	0.964 (0.005)	0.958 (0.006)	0.006 (0.420)	
Round 2	0.972 (0.006)	0.956 (0.008)	0.016 (0.106)	
Round 3	0.956 (0.008)	0.960 (0.007)	-0.003 (0.756)	
Change: Round 3 – Round 2				-0.021 (0.098)*
Consumed 1 or more cup-eq of fruits & vegetables				
Pooled (Rounds 2 & 3)	0.753 (0.013)	0.720 (0.012)	0.033 (0.061)*	
Round 2	0.775 (0.016)	0.722 (0.016)	0.053 (0.019)**	
Round 3	0.731 (0.017)	0.718 (0.016)	0.013 (0.586)	
Change: Round 3 – Round 2				-0.051 (0.086)*
Consumed 2.5 or more cup-eq of fruits & vegetables				
Pooled (Rounds 2 & 3)	0.411 (0.015)	0.358 (0.013)	0.053 (0.007)***	
Round 2	0.424 (0.019)	0.377 (0.018)	0.047 (0.063)*	
Round 3	0.398 (0.019)	0.340 (0.017)	0.058 (0.024)**	
Change: Round 3 – Round 2				-0.001 (0.983)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted and included identical covariates; inclusion of weights and slightly different covariates for interview-level characteristics results in the observed difference in point estimates.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), including 10% second-day subsamples for each round (unweighted N=2959 recalls from 1484 respondents).

Exhibit G8.5: Differences in Impacts of HIP on Probability of Any Fruit and Vegetable Intake in the Past 24 Hours, by Food Equivalent Pattern Group, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Total fruits & vegetables				
Pooled (Rounds 2 & 3)	0.964 (0.005)	0.958 (0.006)	0.006 (0.420)	
Round 2	0.972 (0.006)	0.956 (0.008)	0.016 (0.106)	
Round 3	0.956 (0.008)	0.960 (0.007)	-0.003 (0.756)	
Change: Round 3 – Round 2				-0.021 (0.098)*
Total fruits				
Pooled (Rounds 2 & 3)	0.747 (0.013)	0.728 (0.012)	0.019 (0.295)	
Round 2	0.757 (0.017)	0.734 (0.016)	0.023 (0.316)	
Round 3	0.737 (0.017)	0.722 (0.016)	0.015 (0.527)	
Change: Round 3 – Round 2				-0.002 (0.954)
Citrus fruits, melons, & berries				
Pooled (Rounds 2 & 3)	0.254 (0.013)	0.232 (0.012)	0.022 (0.199)	
Round 2	0.299 (0.018)	0.255 (0.016)	0.044 (0.067)*	
Round 3	0.209 (0.015)	0.208 (0.015)	0.001 (0.980)	
Change: Round 3 – Round 2				-0.036 (0.221)
Other fruits (e.g., apples, pears, bananas, grapes, peaches)				
Pooled (Rounds 2 & 3)	0.479 (0.015)	0.437 (0.014)	0.042 (0.040)**	
Round 2	0.483 (0.019)	0.439 (0.018)	0.043 (0.098)*	
Round 3	0.476 (0.019)	0.436 (0.018)	0.040 (0.124)	
Change: Round 3 – Round 2				<0.001 (0.994)
100% fruit juice				
Pooled (Rounds 2 & 3)	0.507 (0.015)	0.464 (0.014)	0.044 (0.034)**	
Round 2	0.522 (0.019)	0.452 (0.018)	0.070 (0.007)***	
Round 3	0.492 (0.019)	0.475 (0.019)	0.017 (0.516)	
Change: Round 3 – Round 2				-0.052 (0.121)
Total vegetables				
Pooled (Rounds 2 & 3)	0.907 (0.009)	0.898 (0.008)	0.009 (0.470)	
Round 2	0.923 (0.010)	0.899 (0.011)	0.025 (0.104)	
Round 3	0.891 (0.012)	0.898 (0.011)	-0.008 (0.642)	
Change: Round 3 – Round 2				-0.038 (0.061)*
Dark green vegetables				
Pooled (Rounds 2 & 3)	0.159 (0.011)	0.124 (0.009)	0.034 (0.013)**	
Round 2	0.176 (0.014)	0.144 (0.013)	0.032 (0.102)	
Round 3	0.142 (0.014)	0.105 (0.011)	0.037 (0.038)**	
Change: Round 3 – Round 2				0.010 (0.680)
Red & orange vegetables				
Pooled (Rounds 2 & 3)	0.702 (0.013)	0.688 (0.013)	0.014 (0.443)	
Round 2	0.730 (0.017)	0.696 (0.017)	0.034 (0.159)	
Round 3	0.674 (0.019)	0.679 (0.017)	-0.005 (0.831)	
Change: Round 3 – Round 2				-0.045 (0.171)
Tomatoes				
Pooled (Rounds 2 & 3)	0.608 (0.014)	0.606 (0.013)	0.003 (0.887)	
Round 2	0.627 (0.018)	0.607 (0.018)	0.020 (0.441)	
Round 3	0.590 (0.019)	0.604 (0.018)	-0.014 (0.584)	
Change: Round 3 – Round 2				-0.037 (0.295)

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Other red & orange vegetables				
Pooled (Rounds 2 & 3)	0.240 (0.012)	0.223 (0.011)	0.017 (0.314)	
Round 2	0.244 (0.016)	0.226 (0.016)	0.018 (0.436)	
Round 3	0.235 (0.016)	0.219 (0.015)	0.017 (0.460)	
Change: Round 3 – Round 2				-0.009 (0.760)
Starchy vegetables				
Pooled (Rounds 2 & 3)	0.514 (0.014)	0.513 (0.013)	0.001 (0.950)	
Round 2	0.540 (0.019)	0.521 (0.019)	0.019 (0.474)	
Round 3	0.488 (0.019)	0.505 (0.018)	-0.017 (0.530)	
Change: Round 3 – Round 2				-0.041 (0.264)
White potatoes				
Pooled (Rounds 2 & 3)	0.402 (0.014)	0.416 (0.013)	-0.014 (0.462)	
Round 2	0.420 (0.019)	0.407 (0.018)	0.013 (0.620)	
Round 3	0.385 (0.019)	0.426 (0.018)	-0.041 (0.121)	
Change: Round 3 – Round 2				-0.056 (0.124)
Other starchy vegetables				
Pooled (Rounds 2 & 3)	0.227 (0.012)	0.198 (0.011)	0.028 (0.072)*	
Round 2	0.243 (0.016)	0.224 (0.015)	0.019 (0.380)	
Round 3	0.211 (0.016)	0.174 (0.014)	0.037 (0.083)*	
Change: Round 3 – Round 2				0.017 (0.579)
Legumes				
Pooled (Rounds 2 & 3)	0.206 (0.011)	0.218 (0.010)	-0.011 (0.468)	
Round 2	0.217 (0.015)	0.212 (0.015)	0.005 (0.799)	
Round 3	0.196 (0.014)	0.223 (0.015)	-0.027 (0.179)	
Change: Round 3 – Round 2				-0.032 (0.262)
Other vegetables (e.g., celery, cucumbers, mushrooms, green beans, onions, asparagus)				
Pooled (Rounds 2 & 3)	0.683 (0.013)	0.653 (0.013)	0.030 (0.097)*	
Round 2	0.705 (0.017)	0.669 (0.017)	0.036 (0.136)	
Round 3	0.661 (0.018)	0.637 (0.018)	0.024 (0.339)	
Change: Round 3 – Round 2				0.040 (0.653)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted and included identical covariates; inclusion of weights and slightly different covariates for interview-level characteristics results in the observed difference in point estimates.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), including 10% second-day subsamples for each round (unweighted N=2959 recalls from 1484 respondents).

Exhibit G8.6: Differences in Impacts of HIP on Total Number of USDA Food Pattern Fruit & Vegetable Groups Consumed in Past 24 Hours, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Number of fruit & vegetable groups (range: 0–8)				
Pooled (Rounds 2 & 3)	3.505 (0.048)	3.328 (0.046)	0.177 (0.007)***	
Round 2	3.672 (0.059)	3.389 (0.058)	0.283 (0.001)***	
Round 3	3.337 (0.058)	3.268 (0.056)	0.069 (0.390)	
Change: Round 3 – Round 2				-0.225 (0.018)**
Number of fruit groups (range: 0–3)				
Pooled (Rounds 2 & 3)	1.241 (0.028)	1.133 (0.026)	0.108 (0.005)***	
Round 2	1.304 (0.036)	1.147 (0.033)	0.157 (0.001)***	
Round 3	1.177 (0.034)	1.119 (0.033)	0.058 (0.218)	
Change: Round 3 – Round 2				-0.087 (0.125)
Number of vegetable groups (range: 0–5)				
Pooled (Rounds 2 & 3)	2.264 (0.034)	2.195 (0.031)	0.069 (0.133)	
Round 2	2.368 (0.042)	2.242 (0.042)	0.126 (0.034)**	
Round 3	2.160 (0.044)	2.149 (0.042)	0.011 (0.854)	
Change: Round 3 – Round 2				-0.137 (0.069)*

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted and included identical covariates; inclusion of weights and slightly different covariates for interview-level characteristics results in the observed difference in point estimates.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), including 10% second-day subsamples for each round (unweighted N=2959 recalls from 1484 respondents).

Exhibit G8.7: Differences in Impacts of HIP on Consumption of Other Foods, by Food Pattern Equivalent Group, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Total grains (oz-eq)				
Pooled (Rounds 2 & 3)	5.062 (0.115)	5.507 (0.113)	-0.445 (0.006)***	
Round 2	5.115 (0.149)	5.685 (0.148)	-0.570 (0.007)***	
Round 3	5.009 (0.136)	5.332 (0.133)	-0.323 (0.090)*	
Change: Round 3 – Round 2				0.255 (0.284)
Whole grains (oz-eq)				
Pooled (Rounds 2 & 3)	0.645 (0.031)	0.653 (0.031)	-0.008 (0.863)	
Round 2	0.637 (0.039)	0.656 (0.040)	-0.019 (0.736)	
Round 3	0.654 (0.043)	0.650 (0.042)	0.003 (0.955)	
Change: Round 3 – Round 2				0.010 (0.891)
Other grains (oz-eq)				
Pooled (Rounds 2 & 3)	4.417 (0.107)	4.854 (0.107)	-0.437 (0.004)***	
Round 2	4.478 (0.143)	5.029 (0.145)	-0.551 (0.007)***	
Round 3	4.355 (0.125)	4.681 (0.124)	-0.326 (0.065)*	
Change: Round 3 – Round 2				0.244 (0.295)
Total dairy (milk, yogurt, cheese) (cup-eq)				
Pooled (Rounds 2 & 3)	1.550 (0.051)	1.536 (0.042)	0.014 (0.829)	
Round 2	1.644 (0.068)	1.543 (0.051)	0.101 (0.236)	
Round 3	1.456 (0.056)	1.529 (0.055)	-0.073 (0.353)	
Change: Round 3 – Round 2				-0.174 (0.075)*
Meat, poultry, fish, eggs, soy, nuts, seeds, & legumes (oz-eq)				
Pooled (Rounds 2 & 3)	4.966 (0.118)	5.055 (0.108)	-0.089 (0.576)	
Round 2	5.090 (0.156)	5.213 (0.150)	-0.123 (0.567)	
Round 3	4.841 (0.147)	4.899 (0.136)	-0.058 (0.771)	
Change: Round 3 – Round 2				-0.024 (0.928)
Discretionary oils (gm-eq)				
Pooled (Rounds 2 & 3)	17.28 (0.51)	18.22 (0.56)	-0.94 (0.224)	
Round 2	16.96 (0.65)	17.85 (0.67)	-0.89 (0.350)	
Round 3	17.61 (0.69)	18.59 (0.73)	-0.99 (0.327)	
Change: Round 3 – Round 2				-0.34 (0.781)
Discretionary solid fats (gm-eq)				
Pooled (Rounds 2 & 3)	29.23 (0.82)	31.34 (0.74)	-2.11 (0.056)*	
Round 2	30.52 (1.05)	32.66 (0.98)	-2.15 (0.134)	
Round 3	27.94 (0.94)	30.04 (0.85)	-2.10 (0.099)*	
Change: Round 3 – Round 2				-0.07 (0.965)
Added sugar (tsp)[a]				
Pooled (Rounds 2 & 3)	14.72 (0.51)	15.74 (0.47)	-1.02 (0.147)	
Round 2	15.85 (0.62)	16.22 (0.61)	-0.37 (0.678)	
Round 3	13.59 (0.56)	15.27 (0.57)	-1.68 (0.037)**	
Change: Round 3 – Round 2				-1.28 (0.162)

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Alcohol (drinks)[b]				
Pooled (Rounds 2 & 3)	0.196 (0.035)	0.133 (0.019)	0.062 (0.114)	
Round 2	0.253 (0.060)	0.119 (0.021)	0.135 (0.035)**	
Round 3	0.138 (0.028)	0.148 (0.028)	-0.010 (0.800)	
Change: Round 3 – Round 2				-0.142 (0.035)**

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.\
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted and included identical covariates; inclusion of weights and slightly different covariates for interview-level characteristics results in the observed difference in point estimates.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]Includes, for example, the sugar added to sweetened soft drinks consumed.
[b]Reflects alcohol content in beverages consumed.
Source: Participant Survey (AMPM dietary recall module), including 10% second-day subsamples for each round (unweighted N=2959 recalls from 1484 respondents).

Exhibit G8.8: Differences in Impacts of HIP on Total Energy Intake, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Total energy (kcal)				
Pooled (Rounds 2 & 3)	1725 (30)	1795 (29)	-69 (0.096)*	
Round 2	1785 (36)	1834 (35)	-49 (0.327)	
Round 3	1666 (34)	1756 (33)	-90 (0.059)*	
Change: Round 3 – Round 2				-54 (0.288)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted and included identical covariates; inclusion of weights and slightly different covariates for interview-level characteristics results in the observed difference in point estimates.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), including 10% second-day subsamples for each round (unweighted N=2959 recalls from 1484 respondents).

Exhibit G8.9: Differences in Impacts of HIP on Total Nutrient Intake, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Fiber				
Pooled (Rounds 2 & 3)	13.39 (0.27)	13.12 (0.26)	0.27 (0.467)	
Round 2	13.85 (0.33)	13.42 (0.31)	0.43 (0.344)	
Round 3	12.93 (0.32)	12.83 (0.33)	0.10 (0.825)	
Change: Round 3 – Round 2				-0.42 (0.418)
Beta carotene				
Pooled (Rounds 2 & 3)	1699 (114)	1502 (93)	196 (0.174)	
Round 2	1921 (193)	1629 (153)	292 (0.226)	
Round 3	1475 (105)	1378 (98)	98 (0.494)	
Change: Round 3 – Round 2				-251 (0.357)
Vitamin A				
Pooled (Rounds 2 & 3)	588 (22)	567 (18)	21 (0.446)	
Round 2	620 (29)	578 (24)	42 (0.255)	
Round 3	556 (27)	556 (24)	-0 (0.999)	
Change: Round 3 – Round 2				-43 (0.358)
Vitamin C				
Pooled (Rounds 2 & 3)	106 (4)	96 (3)	9 (0.046)**	
Round 2	114 (5)	104 (5)	11 (0.111)	
Round 3	97 (4)	89 (4)	8 (0.154)	
Change: Round 3 – Round 2				-6 (0.417)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted and included identical covariates; inclusion of weights and slightly different covariates for interview-level characteristics results in the observed difference in point estimates.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), including 10% second-day subsamples for each round (unweighted N=2959 recalls from 1484 respondents).

Exhibit G8.10: Differences in Impacts of HIP on Intake of Other Ingredients in Foods with Fruits & Vegetables, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Sodium (mg)				
Pooled (Rounds 2 & 3)	876 (28)	974 (31)	-98 (0.024)**	
Round 2	922 (38)	978 (43)	-57 (0.332)	
Round 3	830 (35)	969 (39)	-139 (0.009)***	
Change: Round 3 – Round 2				-105 (0.131)
Discretionary oils (gm-eq)				
Pooled (Rounds 2 & 3)	6.74 (0.29)	7.69 (0.36)	-0.94 (0.047)**	
Round 2	6.80 (0.40)	6.91 (0.41)	-0.11 (0.853)	
Round 3	6.69 (0.40)	8.45 (0.58)	-1.76 (0.012)**	
Change: Round 3 – Round 2				-1.85 (0.040)**
Discretionary solid fats (gm-eq)				
Pooled (Rounds 2 & 3)	6.14 (0.30)	6.76 (0.32)	-0.61 (0.162)	
Round 2	6.45 (0.43)	6.99 (0.47)	-0.54 (0.398)	
Round 3	5.83 (0.38)	6.53 (0.40)	-0.69 (0.204)	
Change: Round 3 – Round 2				0.06 (0.935)
Added sugar (tsp)				
Pooled (Rounds 2 & 3)	2.92 (0.17)	2.92 (0.20)	>-0.01 (0.987)	
Round 2	3.14 (0.24)	2.69 (0.24)	0.45 (0.184)	
Round 3	2.69 (0.22)	3.15 (0.29)	-0.46 (0.206)	
Change: Round 3 – Round 2				-0.94 (0.036)**

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Note that the point estimate for the Round 2/3 change in impacts is not necessarily equal to the difference in estimated impacts for Rounds 2 and 3 as reported separately in the third column of this table. This discrepancy arises because we estimate the Round 2/3 change in impacts using a regression model with the change in outcomes as the dependent variable, while the estimated impacts for Rounds 2 and 3 are separately estimated using the level of the outcome as the dependent variable. These alternative models would produce identical point estimates of the Round 2/3 change if they were unweighted and included identical covariates; inclusion of weights and slightly different covariates for interview-level characteristics results in the observed difference in point estimates.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), including 10% second-day subsamples for each round (unweighted N=2959 recalls from 1484 respondents).

Exhibit G8.11: Differences in Impacts of HIP on 2010 Dietary Guidelines for Americans, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Percent of respondents at or above recommendations for…				
Total fruit				
Pooled (Rounds 2 & 3)	0.255 (0.175)	0.177 (0.193)	0.078 (0.765)	
Round 2	0.287 (0.168)	0.204 (0.187)	0.083 (0.741)	
Round 3	0.245 (0.195)	0.197 (0.214)	0.048 (0.868)	
Change: Round 3 – Round 2				-0.035 (0.927)
Total vegetables				
Pooled (Rounds 2 & 3)	0.062 (0.221)	0.043 (0.225)	0.019 (0.952)	
Round 2	0.072 (0.218)	0.049 (0.223)	0.023 (0.741)	
Round 3	0.089 (0.238)	0.066 (0.250)	0.024 (0.945)	
Change: Round 3 – Round 2				0.001 (0.998)
Dark green vegetables				
Pooled (Rounds 2 & 3)	0.100 (0.210)	0.035 (0.225)	0.065 (0.832)	
Round 2	0.116 (0.206)	0.034 (0.225)	0.082 (0.941)	
Round 3	0.148 (0.221)	0.142 (0.228)	0.006 (0.984)	
Change: Round 3 – Round 2				-0.076 (0.863)
Red and orange vegetables				
Pooled (Rounds 2 & 3)	0.021 (0.229)	0.017 (0.230)	0.004 (0.990)	
Round 2	0.030 (0.228)	0.023 (0.229)	0.007 (0.789)	
Round 3	0.052 (0.247)	0.047 (0.255)	0.004 (0.990)	
Change: Round 3 – Round 2				-0.003 (0.995)
Legumes				
Pooled (Rounds 2 & 3)	0.132 (0.202)	0.150 (0.198)	-0.018 (0.950)	
Round 2	0.127 (0.203)	0.127 (0.203)	<0.001 (0.999)	
Round 3	0.979 (0.007)	0.978 (0.007)	0.001 (0.910)	
Change: Round 3 – Round 2				0.001 (0.997)
Starchy vegetables				
Pooled (Rounds 2 & 3)	0.126 (0.206)	0.119 (0.208)	0.007 (0.980)	
Round 2	0.049 (0.224)	0.045 (0.225)	0.005 (0.988)	
Round 3	0.223 (0.204)	0.212 (0.212)	0.011 (0.970)	
Change: Round 3 – Round 2				0.006 (0.989)
Other vegetables				
Pooled (Rounds 2 & 3)	0.195 (0.189)	0.144 (0.201)	0.051 (0.853)	
Round 2	0.202 (0.187)	0.160 (0.197)	0.042 (0.876)	
Round 3	0.216 (0.205)	0.153 (0.227)	0.063 (0.837)	
Change: Round 3 – Round 2				0.021 (0.959)
Total grains				
Pooled (Rounds 2 & 3)	0.241 (0.177)	0.329 (0.157)	0.088 (0.711)	
Round 2	0.258 (0.174)	0.360 (0.150)	-0.102 (0.656)	
Round 3	0.252 (0.194)	0.314 (0.183)	-0.062 (0.817)	
Change: Round 3 – Round 2				0.040 (0.910)
Whole grains				
Pooled (Rounds 2 & 3)	0.001 (0.233)	0.001 (0.233)	<0.001 (0.999)	
Round 2	0.005 (0.233)	0.006 (0.232)	-0.001 (0.998)	
Round 3	0.008 (0.257)	0.008 (0.264)	-0.000 (0.999)	
Change: Round 3 – Round 2				0.001 (0.998)

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Enriched grains				
Pooled (Rounds 2 & 3)	0.838 (0.040)	0.894 (0.026)	-0.056 (0.244)	
Round 2	0.826 (0.042)	0.886 (0.028)	-0.060 (0.241)	
Round 3	0.800 (0.055)	0.863 (0.039)	-0.063 (0.351)	
Change: Round 3 – Round 2				-0.003 (0.972)
Protein foods				
Pooled (Rounds 2 & 3)	0.385 (0.144)	0.404 (0.139)	-0.019 (0.923)	
Round 2	0.396 (0.142)	0.425 (0.135)	-0.029 (0.881)	
Round 3	0.367 (0.163)	0.379 (0.164)	-0.011 (0.961)	
Change: Round 3 – Round 2				0.018 (0.953)
Dairy				
Pooled (Rounds 2 & 3)	0.060 (0.221)	0.063 (0.220)	-0.003 (0.991)	
Round 2	0.069 (0.219)	0.070 (0.219)	-0.002 (0.996)	
Round 3	0.056 (0.246)	0.067 (0.249)	-0.010 (0.977)	
Change: Round 3 – Round 2				-0.008 (0.986)
Percent of respondents below allowances for...				
Oils				
Pooled (Rounds 2 & 3)	0.853 (0.199)	0.818 (0.191)	0.035 (0.899)	
Round 2	0.865 (0.203)	0.833 (0.195)	0.032 (0.908)	
Round 3	0.808 (0.209)	0.769 (0.204)	0.040 (0.892)	
Change: Round 3 – Round 2				0.008 (0.984)
Calories from solid fats & added sugars (SoFAS)				
Pooled (Rounds 2 & 3)	0.064 (0.017)	0.053 (0.014)	0.011 (0.600)	
Round 2	0.056 (0.015)	0.046 (0.012)	0.010 (0.604)	
Round 3	0.114 (0.031)	0.086 (0.024)	0.028 (0.479)	
Change: Round 3 – Round 2				0.018 (0.678)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Note that these analyses treat observations as independent rather than paired across rounds, and therefore likely somewhat understate actual statistical significance.
Source: Participant Survey (AMPM dietary recall module), including 10% second-day subsamples for each round (unweighted N=3,919 recalls from 2,009 respondents).

Exhibit G8.12: Differences in Impacts of HIP on Healthy Eating Index-2010 and Component Scores, by Follow-Up Round

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Total vegetables				
Pooled (Rounds 2 & 3)	3.70 (0.10)	3.35 (0.09)	0.35 (0.006)***	
Round 2	3.62 (0.11)	3.34 (0.10)	0.28 (0.062)*	
Round 3	3.89 (0.14)	3.36 (0.13)	0.53 (0.006)***	
Change: Round 3 – Round 2				0.25 (0.302)
Greens and beans				
Pooled (Rounds 2 & 3)	3.02 (0.17)	2.47 (0.17)	0.55 (0.022)**	
Round 2	3.02 (0.22)	2.45 (0.20)	0.57 (0.053)*	
Round 3	2.95 (0.24)	2.31 (0.30)	0.64 (0.096)*	
Change: Round 3 – Round 2				0.07 (0.884)
Total fruit				
Pooled (Rounds 2 & 3)	4.39 (0.18)	3.53 (0.14)	0.85 (<0.001) ***	
Round 2	4.45 (0.19)	3.60 (0.16)	0.85 (0.001)***	
Round 3	4.25 (0.22)	3.58 (0.19)	0.66 (0.023)**	
Change: Round 3 – Round 2				-0.19 (0.614)
Whole fruit				
Pooled (Rounds 2 & 3)	4.91 (0.14)	4.00 (0.21)	0.91 (<0.001) ***	
Round 2	4.90 (0.15)	4.04 (0.21)	0.86 (0.001)***	
Round 3	4.83 (0.22)	4.08 (0.30)	0.75 (0.042)**	
Change: Round 3 – Round 2				-0.11 (0.808)
Whole grains				
Pooled (Rounds 2 & 3)	2.40 (0.11)	2.36 (0.11)	0.04 (0.786)	
Round 2	2.36 (0.12)	2.32 (0.13)	0.04 (0.817)	
Round 3	2.54 (0.16)	2.47 (0.16)	0.07 (0.748)	
Change: Round 3 – Round 2				0.03 (0.916)
Dairy				
Pooled (Rounds 2 & 3)	6.89 (0.18)	6.67 (0.16)	0.22 (0.358)	
Round 2	6.99 (0.20)	6.63 (0.18)	0.36 (0.181)	
Round 3	6.71 (0.22)	6.68 (0.23)	0.02 (0.945)	
Change: Round 3 – Round 2				-0.34 (0.417)
Total protein foods[a]				
Pooled (Rounds 2 & 3)	5.00 (0.00)	5.00 (0.00)	0.00 (1.000)	
Round 2	5.00 (0.00)	5.00 (0.00)	0.00 (1.000)	
Round 3	5.00 (0.00)	5.00 (0.00)	0.00 (1.000)	
Change: Round 3 – Round 2				0.00 (1.000)
Seafood & plant protein				
Pooled (Rounds 2 & 3)	3.48 (0.33)	2.88 (0.21)	0.60 (0.126)	
Round 2	2.98 (0.24)	2.83 (0.25)	0.15 (0.658)	
Round 3	3.76 (0.47)	2.89 (0.34)	0.87 (0.132)	
Change: Round 3 – Round 2				0.72 (0.288)
Fatty acid ratio				
Pooled (Rounds 2 & 3)	3.36 (0.16)	3.48 (0.15)	-0.12 (0.584)	
Round 2	3.08 (0.17)	3.30 (0.18)	-0.22 (0.378)	
Round 3	3.79 (0.23)	3.60 (0.21)	0.19 (0.539)	
Change: Round 3 – Round 2				0.41 (0.303)

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Sodium				
Pooled (Rounds 2 & 3)	4.72 (0.16)	4.43 (0.17)	0.29 (0.215)	
Round 2	4.85 (0.19)	4.56 (0.21)	0.29 (0.308)	
Round 3	4.66 (0.23)	4.28 (0.24)	0.38 (0.253)	
Change: Round 3 – Round 2				0.09 (0.838)
Refined grains				
Pooled (Rounds 2 & 3)	7.08 (0.16)	6.38 (0.16)	0.71 (0.002)***	
Round 2	7.21 (0.20)	6.32 (0.20)	0.88 (0.002)***	
Round 3	6.84 (0.21)	6.50 (0.21)	0.34 (0.248)	
Change: Round 3 – Round 2				-0.54 (0.196)
SoFAS calories				
Pooled (Rounds 2 & 3)	12.90 (0.30)	12.57 (0.27)	0.33 (0.418)	
Round 2	12.40 (0.32)	12.32 (0.31)	0.07 (0.867)	
Round 3	13.72 (0.38)	12.78 (0.36)	0.94 (0.073)*	
Change: Round 3 – Round 2				0.87 (0.206)
Total HEI-2010 score				
Pooled (Rounds 2 & 3)	61.85 (0.89)	57.12 (0.79)	4.73 (<0.001)***	
Round 2	60.85 (0.88)	56.71 (0.90)	4.14 (0.001)***	
Round 3	62.93 (1.20)	57.53 (1.00)	5.40 (0.001)***	
Change: Round 3 – Round 2				1.26 (0.529)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across rounds may differ from differences between reported regression-adjusted means for the treatment and control groups and between rounds.
Note that these analyses treat observations as independent rather than paired across rounds, and therefore likely somewhat understate actual statistical significance.
[a]All respondents in both treatment and control groups achieved the maximum score of 5 on the total protein foods component of the HEI-2010.
Source: Participant Survey (AMPM dietary recall module), including 10% second-day subsamples for each round (unweighted N=3,919 recalls from 2,009 respondents).

Appendix H: Analyses by Subgroup

Exhibit H5.1: Proportion of Primary Shoppers Who Had Ever Heard of HIP, by Treatment and Control Status, by Subgroup: Round 2 and 3 Participant Surveys

	Proportion (N)			P-value
	Total	Treatment	Control	
Primary shopper employment status (N=3249)				
Working full or part-time (N=635)	0.23 (270)	0.74 (216)	0.16 (54)	[.][a]
Not working (N=2614)	0.21 (1075)	0.66 (897)	0.14 (178)	[<0.001]***
Difference: working – not working [p-value]	0.03 [0.311]	0.08 [0.017]**	0.02 [0.314]	
Household composition (N=3395)				
Children (and no elderly) in household (N=1400)	0.23 (604)	0.73 (496)	0.15 (108)	[<0.001]***
Other household (N=1995)	0.21 (795)	0.63 (650)	0.15 (145)	[<0.001]***
Difference: children in HH – other HH [p-value]	0.03 [0.150]	0.11 [<0.001]***	0.01 [0.620]	
Household WIC status (past 30 days) (N=3243)				
Participant (N=587)	0.22 (249)	0.71 (210)	0.14 (39)	[.][a]
Non-participant (N=2656)	0.21 (1097)	0.67 (905)	0.14 (192)	[<0.001]***
Difference: participant – non-participant [p-value]	0.01 [0.594]	0.05 [0.186]	>-0.01 [0.941]	
Household SNAP benefit amount (N=3395)				
$200 or less (N=1923)	0.22 (779)	0.63 (633)	0.15 (146)	[<0.001]***
Over $200 (N=1472)	0.22 (620)	0.72 (513)	0.14 (107)	[<0.001]***
Difference: $200 or less – over $200 [p-value]	>-0.01 [0.840]	-0.09 [0.001]***	0.01 [0.622]	
Baseline respondent fruit & vegetable intake (screener) (N=3395)				
3+ servings/day (N=1713)	0.22 (700)	0.67 (571)	0.15 (129)	[<0.001]***
<3 servings/day (N=1682)	0.22 (699)	0.67 (575)	0.15 (124)	[<0.001]***
Difference: 3+ servings – <3 servings [p-value]	-0.01 [0.718]	>-0.01 [0.962]	>-0.01 [0.845]	
Baseline respondent fruit & vegetable intake (predicted) (N=2724)				
High (N=1395)	0.22 (580)	0.68 (476)	0.15 (104)	[<0.001]***
Low (N=1329)	0.23 (565)	0.70 (465)	0.15 (100)	[<0.001]***
Difference: high – low [p-value]	-0.01 [0.646]	-0.02 [0.438]	>-0.01 [.][a]	
Baseline spending on TFV (N=2724)				
High (N=1337)	0.23 (588)	0.74 (481)	0.16 (107)	[<0.001]***
Low (N=1387)	0.21 (557)	0.65 (460)	0.14 (97)	[.][a]
Difference: high – low [p-value]	0.02 [0.338]	0.09 [0.002]***	0.01 [.][a]	
Attitudes about food, fruits, & vegetables (N=3395)				
High (N=1941)	0.23 (820)	0.68 (658)	0.16 (162)	[<0.001]***
Low (N=1454)	0.20 (579)	0.65 (488)	0.13 (91)	[<0.001]***
Difference: high – low [p-value]	0.03 [0.111]	0.03 [0.309]	0.04 [0.052]*	
Barriers to eating fruits & vegetables (N=3395)				
High (N=1670)	0.22 (653)	0.62 (511)	0.16 (142)	[<0.001]***
Low (N=1725)	0.22 (746)	0.71 (635)	0.13 (111)	[<0.001]***
Difference: high – low [p-value]	<0.01 [0.639]	-0.08 [0.001]***	0.03 [0.096]*	
Barriers to grocery shopping (N=3395)				
High (N=1522)	0.22 (596)	0.63 (470)	0.16 (126)	[<0.001]***
Low (N=1873)	0.22 (803)	0.70 (676)	0.13 (127)	[<0.001]***
Difference: high – low [p-value]	0.01 [0.606]	-0.07 [0.009]***	0.03 [0.136]	

	Proportion (N)			P-value
	Total	Treatment	Control	
Fruits & vegetables at home (N=3395)				
High (N=1481)	0.22 (627)	0.70 (510)	0.15 (117)	[<0.001]***
Low (N=1914)	0.21 (772)	0.65 (636)	0.14 (136)	[<0.001]***
Difference: high – low [p-value]	0.01 [0.669]	0.04 [0.094]*	0.01 [0.718]	
Pre-HIP shopping patterns (N=2202)				
Shopped primarily at HIP participating retailers (N=1320)	0.20 (528)	0.65 (444)	0.13 (84)	[<0.001]***
Shopped primarily at non-HIP participating retailers (N=882)	0.20 (343)	0.64 (278)	0.14 (65)	[.][a]
Difference: HIP shoppers - non-HIP-shoppers [P-value]	0.01 [0.840]	0.01 [0.811]	>-0.01 [0.818]	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don't know” and “refused” responses coded as missing.
Due to rounding, reported differences in proportions across subgroups may differ from differences between proportions for the subgroups.
Test statistics are adjusted for clustering at the individual respondent level.
[a]Missing test statistic because of stratum with single sampling unit.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit H5.2a: Proportion of Primary Shoppers Who Attended Meeting to Learn about HIP, by Subgroup: Round 2 and 3 Participant Surveys, HIP Participants

	Proportion (N)
Primary shopper employment status (N=1654)	
Working full or part-time (N=299)	0.03 (11)
Not working (N=1355)	0.06 (82)
Difference: working – not working [p-value]	-0.03 [0.092]
Household composition (N=1712)	
Children (and no elderly) in household (N=683)	0.04 (30)
Other household (N=1029)	0.06 (64)
Difference: children in HH – other HH [p-value]	-0.02 [0.107]
Household WIC status (past 30 days) (N=1651)	
Participant (N=298)	0.06 (18)
Non-participant (N=1353)	0.05 (75)
Difference: participant – non-participant [p-value]	<0.01 [0.820]
Household SNAP benefit amount (N=1712)	
$200 or less (N=997)	0.06 (60)
Over $200 (N=715)	0.05 (34)
Difference: $200 or less – over $200 [p-value]	0.01 [0.360]
Baseline respondent fruit & vegetable intake (screener) (N=1712)	
3+ servings/day (N=853)	0.07 (59)
<3 servings/day (N=859)	0.04 (35)
Difference: 3+ servings – <3 servings [p-value]	0.03 [0.006]***
Baseline respondent fruit & vegetable intake (predicted) (N=1363)	
High (N=706)	0.07 (51)
Low (N=657)	0.04 (29)
Difference: high – low [p-value]	0.03 [0.060]*
Baseline spending on TFV (N=1363)	
High (N=655)	0.06 (44)
Low (N=708)	0.05 (36)
Difference: high – low [p-value]	0.02 [0.209]
Attitudes about food, fruits, & vegetables (N=1712)	
High (N=967)	0.05 (53)
Low (N=745)	0.05 (41)
Difference: high – low [p-value]	>-0.01 [0.914]
Barriers to eating fruits & vegetables (N=1712)	
High (N=825)	0.05 (46)
Low (N=887)	0.05 (58)
Difference: high – low [p-value]	>-0.01 [0.958]
Barriers to grocery shopping (N=1712)	
High (N=754)	0.05 (40)
Low (N=958)	0.05 (54)
Difference: high – low [p-value]	-0.01 [0.653]
Fruits & vegetables at home (N=1712)	
High (N=734)	0.07 (52)
Low (N=978)	0.04 (42)
Difference: high – low [p-value]	0.03 [0.026]**

	Proportion (N)
Pre-HIP shopping patterns (N=1108)	
Shopped primarily at HIP participating retailers (N=682)	0.06 (46)
Shopped primarily at non-HIP participating retailers (N=426)	0.04 (15)
Difference: HIP shoppers - non-HIP-shoppers [P-value]	0.03 [0.074]*

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" and "refused" responses coded as missing.
Due to rounding, reported differences in proportions across subgroups may differ from differences between proportions for the subgroups.
Test statistics are adjusted for clustering at the individual respondent level.
Includes participants who reported they had not heard of HIP.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit H5.2b: Proportion of Primary Shoppers Who Called EBT or HIP Hotline with Questions or Problems in Past Month, by Subgroup: Round 2 and 3 Participant Surveys, HIP Participants

	Proportion (N)
Primary shopper employment status (N=1628)	
Working full or part-time (N=294)	0.04 (12)
Not working (N=1334)	0.07 (86)
Difference: working – not working [p-value]	-0.02 [0.185]
Household composition (N=1685)	
Children (and no elderly) in household (N=670)	0.05 (31)
Other household (N=1015)	0.07 (68)
Difference: children in HH – other HH [p-value]	-0.02 [0.133]
Household WIC status (past 30 days) (N=1625)	
Participant (N=295)	0.04 (12)
Non-participant (N=1330)	0.07 (86)
Difference: participant – non-participant [p-value]	-0.02 [0.273]
Household SNAP benefit amount (N=1685)	
$200 or less (N=983)	0.07 (66)
Over $200 (N=702)	0.05 (33)
Difference: $200 or less – over $200 [p-value]	0.02 [0.136]
Baseline respondent fruit & vegetable intake (screener) (N=1685)	
3+ servings/day (N=842)	0.06 (52)
<3 servings/day (N=843)	0.06 (47)
Difference: 3+ servings – <3 servings [p-value]	>-0.01 [0.888]
Baseline respondent fruit & vegetable intake (predicted) (N=1342)	
High (N=701)	0.06 (42)
Low (N=641)	0.05 (36)
Difference: high – low [p-value]	0.01 [0.490]
Baseline spending on TFV (N=1342)	
High (N=644)	0.06 (41)
Low (N=698)	0.05 (37)
Difference: high – low [p-value]	0.01 [0.640]
Attitudes about food, fruits, & vegetables (N=1685)	
High (N=951)	0.06 (55)
Low (N=734)	0.06 (44)
Difference: high – low [p-value]	0.01 [0.689]
Barriers to eating fruits & vegetables (N=1685)	
High (N=814)	0.07 (50)
Low (N=871)	0.06 (49)
Difference: high – low [p-value]	0.01 [0.604]
Barriers to grocery shopping (N=1685)	
High (N=747)	0.06 (47)
Low (N=938)	0.06 (52)
Difference: high – low [p-value]	0.01 [0.672]
Fruits & vegetables at home (N=1685)	
High (N=717)	0.06 (44)
Low (N=968)	0.06 (55)
Difference: high – low [p-value]	<0.01 [0.766]

	Proportion (N)
Pre-HIP shopping patterns (N=1084)	
Shopped primarily at HIP participating retailers (N=667)	0.07 (43)
Shopped primarily at non-HIP participating retailers (N=417)	0.05 (21)
Difference: HIP shoppers - non-HIP-shoppers [P-value]	0.02 [0.206]

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don’t know” and “refused” responses coded as missing.
Due to rounding, reported differences in proportions across subgroups may differ from differences between proportions for the subgroups.
Test statistics are adjusted for clustering at the individual respondent level.
Includes participants who reported they had not heard of HIP.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit H5.3a: Primary Shopper Report: "How easy or hard has it been to understand how HIP works?", by Subgroup: Round 2 and 3 Participant Surveys, HIP Participants

	Very easy	Easy	Somewhat easy	Somewhat hard	Hard	Very hard	Don't know	P-value for subgroup difference
Primary shopper employment status								
Working	0.15 (48)	0.41 (115)	0.16 (53)	0.06 (15)	0.03 (8)	0.02 (6)	0.17 (55)	[0.239]
Not working	0.14 (199)	0.34 (459)	0.19 (253)	0.07 (98)	0.04 (55)	0.04 (51)	0.18 (244)	
Household composition								
Children (and no elderly) in household	0.15 (107)	0.39 (259)	0.17 (117)	0.08 (48)	0.04 (25)	0.02 (10)	0.16 (117)	[0.006]***
Other household	0.14 (148)	0.33 (337)	0.19 (196)	0.06 (66)	0.04 (43)	0.05 (48)	0.19 (198)	
Household WIC status (past 30 days)								
Participant	0.15 (48)	0.43 (123)	0.14 (41)	0.08 (25)	0.03 (10)	0.01 (3)	0.16 (48)	[0.029]**
Non-participant	0.14 (199)	0.34 (453)	0.19 (262)	0.07 (87)	0.04 (53)	0.04 (54)	0.18 (249)	
Household SNAP benefit amount								
$200 or less	0.14 (142)	0.33 (327)	0.19 (189)	0.07 (67)	0.05 (44)	0.05 (47)	0.18 (186)	[0.013]**
Over $200	0.15 (113)	0.39 (269)	0.17 (124)	0.07 (47)	0.03 (24)	0.02 (11)	0.17 (129)	
Baseline respondent fruit & vegetable intake (screener)								
3+ servings/day	0.15 (129)	0.37 (309)	0.17 (149)	0.06 (49)	0.04 (33)	0.04 (33)	0.18 (157)	[0.369]
<3 servings/day	0.14 (126)	0.34 (287)	0.19 (164)	0.08 (65)	0.04 (35)	0.03 (25)	0.18 (158)	
Baseline respondent fruit & vegetable intake (predicted)								
High	0.15 (112)	0.38 (256)	0.15 (114)	0.06 (43)	0.04 (29)	0.04 (26)	0.18 (130)	[0.373]
Low	0.16 (104)	0.35 (234)	0.20 (129)	0.07 (45)	0.03 (18)	0.03 (17)	0.17 (110)	
Baseline spending on TFV								
High	0.17 (112)	0.37 (241)	0.17 (112)	0.08 (47)	0.03 (20)	0.03 (18)	0.16 (106)	[0.470]
Low	0.14 (104)	0.35 (249)	0.18 (131)	0.06 (41)	0.04 (27)	0.03 (25)	0.19 (134)	
Attitudes about food, fruits, & vegetables								
High	0.16 (157)	0.37 (353)	0.17 (169)	0.06 (53)	0.04 (39)	0.03 (29)	0.17 (169)	[0.085]*
Low	0.13 (98)	0.33 (243)	0.19 (144)	0.08 (61)	0.04 (29)	0.04 (29)	0.19 (146)	
Barriers to eating fruits & vegetables								
High	0.09 (78)	0.34 (278)	0.18 (156)	0.08 (60)	0.06 (46)	0.04 (35)	0.20 (172)	[<0.001]***
Low	0.19 (177)	0.36 (318)	0.18 (157)	0.06 (54)	0.02 (22)	0.03 (23)	0.16 (143)	
Barriers to grocery shopping								
High	0.13 (100)	0.32 (241)	0.20 (146)	0.07 (51)	0.05 (38)	0.04 (32)	0.20 (149)	[0.052]*
Low	0.16 (155)	0.38 (355)	0.17 (167)	0.07 (63)	0.03 (30)	0.03 (26)	0.17 (166)	

	Very easy	Easy	Somewhat easy	Somewhat hard	Hard	Very hard	Don't know	P-value for subgroup difference
Fruits & vegetables at home								
High	0.16 (122)	0.38 (274)	0.17 (129)	0.06 (44)	0.03 (21)	0.03 (23)	0.16 (124)	[0.109]
Low	0.13 (133)	0.33 (322)	0.19 (184)	0.07 (70)	0.05 (47)	0.04 (35)	0.19 (191)	
Pre-HIP shopping patterns (N=1115)								
Shopped primarily at HIP participating retailers	0.14 (97)	0.33 (227)	0.19 (126)	0.07 (49)	0.05 (29)	0.03 (24)	0.19 (131)	[0.239]
Shopped primarily at non-HIP participating retailers	0.12 (53)	0.34 (150)	0.21 (91)	0.04 (17)	0.05 (19)	0.03 (13)	0.21 (89)	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don’t know” and “refused” responses coded as missing.
Due to rounding, reported proportions may not sum to one.
Test statistics are adjusted for clustering at the individual respondent level.
Includes participants who reported they had not heard of HIP.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=1719).

Exhibit H5.3b: Primary Shopper Report: "How easy or hard is it remembering which fruits and vegetables earn the HIP rebate?" by Subgroup: Round 2 and 3 Participant Surveys, HIP Participants

	Very easy	Easy	Somewhat easy	Somewhat hard	Hard	Very hard	Don't know	P-value for subgroup difference
Primary shopper employment status								
Working	0.11 (37)	0.37 (103)	0.25 (77)	0.11 (31)	0.06 (16)	0.02 (6)	0.09 (29)	[0.252]
Not working	0.13 (182)	0.33 (446)	0.20 (273)	0.13 (175)	0.07 (98)	0.04 (50)	0.10 (134)	
Household composition								
Children (and no elderly) in household	0.13 (90)	0.33 (222)	0.24 (165)	0.13 (87)	0.07 (47)	0.02 (15)	0.08 (57)	[0.041]**
Other household	0.13 (138)	0.34 (349)	0.19 (195)	0.12 (122)	0.07 (71)	0.04 (42)	0.11 (117)	
Household WIC status (past 30 days)								
Participant	0.13 (41)	0.42 (117)	0.20 (61)	0.13 (36)	0.06 (17)	0.01 (4)	0.06 (21)	[0.023]**
Non-participant	0.13 (178)	0.32 (435)	0.22 (289)	0.12 (168)	0.07 (93)	0.04 (52)	0.10 (141)	
Household SNAP benefit amount								
$200 or less	0.13 (135)	0.33 (329)	0.19 (192)	0.12 (121)	0.07 (70)	0.04 (45)	0.11 (109)	[0.020]**
Over $200	0.12 (93)	0.34 (242)	0.24 (168)	0.13 (88)	0.07 (48)	0.02 (12)	0.09 (65)	
Baseline respondent fruit & vegetable intake (screener)								
3+ servings/day	0.13 (118)	0.35 (294)	0.21 (175)	0.12 (101)	0.06 (54)	0.03 (26)	0.10 (89)	[0.835]
<3 servings/day	0.12 (110)	0.32 (277)	0.22 (185)	0.13 (108)	0.08 (64)	0.03 (31)	0.10 (85)	
Baseline respondent fruit & vegetable intake (predicted)								
High	0.13 (101)	0.36 (246)	0.21 (147)	0.11 (79)	0.07 (45)	0.03 (24)	0.09 (67)	[0.385]
Low	0.14 (94)	0.31 (200)	0.22 (143)	0.15 (94)	0.07 (46)	0.03 (22)	0.08 (57)	
Baseline spending on TFV								
High	0.14 (95)	0.34 (217)	0.23 (150)	0.14 (85)	0.06 (36)	0.03 (19)	0.07 (55)	[0.519]
Low	0.13 (100)	0.33 (229)	0.20 (140)	0.12 (88)	0.08 (55)	0.04 (27)	0.10 (69)	
Attitudes about food, fruits, & vegetables								
High	0.14 (138)	0.36 (343)	0.21 (207)	0.10 (99)	0.06 (58)	0.02 (24)	0.10 (100)	[0.009]***
Low	0.11 (90)	0.31 (228)	0.21 (153)	0.15 (110)	0.08 (60)	0.04 (33)	0.10 (74)	
Barriers to eating fruits & vegetables								
High	0.09 (77)	0.31 (254)	0.20 (169)	0.15 (125)	0.09 (70)	0.04 (35)	0.11 (94)	[<0.001]***
Low	0.16 (151)	0.36 (317)	0.22 (191)	0.10 (84)	0.06 (48)	0.02 (22)	0.09 (80)	
Barriers to grocery shopping								
High	0.12 (97)	0.31 (235)	0.22 (162)	0.13 (96)	0.09 (61)	0.04 (33)	0.09 (72)	[0.103]
Low	0.13 (131)	0.36 (336)	0.21 (198)	0.12 (113)	0.06 (57)	0.03 (24)	0.11 (102)	

	Very easy	Easy	Somewhat easy	Somewhat hard	Hard	Very hard	Don't know	P-value for subgroup difference
Fruits & vegetables at home								
High	0.14 (107)	0.37 (266)	0.20 (149)	0.11 (77)	0.06 (43)	0.03 (20)	0.10 (74)	[0.152]
Low	0.12 (121)	0.31 (305)	0.22 (211)	0.14 (132)	0.08 (75)	0.04 (37)	0.10 (100)	
Pre-HIP shopping patterns (N=1115)								
Shopped primarily at HIP participating retailers	0.12 (90)	0.33 (225)	0.20 (133)	0.13 (87)	0.08 (53)	0.03 (22)	0.11 (74)	[0.252]
Shopped primarily at non-HIP participating retailers	0.11 (49)	0.33 (140)	0.25 (109)	0.10 (42)	0.06 (26)	0.04 (17)	0.11 (49)	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don’t know” and “refused” responses coded as missing.
Due to rounding, reported proportions may not sum to one.
Test statistics are adjusted for clustering at the individual respondent level.
Includes participants who reported they had not heard of HIP.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=1719).

Exhibit H5.3c: Primary Shopper Report: "How easy or hard is it keeping track of the HIP rebates you earn?" by Subgroup: Round 2 and 3 Participant Surveys, HIP Participants

	Very easy	Easy	Somewhat easy	Somewhat hard	Hard	Very hard	Don't know	P-value for subgroup difference
Primary shopper employment status								
Working	0.20 (27)	0.54 (60)	0.17 (23)	0.04 (5)	0.03 (3)	0.00 (0)	0.02 (2)	[0.353]
Not working	0.26 (122)	0.42 (201)	0.22 (103)	0.06 (25)	0.02 (11)	0.01 (4)	0.02 (10)	
Household composition								
Children (and no elderly) in household	0.25 (68)	0.48 (122)	0.18 (49)	0.05 (10)	0.03 (8)	<0.01 (1)	0.02 (5)	[0.758]
Other household	0.24 (86)	0.42 (148)	0.23 (79)	0.05 (20)	0.02 (7)	0.01 (3)	0.02 (8)	
Household WIC status (past 30 days)								
Participant	0.24 (26)	0.53 (59)	0.15 (17)	0.06 (7)	0.01 (1)	0.00 (0)	0.01 (2)	[0.184]
Non-participant	0.25 (123)	0.42 (201)	0.23 (109)	0.05 (23)	0.03 (13)	0.01 (4)	0.02 (10)	
Household SNAP benefit amount								
$200 or less	0.25 (83)	0.43 (142)	0.21 (68)	0.06 (20)	0.01 (4)	0.01 (3)	0.02 (8)	[0.562]
Over $200	0.24 (71)	0.46 (128)	0.20 (60)	0.04 (10)	0.04 (11)	<0.01 (1)	0.02 (5)	
Baseline respondent fruit & vegetable intake (screener)								
3+ servings/day	0.26 (80)	0.44 (128)	0.22 (65)	0.05 (16)	0.01 (4)	0.01 (2)	0.02 (6)	[0.641]
<3 servings/day	0.23 (74)	0.46 (142)	0.20 (63)	0.05 (14)	0.04 (11)	0.01 (2)	0.02 (7)	
Baseline respondent fruit & vegetable intake (predicted)								
High	0.23 (70)	0.44 (124)	0.21 (57)	0.06 (18)	0.03 (8)	0.01 (3)	0.02 (6)	[0.681]
Low	0.26 (61)	0.45 (105)	0.20 (50)	0.04 (9)	0.02 (5)	0.00 (0)	0.02 (4)	
Baseline spending on TFV								
High	0.23 (66)	0.47 (127)	0.19 (55)	0.05 (11)	0.03 (8)	0.01 (3)	0.02 (7)	[0.508]
Low	0.26 (65)	0.42 (102)	0.22 (52)	0.06 (16)	0.02 (5)	0.00 (0)	0.01 (3)	
Attitudes about food, fruits, & vegetables								
High	0.24 (89)	0.44 (159)	0.21 (75)	0.06 (19)	0.03 (10)	0.01 (3)	0.02 (8)	[0.969]
Low	0.26 (65)	0.46 (111)	0.20 (53)	0.04 (11)	0.02 (5)	<0.01 (1)	0.02 (5)	
Barriers to eating fruits & vegetables								
High	0.19 (49)	0.44 (105)	0.24 (60)	0.05 (12)	0.04 (10)	0.01 (2)	0.03 (6)	[0.117]
Low	0.28 (105)	0.45 (165)	0.19 (68)	0.05 (18)	0.01 (5)	<0.01 (2)	0.02 (7)	
Barriers to grocery shopping								
High	0.25 (65)	0.43 (112)	0.20 (55)	0.05 (12)	0.05 (12)	0.01 (4)	0.01 (3)	[0.010]**
Low	0.24 (89)	0.46 (158)	0.21 (73)	0.05 (18)	0.01 (3)	0.00 (0)	0.03 (10)	

	Very easy	Easy	Somewhat easy	Somewhat hard	Hard	Very hard	Don't know	P-value for subgroup difference
Fruits & vegetables at home								
High	0.25 (75)	0.47 (133)	0.18 (52)	0.04 (11)	0.03 (7)	0.01 (3)	0.02 (6)	[0.422]
Low	0.24 (79)	0.42 (137)	0.23 (76)	0.06 (19)	0.02 (8)	<0.01 (1)	0.02 (7)	
Pre-HIP shopping patterns (N=377)								
Shopped primarily at HIP participating retailers	0.24 (58)	0.44 (105)	0.22 (52)	0.05 (10)	0.02 (6)	<0.01 (1)	0.02 (5)	[0.353]
Shopped primarily at non-HIP participating retailers	0.27 (37)	0.42 (60)	0.22 (29)	0.03 (5)	0.03 (4)	0.01 (1)	0.03 (4)	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don’t know” and “refused” responses coded as missing.
Due to rounding, reported proportions may not sum to one.
Test statistics are adjusted for clustering at the individual respondent level.
Includes participants who reported they had not heard of HIP.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=614).

Exhibit H5.4: Proportion of Primary Shoppers Who Keep Track of HIP Rebate Earned, by Subgroup: Round 2 and 3 Participant Surveys, HIP Participants

	Proportion (N)
Primary shopper employment status (N=1522)	
Working full or part-time (N=279)	0.43 (120)
Not working (N=1243)	0.38 (476)
Difference: working – not working [p-value]	0.04 [0.264]
Household composition (N=1574)	
Children (and no elderly) in household (N=642)	0.40 (263)
Other household (N=932)	0.38 (351)
Difference: children in HH – other HH [p-value]	0.02 [0.445]
Household WIC status (past 30 days) (N=1519)	
Participant (N=281)	0.40 (112)
Non-participant (N=1238)	0.39 (483)
Difference: participant – non-participant [p-value]	0.01 [0.863]
Household SNAP benefit amount (N=1574)	
$200 or less (N=907)	0.36 (328)
Over $200 (N=667)	0.42 (286)
Difference: $200 or less – over $200 [p-value]	-0.06 [0.062]*
Baseline respondent fruit & vegetable intake (screener) (N=1574)	
3+ servings/day (N=778)	0.39 (301)
<3 servings/day (N=796)	0.39 (313)
Difference: 3+ servings – <3 servings [p-value]	>-0.01 [0.976]
Baseline respondent fruit & vegetable intake (predicted) (N=1261)	
High (N=651)	0.45 (286)
Low (N=610)	0.38 (234)
Difference: high – low [p-value]	0.07 [0.037]**
Baseline spending on TFV (N=1261)	
High (N=612)	0.46 (277)
Low (N=649)	0.37 (243)
Difference: high – low [p-value]	0.08 [0.012]**
Attitudes about food, fruits, & vegetables (N=1574)	
High (N=887)	0.41 (363)
Low (N=687)	0.36 (251)
Difference: high – low [p-value]	0.05 [0.071]*
Barriers to eating fruits & vegetables (N=1574)	
High (N=743)	0.32 (244)
Low (N=831)	0.45 (370)
Difference: high – low [p-value]	-0.13 [<0.001]***
Barriers to grocery shopping (N=1574)	
High (N=686)	0.39 (263)
Low (N=888)	0.39 (351)
Difference: high – low [p-value]	-0.01 [0.836]
Fruits & vegetables at home (N=1574)	
High (N=677)	0.42 (287)
Low (N=897)	0.37 (327)
Difference: high – low [p-value]	0.05 [0.084]*

	Proportion (N)
Pre-HIP shopping patterns (N=1013)	
Shopped primarily at HIP participating retailers (N=627)	0.37 (237)
Shopped primarily at non-HIP participating retailers (N=386)	0.36 (140)
Difference: HIP shoppers - non-HIP-shoppers [P-value]	0.01 [0.787]

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don’t know” and “refused” responses coded as missing.
Due to rounding, reported differences in proportions across subgroups may differ from differences between proportions for the subgroups.
Test statistics are adjusted for clustering at the individual respondent level.
Includes participants who reported they had not heard of HIP.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit H5.5a: Proportion of Primary Shoppers Who Are Primary Users of EBT Card, by Treatment and Control Status, by Subgroup: Round 2 & 3 Participant Surveys

	Total	Treatment	Control	P-value
Primary shopper employment status (N=3274)				
Working full or part-time (N=644)	0.90 (578)	0.90 (265)	0.90 (313)	[.][a]
Not working (N=2630)	0.90 (2384)	0.91 (1243)	0.90 (1141)	[0.510]
Difference: working – not working [p-value]	<0.01 [0.979]	-0.01 [0.778]	<0.01 [0.940]	
Household composition (N=3421)				
Children (and no elderly) in household (N=1418)	0.90 (1292)	0.91 (627)	0.90 (665)	[0.721]
Other household (N=2003)	0.89 (1784)	0.89 (925)	0.89 (859)	[0.656]
Difference: children in HH – other HH [p-value]	0.02 [0.297]	0.02 [0.358]	0.02 [0.363]	
Household WIC status (past 30 days) (N=3268)				
Participant (N=595)	0.91 (542)	0.91 (271)	0.90 (271)	[.][a]
Non-participant (N=2673)	0.90 (2417)	0.91 (1236)	0.90 (1181)	[0.388]
Difference: participant – non-participant [p-value]	<0.01 [0.817]	>-0.01 [0.929]	0.01 [0.808]	
Household SNAP benefit amount (N=3421)				
$200 or less (N=1934)	0.89 (1741)	0.91 (912)	0.89 (829)	[0.130]
Over $200 (N=1487)	0.90 (1335)	0.89 (640)	0.90 (695)	[0.481]
Difference: $200 or less – over $200 [p-value]	-0.01 [0.445]	0.02 [0.235]	-0.02 [0.344]	
Baseline respondent fruit & vegetable intake (screener) (N=3421)				
3+ servings/day (N=1726)	0.89 (1547)	0.89 (769)	0.89 (778)	[0.994]
<3 servings/day (N=1695)	0.90 (1529)	0.91 (783)	0.89 (746)	[0.396]
Difference: 3+ servings – <3 servings [p-value]	<0.01 [0.839]	-0.02 [0.359]	<0.01 [0.949]	
Baseline respondent fruit & vegetable intake (predicted) (N=2741)				
High (N=1407)	0.91 (1278)	0.90 (641)	0.91 (637)	[0.684]
Low (N=1334)	0.91 (1215)	0.91 (602)	0.91 (613)	[0.754]
Difference: high – low [p-value]	<0.01 [0.992]	-0.01 [0.526]	<0.01 [.][a]	
Baseline spending on TFV (N=2741)				
High (N=1346)	0.91 (1220)	0.90 (590)	0.92 (630)	[0.501]
Low (N=1395)	0.91 (1273)	0.91 (653)	0.90 (620)	[.][a]
Difference: high – low [p-value]	0.01 [0.588]	-0.01 [0.559]	0.01 [.][a]	
Attitudes about food, fruits, & vegetables (N=3421)				
High (N=1955)	0.90 (1788)	0.92 (895)	0.90 (893)	[0.247]
Low (N=1466)	0.88 (1288)	0.88 (657)	0.88 (631)	[0.806]
Difference: high – low [p-value]	0.02 [0.144]	0.04 [0.014]**	0.02 [0.266]	
Barriers to eating fruits & vegetables (N=3421)				
High (N=1683)	0.89 (1496)	0.88 (733)	0.89 (763)	[0.810]
Low (N=1738)	0.90 (1580)	0.92 (819)	0.90 (761)	[0.287]
Difference: high – low [p-value]	-0.01 [0.408]	-0.03 [0.063]*	-0.01 [0.579]	
Barriers to grocery shopping (N=3421)				
High (N=1536)	0.89 (1371)	0.89 (675)	0.89 (696)	[0.942]
Low (N=1885)	0.90 (1705)	0.91 (877)	0.90 (828)	[0.411]
Difference: high – low [p-value]	-0.01 [0.468]	-0.02 [0.164]	-0.01 [0.601]	

	Total	Treatment	Control	P-value
Fruits & vegetables at home (N=3421)				
High (N=1489)	0.91 (1353)	0.90 (664)	0.91 (689)	[0.378]
Low (N=1932)	0.88 (1723)	0.90 (888)	0.88 (835)	[0.111]
Difference: high – low [p-value]	0.03 [0.064]*	-0.01 [0.643]	0.03 [0.052]*	
Pre-HIP shopping patterns (N=2219)				
Shopped primarily at HIP participating retailers (N=1332)	0.91 (1214)	0.92 (629)	0.91 (585)	[0.428]
Shopped primarily at non-HIP participating retailers (N=887)	0.90 (795)	0.88 (380)	0.91 (415)	[.][a]
Difference: high – low [p-value]	<0.01 [0.834]	0.04 [0.063]*	>-0.01 [0.965]	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don’t know” responses coded as missing.
Due to rounding, reported differences in proportions across subgroups may differ from differences between proportions for the subgroups.
Test statistics are adjusted for clustering at the individual respondent level.
[a] Test statistics cannot be computed because of stratum with single sampling unit.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit H5.5b: Proportion of Primary Shoppers Who Had Problems with EBT Card or Account in Past Month, by Treatment and Control Status, by Subgroup: Round 2 and 3 Participant Surveys

	Total	Treatment	Control	P-value
Primary shopper employment status (N=3276)				
Working full or part-time (N=643)	0.01 (5)	0.00 (1)	0.01 (4)	[.][a]
Not working (N=2633)	0.04 (93)	0.03 (40)	0.04 (53)	[0.132]
Difference: working – not working [p-value]	-0.03 [0.005]***	-0.03 [0.018]**	-0.03 [0.010]**	
Household composition (N=3423)				
Children (and no elderly) in household (N=1417)	0.03 (35)	0.02 (13)	0.03 (22)	[0.155]
Other household (N=2006)	0.04 (65)	0.03 (29)	0.04 (36)	[0.368]
Difference: children in HH – other HH [p-value]	-0.01 [0.385]	-0.01 [0.191]	-0.01 [0.484]	
Household WIC status (past 30 days) (N=3270)				
Participant (N=595)	0.03 (17)	0.02 (6)	0.03 (11)	[.][a]
Non-participant (N=2675)	0.03 (80)	0.03 (36)	0.03 (44)	[0.256]
Difference: participant – non-participant [p-value]	>-0.01 [0.994]	>-0.01 [0.826]	<0.01 [0.973]	
Household SNAP benefit amount (N=3423)				
$200 or less (N=1935)	0.04 (62)	0.03 (27)	0.04 (35)	[0.269]
Over $200 (N=1488)	0.03 (38)	0.02 (15)	0.03 (23)	[0.258]
Difference: $200 or less – over $200 [p-value]	0.01 [0.328]	0.01 [0.362]	0.01 [0.386]	
Baseline respondent fruit & vegetable intake (screener) (N=3423)				
3+ servings/day (N=1725)	0.03 (48)	0.03 (24)	0.03 (24)	[0.941]
<3 servings/day (N=1698)	0.04 (52)	0.02 (18)	0.04 (34)	[0.035]**
Difference: 3+ servings – <3 servings [p-value]	-0.01 [0.181]	0.01 [0.387]	-0.01 [0.139]	
Baseline respondent fruit & vegetable intake (predicted) (N=2744)				
High (N=1408)	0.03 (40)	0.02 (16)	0.03 (24)	[0.169]
Low (N=1336)	0.04 (40)	0.02 (14)	0.04 (26)	[0.128]
Difference: high – low [p-value]	>-0.01 [0.736]	>-0.01 [0.977]	>-0.01 [.][a]	
Baseline spending on TFV (N=2744)				
High (N=1348)	0.04 (41)	0.02 (14)	0.04 (27)	[0.073]*
Low (N=1396)	0.03 (39)	0.02 (16)	0.04 (23)	[.][a]
Difference: high – low [p-value]	<0.01 [0.865]	>-0.01 [0.726]	<0.01 [.][a]	
Attitudes about food, fruits, & vegetables (N=3423)				
High (N=1954)	0.03 (57)	0.02 (24)	0.03 (33)	[0.351]
Low (N=1469)	0.03 (43)	0.02 (18)	0.04 (25)	[0.205]
Difference: high – low [p-value]	>-0.01 [0.769]	<0.01 [0.808]	>-0.01 [0.733]	
Barriers to eating fruits & vegetables (N=3423)				
High (N=1683)	0.04 (48)	0.02 (17)	0.04 (31)	[0.083]*
Low (N=1740)	0.03 (52)	0.03 (25)	0.03 (27)	[0.739]
Difference: high – low [p-value]	0.01 [0.367]	-0.01 [0.526]	0.01 [0.325]	
Barriers to grocery shopping (N=3423)				
High (N=1541)	0.04 (50)	0.03 (19)	0.04 (31)	[0.220]
Low (N=1882)	0.03 (50)	0.02 (23)	0.03 (27)	[0.362]
Difference: high – low [p-value]	0.01 [0.259]	<0.01 [0.629]	0.01 [0.286]	

	Total	Treatment	Control	P-value
Fruits & vegetables at home (N=3423)				
High (N=1492)	0.02 (31)	0.01 (10)	0.02 (21)	[0.096]*
Low (N=1931)	0.04 (69)	0.03 (32)	0.04 (37)	[0.355]
Difference: high – low [p-value]	-0.02 [0.039]**	-0.02 [0.011]**	-0.02 [0.074]*	
Pre-HIP shopping patterns (N=2219)				
Shopped primarily at HIP participating retailers (N=1336)	0.03 (39)	0.03 (17)	0.03 (22)	[0.692]*
Shopped primarily at non-HIP participating retailers (N=883)	0.03 (25)	0.01 (8)	0.04 (17)	[.][a]
Difference: high – low [p-value]	>-0.01 [0.853]	0.01 [0.150]	>-0.01 [0.742]	

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" responses coded as missing.
Due to rounding, reported differences in proportions across subgroups may differ from differences between proportions for the subgroups.
Test statistics are adjusted for clustering at the individual respondent level.
[a] Test statistics cannot be computed because of stratum with single sampling unit.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit H5.6: Proportion of Primary Shoppers Who Would Like to Keep Participating in HIP, by Subgroup: Round & 3 Participant Surveys, HIP Participants

	Proportion (N)
Primary shopper employment status (N=1550)	
Working full or part-time (N=283)	0.96 (270)
Not working (N=1267)	0.95 (1206)
Difference: working – not working [p-value]	0.01 [0.371]
Household composition (N=1603)	
Children (and no elderly) in household (N=648)	0.95 (622)
Other household (N=955)	0.95 (901)
Difference: children in HH – other HH [p-value]	<0.01 [0.714]
Household WIC status (past 30 days) (N=1547)	
Participant (N=283)	0.96 (275)
Non-participant (N=1264)	0.95 (1197)
Difference: participant – non-participant [p-value]	0.02 [0.289]
Household SNAP benefit amount (N=1603)	
$200 or less (N=926)	0.95 (876)
Over $200 (N=677)	0.95 (647)
Difference: $200 or less – over $200 [p-value]	>-0.01 [0.851]
Baseline respondent fruit & vegetable intake (screener) (N=1603)	
3+ servings/day (N=806)	0.96 (777)
<3 servings/day (N=797)	0.93 (746)
Difference: 3+ servings – <3 servings [p-value]	0.03 [0.022]**
Baseline respondent fruit & vegetable intake (predicted) (N=1286)	
High (N=671)	0.96 (647)
Low (N=615)	0.95 (584)
Difference: high – low [p-value]	0.01 [0.382]
Baseline spending on TFV (N=1286)	
High (N=626)	0.96 (607)
Low (N=660)	0.95 (624)
Difference: high – low [p-value]	0.01 [0.305]
Attitudes about food, fruits, & vegetables (N=1603)	
High (N=911)	0.95 (873)
Low (N=692)	0.94 (650)
Difference: high – low [p-value]	0.01 [0.315]
Barriers to eating fruits & vegetables (N=1603)	
High (N=760)	0.95 (720)
Low (N=843)	0.95 (803)
Difference: high – low [p-value]	>-0.01 [0.980]
Barriers to grocery shopping (N=1603)	
High (N=709)	0.95 (678)
Low (N=894)	0.94 (845)
Difference: high – low [p-value]	0.01 [0.512]
Fruits & vegetables at home (N=1603)	
High (N=691)	0.95 (660)
Low (N=912)	0.95 (863)
Difference: high – low [p-value]	<0.01 [0.724]

	Proportion (N)
Pre-HIP shopping patterns (N=1030)	
Shopped primarily at HIP participating retailers (N=636)	0.97 (618)
Shopped primarily at non-HIP participating retailers (N=394)	0.94 (369)
Difference: HIP shoppers - non-HIP-shoppers [P-value]	0.03 [0.021]**

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don’t know” and “refused” responses coded as missing.
Due to rounding, reported differences in proportions across subgroups may differ from differences between proportions for the subgroups.
Test statistics are adjusted for clustering at the individual respondent level.
Includes participants who reported they had not heard of HIP.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit H6.1: Descriptive Results for EBT Analysis of Subgroups: Unweighted Percentage of All Households

	Round 2			Round 3		
	HIP (%)	Non-HIP (%)	Total (N)	HIP (%)	Non-HIP (%)	Total (N)
Monthly SNAP benefit						
$1-$160	26.7	25.9	60,593	26.7	25.9	35,014
$161–$200	37.3	37.8	87,904	37.1	37.5	50,435
$201–$349	11.0	10.6	24,794	11.2	10.6	14,353
$350 +	25.0	25.6	59,437	25.0	26.0	34,764
Primary language						
Other primary language	73.3	73.5	170,930	73.3	73.4	98,739
Spanish primary language	26.7	26.5	61,798	26.7	26.6	35,827
Monthly income						
$0	21.8	22.1	51,408	21.4	21.8	29,257
$1–$787	27.3	26.4	61,674	27.4	26.5	35,847
$788–$1,083	27.2	27.1	63,171	27.5	27.4	36,894
$1,084 +	23.7	24.4	56,475	23.7	24.3	32,568
Household head age						
16–30	26.1	25.8	60,191	26.0	25.7	34,659
31–40	21.3	20.7	48,305	21.4	20.6	27,918
41–54	26.3	27.1	62,727	26.3	27.1	36,387
55 +	26.4	26.4	61,505	26.2	26.5	35,602
Household head race/ethnicity						
Hispanic	44.6	44.1	102,739	44.5	44.3	59,661
White	35.5	36.4	84,425	35.6	36.2	48,605
Black	13.1	12.8	29,777	13.1	12.8	17,233
Other	6.8	6.8	15,787	6.8	6.7	9,067
Disability status						
Not Disabled	46.3	46.7	108,635	45.9	46.3	62,213
Disabled	53.7	53.3	124,093	54.1	53.7	72,353
Household composition						
Household with children (no elderly)	36.4	36.2	84,301	36.6	36.5	49,148
Household with elderly (with or without children)	13.1	13.5	31,267	12.9	13.5	18,049
Other household	50.5	50.3	117,160	50.4	50.0	67,369
Location						
Springfield	53.2	52.9	123,122	52.9	53.0	71,343
Chicopee & Holyoke	24.8	24.9	57,971	25.2	24.9	33,603
Other	22.0	22.2	51,635	22.0	22.0	29,620
Household Size and Headship						
HH Size 2+ male head	4.9	5.0	11,551	4.7	4.9	6,534
HH Size 2+ female head	40.0	40.2	93,409	40.4	40.6	54,549
HH Size 1 male head	26.7	26.7	62,083	26.5	26.3	35,427
HH Size 1 female head	28.4	28.2	65,685	28.4	28.3	38,056

Source: 2011 case file data merged with EBT Transaction Data pooled across March-October 2012 (average of 45,912 households per month).

Exhibit H6.2: Differences in Impacts of SNAP Purchases and Eligible TFV Purchases at Supermarkets and Superstores by HIP Status and Subgroup, March to October 2012

	SNAP purchases at participating supermarkets and superstores ($)				TFV purchases at participating supermarkets and superstores ($)				TFV purchases as a percent of SNAP purchases at participating supermarkets and superstores (%)			
	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts
Monthly SNAP benefit												
$1–$160	97.74 (1.59)	94.64 (0.88)	3.10 (0.043)**		9.67 (0.25)	8.37 (0.11)	1.29 (<0.001)***		10.97 (0.27)	9.88 (0.10)	1.10 (<0.001)	
$161–$200	115.63 (1.39)	113.95 (0.78)	1.682 (0.205)		11.43 (0.23)	10.44 (0.10)	0.99 (<0.001)***		9.93 (0.20)	9.18 (0.08)	0.75 (<0.001)	
$201–$349	135.63 (3.68)	126.20 (1.53)	9.43 (0.015)**		13.21 (0.50)	11.28 (0.19)	1.93 (<0.001)***		9.66 (0.28)	8.99 (0.13)	0.67 (0.020)	
$350 +	167.86 (3.19)	160.51 (1.43)	7.36 (0.026)**		14.86 (0.38)	13.83 (0.18)	1.03 (0.008)***		9.44 (0.18)	9.10 (0.11)	0.34 (0.029)	
P-value for difference				0.139				0.375				0.089*
Primary language												
Other primary language	129.54 (1.28)	124.39 (0.51)	5.14 (<0.001)***		11.16 (0.16)	10.10 (0.06)	1.06 (<.001)***		9.21 (0.12)	8.61 (0.05)	0.60 (<0.001)	
Spanish primary language	118.14 (1.95)	116.03 (0.86)	2.11 (0.300)		14.49 (0.34)	12.95 (0.13)	1.54 (<0.001)***		12.30 (0.25)	11.30 (0.10)	0.99 (<0.001)	
P-value for difference				0.215				0.223				0.178
Monthly income												
$0	132.26 (2.46)	127.92 (1.08)	4.33 (0.089)*		12.09 (0.31)	11.03 (0.14)	1.05 (0.001)***		9.80 (0.20)	9.09 (0.08)	0.71 (<0.001)	
$1–$787	131.76 (1.97)	129.28 (0.85)	2.48 (0.232)		12.14 (0.28)	11.27 (0.11)	0.88 (0.003)***		9.52 (0.20)	9.05 (0.07)	0.47 (0.025)	
$788–$1,083	137.10 (1.74)	130.59 (0.79)	6.51 (<0.001)***		12.45 (0.26)	11.43 (0.11)	1.01 (<0.001)***		9.33 (0.22)	8.854 (0.08)	0.48 (0.046)	
$1,084 +	103.67 (2.56)	99.71 (1.09)	3.96 (0.145)		11.46 (0.36)	9.61 (0.14)	1.86 (<0.001)***		11.61 (0.24)	10.37 (0.10)	1.24 (<0.001)	
P-value for difference				0.521				0.185				0.0872*

	SNAP purchases at participating supermarkets and superstores ($)				TFV purchases at participating supermarkets and superstores ($)				TFV purchases as a percent of SNAP purchases at participating supermarkets and superstores (%)			
	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts
Household head age												
16–30	131.71 (2.33)	129.62 (0.97)	2.08 (0.403)		10.51 (0.26)	9.53 (0.11)	0.97 (<0.001)***		8.15 (0.15)	7.59 (0.07)	0.56 (<0.001)***	
31–40	126.62 (2.87)	119.14 (1.05)	7.48 (0.016)**		10.99 (0.35)	9.85 (0.13)	1.13 (0.002)***		8.78 (0.21)	8.29 (0.08)	0.49 (0.020)**	
41–54	119.87 (1.84)	117.46 (0.78)	2.41 (0.213)		11.81 (0.27)	11.20 (0.11)	0.61 (0.033)**		9.83 (0.21)	9.52 (0.08)	0.31 (0.144)	
55 +	128.03 (1.59)	122.07 (0.84)	5.96 (<0.001)***		14.61 (0.32)	12.60 (0.13)	2.01 (<0.001)***		13.11 (0.30)	11.62 (0.12)	1.48 (<0.001)***	
P-value for difference				0.270				0.012**				0.020**
Household head race/ethnicity												
Hispanic	136.07 (1.70)	133.34 (0.68)	2.72 (0.127)		11.59 (0.20)	10.85 (0.08)	0.75 (<0.001)***		8.99 (0.14)	8.54 (0.06)	0.45 (0.002)***	
White	121.9 (1.76)	114.94 (0.78)	6.96 (<0.001)***		12.43 (0.27)	10.64 (0.10)	1.79 (<0.001)***		10.71 (0.21)	9.84 (0.08)	0.87 (<0.001)***	
Black	112.85 (2.74)	111.95 (1.19)	0.91 (0.758)		11.27 (0.34)	10.78 (0.16)	0.49 (0.174)		9.854 (0.28)	9.16 (0.10)	0.70 (0.016)**	
Other	114.89 (3.69)	107.21 (1.49)	7.68 (0.052)*		14.51 (0.72)	12.30 (0.30)	2.21 (0.005)***		13.78 (0.65)	11.98 (0.06)	1.80 (0.009)***	
P-value for difference				0.177				0.004***				0.121
Disability status												
Not disabled	133.15 (1.83)	127.87 (0.69)	5.28 (0.007)***		12.97 (0.24)	11.52 (0.09)	1.45 (<0.001)***		10.27 (0.15)	9.50 (0.06)	0.78 (<0.001)***	
Disabled	120.74 (1.24)	117.21 (0.59)	3.53 (0.005)***		11.25 (0.18)	10.29 (0.08)	0.96 (<0.001)***		9.82 (0.16)	9.17 (0.06)	0.65 (<0.001) ***	
P-value for difference				0.453				0.128				0.586

	SNAP purchases at participating supermarkets and superstores ($)				TFV purchases at participating supermarkets and superstores ($)				TFV purchases as a percent of SNAP purchases at participating supermarkets and superstores (%)			
	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts
Household composition												
Household with children (no elderly)	126.14 (2.53)	118.08 (1.23)	8.06 (0.002)***		11.54 (0.31)	10.18 (0.16)	1.36 (<0.001)***		9.55 (0.16)	9.01 (0.11)	0.53 (<0.001)***	
Household with elderly (with or without children)	127.92 (2.14)	124.36 (1.15)	3.57 (0.085)*		14.14 (0.49)	12.12 (0.20)	2.02 (<0.001)***		13.46 (0.49)	11.68 (0.19)	1.78 (<0.001)***	
Other household	126.39 (1.26)	124.55 (0.79)	1.84 (0.106)		11.86 (0.19)	11.02 (0.11)	0.84 (<0.001)***		9.51 (0.17)	8.92 (0.07)	0.60 (<0.001)***	
P-value for difference				0.082*				0.044**				0.060*
Location												
Springfield	122.50 (1.44)	121.01 (0.58)	1.49 (0.33)		11.49 (0.19)	10.60 (0.07)	0.89 (<0.001)***		10.08 (0.14)	9.39 (0.05)	0.69 (<0.001)***	
Chicopee & Holyoke	137.19 (2.19)	130.3 (0.82)	6.89 (0.003)***		12.00 (0.28)	10.98 (0.11)	1.01 (<0.001)***		8.70 (0.19)	8.263 (0.07)	0.44 (0.032)**	
Other	124.09 (2.23)	115.78 (0.96)	8.31 (0.001)***		13.44 (0.39)	11.34 (0.14)	2.10 (<0.001)***		11.47 (0.29)	10.35 (0.10)	1.12 (<0.001)***	
P-value for difference				0.025**				0.025**				0.182
Household size and headship												
HH Size 2+ male head	127.25 (6.09)	117.37 (2.49)	9.87 (0.131)		16.43 (1.04)	14.02 (0.41)	2.41 (0.032)**		12.51 (0.66)	11.01 (0.23)	1.50 (0.029)**	
HH Size 2+ female head	141.32 (2.51)	136.20 (1.32)	5.12 (0.040)**		12.80 (0.29)	11.74 (0.16)	1.06 (<0.001)***		9.79 (0.16)	9.34 (0.12)	0.45 (<0.001)***	
HH Size 1 male head	107.17 (1.62)	104.52 (1.04)	2.64 (0.066)*		9.91 (0.25)	8.87 (0.14)	1.04 (<0.001)***		9.16 (0.25)	8.32 (0.11)	0.84 (<0.001)***	
HH Size 1 female head	121.24 (1.58)	119.93 (1.03)	1.31 (0.351)		12.03 (0.28)	10.95 (0.14)	1.07 (<0.001) ***		10.78 (0.26)	9.92 (0.12)	0.86 (0.001)***	
P-value for difference				0.374				0.697				0.172

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the household level.
Source: EBT Transaction Data, pooled across March-October 2012 merged with July 2011 case file data (average of 45,912 households per month).

Exhibit H6.3a: Differences in Impacts of HIP on Self-Reported Monthly SNAP Expenditures, by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE) ($)	Regression-adjusted control mean (SE) ($)	Treatment-control impact (P-value) ($)	Difference in impacts (P-value) ($)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	279.70 (7.53)	274.77 (5.49)	4.93 (0.569)	
<3 servings/day	270.72 (7.03)	279.14 (6.86)	-8.43 (0.297)	
Impact: 3+ servings – <3 servings				13.36 (0.261)
Attitudes about food, fruits, & vegetables				
High	279.29 (6.78)	276.43 (5.51)	2.86 (0.708)	
Low	269.76 (7.68)	277.43 (7.79)	-7.67 (0.398)	
Impact: high – low				10.53 (0.370)
Fruits & vegetables at home				
Frequently	271.86 (8.80)	266.38 (7.77)	5.48 (0.584)	
Infrequently	278.60 (6.71)	286.21 (6.64)	-7.60 (0.288)	
Impact: freq. – infreq.				13.08 (0.293)
Pre-HIP shopping patterns (N=2042 interviews from 1218 respondents)[a]				
Shopped primarily at HIP participating retailers	261.62 (6.58)	259.77 (5.31)	1.86 (0.836)	
Shopped primarily at non-HIP participating retailers	283.87 (10.12)	276.13 (7.45)	7.74 (0.524)	
Impact: HIP shoppers – non-HIP-shoppers				-5.88 (0.694)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Continuous outcomes: self-reported expenses in dollars per month; "don't know" and "refused" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,131 interviews over 1,836 respondents).

Exhibit H6.3b: Differences in Impacts of HIP on Self-Reported Monthly Expenditures on Groceries, by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE) ($)	Regression-adjusted control mean (SE) ($)	Treatment-control impact (P-value) ($)	Difference in impacts (P-value) ($)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	144.13 (6.15)	147.69 (6.42)	-3.56 (0.645)	
<3 servings/day	154.15 (7.18)	148.94 (6.96)	5.21 (0.480)	
Impact: 3+ servings – <3 servings				-8.77 (0.414)
Attitudes about food, fruits, & vegetables				
High	146.89 (6.31)	144.57 (6.58)	2.32 (0.750)	
Low	151.85 (6.98)	153.45 (7.41)	-1.61 (0.839)	
Impact: high – low				3.92 (0.717)
Fruits & vegetables at home				
Frequently	147.19 (7.43)	147.91 (6.75)	-0.72 (0.932)	
Infrequently	150.64 (6.42)	148.63 (6.24)	2.01 (0.768)	
Impact: freq. – infreq.				-2.73 (0.802)
Pre-HIP shopping patterns (N=1982 interviews from 1196 respondents)[a]				
Shopped primarily at HIP participating retailers	145.73 (5.66)	138.73 (5.26)	7.00 (0.359)	
Shopped primarily at non-HIP participating retailers	149.17 (8.18)	145.97 (7.78)	3.21 (0.773)	
Impact: HIP shoppers – non-HIP-shoppers				3.79 (0.782)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Continuous outcomes: self-reported expenses in dollars per month; “don't know” and “refused” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,051 interviews over 1,803 respondents).

Exhibit H6.3c: Differences in Impacts of HIP on Self-Reported Monthly Expenditures on Groceries, Food Items, by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE) ($)	Regression-adjusted control mean (SE) ($)	Treatment-control impact (P-value) ($)	Difference in impacts (P-value) ($)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	101.46 (4.81)	107.55 (5.39)	-6.09 (0.355)	
<3 servings/day	109.52 (5.39)	106.20 (5.04)	3.32 (0.613)	
Impact: 3+ servings – <3 servings				-9.41 (0.321)
Attitudes about food, fruits, & vegetables				
High	102.83 (5.35)	104.34 (5.64)	-1.51 (0.807)	
Low	109.05 (6.11)	110.51 (6.54)	-1.46 (0.837)	
Impact: high – low				-0.05 (0.996)
Fruits & vegetables at home				
Frequently	107.50 (6.47)	105.03 (6.06)	2.47 (0.726)	
Infrequently	104.08 (5.56)	108.59 (5.36)	-4.51 (0.448)	
Impact: freq. – infreq.				6.98 (0.449)
Pre-HIP shopping patterns (N=1915 interviews from 1166 respondents)[a]				
Shopped primarily at HIP participating retailers	102.04 (5.07)	99.77 (4.91)	2.27 (0.743)	
Shopped primarily at non-HIP participating retailers	101.52 (7.18)	106.64 (7.26)	-5.12 (0.604)	
Impact: HIP shoppers – non-HIP-shoppers				7.39 (0.546)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Continuous outcomes: self-reported expenses in dollars per month; “don't know” and “refused” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=2,949 interviews over 1,758 respondents) .

Exhibit H6.3d: Differences in Impacts of HIP on Self-Reported Monthly Expenditures on Groceries, Non-Food Items, by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE) ($)	Regression-adjusted control mean (SE) ($)	Treatment-control impact (P-value) ($)	Difference in impacts (P-value) ($)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	44.14 (2.65)	42.91 (2.70)	1.24 (0.719)	
<3 servings/day	42.29 (2.48)	39.45 (2.39)	2.84 (0.342)	
Impact: 3+ servings – <3 servings				-1.61 (0.722)
Attitudes about food, fruits, & vegetables				
High	42.07 (2.55)	39.16 (2.33)	2.91 (0.338)	
Low	44.93 (3.01)	44.22 (3.57)	0.71 (0.847)	
Impact: high – low				2.20 (0.649)
Fruits & vegetables at home				
Frequently	42.16 (3.27)	44.01 (2.80)	-1.85 (0.614)	
Infrequently	44.01 (2.56)	38.81 (2.48)	5.20 (0.064)*	
Impact: freq. – infreq.				-7.05 (0.123)
Pre-HIP shopping patterns (N=1915 interviews from 1166 respondents)[a]				
Shopped primarily at HIP participating retailers	42.73 (2.55)	39.67 (2.26)	3.07 (0.361)	
Shopped primarily at non-HIP participating retailers	47.62 (3.62)	41.73 (3.25)	5.89 (0.212)	
Impact: HIP shoppers – non-HIP-shoppers				-2.83 (0.633)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Continuous outcomes: self-reported expenses in dollars per month; "don't know" and "refused" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=2,949 interviews over 1,758 respondents).

Exhibit H6.3e: Differences in Impacts of HIP on Self-Reported Monthly Restaurant Expenditures, by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	32.09 (1.97)	36.16 (2.41)	-4.07 (0.144)	
<3 servings/day	38.43 (2.03)	37.12 (2.44)	1.31 (0.646)	
Impact: 3+ servings – <3 servings				-5.38 (0.179)
Attitudes about food, fruits, & vegetables				
High	33.53 (2.03)	35.70 (2.17)	-2.17 (0.380)	
Low	37.36 (2.77)	37.93 (3.21)	-0.56 (0.863)	
Impact: high – low				-1.61 (0.691)
Fruits & vegetables at home				
Frequently	32.60 (2.64)	36.77 (2.99)	-4.18 (0.156)	
Infrequently	37.31 (2.56)	36.49 (2.73)	0.82 (0.783)	
Impact: freq. – infreq.				-5.00 (0.262)
Pre-HIP shopping patterns (N=1197 interviews from 1203 respondents)[a]				
Shopped primarily at HIP participating retailers	32.14 (2.18)	36.40 (2.20)	-4.26 (0.174)	
Shopped primarily at non-HIP participating retailers	35.86 (2.72)	36.34 (3.12)	-0.48 (0.900)	
Impact: HIP shoppers – non-HIP-shoppers				-3.78 (0.422)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Continuous outcomes: self-reported expenses in dollars per month; “don't know” and “refused” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,088 interviews over 1,821 respondents).

Exhibit H6.3f: Differences in Impacts of HIP on Self-Reported Monthly Fruit & Vegetable Expenditures, by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE) ($)	Regression-adjusted control mean (SE) ($)	Treatment-control impact (P-value) ($)	Difference in impacts (P-value) ($)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	76.38 (3.38)	68.28 (3.37)	8.10 (0.049)**	
<3 servings/day	80.43 (3.44)	76.32 (3.74)	4.11 (0.251)	
Impact: 3+ servings – <3 servings				3.99 (0.471)
Attitudes about food, fruits, & vegetables				
High	78.27 (3.08)	72.57 (3.37)	5.70 (0.119)	
Low	78.00 (3.72)	71.21 (3.61)	6.79 (0.094)*	
Impact: high – low				-1.09 (0.844)
Fruits & vegetables at home				
Frequently	76.77 (3.85)	72.71 (3.60)	4.06 (0.365)	
Infrequently	79.27 (3.32)	71.37 (3.26)	7.90 (0.022)**	
Impact: Freq. - Infreq.				-3.84 (0.509)
Pre-HIP shopping patterns (N=1774 interviews from 1087 respondents)[a]				
Shopped primarily at HIP participating retailers	71.80 (3.30)	69.37 (2.72)	2.42 (0.577)	
Shopped primarily at non-HIP participating retailers	78.25 (3.62)	72.72 (4.26)	5.53 (0.305)	
Impact: HIP shoppers – non-HIP-shoppers				-3.10 (0.648)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Continuous outcomes: self-reported expenses in dollars per month; “don't know” and “refused” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=2,708 interviews over 1,651 respondents).

Exhibit H6.4: Differences in Impacts of SNAP Purchases by HIP Status, Retailer Type, and Subgroup, March to October 2012

	SNAP purchases at all retailers ($)				SNAP purchases at participating retailers ($)				SNAP purchases at non-participating retailers ($)			
	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts
Monthly SNAP benefit												
$1–$160	205.45 (2.07)	202.19 (1.17)	3.26 (0.097)		106.89 (1.63)	103.20 (0.90)	3.69 (0.018)		98.56 (1.60)	98.99 (0.94)	-0.44 (0.775)	
$161–$200	244.63 (1.33)	243.32 (0.97)	1.30 (0.231)		124.78 (1.38)	123.31 (0.79)	1.47 (0.264)		119.85 (1.37)	120.01 (0.81)	-0.16 (0.902)	
$201–$349	273.72 (4.43)	264.13 (1.92)	9.59 (0.039)		146.28 (3.70)	136.02 (1.55)	10.26 (0.008)		127.44 (3.61)	128.11 (1.54)	-0.67 (0.860)	
$350 +	348.25 (3.28)	340.72 (1.73)	7.54 (0.020)		180.81 (3.22)	173.81 (1.46)	6.99 (0.036)		167.45 (3.18)	166.90 (1.49)	0.54 (0.868)	
P-value for difference				0.106				0.092*				0.993
Primary language												
Other primary language	265.41 (1.29)	260.57 (0.53)	4.85 (<0.001)		138.87 (1.28)	134.02 (0.51)	4.85 (<0.001)		126.54 (1.24)	126.55 (0.51)	-0.01 (0.998)	
Spanish primary language	260.52 (2.14)	257.72 (0.95)	2.80 (0.211)		131.07 (1.98)	127.86 (0.88)	3.21 (0.120)		129.45 (2.01)	129.87 (0.92)	-0.42 (0.842)	
P-value for difference				0.434				0.508				0.867
Monthly income												
$0	289.27 (2.21)	287.70 (1.50)	1.57 (0.485)		146.28 (2.47)	141.72 (1.10)	4.56 (0.075)		142.99 (2.42)	145.98 (1.15)	-2.99 (0.234)	
$1–$787	281.09 (1.79)	275.49 (0.82)	5.59 (0.003)		143.2 (1.96)	140.48 (0.86)	2.72 (0.189)		137.88 (1.94)	135.02 (0.87)	2.87 (0.162)	
$788–$1,083	275.93 (1.49)	272.40 (0.74)	3.53 (0.019)		147.03 (1.75)	140.89 (0.78)	6.13 (0.001)		128.90 (1.60)	131.51 (0.79)	-2.60 (0.114)	
$1,084 +	209.42 (3.28)	203.23 (1.29)	6.19 (0.077)		109.73 (2.62)	105.5 (1.109)	4.23 (0.126)		99.69 (2.64)	97.73 (1.14)	1.96 (0.481)	
P-value for difference				0.499				0.664				0.108

	SNAP purchases at all retailers ($)				SNAP purchases at participating retailers ($)				SNAP purchases at non-participating retailers ($)			
	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts
Household head age												
16–30	277.77 (2.35)	274.99 (1.00)	2.79 (0.267)		144.26 (2.36)	141.47 (0.97)	2.78 (0.269)		133.52 (2.27)	133.52 (0.98)	<0.01 (0.999)	
31–40	261.60 (3.15)	255.40 (1.15)	6.20 (0.069)		136.27 (2.89)	128.82 (1.06)	7.46 (0.017)		125.33 (2.84)	126.59 (1.09)	-1.26 (0.684)	
41–54	257.24 (1.92)	253.26 (0.83)	3.98 (0.050)		129.91 (1.85)	127.54 (0.78)	2.37 (0.225)		127.34 (1.83)	125.73 (0.80)	1.61 (0.406)	
55 +	259.72 (1.39)	255.14 (0.83)	4.58 (0.001)		136.87 (1.57)	131.26 (0.84)	5.62 (<0.001)		122.85 (1.56)	123.88 (0.87)	-1.03 (0.495)	
P-value for difference				0.863				0.379				0.730
Household head race/ethnicity												
Hispanic	261.64 (1.80)	257.74 (0.72)	3.89 (0.040)		148.58 (1.70)	145.75 (0.69)	2.82 (0.114)		113.06 (1.59)	111.99 (0.67)	1.07 (0.522)	
White	266.78 (1.73)	259.99 (0.78)	6.79 (<0.001)		128.19 (1.76)	121.66 (0.79)	6.52 (<0.001)		138.60 (1.76)	138.33 (0.81)	0.27 (0.886)	
Black	262.66 (2.92)	261.96 (1.31)	0.70 (0.824)		126.28 (2.80)	124.67 (1.20)	1.61 (0.589)		136.38 (2.95)	137.30 (1.25)	-0.92 (0.771)	
Other	269.12 (3.42)	268.31 (1.46)	0.82 (0.825)		126.11 (3.78)	117.02 (1.55)	9.09 (0.025)		143.01 (4.07)	151.28 (1.79)	-8.27 (0.061)	
P-value for difference				0.246				0.232				0.260
Disability status												
Not disabled	273.58 (1.92)	267.81 (0.74)	5.77 (0.005)		142.96 (1.85)	137.37 (0.70)	5.59 (0.005)		130.62 (1.80)	130.44 (0.71)	0.18 (0.926)	
Disabled	255.9 (1.24)	252.86 (0.62)	3.04 (0.015)		131.45 (1.24)	128.05 (0.60)	3.41 (0.007)		124.44 (1.22)	124.81 (0.61)	-0.36 (0.769)	
P-value for difference				0.259				0.353				0.813
Household composition												
Household with children (no elderly)	250.33 (2.76)	242.49 (1.43)	7.84 (0.005)		135.42 (2.55)	127.27 (1.25)	8.15 (0.002)		114.91 (2.47)	115.22 (1.28)	-0.31 (0.901)	
Household with elderly (with or without children)	269.63 (1.91)	264.40 (1.16)	5.22 (0.004)		137.86 (2.11)	134.23 (1.16)	3.63 (0.075)		131.76 (2.13)	130.17 (1.20)	1.59 (0.439)	
Other household	272.62 (1.29)	271.12 (0.89)	1.50 (0.161)		137.50 (1.27)	135.59 (0.80)	1.91 (0.094)		135.11 (1.31)	135.53 (0.83)	-0.41 (0.721)	
P-value for difference				0.037**				0.084*				0.690

	SNAP purchases at all retailers ($)				SNAP purchases at participating retailers ($)				SNAP purchases at non-participating retailers ($)			
	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	P-value for difference in impacts
Location												
Springfield	262.35 (1.52)	260.75 (0.61)	1.60 (0.325)		130.58 (1.46)	129.18 (0.59)	1.40 (0.366)		131.76 (1.45)	131.57 (0.60)	0.20 (0.900)	
Chicopee & Holyoke	266.79 (2.13)	259.79 (0.85)	7.00 (0.002)		152.43 (2.19)	145.87 (0.83)	6.56 (0.005)		114.37 (1.92)	113.92 (0.80)	0.45 (0.829)	
Other	265.34 (2.31)	257.60 (0.99)	7.74 (0.002)		134.08 (2.24)	124.85 (0.97)	9.23 (<0.001)		131.25 (2.34)	132.74 (1.02)	-1.49 (0.553)	
P-value for difference				0.047**				0.013**				0.814
Household size and headship												
HH Size 2+ male head	276.66 (7.98)	282.45 (3.60)	-5.78 (0.507)		139.90 (6.33)	130.99 (2.63)	9.00 (0.187)		136.77 (6.63)	151.55 (2.95)	-14.78 (0.042)	
HH Size 2+ female head	283.28 (3.37)	278.79 (1.93)	4.48 (0.161)		150.63 (2.57)	145.46 (1.35)	5.17 (0.042)		132.65 (2.59)	133.33 (1.42)	-0.68 (0.787)	
HH Size 1 male head	240.09 (1.78)	237.82 (1.42)	2.27 (0.066)		119.07 (1.62)	115.96 (1.06)	3.11 (0.028)		121.01 (1.65)	121.86 (1.12)	-0.85 (0.549)	
HH Size 1 female head	251.82 (1.74)	250.31 (1.40)	1.51 (0.227)		130.76 (1.58)	129.82 (1.05)	0.94 (0.497)		121.05 (1.64)	120.49 (1.10)	0.57 (0.690)	
P-value for difference				0.659				0.324				0.213

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the household level.
Source: EBT Transaction Data, pooled across March-October 2012 merged with July 2011 case file data (average of 45,912 households per month).

Exhibit H6.5a: Differences in Impacts of HIP on Usual Grocery Store Type (Large Chain Grocery Store or Supermarket), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.813 (0.017)	0.820 (0.016)	-0.007 (0.735)	
<3 servings/day	0.817 (0.018)	0.812 (0.017)	0.005 (0.808)	
Impact: 3+ servings – <3 servings				-0.012 (0.682)
Attitudes about food, fruits, & vegetables				
High	0.825 (0.017)	0.826 (0.017)	-0.001 (0.972)	
Low	0.802 (0.022)	0.803 (0.022)	>-0.001 (0.995)	
Impact: high – low				-0.001 (0.986)
Fruits & vegetables at home				
Frequently	0.839 (0.020)	0.817 (0.020)	0.022 (0.326)	
Infrequently	0.796 (0.019)	0.816 (0.019)	-0.019 (0.352)	
Impact: freq. – infreq.				0.041 (0.177)
Pre-HIP shopping patterns (N=2137 interviews from 1262 respondents)[a]				
Shopped primarily at HIP participating retailers	0.840 (0.016)	0.842 (0.015)	-0.001 (0.963)	
Shopped primarily at non-HIP participating retailers	0.801 (0.023)	0.793 (0.022)	0.009 (0.779)	
Impact: HIP shoppers – non-HIP-shoppers				-0.010 (0.801)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,298 interviews over 1,912 respondents).

Exhibit H6.5b: Differences in Impacts of HIP on Usual Grocery Store Type (Natural or Organic Supermarket (such as Whole Foods Market), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.002 (0.002)	0.005 (0.003)	-0.004 (0.244)	
<3 servings/day	0.011 (0.004)	0.004 (0.004)	0.007 (0.158)	
Impact: 3+ servings – <3 servings				-0.010 (0.088)*
Attitudes about food, fruits, & vegetables				
High	0.004 (0.003)	0.004 (0.002)	<0.001 (0.915)	
Low	0.009 (0.004)	0.006 (0.004)	0.003 (0.543)	
Impact: high – low				-0.003 (0.673)
Fruits & vegetables at home				
Frequently	0.005 (0.004)	0.008 (0.004)	-0.003 (0.496)	
Infrequently	0.008 (0.003)	0.002 (0.002)	0.005 (0.105)	
Impact: freq. – infreq.				-0.009 (0.152)
Pre-HIP shopping patterns (N=2137 interviews from 1262 respondents)[a]				
Shopped primarily at HIP participating retailers	0.007 (0.003)	0.002 (0.002)	0.004 (0.236)	
Shopped primarily at non-HIP participating retailers	0.009 (0.005)	0.006 (0.005)	0.003 (0.656)	
Impact: HIP shoppers – non-HIP-shoppers				0.001 (0.873)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,298 interviews over 1,912 respondents).

Exhibit H6.5c: Differences in Impacts of HIP on Usual Grocery Store Type (Small Local Store or Corner Store), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.027 (0.006)	0.029 (0.007)	-0.002 (0.806)	
<3 servings/day	0.017 (0.007)	0.022 (0.007)	-0.005 (0.565)	
Impact: 3+ servings – <3 servings				0.003 (0.806)
Attitudes about food, fruits, & vegetables				
High	0.023 (0.008)	0.021 (0.008)	0.002 (0.797)	
Low	0.021 (0.011)	0.032 (0.010)	-0.011 (0.293)	
Impact: high – low				0.013 (0.316)
Fruits & vegetables at home				
Frequently	0.019 (0.008)	0.020 (0.008)	-0.001 (0.931)	
Infrequently	0.025 (0.007)	0.031 (0.009)	-0.006 (0.505)	
Impact: freq. – infreq.				0.005 (0.657)
Pre-HIP shopping patterns (N=2137 interviews from 1262 respondents)[a]				
Shopped primarily at HIP participating retailers	0.029 (0.007)	0.018 (0.005)	0.011 (0.181)	
Shopped primarily at non-HIP participating retailers	0.020 (0.009)	0.041 (0.009)	-0.021 (0.113)	
Impact: HIP shoppers – non-HIP-shoppers				0.031 (0.049)**

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,298 interviews over 1,912 respondents).

Exhibit H6.5d: Differences in Impacts of HIP on Usual Grocery Store Type (Convenience Store (such as 7-11 or mini market), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.002 (0.002)	<0.001 (0.001)	0.002 (0.260)	
<3 servings/day	0.002 (0.001)	0.003 (0.002)	-0.001 (0.740)	
Impact: 3+ servings – <3 servings				0.003 (0.375)
Attitudes about food, fruits, & vegetables				
High	0.002 (0.002)	<0.001 (0.001)	0.002 (0.238)	
Low	0.002 (0.002)	0.003 (0.002)	-0.001 (0.693)	
Impact: high – low				0.003 (0.390)
Fruits & vegetables at home				
Frequently	0.002 (0.001)	0.002 (0.001)	<0.001 (0.983)	
Infrequently	0.002 (0.002)	0.001 (0.002)	0.001 (0.676)	
Impact: freq. – infreq.				-0.001 (0.676)
Pre-HIP shopping patterns (N=2137 interviews from 1262 respondents)[a]				
Shopped primarily at HIP participating retailers	0.001 (0.001)	0.001 (0.001)	>-0.001 (0.893)	
Shopped primarily at non-HIP participating retailers	0.002 (0.003)	0.003 (0.003)	-0.001 (0.752)	
Impact: HIP shoppers – non-HIP-shoppers				0.001 (0.769)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,298 interviews over 1,912 respondents).

Exhibit H6.5e: Differences in Impacts of HIP on Usual Grocery Store Type (Warehouse Club Store (such as Sam's Club or Costco), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.011 (0.006)	0.023 (0.007)	-0.012 (0.128)	
<3 servings/day	0.025 (0.007)	0.024 (0.007)	0.001 (0.945)	
Impact: 3+ servings – <3 servings				-0.013 (0.256)
Attitudes about food, fruits, & vegetables				
High	0.026 (0.006)	0.029 (0.008)	-0.003 (0.700)	
Low	0.007 (0.006)	0.016 (0.008)	-0.009 (0.235)	
Impact: high – low				0.005 (0.635)
Fruits & vegetables at home				
Frequently	0.011 (0.007)	0.028 (0.008)	-0.017 (0.083)*	
Infrequently	0.023 (0.006)	0.020 (0.007)	0.003 (0.673)	
Impact: freq. – infreq.				-0.020 (0.100)
Pre-HIP shopping patterns (N=2137 interviews from 1262 respondents)[a]				
Shopped primarily at HIP participating retailers	0.008 (0.005)	0.014 (0.005)	-0.005 (0.487)	
Shopped primarily at non-HIP participating retailers	0.025 (0.010)	0.048 (0.012)	-0.023 (0.176)	
Impact: HIP shoppers – non-HIP-shoppers				0.018 (0.330)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,298 interviews over 1,912 respondents).

Exhibit H6.5f: Differences in Impacts of HIP on Usual Grocery Store Type (Discount Superstore (such as Walmart), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.132 (0.014)	0.106 (0.013)	0.026 (0.125)	
<3 servings/day	0.119 (0.015)	0.131 (0.014)	-0.011 (0.527)	
Impact: 3+ servings – <3 servings				0.038 (0.130)
Attitudes about food, fruits, & vegetables				
High	0.103 (0.013)	0.100 (0.013)	0.003 (0.855)	
Low	0.154 (0.018)	0.143 (0.018)	0.011 (0.587)	
Impact: high – low				-0.008 (0.748)
Fruits & vegetables at home				
Frequently	0.115 (0.017)	0.116 (0.016)	>-0.001 (0.992)	
Infrequently	0.133 (0.016)	0.120 (0.015)	0.013 (0.446)	
Impact: freq. – infreq.				-0.013 (0.600)
Pre-HIP shopping patterns (N=2137 interviews from 1262 respondents)[a]				
Shopped primarily at HIP participating retailers	0.112 (0.014)	0.117 (0.013)	-0.004 (0.825)	
Shopped primarily at non-HIP participating retailers	0.123 (0.018)	0.097 (0.015)	0.026 (0.254)	
Impact: HIP shoppers – non-HIP-shoppers				-0.030 (0.322)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,298 interviews over 1,912 respondents).

Exhibit H6.5g: Differences in Impacts of HIP on Usual Grocery Store Type (Ethnic Market), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.006 (0.003)	0.010 (0.003)	-0.004 (0.393)	
<3 servings/day	0.001 (0.002)	0.001 (0.002)	-0.001 (0.720)	
Impact: 3+ servings – <3 servings				-0.003 (0.531)
Attitudes about food, fruits, & vegetables				
High	0.007 (0.003)	0.009 (0.003)	-0.002 (0.564)	
Low	-0.001 (0.002)	0.001 (0.003)	-0.002 (0.364)	
Impact: high – low				>-0.001 (0.916)
Fruits & vegetables at home				
Frequently	0.002 (0.004)	0.003 (0.003)	-0.002 (0.683)	
Infrequently	0.005 (0.002)	0.008 (0.004)	-0.003 (0.339)	
Impact: freq. – infreq.				0.001 (0.844)
Pre-HIP shopping patterns (N=2137 interviews from 1262 respondents)[a]				
Shopped primarily at HIP participating retailers	<0.001 (0.001)	0.004 (0.002)	-0.004 (0.131)	
Shopped primarily at non-HIP participating retailers	0.008 (0.006)	0.006 (0.004)	0.001 (0.839)	
Impact: HIP shoppers – non-HIP-shoppers				-0.006 (0.420)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,298 interviews over 1,912 respondents).

Exhibit H6.5h: Differences in Impacts of HIP on Usual Grocery Store Type (Farmers Market/Co-Op), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.001 (0.002)	<0.001 (0.001)	0.001 (0.711)	
<3 servings/day	0.005 (0.003)	0.002 (0.001)	0.003 (0.355)	
Impact: 3+ servings – <3 servings				-0.002 (0.633)
Attitudes about food, fruits, & vegetables				
High	0.002 (0.002)	0.001 (0.001)	<0.001 (0.943)	
Low	0.005 (0.003)	0.001 (0.001)	0.004 (0.211)	
Impact: high – low				-0.004 (0.360)
Fruits & vegetables at home				
Frequently	0.005 (0.004)	0.003 (0.002)	0.002 (0.669)	
Infrequently	0.001 (0.002)	<0.001 (0.001)	0.002 (0.266)	
Impact: freq. – infreq.				<0.001 (0.981)
Pre-HIP shopping patterns (N=2137 interviews from 1262 respondents)[a]				
Shopped primarily at HIP participating retailers	<0.001 (0.003)	0.001 (0.001)	-0.001 (0.721)	
Shopped primarily at non-HIP participating retailers	-0.001 (0.004)	0.003 (0.001)	-0.004 (0.379)	
Impact: HIP shoppers – non-HIP-shoppers				0.003 (0.562)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,298 interviews over 1,912 respondents).

Exhibit H6.5i: Differences in Impacts of HIP on Usual Grocery Store Type (Some Other Location), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.005 (0.003)	0.006 (0.003)	-0.001 (0.895)	
<3 servings/day	0.001 (0.002)	0.001 (0.001)	<0.001 (0.845)	
Impact: 3+ servings – <3 servings				-0.001 (0.852)
Attitudes about food, fruits, & vegetables				
High	0.005 (0.002)	0.007 (0.003)	-0.002 (0.489)	
Low	0.001 (0.002)	-0.002 (0.002)	0.003 (0.136)	
Impact: high – low				-0.005 (0.166)
Fruits & vegetables at home				
Frequently	0.003 (0.002)	0.005 (0.003)	-0.002 (0.379)	
Infrequently	0.004 (0.002)	0.002 (0.002)	0.002 (0.576)	
Impact: freq. – infreq.				-0.004 (0.280)
Pre-HIP shopping patterns (N=2137 interviews from 1262 respondents)[a]				
Shopped primarily at HIP participating retailers	0.001 (0.002)	0.002 (0.001)	>-0.001 (0.918)	
Shopped primarily at non-HIP participating retailers	0.004 (0.004)	0.003 (0.002)	0.002 (0.711)	
Impact: HIP shoppers – non-HIP-shoppers				-0.002 (0.716)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,298 interviews over 1,912 respondents).

Exhibit H6.6a: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Prices/Affordability), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.467 (0.023)	0.494 (0.022)	-0.027 (0.346)	
<3 servings/day	0.500 (0.023)	0.532 (0.022)	-0.032 (0.256)	
Impact: 3+ servings – <3 servings				0.005 (0.894)
Attitudes about food, fruits, & vegetables				
High	0.471 (0.022)	0.492 (0.023)	-0.021 (0.417)	
Low	0.498 (0.027)	0.541 (0.027)	-0.042 (0.166)	
Impact: high – low				0.021 (0.612)
Fruits & vegetables at home				
Frequently	0.479 (0.027)	0.513 (0.026)	-0.034 (0.240)	
Infrequently	0.486 (0.026)	0.512 (0.025)	-0.027 (0.336)	
Impact: freq. – infreq.				-0.007 (0.856)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.508 (0.022)	0.520 (0.023)	-0.012 (0.707)	
Shopped primarily at non-HIP participating retailers	0.444 (0.028)	0.498 (0.027)	-0.054 (0.160)	
Impact: HIP shoppers – non-HIP-shoppers				0.042 (0.402)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6b: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Close to Home), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.305 (0.020)	0.287 (0.019)	0.017 (0.495)	
<3 servings/day	0.317 (0.021)	0.362 (0.021)	-0.045 (0.084)*	
Impact: 3+ servings – <3 servings				0.063 (0.088)*
Attitudes about food, fruits, & vegetables				
High	0.293 (0.020)	0.325 (0.020)	-0.031 (0.185)	
Low	0.329 (0.026)	0.322 (0.024)	0.007 (0.802)	
Impact: high – low				-0.038 (0.295)
Fruits & vegetables at home				
Frequently	0.323 (0.025)	0.325 (0.024)	-0.002 (0.944)	
Infrequently	0.297 (0.022)	0.322 (0.022)	-0.025 (0.307)	
Impact: freq. – infreq.				0.023 (0.528)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.327 (0.021)	0.346 (0.021)	-0.019 (0.505)	
Shopped primarily at non-HIP participating retailers	0.317 (0.025)	0.324 (0.023)	-0.008 (0.820)	
Impact: HIP shoppers – non-HIP-shoppers				-0.012 (0.793)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6c: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Variety of Products), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.228 (0.017)	0.193 (0.017)	0.035 (0.104)	
<3 servings/day	0.256 (0.019)	0.206 (0.017)	0.050 (0.029)**	
Impact: 3+ servings – <3 servings				-0.015 (0.641)
Attitudes about food, fruits, & vegetables				
High	0.251 (0.018)	0.196 (0.017)	0.055 (0.009)***	
Low	0.229 (0.021)	0.204 (0.021)	0.025 (0.289)	
Impact: high – low				0.029 (0.363)
Fruits & vegetables at home				
Frequently	0.225 (0.020)	0.191 (0.019)	0.034 (0.126)	
Infrequently	0.256 (0.020)	0.207 (0.018)	0.049 (0.027)**	
Impact: freq. – infreq.				-0.015 (0.633)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.248 (0.019)	0.190 (0.017)	0.057 (0.024)**	
Shopped primarily at non-HIP participating retailers	0.213 (0.023)	0.189 (0.019)	0.023 (0.413)	
Impact: HIP shoppers – non-HIP-shoppers				0.034 (0.387)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6d: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Produce Better or Fresher), by Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.149 (0.016)	0.133 (0.014)	0.017 (0.385)	
<3 servings/day	0.174 (0.016)	0.134 (0.015)	0.039 (0.033)**	
Impact: 3+ servings – <3 servings				-0.023 (0.402)
Attitudes about food, fruits, & vegetables				
High	0.172 (0.016)	0.146 (0.016)	0.025 (0.168)	
Low	0.148 (0.018)	0.116 (0.017)	0.032 (0.088)*	
Impact: high – low				-0.007 (0.791)
Fruits & vegetables at home				
Frequently	0.189 (0.020)	0.163 (0.018)	0.026 (0.214)	
Infrequently	0.137 (0.017)	0.107 (0.015)	0.030 (0.086)*	
Impact: freq. – infreq.				-0.004 (0.883)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.152 (0.016)	0.114 (0.014)	0.038 (0.072)*	
Shopped primarily at non-HIP participating retailers	0.173 (0.021)	0.165 (0.019)	0.008 (0.779)	
Impact: HIP shoppers – non-HIP-shoppers				0.030 (0.407)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6e: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Sales/Promotions in Store), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.105 (0.013)	0.141 (0.014)	-0.036 (0.040)**	
<3 servings/day	0.094 (0.013)	0.122 (0.014)	-0.028 (0.107)	
Impact: 3+ servings – <3 servings				-0.008 (0.756)
Attitudes about food, fruits, & vegetables				
High	0.103 (0.014)	0.145 (0.014)	-0.042 (0.014)**	
Low	0.096 (0.016)	0.114 (0.017)	-0.018 (0.320)	
Impact: high – low				-0.024 (0.317)
Fruits & vegetables at home				
Frequently	0.092 (0.016)	0.151 (0.018)	-0.059 (0.001)***	
Infrequently	0.104 (0.015)	0.115 (0.016)	-0.010 (0.554)	
Impact: freq. – infreq.				-0.049 (0.048)**
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.106 (0.014)	0.125 (0.015)	-0.018 (0.346)	
Shopped primarily at non-HIP participating retailers	0.095 (0.016)	0.116 (0.016)	-0.021 (0.364)	
Impact: HIP shoppers – non-HIP-shoppers				0.003 (0.925)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6f: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Preferred Products Are Available), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.099 (0.013)	0.134 (0.014)	-0.035 (0.041)**	
<3 servings/day	0.090 (0.013)	0.122 (0.014)	-0.032 (0.043)**	
Impact: 3+ servings – <3 servings				-0.002 (0.923)
Attitudes about food, fruits, & vegetables				
High	0.091 (0.014)	0.123 (0.013)	-0.031 (0.049)**	
Low	0.099 (0.015)	0.136 (0.017)	-0.037 (0.026)**	
Impact: high – low				0.006 (0.796)
Fruits & vegetables at home				
Frequently	0.112 (0.016)	0.147 (0.016)	-0.035 (0.056)*	
Infrequently	0.080 (0.013)	0.112 (0.014)	-0.032 (0.026)**	
Impact: freq. – infreq.				-0.003 (0.910)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.097 (0.013)	0.139 (0.014)	-0.042 (0.026)**	
Shopped primarily at non-HIP participating retailers	0.094 (0.018)	0.149 (0.018)	-0.055 (0.028)**	
Impact: HIP shoppers – non-HIP-shoppers				0.013 (0.686)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6g: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Familiarity with Store), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.064 (0.011)	0.067 (0.011)	-0.002 (0.864)	
<3 servings/day	0.073 (0.012)	0.046 (0.010)	0.027 (0.081)*	
Impact: 3+ servings – <3 servings				-0.029 (0.159)
Attitudes about food, fruits, & vegetables				
High	0.063 (0.011)	0.060 (0.011)	0.003 (0.822)	
Low	0.077 (0.016)	0.051 (0.012)	0.026 (0.128)	
Impact: high – low				-0.023 (0.267)
Fruits & vegetables at home				
Frequently	0.067 (0.013)	0.067 (0.011)	0.001 (0.965)	
Infrequently	0.070 (0.013)	0.047 (0.009)	0.022 (0.121)	
Impact: freq. – infreq.				-0.022 (0.269)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.067 (0.011)	0.053 (0.011)	0.014 (0.332)	
Shopped primarily at non-HIP participating retailers	0.069 (0.013)	0.057 (0.012)	0.012 (0.522)	
Impact: HIP shoppers – non-HIP-shoppers				0.003 (0.908)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6h: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (One Stop Shopping), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.065 (0.011)	0.057 (0.009)	0.009 (0.497)	
<3 servings/day	0.050 (0.010)	0.056 (0.010)	-0.005 (0.630)	
Impact: 3+ servings – <3 servings				0.014 (0.418)
Attitudes about food, fruits, & vegetables				
High	0.053 (0.010)	0.045 (0.009)	0.008 (0.438)	
Low	0.064 (0.013)	0.072 (0.013)	-0.008 (0.572)	
Impact: high – low				0.016 (0.366)
Fruits & vegetables at home				
Frequently	0.061 (0.012)	0.057 (0.012)	0.003 (0.797)	
Infrequently	0.055 (0.010)	0.055 (0.010)	<0.001 (0.991)	
Impact: freq. – infreq.				0.003 (0.849)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.053 (0.010)	0.072 (0.011)	-0.019 (0.175)	
Shopped primarily at non-HIP participating retailers	0.054 (0.012)	0.040 (0.010)	0.014 (0.359)	
Impact: HIP shoppers – non-HIP-shoppers				-0.033 (0.113)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6i: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Easy to Get There), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.021 (0.005)	0.021 (0.006)	<0.001 (0.982)	
<3 servings/day	0.025 (0.007)	0.014 (0.005)	0.010 (0.216)	
Impact: 3+ servings – <3 servings				-0.010 (0.354)
Attitudes about food, fruits, & vegetables				
High	0.030 (0.007)	0.021 (0.006)	0.009 (0.197)	
Low	0.014 (0.008)	0.014 (0.006)	0.001 (0.951)	
Impact: high – low				0.009 (0.428)
Fruits & vegetables at home				
Frequently	0.033 (0.009)	0.020 (0.007)	0.012 (0.118)	
Infrequently	0.015 (0.008)	0.015 (0.007)	>-0.001 (0.966)	
Impact: freq. – infreq.				0.013 (0.249)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.019 (0.006)	0.018 (0.006)	<0.001 (0.963)	
Shopped primarily at non-HIP participating retailers	0.021 (0.010)	0.017 (0.007)	0.003 (0.781)	
Impact: HIP shoppers – non-HIP-shoppers				-0.003 (0.826)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6j: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Quality), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.023 (0.007)	0.047 (0.010)	-0.024 (0.015)**	
<3 servings/day	0.059 (0.009)	0.052 (0.009)	0.007 (0.525)	
Impact: 3+ servings – <3 servings				-0.031 (0.040)**
Attitudes about food, fruits, & vegetables				
High	0.042 (0.008)	0.060 (0.010)	-0.017 (0.075)*	
Low	0.039 (0.011)	0.035 (0.010)	0.003 (0.765)	
Impact: high – low				-0.021 (0.178)
Fruits & vegetables at home				
Frequently	0.048 (0.010)	0.056 (0.009)	-0.008 (0.519)	
Infrequently	0.034 (0.008)	0.044 (0.008)	-0.009 (0.320)	
Impact: freq. – infreq.				0.002 (0.901)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.042 (0.008)	0.052 (0.009)	-0.010 (0.371)	
Shopped primarily at non-HIP participating retailers	0.040 (0.011)	0.037 (0.011)	0.003 (0.853)	
Impact: HIP shoppers – non-HIP-shoppers				-0.013 (0.514)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6k: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Close to Work), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.006 (0.002)	0.005 (0.003)	0.001 (0.825)	
<3 servings/day	0.007 (0.004)	0.003 (0.002)	0.004 (0.400)	
Impact: 3+ servings – <3 servings				-0.003 (0.556)
Attitudes about food, fruits, & vegetables				
High	0.009 (0.004)	0.005 (0.002)	0.004 (0.320)	
Low	0.002 (0.003)	0.002 (0.002)	<0.001 (0.997)	
Impact: high – low				0.004 (0.423)
Fruits & vegetables at home				
Frequently	0.001 (0.003)	0.001 (0.002)	>-0.001 (0.982)	
Infrequently	0.010 (0.004)	0.006 (0.002)	0.004 (0.313)	
Impact: freq. – infreq.				-0.004 (0.387)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.007 (0.003)	0.004 (0.003)	0.003 (0.432)	
Shopped primarily at non-HIP participating retailers	0.007 (0.004)	0.003 (0.003)	0.004 (0.312)	
Impact: HIP shoppers – non-HIP-shoppers				-0.001 (0.910)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6l: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Close to Some Other Location), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.004 (0.002)	0.005 (0.002)	-0.001 (0.829)	
<3 servings/day	0.003 (0.003)	0.003 (0.002)	0.001 (0.840)	
Impact: 3+ servings – <3 servings				-0.001 (0.771)
Attitudes about food, fruits, & vegetables				
High	0.006 (0.002)	0.005 (0.002)	0.001 (0.737)	
Low	0.001 (0.003)	0.002 (0.002)	-0.001 (0.870)	
Impact: high – low				0.002 (0.760)
Fruits & vegetables at home				
Frequently	0.001 (0.003)	0.002 (0.003)	-0.001 (0.788)	
Infrequently	0.006 (0.003)	0.006 (0.003)	0.001 (0.798)	
Impact: freq. – infreq.				-0.002 (0.702)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	<0.001 (<0.001)	0.002 (0.002)	-0.001 (0.415)	
Shopped primarily at non-HIP participating retailers	0.007 (0.004)	0.002 (0.002)	0.005 (0.264)	
Impact: HIP shoppers – non-HIP-shoppers				-0.006 (0.199)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6m: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Disability Accessible), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.002 (0.001)	0.001 (0.001)	<0.001 (0.850)	
<3 servings/day	0.005 (0.002)	0.001 (0.001)	0.003 (0.228)	
Impact: 3+ servings – <3 servings				-0.003 (0.358)
Attitudes about food, fruits, & vegetables				
High	0.003 (0.002)	0.001 (0.001)	0.002 (0.299)	
Low	0.003 (0.001)	0.002 (0.001)	0.001 (0.634)	
Impact: high – low				0.002 (0.586)
Fruits & vegetables at home				
Frequently	0.001 (0.002)	>-0.001 (0.001)	0.001 (0.529)	
Infrequently	0.005 (0.002)	0.003 (0.001)	0.002 (0.312)	
Impact: freq. – infreq.				-0.001 (0.674)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.002 (0.002)	0.002 (0.001)	<0.001 (0.915)	
Shopped primarily at non-HIP participating retailers	0.002 (0.001)	0.002 (0.001)	<0.001 (0.990)	
Impact: HIP shoppers – non-HIP-shoppers				<0.001 (0.912)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6n: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Hours of Operation Convenient), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.008 (0.003)	0.006 (0.003)	0.001 (0.720)	
<3 servings/day	0.005 (0.004)	0.009 (0.004)	-0.004 (0.444)	
Impact: 3+ servings – <3 servings				0.005 (0.395)
Attitudes about food, fruits, & vegetables				
High	0.005 (0.003)	0.006 (0.004)	-0.001 (0.780)	
Low	0.008 (0.004)	0.010 (0.006)	-0.002 (0.723)	
Impact: high – low				0.001 (0.884)
Fruits & vegetables at home				
Frequently	0.009 (0.004)	0.007 (0.004)	0.002 (0.684)	
Infrequently	0.004 (0.003)	0.008 (0.004)	-0.004 (0.278)	
Impact: freq. – infreq.				0.006 (0.314)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.003 (0.003)	0.008 (0.003)	-0.004 (0.344)	
Shopped primarily at non-HIP participating retailers	0.004 (0.003)	0.003 (0.003)	0.001 (0.861)	
Impact: HIP shoppers – non-HIP-shoppers				-0.005 (0.438)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6o: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (EBT Card Accepted), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.036 (0.008)	0.012 (0.004)	0.024 (0.003)***	
<3 servings/day	0.021 (0.007)	0.017 (0.005)	0.004 (0.642)	
Impact: 3+ servings – <3 servings				0.020 (0.077)*
Attitudes about food, fruits, & vegetables				
High	0.034 (0.007)	0.019 (0.006)	0.016 (0.051)*	
Low	0.021 (0.008)	0.009 (0.006)	0.012 (0.148)	
Impact: high – low				0.004 (0.723)
Fruits & vegetables at home				
Frequently	0.034 (0.008)	0.017 (0.006)	0.017 (0.021)**	
Infrequently	0.024 (0.008)	0.013 (0.005)	0.011 (0.197)	
Impact: freq. – infreq.				0.006 (0.594)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.026 (0.007)	0.016 (0.005)	0.010 (0.245)	
Shopped primarily at non-HIP participating retailers	0.027 (0.009)	0.018 (0.006)	0.009 (0.428)	
Impact: HIP shoppers – non-HIP-shoppers				0.001 (0.966)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6p: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Ethnic Foods Are Available), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.008 (0.004)	0.004 (0.003)	0.004 (0.367)	
<3 servings/day	0.005 (0.003)	0.011 (0.004)	-0.006 (0.107)	
Impact: 3+ servings – <3 servings				0.010 (0.084)*
Attitudes about food, fruits, & vegetables				
High	0.001 (0.003)	-0.001 (0.002)	0.002 (0.618)	
Low	0.014 (0.004)	0.019 (0.006)	-0.005 (0.328)	
Impact: high – low				0.007 (0.274)
Fruits & vegetables at home				
Frequently	0.009 (0.004)	0.010 (0.004)	-0.001 (0.769)	
Infrequently	0.004 (0.004)	0.005 (0.004)	-0.001 (0.804)	
Impact: freq. – infreq.				<-0.001 (0.993)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.006 (0.004)	0.005 (0.003)	0.001 (0.811)	
Shopped primarily at non-HIP participating retailers	0.010 (0.006)	0.008 (0.004)	0.003 (0.706)	
Impact: HIP shoppers – non-HIP-shoppers				-0.001 (0.845)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6q: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Good Service), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.029 (0.007)	0.019 (0.005)	0.009 (0.258)	
<3 servings/day	0.026 (0.007)	0.016 (0.005)	0.010 (0.207)	
Impact: 3+ servings – <3 servings				-0.001 (0.932)
Attitudes about food, fruits, & vegetables				
High	0.028 (0.006)	0.024 (0.006)	0.004 (0.578)	
Low	0.027 (0.008)	0.010 (0.005)	0.017 (0.044)**	
Impact: high – low				-0.013 (0.257)
Fruits & vegetables at home				
Frequently	0.029 (0.008)	0.023 (0.007)	0.006 (0.409)	
Infrequently	0.026 (0.009)	0.013 (0.006)	0.013 (0.133)	
Impact: freq. – infreq.				-0.006 (0.570)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.021 (0.006)	0.020 (0.006)	0.001 (0.923)	
Shopped primarily at non-HIP participating retailers	0.022 (0.009)	0.014 (0.007)	0.008 (0.491)	
Impact: HIP shoppers – non-HIP-shoppers				-0.007 (0.613)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6r: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Bulk Purchases), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.016 (0.006)	0.030 (0.007)	-0.014 (0.103)	
<3 servings/day	0.027 (0.008)	0.020 (0.007)	0.007 (0.479)	
Impact: 3+ servings – <3 servings				-0.021 (0.104)
Attitudes about food, fruits, & vegetables				
High	0.030 (0.008)	0.037 (0.008)	-0.007 (0.470)	
Low	0.010 (0.007)	0.009 (0.006)	0.001 (0.878)	
Impact: high – low				-0.008 (0.507)
Fruits & vegetables at home				
Frequently	0.020 (0.008)	0.032 (0.010)	-0.012 (0.256)	
Infrequently	0.022 (0.007)	0.019 (0.008)	0.003 (0.730)	
Impact: freq. – infreq.				-0.015 (0.277)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.012 (0.006)	0.021 (0.006)	-0.010 (0.270)	
Shopped primarily at non-HIP participating retailers	0.027 (0.009)	0.030 (0.009)	-0.003 (0.823)	
Impact: HIP shoppers – non-HIP-shoppers				-0.007 (0.674)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6s: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Clean), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.021 (0.007)	0.020 (0.006)	0.001 (0.884)	
<3 servings/day	0.019 (0.006)	0.015 (0.005)	0.004 (0.508)	
Impact: 3+ servings – <3 servings				-0.003 (0.781)
Attitudes about food, fruits, & vegetables				
High	0.021 (0.006)	0.017 (0.006)	0.003 (0.629)	
Low	0.019 (0.006)	0.017 (0.006)	0.002 (0.777)	
Impact: high – low				0.001 (0.921)
Fruits & vegetables at home				
Frequently	0.013 (0.007)	0.004 (0.006)	0.009 (0.182)	
Infrequently	0.027 (0.006)	0.029 (0.008)	-0.002 (0.775)	
Impact: freq. – infreq.				0.011 (0.299)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.011 (0.005)	0.014 (0.005)	-0.003 (0.682)	
Shopped primarily at non-HIP participating retailers	0.025 (0.007)	0.029 (0.009)	-0.005 (0.685)	
Impact: HIP shoppers – non-HIP-shoppers				0.002 (0.892)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.6t: Differences in Impacts of HIP on Reason for Choosing Usual Place to Shop (Some Other Reason), by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.009 (0.004)	0.004 (0.002)	0.005 (0.204)	
<3 servings/day	0.010 (0.005)	0.011 (0.004)	-0.002 (0.771)	
Impact: 3+ servings – <3 servings				0.007 (0.322)
Attitudes about food, fruits, & vegetables				
High	0.003 (0.004)	0.005 (0.003)	-0.002 (0.711)	
Low	0.017 (0.006)	0.011 (0.005)	0.006 (0.318)	
Impact: high – low				-0.008 (0.300)
Fruits & vegetables at home				
Frequently	0.015 (0.007)	0.007 (0.004)	0.009 (0.189)	
Infrequently	0.004 (0.004)	0.008 (0.003)	-0.004 (0.364)	
Impact: freq. – infreq.				0.012 (0.108)
Pre-HIP shopping patterns (N=2130 interviews from 1258 respondents)[a]				
Shopped primarily at HIP participating retailers	0.007 (0.003)	0.001 (0.002)	0.006 (0.128)	
Shopped primarily at non-HIP participating retailers	0.014 (0.007)	0.011 (0.005)	0.003 (0.725)	
Impact: HIP shoppers – non-HIP-shoppers				0.003 (0.758)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,281 interviews over 1,904 respondents).

Exhibit H6.7a: Differences in Impacts of HIP on Grocery Shopping Frequency, by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	5.270 (0.041)	5.200 (0.036)	0.070 (0.158)	
<3 servings/day	5.209 (0.039)	5.237 (0.039)	-0.029 (0.566)	
Impact: 3+ servings – <3 servings				0.099 (0.168)
Attitudes about food, fruits, & vegetables				
High	5.245 (0.040)	5.221 (0.037)	0.024 (0.610)	
Low	5.230 (0.048)	5.214 (0.047)	0.016 (0.757)	
Impact: high – low				0.007 (0.919)
Fruits & vegetables at home				
Frequently	5.240 (0.048)	5.258 (0.043)	-0.018 (0.719)	
Infrequently	5.235 (0.042)	5.183 (0.042)	0.052 (0.275)	
Impact: freq. – infreq.				-0.071 (0.317)
Pre-HIP shopping patterns (N=2151 interviews from 1270 respondents)[a]				
Shopped primarily at HIP participating retailers	5.227 (0.039)	5.123 (0.036)	0.104 (0.041)**	
Shopped primarily at non-HIP participating retailers	5.179 (0.052)	5.209 (0.045)	-0.030 (0.664)	
Impact: HIP shoppers – non-HIP-shoppers				0.134 (0.120)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcome, 1=yearly or not at all, 2=2 to 3 times a year, 3=every other month, 4=once a month, 5=every other week, 6=once a week, 7=more than once a week; “don’t know” and “refused” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,311 interviews over 1,921 respondents).

Exhibit H6.7b: Differences in Impacts of HIP on Probability of Going Out of Way to Shop for Fruits & Vegetables at a Particular Store, by Baseline Intake, Attitudes, and Pre-HIP Shopping Patterns Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.380 (0.021)	0.418 (0.020)	-0.038 (0.146)	
<3 servings/day	0.392 (0.023)	0.385 (0.021)	0.007 (0.792)	
Impact: 3+ servings – <3 servings				-0.045 (0.235)
Attitudes about food, fruits, & vegetables				
High	0.371 (0.021)	0.413 (0.020)	-0.043 (0.088)*	
Low	0.408 (0.025)	0.386 (0.025)	0.021 (0.453)	
Impact: high – low				-0.064 (0.093)*
Fruits & vegetables at home				
Frequently	0.367 (0.026)	0.405 (0.025)	-0.038 (0.168)	
Infrequently	0.403 (0.023)	0.399 (0.023)	0.004 (0.887)	
Impact: freq. – infreq.				-0.042 (0.268)
Pre-HIP shopping patterns (N=2151 interviews from 1270 respondents)[a]				
Shopped primarily at HIP participating retailers	0.399 (0.022)	0.364 (0.020)	0.035 (0.232)	
Shopped primarily at non-HIP participating retailers	0.383 (0.028)	0.427 (0.026)	-0.043 (0.244)	
Impact: HIP shoppers – non-HIP-shoppers				0.079 (0.102)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcome: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always, 'don't know' and 'refused' responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,283 interviews over 1,907 respondents).

Exhibit H6.8: Proportion of Primary Shoppers Who Reported Changing Store for Purchasing Fruits & Vegetables Because of HIP, by Subgroup: Round 2 & 3 Participant Surveys, HIP Participants

	Proportion (N)
Baseline Respondent Fruit & Vegetable Intake (screener) (N=1611)	
3+ servings/day (N=802)	0.29 (236)
<3 servings/day (N=809)	0.26 (209)
Difference: 3+ servings – <3 servings [P-value]	0.04 [0.166]
Attitudes about Food, Fruits, & Vegetables (N=1611)	
High (N=914)	0.31 (284)
Low (N=697)	0.23 (161)
Difference: high – low [P-value]	0.07 [0.005]***
Fruits & Vegetables at Home (N=1611)	
High (N=688)	0.27 (193)
Low (N=923)	0.28 (252)
Difference: high – low [P-value]	-0.01 [0.742]
Pre-HIP Shopping Patterns[a] (N=1030)	
Shopped primarily at HIP participating retailers (N=636)	0.26 (164)
Shopped primarily at non-HIP participating retailers (N=394)	0.32 (126)
Difference: HIP shoppers - non-HIP-shoppers [P-value]	-0.05 [0.109]*

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don't know” and “refused” responses coded as missing.
Due to rounding, reported differences in proportions across subgroups may differ from differences between proportions for the subgroups.
Test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit H6.9a: Proportion of Primary Shoppers Who Changed Stores for Purchasing Fruits and Vegetables Because Other Store Has Greater Variety of Fruits and Vegetables, by Subgroup: Round 2 & 3 Participant Surveys, HIP Participants

	Proportion (N)
Baseline Respondent Fruit & Vegetable Intake (screener) (N=444)	
3+ servings/day (N=236)	0.67 (157)
<3 servings/day (N=208)	0.62 (130)
Difference: 3+ servings – <3 servings [P-value]	0.05 [0.327]
Attitudes about Food, Fruits, & Vegetables (N=444)	
High (N=284)	0.69 (196)
Low (N=16)	0.56 (91)
Difference: high – low [P-value]	0.13 [0.013]**
Fruits & Vegetables at Home (N=444)	
High (N=192)	0.61 (119)
Low (N=252)	0.67 (168)
Difference: high – low [P-value]	-0.06 [0.249]
Pre-HIP Shopping Patterns[a] (N=289)	
Shopped primarily at HIP participating retailers (N=163)	0.77 (126)
Shopped primarily at non-HIP participating retailers (N=126)	0.55 (68)
Difference: HIP shoppers - non-HIP-shoppers [P-value]	0.22 [0.001]***

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
"Don't know" and "refused" responses coded as missing.
Due to rounding, reported differences in proportions across subgroups may differ from differences between proportions for the subgroups.
Test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit H6.9b: Proportion of Primary Shoppers Who Changed Stores for Purchasing Fruits and Vegetables Because Price of Fruits and Vegetables More Affordable at Other Store, by Subgroup: Round 2 & 3 Participant Surveys, HIP Participants

	Proportion (N)
Baseline Respondent Fruit & Vegetable Intake (screener) (N=442)	
3+ servings/day (N=235)	0.79 (189)
<3 servings/day (N=207)	0.75 (153)
Difference: 3+ servings – <3 servings [P-value]	0.04 [0.322]
Attitudes about Food, Fruits, & Vegetables (N=442)	
High (N=284)	0.77 (219)
Low (N=158)	0.78 (123)
Difference: High - Low [P-value]	>-0.01 [0.916]
Fruits & Vegetables at Home (N=442)	
High (N=191)	0.76 (144)
Low (N=251)	0.78 (198)
Difference: high – low [P-value]	-0.03 [0.519]
Pre-HIP Shopping Patterns[a] (N=287)	
Shopped primarily at HIP participating retailers (N=162)	0.86 (138)
Shopped primarily at non-HIP participating retailers (N=125)	0.69 (86)
Difference: HIP shoppers – non-HIP-shoppers [P-value]	0.17 [0.001]***

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don't know” and “refused” responses coded as missing.
Due to rounding, reported differences in proportions across subgroups may differ from differences between proportions for the subgroups.
Test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit H6.9c: Proportion of Primary Shoppers Who Changed Stores for Purchasing Fruits and Vegetables Because Other Store Has Fresh Fruits and Vegetables, by Subgroup: Round 2 & 3 Participant Surveys, HIP Participants

	Proportion (N)
Baseline Respondent Fruit & Vegetable Intake (screener) (N=442)	
3+ servings/day (N=234)	0.79 (184)
<3 servings/day (N=208)	0.71 (149)
Difference: 3+ servings – <3 servings [P-value]	0.08 [0.109]
Attitudes about Food, Fruits, & Vegetables (N=442)	
High (N=282)	0.77 (217)
Low (N=160)	0.72 (116)
Difference: high – low [P-value]	0.06 [0.217]
Fruits & Vegetables at Home (N=442)	
High (N=190)	0.77 (145)
Low (N=252)	0.74 (188)
Difference: high – low [P-value]	0.03 [0.543]
Pre-HIP Shopping Patterns[a] (N=288)	
Shopped primarily at HIP participating retailers (N=162)	0.83 (136)
Shopped primarily at non-HIP participating retailers (N=126)	0.66 (82)
Difference: HIP shoppers - non-HIP-shoppers [P-value]	0.16 [0.011]**

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don't know” and “refused” responses coded as missing.
Due to rounding, reported differences in proportions across subgroups may differ from differences between proportions for the subgroups.
Test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit H6.9d: Proportion of Primary Shoppers Who Changed Stores for Purchasing Fruits and Vegetables Because Other Store Participates in HIP, by Subgroup: Round 2 & 3 Participant Surveys, HIP Participants

	Proportion (N)
Baseline Respondent Fruit & Vegetable Intake (screener) (N=443)	
3+ servings/day (N=236)	0.21 (50)
<3 servings/day (N=207)	0.23 (50)
Difference: 3+ servings – <3 servings [P-value]	-0.02 [0.655]
Attitudes about Food, Fruits, & Vegetables (N=443)	
High (N=283)	0.21 (61)
Low (N=160)	0.24 (39)
Difference: high – low [P-value]	-0.02 [0.630]
Fruits & Vegetables at Home (N=443)	
High (N=191)	0.24 (44)
Low (N=252)	0.21 (56)
Difference: high – low [P-value]	0.03 [0.579]
Pre-HIP Shopping Patterns[a] (N=288)	
Shopped primarily at HIP participating retailers (N=163)	0.16 (26)
Shopped primarily at non-HIP participating retailers (N=125)	0.31 (40)
Difference: HIP shoppers - non-HIP-shoppers [P-value]	-0.14 [0.014]**

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don't know” and “refused” responses coded as missing.
Due to rounding, reported differences in proportions across subgroups may differ from differences between proportions for the subgroups.
Test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit H6.9e: Proportion of Primary Shoppers Who Changed Stores for Purchasing Fruits and Vegetables for Some Other Reason, by Subgroup: Round 2 & 3 Participant Surveys, HIP Participants

	Proportion (N)
Baseline Respondent Fruit & Vegetable Intake (screener) (N=443)	
3+ servings/day (N=236)	0.05 (13)
<3 servings/day (N=207)	0.05 (10)
Difference: 3+ servings – <3 servings [P-value]	<0.01 [0.880]
Attitudes about Food, Fruits, & Vegetables (N=443)	
High (N=283)	0.04 (12)
Low (N=160)	0.07 (11)
Difference: high – low [P-value]	-0.03 [0.170]
Fruits & Vegetables at Home (N=443)	
High (N=191)	0.06 (13)
Low (N=252)	0.04 (10)
Difference: high – low [P-value]	0.03 [0.262]
Pre-HIP Shopping Patterns[a] (N=288)	
Shopped primarily at HIP participating retailers (N=163)	0.01 (1)
Shopped primarily at non-HIP participating retailers (N=125)	0.06 (9)
Difference: HIP shoppers - non-HIP-shoppers [P-value]	-0.05 [0.034]**

Weighted proportions (unweighted Ns).
Two-sided chi-square test: *p<0.1, **p<0.05, ***p<0.01.
“Don't know” and “refused” responses coded as missing.
Due to rounding, reported differences in proportions across subgroups may differ from differences between proportions for the subgroups.
Test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample.

Exhibit H7.1a: Differences in Impacts of HIP on Self-Reported Receipt of Messages about Fruits and Vegetables in Past 3 Months, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.776 (0.019)	0.685 (0.019)	0.091 (<0.001) ***	
<3 servings/day	0.734 (0.021)	0.672 (0.020)	0.062 (0.016)**	
Impact: 3+ servings – <3 servings				0.028 (0.422)
Attitudes about food, fruits, & vegetables				
High	0.784 (0.020)	0.701 (0.020)	0.083 (<0.001) ***	
Low	0.719 (0.024)	0.649 (0.026)	0.070 (0.013)**	
Impact: high – low				0.013 (0.708)
Fruits & vegetables at home				
Frequently	0.759 (0.025)	0.669 (0.026)	0.090 (0.001)***	
Infrequently	0.753 (0.022)	0.686 (0.022)	0.067 (0.006)***	
Impact: freq. – infreq.				0.023 (0.512)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,392 interviews over 1,965 respondents).

Exhibit H7.1b: Differences in Impacts of HIP on Self-Reported Attendance at Nutrition Education Class or Program in Past 3 Months, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.117 (0.014)	0.121 (0.014)	-0.004 (0.809)	
<3 servings/day	0.084 (0.014)	0.095 (0.013)	-0.011 (0.545)	
Impact: 3+ servings – <3 servings				0.006 (0.796)
Attitudes about food, fruits, & vegetables				
High	0.106 (0.015)	0.105 (0.013)	0.001 (0.969)	
Low	0.095 (0.016)	0.112 (0.017)	-0.017 (0.321)	
Impact: high – low				0.018 (0.466)
Fruits & vegetables at home				
Frequently	0.112 (0.018)	0.116 (0.018)	-0.003 (0.857)	
Infrequently	0.092 (0.016)	0.102 (0.015)	-0.010 (0.550)	
Impact: freq. – infreq.				0.007 (0.783)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Binary outcomes, 1=yes, 0=no; “don’t know” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,406 interviews over 1,966 respondents).

Exhibit H7.2a: Differences in Impacts of HIP on Level of Agreement that "I enjoy trying new foods," by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	3.920 (0.034)	3.845 (0.036)	0.075 (0.080)*	
<3 servings/day	3.878 (0.039)	3.823 (0.042)	0.056 (0.279)	
Impact: 3+ servings – <3 servings				0.019 (0.779)
Attitudes about food, fruits, & vegetables				
High	3.918 (0.035)	3.830 (0.037)	0.089 (0.018)**	
Low	3.876 (0.048)	3.840 (0.053)	0.036 (0.540)	
Impact: high – low				0.052 (0.456)
Fruits & vegetables at home				
Frequently	3.957 (0.045)	3.884 (0.046)	0.073 (0.133)	
Infrequently	3.854 (0.040)	3.794 (0.042)	0.060 (0.193)	
Impact: freq. – infreq.				0.013 (0.849)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,381 interviews over 1,956 respondents).

Exhibit H7.2b: Differences in Impacts of HIP on Level of Agreement that "I enjoy trying new fruits," by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	3.941 (0.035)	3.957 (0.033)	-0.016 (0.701)	
<3 servings/day	3.864 (0.037)	3.911 (0.037)	-0.047 (0.342)	
Impact: 3+ servings – <3 servings				0.030 (0.643)
Attitudes about food, fruits, & vegetables				
High	3.954 (0.037)	3.973 (0.036)	-0.019 (0.586)	
Low	3.839 (0.053)	3.881 (0.049)	-0.042 (0.470)	
Impact: high – low				0.023 (0.738)
Fruits & vegetables at home				
Frequently	3.902 (0.044)	3.913 (0.045)	-0.011 (0.820)	
Infrequently	3.905 (0.038)	3.952 (0.037)	-0.047 (0.287)	
Impact: freq. – infreq.				0.036 (0.585)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,388 interviews over 1,960 respondents).

Exhibit H7.2c: Differences in Impacts of HIP on Level of Agreement that "I enjoy trying new vegetables," by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	3.736 (0.038)	3.615 (0.039)	0.121 (0.012)**	
<3 servings/day	3.627 (0.043)	3.689 (0.041)	-0.062 (0.234)	
Impact: 3+ servings – <3 servings				0.183 (0.010)***
Attitudes about food, fruits, & vegetables				
High	3.711 (0.039)	3.712 (0.039)	-0.001 (0.977)	
Low	3.642 (0.052)	3.569 (0.052)	0.073 (0.226)	
Impact: high – low				-0.074 (0.310)
Fruits & vegetables at home				
Frequently	3.735 (0.051)	3.677 (0.050)	0.058 (0.261)	
Infrequently	3.638 (0.043)	3.631 (0.044)	0.007 (0.883)	
Impact: freq. – infreq.				0.051 (0.473)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,392 interviews over 1,961 respondents).

Exhibit H7.2d: Differences in Impacts of HIP on Level of Agreement that "I eat enough fruits to keep me healthy," by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	3.778 (0.035)	3.726 (0.038)	0.052 (0.248)	
<3 servings/day	3.678 (0.042)	3.647 (0.041)	0.031 (0.576)	
Impact: 3+ servings – <3 servings				0.021 (0.770)
Attitudes about food, fruits, & vegetables				
High	3.748 (0.039)	3.738 (0.039)	0.010 (0.811)	
Low	3.705 (0.052)	3.620 (0.050)	0.086 (0.146)	
Impact: high – low				-0.076 (0.298)
Fruits & vegetables at home				
Frequently	3.747 (0.051)	3.785 (0.050)	-0.038 (0.446)	
Infrequently	3.713 (0.044)	3.610 (0.044)	0.102 (0.037)**	
Impact: freq. – infreq.				-0.140 (0.044)**

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,383 interviews over 1,957 respondents).

Exhibit H7.2e: Differences in Impacts of HIP on Level of Agreement that "I eat enough vegetables to keep me healthy," by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	3.798 (0.035)	3.732 (0.035)	0.065 (0.144)	
<3 servings/day	3.669 (0.044)	3.651 (0.038)	0.018 (0.735)	
Impact: 3+ servings – <3 servings				0.047 (0.498)
Attitudes about food, fruits, & vegetables				
High	3.773 (0.039)	3.723 (0.035)	0.050 (0.243)	
Low	3.688 (0.052)	3.652 (0.049)	0.036 (0.534)	
Impact: high – low				0.014 (0.847)
Fruits & vegetables at home				
Frequently	3.734 (0.050)	3.701 (0.045)	0.033 (0.517)	
Infrequently	3.736 (0.043)	3.686 (0.041)	0.050 (0.296)	
Impact: freq. – infreq.				-0.017 (0.803)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,393 interviews over 1,958 respondents).

Exhibit H7.2f: Differences in Impacts of HIP on Level of Agreement that "I often encourage family/friends to eat fruits & vegetables," by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	3.966 (0.036)	3.829 (0.039)	0.137 (0.003)***	
<3 servings/day	3.764 (0.040)	3.808 (0.041)	-0.044 (0.381)	
Impact: 3+ servings – <3 servings				0.181 (0.008)***
Attitudes about food, fruits, & vegetables				
High	3.836 (0.037)	3.767 (0.039)	0.068 (0.101)	
Low	3.905 (0.049)	3.889 (0.050)	0.016 (0.782)	
Impact: high – low				0.053 (0.460)
Fruits & vegetables at home				
Frequently	3.864 (0.048)	3.767 (0.049)	0.097 (0.043)**	
Infrequently	3.870 (0.043)	3.860 (0.042)	0.010 (0.840)	
Impact: freq. – infreq.				0.087 (0.200)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,346 interviews over 1,941 respondents).

Exhibit H7.2g: Differences in Impacts of HIP on Positive Attitudes Toward Food, Fruits, & Vegetables Scale, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	3.855 (0.022)	3.783 (0.022)	0.072 (0.008)***	
<3 servings/day	3.747 (0.025)	3.751 (0.025)	-0.004 (0.896)	
Impact: 3+ servings – <3 servings				0.076 (0.069)*
Attitudes about food, fruits, & vegetables				
High	3.823 (0.023)	3.788 (0.023)	0.034 (0.182)	
Low	3.775 (0.030)	3.739 (0.030)	0.036 (0.295)	
Impact: high – low				-0.002 (0.969)
Fruits & vegetables at home				
Frequently	3.821 (0.030)	3.785 (0.028)	0.036 (0.237)	
Infrequently	3.786 (0.025)	3.753 (0.025)	0.033 (0.251)	
Impact: freq. – infreq.				0.004 (0.931)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Scale is the mean of variables with these categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; “don’t know” and “does not apply” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,392 interviews over 1,959 respondents).

Exhibit H7.3a: Differences in Impacts of HIP on Level of Agreement that "Hard to eat vegetables because don't know how to prepare," by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	2.400 (0.042)	2.404 (0.042)	-0.005 (0.934)	
<3 servings/day	2.376 (0.045)	2.392 (0.040)	-0.015 (0.777)	
Impact: 3+ servings – <3 servings				0.011 (0.889)
Attitudes about food, fruits, & vegetables				
High	2.424 (0.047)	2.422 (0.043)	0.002 (0.968)	
Low	2.343 (0.052)	2.366 (0.052)	-0.023 (0.686)	
Impact: high – low				0.025 (0.748)
Fruits & vegetables at home				
Frequently	2.458 (0.054)	2.384 (0.052)	0.074 (0.195)	
Infrequently	2.335 (0.048)	2.409 (0.046)	-0.074 (0.164)	
Impact: freq. – infreq.				0.149 (0.059)*

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,366 interviews over 1,948 respondents).

Exhibit H7.3b: Differences in Impacts of HIP on Level of Agreement that "Hard to eat vegetables because hard to find where I shop," by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	2.206 (0.035)	2.203 (0.034)	0.003 (0.940)	
<3 servings/day	2.167 (0.037)	2.214 (0.036)	-0.047 (0.317)	
Impact: 3+ servings – <3 servings				0.050 (0.438)
Attitudes about food, fruits, & vegetables				
High	2.235 (0.036)	2.252 (0.036)	-0.017 (0.708)	
Low	2.124 (0.041)	2.149 (0.042)	-0.025 (0.596)	
Impact: high – low				0.008 (0.900)
Fruits & vegetables at home				
Frequently	2.150 (0.044)	2.162 (0.044)	-0.012 (0.796)	
Infrequently	2.216 (0.038)	2.245 (0.039)	-0.029 (0.511)	
Impact: freq. – infreq.				0.017 (0.794)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,369 interviews over 1,948 respondents).

Exhibit H7.3c: Differences in Impacts of HIP on Level of Agreement that "Hard to eat fruits because hard to find where I shop," by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	2.193 (0.035)	2.152 (0.032)	0.041 (0.348)	
<3 servings/day	2.134 (0.036)	2.153 (0.036)	-0.019 (0.676)	
Impact: 3+ servings – <3 servings				0.060 (0.345)
Attitudes about food, fruits, & vegetables				
High	2.191 (0.035)	2.186 (0.035)	0.005 (0.909)	
Low	2.129 (0.040)	2.106 (0.039)	0.023 (0.619)	
Impact: high – low				-0.018 (0.776)
Fruits & vegetables at home				
Frequently	2.142 (0.043)	2.159 (0.044)	-0.016 (0.716)	
Infrequently	2.180 (0.039)	2.148 (0.037)	0.032 (0.458)	
Impact: freq. – infreq.				-0.048 (0.438)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,372 interviews over 1,950 respondents).

Exhibit H7.3d: Differences in Impacts of HIP on Level of Agreement that "Don't eat fruits & vegetables as much as would like because cost too much," by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	2.874 (0.047)	2.949 (0.050)	-0.075 (0.222)	
<3 servings/day	2.967 (0.049)	2.933 (0.047)	0.035 (0.568)	
Impact: 3+ servings – <3 servings				-0.110 (0.208)
Attitudes about food, fruits, & vegetables				
High	2.965 (0.053)	2.979 (0.051)	-0.014 (0.806)	
Low	2.866 (0.058)	2.890 (0.059)	-0.024 (0.702)	
Impact: high – low				0.009 (0.913)
Fruits & vegetables at home				
Frequently	2.896 (0.063)	2.904 (0.060)	-0.008 (0.909)	
Infrequently	2.941 (0.051)	2.971 (0.052)	-0.030 (0.599)	
Impact: freq. – infreq.				0.022 (0.800)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,379 interviews over 1,953 respondents).

Exhibit H7.3e: Differences in Impacts of HIP on Level of Agreement that "Don't eat fruits & vegetables as much as would like because they spoil," by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	2.772 (0.046)	2.867 (0.044)	-0.096 (0.095)*	
<3 servings/day	2.839 (0.047)	2.931 (0.049)	-0.092 (0.125)	
Impact: 3+ servings – <3 servings				-0.003 (0.970)
Attitudes about food, fruits, & vegetables				
High	2.798 (0.049)	2.857 (0.048)	-0.060 (0.279)	
Low	2.813 (0.056)	2.955 (0.058)	-0.142 (0.023)**	
Impact: high – low				0.082 (0.321)
Fruits & vegetables at home				
Frequently	2.782 (0.060)	2.842 (0.060)	-0.060 (0.317)	
Infrequently	2.823 (0.053)	2.943 (0.053)	-0.120 (0.035)**	
Impact: freq. – infreq.				0.060 (0.472)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,372 interviews over 1,950 respondents).

Exhibit H7.3f: Differences in Impacts of HIP on Level of Agreement that "Don't eat fruits & vegetables as much as would like because family dislikes," by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	2.108 (0.032)	2.066 (0.029)	0.042 (0.289)	
<3 servings/day	2.174 (0.039)	2.147 (0.037)	0.027 (0.594)	
Impact: 3+ servings – <3 servings				0.015 (0.814)
Attitudes about food, fruits, & vegetables				
High	2.174 (0.039)	2.093 (0.033)	0.081 (0.057)*	
Low	2.096 (0.041)	2.123 (0.042)	-0.027 (0.549)	
Impact: high – low				0.108 (0.084)*
Fruits & vegetables at home				
Frequently	2.158 (0.045)	2.108 (0.041)	0.050 (0.272)	
Infrequently	2.125 (0.039)	2.104 (0.037)	0.021 (0.624)	
Impact: freq. – infreq.				0.029 (0.642)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,230 interviews over 1,889 respondents).

Exhibit H7.3g: Differences in Impacts of HIP on Level of Agreement that "Don't eat fruits & vegetables as much as would like because I dislike," by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	2.013 (0.031)	2.001 (0.031)	0.011 (0.773)	
<3 servings/day	2.048 (0.033)	2.119 (0.035)	-0.071 (0.093)*	
Impact: 3+ servings – <3 servings				0.082 (0.154)
Attitudes about food, fruits, & vegetables				
High	2.062 (0.034)	2.045 (0.034)	0.017 (0.640)	
Low	1.987 (0.041)	2.078 (0.044)	-0.091 (0.047)**	
Impact: high – low				0.108 (0.066)*
Fruits & vegetables at home				
Frequently	2.056 (0.042)	2.088 (0.044)	-0.032 (0.453)	
Infrequently	2.006 (0.035)	2.035 (0.035)	-0.029 (0.452)	
Impact: freq. – infreq.				-0.003 (0.952)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,379 interviews over 1,954 respondents).

Exhibit H7.3h: Differences in Impacts of HIP on Barriers to Eating Fruits & Vegetables Scale, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	2.359 (0.023)	2.376 (0.021)	-0.016 (0.575)	
<3 servings/day	2.386 (0.024)	2.418 (0.023)	-0.032 (0.282)	
Impact: 3+ servings – <3 servings				0.015 (0.711)
Attitudes about food, fruits, & vegetables				
High	2.399 (0.024)	2.405 (0.023)	-0.006 (0.834)	
Low	2.338 (0.025)	2.384 (0.027)	-0.046 (0.106)	
Impact: high – low				0.040 (0.331)
Fruits & vegetables at home				
Frequently	2.378 (0.029)	2.382 (0.029)	-0.004 (0.895)	
Infrequently	2.368 (0.025)	2.407 (0.027)	-0.040 (0.155)	
Impact: freq. – infreq.				0.035 (0.395)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Scale is the mean of variables with these categorical outcomes: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree; "don't know" and "does not apply" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module), pooled Round 2 and Round 3 sample (N=3,358 interviews over 1,943 respondents).

Exhibit H7.4a: Differences in Impacts of HIP on How Often Kept from Grocery Shopping, by Limited Transportation, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	2.223 (0.051)	2.154 (0.051)	0.069 (0.300)	
<3 servings/day	2.126 (0.055)	2.026 (0.050)	0.100 (0.145)	
Impact: 3+ servings – <3 servings				-0.031 (0.747)
Attitudes about food, fruits, & vegetables				
High	2.194 (0.053)	2.147 (0.052)	0.047 (0.429)	
Low	2.153 (0.065)	2.017 (0.067)	0.136 (0.074)*	
Impact: high – low				-0.089 (0.355)
Fruits & vegetables at home				
Frequently	2.143 (0.063)	2.129 (0.063)	0.014 (0.836)	
Infrequently	2.202 (0.061)	2.060 (0.055)	0.142 (0.034)**	
Impact: freq. – infreq.				-0.129 (0.170)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcome: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always, 'don't know' and 'refused' responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,275 interviews over 1,902 respondents).

Exhibit H7.4b: Differences in Impacts of HIP on How Often Kept from Grocery Shopping, by Distance to Grocery Store, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	1.969 (0.050)	1.999 (0.053)	-0.030 (0.646)	
<3 servings/day	1.967 (0.055)	1.900 (0.052)	0.068 (0.314)	
Impact: 3+ servings – <3 servings				-0.097 (0.293)
Attitudes about food, fruits, & vegetables				
High	1.979 (0.052)	2.006 (0.054)	-0.027 (0.653)	
Low	1.957 (0.064)	1.875 (0.064)	0.082 (0.262)	
Impact: high – low				-0.109 (0.249)
Fruits & vegetables at home				
Frequently	1.906 (0.063)	1.999 (0.063)	-0.092 (0.156)	
Infrequently	2.020 (0.060)	1.909 (0.056)	0.111 (0.092)*	
Impact: freq. – infreq.				-0.203 (0.028)**

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcome: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always, 'don't know' and 'refused' responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,253 interviews over 1,891 respondents).

Exhibit H7.4c: Differences in Impacts of HIP on Barriers to Grocery Shopping (Composite Scale), by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	2.084 (0.046)	2.063 (0.048)	0.021 (0.730)	
<3 servings/day	2.048 (0.050)	1.962 (0.047)	0.086 (0.165)	
Impact: 3+ servings – <3 servings				-0.065 (0.448)
Attitudes about food, fruits, & vegetables				
High	2.079 (0.048)	2.065 (0.048)	0.014 (0.802)	
Low	2.052 (0.058)	1.945 (0.061)	0.108 (0.115)	
Impact: high – low				-0.094 (0.283)
Fruits & vegetables at home				
Frequently	2.024 (0.058)	2.063 (0.059)	-0.039 (0.512)	
Infrequently	2.101 (0.056)	1.971 (0.052)	0.130 (0.034)**	
Impact: freq. – infreq.				-0.169 (0.047)**

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Scale is the mean of variables with these categorical outcome: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always, 'don't know' and 'refused' responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,230 interviews over 1,880 respondents).

Exhibit H7.5a: Differences in Impacts of HIP on How Often Fruits are Available at Home, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	4.345 (0.035)	4.248 (0.037)	0.097 (0.027)**	
<3 servings/day	4.256 (0.038)	4.133 (0.039)	0.123 (0.013)**	
Impact: 3+ servings – <3 servings				-0.026 (0.694)
Attitudes about food, fruits, & vegetables				
High	4.297 (0.039)	4.177 (0.042)	0.120 (0.004)***	
Low	4.312 (0.048)	4.214 (0.044)	0.098 (0.064)*	
Impact: high – low				0.023 (0.735)
Fruits & vegetables at home				
Frequently	4.231 (0.043)	4.171 (0.046)	0.061 (0.140)	
Infrequently	4.364 (0.044)	4.212 (0.044)	0.152 (0.003)***	
Impact: freq. – infreq.				-0.092 (0.163)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always; "don't know" responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,314 interviews over 1,918 respondents).

Exhibit H7.5b: Differences in Impacts of HIP on How Often Fruits are in Refrigerator or on Counter, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	4.062 (0.038)	4.025 (0.039)	0.037 (0.436)	
<3 servings/day	3.952 (0.043)	3.881 (0.042)	0.071 (0.185)	
Impact: 3+ servings – <3 servings				-0.033 (0.644)
Attitudes about food, fruits, & vegetables				
High	4.016 (0.041)	3.942 (0.042)	0.074 (0.122)	
Low	4.003 (0.049)	3.974 (0.047)	0.029 (0.596)	
Impact: high – low				0.044 (0.544)
Fruits & vegetables at home				
Frequently	3.963 (0.047)	3.918 (0.049)	0.044 (0.366)	
Infrequently	4.051 (0.047)	3.988 (0.044)	0.063 (0.227)	
Impact: freq. – infreq.				-0.019 (0.795)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always, 'don't know' responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,311 interviews over 1,918 respondents).

Exhibit H7.5c: Differences in Impacts of HIP on How Often Vegetables are Available at Home, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	4.476 (0.034)	4.417 (0.033)	0.059 (0.164)	
<3 servings/day	4.526 (0.038)	4.419 (0.038)	0.107 (0.028)**	
Impact: 3+ servings – <3 servings				-0.048 (0.454)
Attitudes about food, fruits, & vegetables				
High	4.496 (0.034)	4.442 (0.036)	0.054 (0.174)	
Low	4.505 (0.045)	4.384 (0.042)	0.121 (0.022)**	
Impact: high – low				-0.067 (0.318)
Fruits & vegetables at home				
Frequently	4.419 (0.045)	4.393 (0.045)	0.026 (0.470)	
Infrequently	4.569 (0.049)	4.440 (0.040)	0.129 (0.011)**	
Impact: freq. – infreq.				-0.103 (0.100)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always, 'don't know' and “No refrigerator or freezer” responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,315 interviews over 1,918 respondents).

Exhibit H7.5d: Differences in Impacts of HIP on How Often Ready-to-Eat Vegetables are Available on Counter or in Refrigerator, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	3.979 (0.047)	3.899 (0.048)	0.080 (0.181)	
<3 servings/day	3.809 (0.053)	3.751 (0.050)	0.058 (0.364)	
Impact: 3+ servings – <3 servings				0.022 (0.800)
Attitudes about food, fruits, & vegetables				
High	3.953 (0.049)	3.830 (0.049)	0.123 (0.027)**	
Low	3.824 (0.061)	3.825 (0.064)	-0.001 (0.990)	
Impact: high – low				0.124 (0.167)
Fruits & vegetables at home				
Frequently	3.909 (0.064)	3.836 (0.063)	0.073 (0.202)	
Infrequently	3.888 (0.066)	3.820 (0.058)	0.067 (0.298)	
Impact: freq. – infreq.				0.005 (0.952)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always, 'don't know' responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,284 interviews over 1,909 respondents).

Exhibit H7.5e: Differences in Impacts of HIP on Fruits and Vegetables Available at Home Scale, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	4.211 (0.029)	4.144 (0.030)	0.067 (0.067)*	
<3 servings/day	4.135 (0.033)	4.040 (0.032)	0.096 (0.017)**	
Impact: 3+ servings – <3 servings				-0.029 (0.594)
Attitudes about food, fruits, & vegetables				
High	4.186 (0.030)	4.092 (0.032)	0.094 (0.008)***	
Low	4.161 (0.037)	4.096 (0.036)	0.065 (0.124)	
Impact: high – low				0.029 (0.597)
Fruits & vegetables at home				
Frequently	4.133 (0.039)	4.082 (0.040)	0.051 (0.138)	
Infrequently	4.210 (0.041)	4.104 (0.035)	0.106 (0.010)***	
Impact: freq. – infreq.				-0.055 (0.309)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Scale is the mean of variables with these categorical outcomes: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always, 'don't know' responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,318 interviews over 1,921 respondents).

Exhibit H7.5f: Differences in Impacts of HIP on How Often Salty Snacks are Available at Home, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	3.245 (0.051)	3.225 (0.050)	0.019 (0.764)	
<3 servings/day	3.158 (0.052)	3.205 (0.049)	-0.047 (0.452)	
Impact: 3+ servings – <3 servings				0.066 (0.464)
Attitudes about food, fruits, & vegetables				
High	3.226 (0.052)	3.237 (0.050)	-0.011 (0.848)	
Low	3.170 (0.062)	3.185 (0.062)	-0.014 (0.836)	
Impact: high – low				0.003 (0.976)
Fruits & vegetables at home				
Frequently	3.121 (0.064)	3.178 (0.060)	-0.057 (0.389)	
Infrequently	3.271 (0.057)	3.248 (0.056)	0.022 (0.718)	
Impact: freq. – infreq.				-0.080 (0.382)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always, 'don't know' responses coded as missing.
Due to rounding, reported impacts (T-C differences) may differ from differences between reported regression-adjusted means for the treatment and control groups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,312 interviews over 1,922 respondents).

Exhibit H7.5g: Differences in Impacts of HIP on How Often 1% Fat, Skim or Fat-Free Milk is Available at Home, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	3.362 (0.072)	3.348 (0.068)	0.014 (0.878)	
<3 servings/day	3.327 (0.073)	3.207 (0.073)	0.120 (0.178)	
Impact: 3+ servings – <3 servings				-0.106 (0.399)
Attitudes about food, fruits, & vegetables				
High	3.428 (0.072)	3.358 (0.070)	0.070 (0.401)	
Low	3.242 (0.088)	3.171 (0.087)	0.071 (0.463)	
Impact: high – low				-0.001 (0.993)
Fruits & vegetables at home				
Frequently	3.282 (0.085)	3.271 (0.081)	0.011 (0.905)	
Infrequently	3.401 (0.078)	3.288 (0.077)	0.113 (0.188)	
Impact: freq. – infreq.				-0.102 (0.419)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always, 'don't know' responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,292 interviews over 1,910 respondents).

Exhibit H7.5h: Differences in Impacts of HIP on How Often Soft Drinks are Available at Home, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	3.185 (0.060)	3.272 (0.058)	-0.088 (0.246)	
<3 servings/day	3.110 (0.060)	3.201 (0.059)	-0.091 (0.222)	
Impact: 3+ servings – <3 servings				0.003 (0.978)
Attitudes about food, fruits, & vegetables				
High	3.152 (0.062)	3.222 (0.060)	-0.071 (0.318)	
Low	3.146 (0.071)	3.260 (0.072)	-0.114 (0.158)	
Impact: high – low				0.043 (0.687)
Fruits & vegetables at home				
Frequently	3.223 (0.075)	3.265 (0.075)	-0.042 (0.583)	
Infrequently	3.087 (0.073)	3.214 (0.064)	-0.126 (0.082)*	
Impact: freq. – infreq.				0.084 (0.424)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always, 'don't know' responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,312 interviews over 1,918 respondents).

Exhibit H7.5i: Differences in Impacts of HIP on How Often All or Most of Family Sits Down and Eats Evening Meals Together at Home, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	3.861 (0.054)	3.914 (0.051)	-0.053 (0.421)	
<3 servings/day	3.966 (0.054)	3.925 (0.051)	0.041 (0.540)	
Impact: 3+ servings – <3 servings				-0.094 (0.317)
Attitudes about food, fruits, & vegetables				
High	3.878 (0.055)	3.925 (0.051)	-0.046 (0.459)	
Low	3.962 (0.063)	3.912 (0.065)	0.050 (0.488)	
Impact: high – low				-0.097 (0.320)
Fruits & vegetables at home				
Frequently	3.895 (0.060)	3.856 (0.059)	0.039 (0.564)	
Infrequently	3.936 (0.063)	3.984 (0.053)	-0.049 (0.465)	
Impact: freq. – infreq.				0.087 (0.358)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always, 'don't know' responses coded as missing.
Asked only in households with more than one member.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=2,306 interviews over 1,379 respondents).

Exhibit H7.5j: Differences in Impacts of HIP on How Often Evening Meals are Cooked at Home, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	4.381 (0.034)	4.434 (0.036)	-0.053 (0.228)	
<3 servings/day	4.481 (0.035)	4.394 (0.036)	0.087 (0.056)*	
Impact: 3+ servings – <3 servings				-0.140 (0.027)**
Attitudes about food, fruits, & vegetables				
High	4.440 (0.037)	4.429 (0.037)	0.011 (0.798)	
Low	4.420 (0.042)	4.394 (0.044)	0.026 (0.577)	
Impact: high – low				-0.015 (0.818)
Fruits & vegetables at home				
Frequently	4.432 (0.041)	4.421 (0.040)	0.010 (0.806)	
Infrequently	4.431 (0.040)	4.409 (0.040)	0.023 (0.622)	
Impact: freq. – infreq.				-0.012 (0.846)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Categorical outcomes: 1=never, 2=rarely, 3=sometimes, 4=most of the time, 5=always, 'don't know' responses coded as missing.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 sample (N=3,311 interviews over 1,918 respondents).

Exhibit H8.1: Differences in Impacts of HIP on Consumption of Targeted Fruits (TF), Cup-Equivalents, by Demographic Subgroup, Preferred Restrictive Proxy Measure

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Respondent gender (N=3913 recalls from 2009 respondents)				
Females	0.581 (0.041)	0.463 (0.035)	0.118 (0.008)***	
Males	0.549 (0.066)	0.470 (0.057)	0.079 (0.262)	
Impact: females – males				0.039 (0.638)
Respondent age group (N=3913 recalls from 2009 respondents)				
16-40 years	0.180 (0.132)	0.108 (0.136)	0.072 (0.094)*	
41+ years	0.725 (0.062)	0.587 (0.059)	0.139 (0.023)**	
Impact: 16-40 years – 41+ years				-0.067 (0.372)
Respondent educational attainment (N=3892 recalls from 2000 respondents)[a]				
Less than high school (including GED)	0.618 (0.047)	0.476 (0.037)	0.143 (0.014)**	
High school diploma	0.486 (0.061)	0.420 (0.046)	0.066 (0.389)	
More than high school	0.530 (0.044)	0.485 (0.043)	0.045 (0.457)	
P-value for difference [c]				(0.481)
Respondent race/ethnicity (N=3913 recalls from 2009 respondents)				
Hispanic	0.589 (0.044)	0.482 (0.033)	0.107 (0.030)**	
Non-Hispanic white	0.479 (0.052)	0.418 (0.042)	0.061 (0.366)	
Non-Hispanic black	0.564 (0.073)	0.480 (0.083)	0.083 (0.415)	
Non-Hispanic other	0.993 (0.192)	0.577 (0.093)	0.416 (0.051)*	
P-value for difference [c]				(0.466)
Respondent disability status (N=3913 recalls from 2009 respondents)				
Disabled	0.570 (0.044)	0.513 (0.023)	0.099 (0.058)*	
Non-disabled	0.621 (0.043)	0.513 (0.023)	0.108 (0.026)**	
Impact: disabled – non-disabled				-0.005 (0.946)
Primary shopper employment status (N=3751 recalls from 1916 respondents)[b]				
Working full or part-time	0.542 (0.060)	0.495 (0.058)	0.047 (0.558)	
Not working	0.577 (0.035)	0.454 (0.027)	0.123 (0.006)***	
Impact: working – not working				-0.076 (0.416)
Household composition (N=3913 recalls from 2009 respondents)				
Children (and no elderly) in household	0.630 (0.053)	0.510 (0.044)	0.120 (0.018)**	
Other household	0.527 (0.045)	0.432 (0.035)	0.095 (0.077)*	
Impact: children in HH – other HH				0.026 (0.732)
Household WIC status (N=3744 recalls from 1915 respondents)[b]				
Participant	0.470 (0.057)	0.454 (0.053)	0.016 (0.818)	
Non-participant	0.589 (0.035)	0.462 (0.027)	0.128 (0.004)***	
Impact: participant – non-participant				-0.112 (0.164)
Household SNAP benefit amount (N=3913 recalls from 2009 respondents)				
$200 or less	0.583 (0.049)	0.471 (0.039)	0.112 (0.045)**	
Over $200	0.555 (0.050)	0.457 (0.042)	0.098 (0.042)**	
Impact: $200 or less – over $200				0.014 (0.850)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.

Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted fruit intake proxy measure includes intake of fruits acquired from the store. It excludes 100% juice, as well as mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Sample size is smaller for this subgroup analysis due to missing data on educational attainment for some sampled respondents.
[b] Sample size is smaller for this subgroup analysis because the primary shopper employment status and household WIC status items are included in the primary shopper survey, which was not completed in all households with a sampled respondent completing a dietary recall interview.
[c] For demographic characteristics with more than two subgroup categories (respondent educational attainment and respondent race/ethnicity), p-value in parentheses represents significance level for joint test across all categories.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round.

Exhibit H8.2: Differences in Impacts of HIP on Consumption of Targeted Fruits (TF), Cup-Equivalents, by Baseline Fruit and Vegetable Behaviors and Preferences Subgroup, Preferred Restrictive Proxy Measure

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline fruit and vegetable intake (screener) (N=3913 recalls from 2009 respondents)				
3+ servings/day	0.607 (0.055)	0.467 (0.043)	0.140 (0.031)**	
<3 servings/day	0.534 (0.040)	0.464 (0.036)	0.071 (0.070)*	
Impact: 3+ servings – <3 servings				0.069 (0.365)
Baseline TFV intake (predicted) (N=3162 recalls from 1604 respondents)				
High (above median)	0.605 (0.061)	0.480 (0.042)	0.124 (0.081)*	
Low (below median)	0.510 (0.045)	0.425 (0.042)	0.085 (0.053)*	
Impact: high – low				0.039 (0.636)
Baseline TFV spending (predicted) (N=3162 recalls from 1604 respondents)				
High (above median)	0.607 (0.058)	0.466 (0.042)	0.141 (0.029)**	
Low (below median)	0.513 (0.047)	0.440 (0.048)	0.073 (0.204)	
Impact: high – low				0.068 (0.438)
Attitudes about food, fruits, and vegetables (N=3913 recalls from 2009 respondents)				
High (above median)	0.661 (0.045)	0.506 (0.036)	0.155 (0.002)***	
Low (below median)	0.456 (0.052)	0.409 (0.042)	0.047 (0.384)	
Impact: high – low				0.108 (0.144)
Barriers to eating fruits and vegetables (N=3913 recalls from 2009 respondents)				
High (above median)	0.590 (0.050)	0.459 (0.035)	0.131 (0.028)**	
Low (below median)	0.547 (0.034)	0.472 (0.034)	0.075 (0.121)	
Impact: high – low				0.055 (0.473)
Barriers to grocery shopping (N=3913 recalls from 2009 respondents)				
High (above median)	0.598 (0.072)	0.458 (0.052)	0.141 (0.028)**	
Low (below median)	0.549 (0.049)	0.471 (0.044)	0.078 (0.088)*	
Impact: high – low				0.063 (0.430)
Fruits and vegetables at home (N=3913 recalls from 2009 respondents)				
Frequently	0.522 (0.059)	0.494 (0.047)	0.028 (0.655)	
Infrequently	0.607 (0.047)	0.442 (0.043)	0.166 (<0.001) ***	
Impact: frequently – infrequently				-0.138 (0.080)*
Pre-HIP shopping patterns (N=2521 interviews from 1327 respondents)[a]				
Shopped primarily at HIP participating retailers	0.596 (0.044)	0.416 (0.033)	0.180 (0.001)***	
Shopped primarily at non-HIP participating retailers	0.617 (0.063)	0.454 (0.049)	0.163 (0.042)**	
Impact: HIP shoppers – non-HIP-shoppers				0.017 (0.857)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted fruit intake proxy measure includes intake of fruits acquired from the store. It excludes 100% juice, as well as mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round.

Exhibit H8.3: Differences in Impacts of HIP on Consumption of Targeted Vegetables (TV), Cup-Equivalents, by Demographic Subgroup, Preferred Restrictive Proxy Measure

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Respondent gender (N=3913 recalls from 2009 respondents)				
Females	0.589 (0.034)	0.440 (0.027)	0.149 (<0.001)***	
Males	0.555 (0.057)	0.456 (0.044)	0.098 (0.150)	
Impact: females – males				0.051 (0.521)
Respondent age group (N=3913 recalls from 2009 respondents)				
16-40 years	0.186 (0.111)	0.065 (0.120)	0.121 (0.010)***	
41+ years	0.737 (0.048)	0.593 (0.046)	0.144 (0.001)***	
Impact: 16-40 years – 41+ years				-0.023 (0.720)
Respondent educational attainment (N=3892 recalls from 2000 respondents)[a]				
Less than high school (including GED)	0.568 (0.034)	0.397 (0.026)	0.171 (<0.001)***	
High school diploma	0.548 (0.054)	0.508 (0.050)	0.040 (0.587)	
More than high school	0.625 (0.053)	0.491 (0.052)	0.134 (0.058)*	
P-value for difference[c]				(0.302)
Respondent race/ethnicity (N=3913 recalls from 2009 respondents)				
Hispanic	0.580 (0.042)	0.472 (0.035)	0.108 (0.030)**	
Non-Hispanic white	0.534 (0.043)	0.364 (0.035)	0.170 (0.001)***	
Non-Hispanic black	0.605 (0.074)	0.468 (0.048)	0.136 (0.109)	
Non-Hispanic other	0.730 (0.128)	0.664 (0.172)	0.067 (0.754)	
P-value for difference[c]				(0.840)
Respondent disability status (N=3913 recalls from 2009 respondents)				
Disabled	0.571 (0.037)	0.469 (0.033)	0.102 (0.027)**	
Non-disabled	0.586 (0.038)	0.421 (0.031)	0.165 (<0.001) ***	
Impact: disabled – non-disabled				-0.063 (0.343)
Primary shopper employment status (N=3751 recalls from 1916 respondents)[b]				
Working full or part-time	0.537 (0.056)	0.430 (0.035)	0.107 (0.099)*	
Not working	0.589 (0.029)	0.440 (0.022)	0.149 (<0.001)***	
Impact: working – not working				-0.042 (0.573)
Household composition (N=3913 recalls from 2009 respondents)				
Children (and no elderly) in household	0.682 (0.045)	0.520 (0.043)	0.162 (0.001)***	
Other household	0.502 (0.036)	0.390 (0.027)	0.112 (0.010)***	
Impact: children in HH – other HH				0.050 (0.448)
Household WIC status (N=3744 recalls from 1915 respondents)[b]				
Participant	0.570 (0.062)	0.405 (0.044)	0.166 (0.016)**	
Non-participant	0.582 (0.029)	0.449 (0.022)	0.133 (<0.001)***	
Impact: participant – non-participant				0.033 (0.677)
Household SNAP benefit amount (N=3913 recalls from 2009 respondents)				
$200 or less	0.552 (0.039)	0.437 (0.029)	0.115 (0.009)***	
Over $200	0.611 (0.043)	0.455 (0.036)	0.156 (0.001)***	
Impact: $200 or less – over $200				-0.041 (0.531)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.

Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted vegetable intake proxy measure includes intake of vegetables acquired from the store. It excludes white potatoes and legumes, as well as mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]Sample size is smaller for this subgroup analysis due to missing data on educational attainment for some sampled respondents.
[b]Sample size is smaller for this subgroup analysis because the primary shopper employment status and household WIC status items are included in the primary shopper survey, which was not completed in all households with a sampled respondent completing a dietary recall interview.
[c]For demographic characteristics with more than two subgroup categories (respondent educational attainment and respondent race/ethnicity), p-value in parentheses represents significance level for joint test across all categories.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round.

Exhibit H8.4: Differences in Impacts of HIP on Consumption of Targeted Vegetables (TV), Cup-Equivalents, by Baseline Fruit and Vegetable Behaviors and Preferences Subgroup, Preferred Restrictive Proxy Measure

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline fruit and vegetable intake (screener) (N=3913 recalls from 2009 respondents)				
3+ servings/day	0.592 (0.040)	0.442 (0.038)	0.149 (0.003)***	
<3 servings/day	0.564 (0.039)	0.448 (0.030)	0.116 (0.004)***	
Impact: 3+ servings – <3 servings				0.033 (0.600)
Baseline TFV intake (predicted) (N=3162 recalls from 1604 respondents)				
High (above median)	0.642 (0.051)	0.429 (0.032)	0.213 (<0.001) ***	
Low (below median)	0.566 (0.041)	0.452 (0.037)	0.114 (0.008)***	
Impact: high – low				0.099 (0.170)
Baseline TFV spending (predicted) (N=3162 recalls from 1604 respondents)				
High (above median)	0.647 (0.046)	0.412 (0.029)	0.235 (<0.001)***	
Low (below median)	0.565 (0.041)	0.470 (0.035)	0.095 (0.060)*	
Impact: high – low				0.140 (0.050)*
Attitudes about food, fruits, and vegetables (N=3913 recalls from 2009 respondents)				
High (above median)	0.644 (0.042)	0.439 (0.032)	0.205 (<0.001)***	
Low (below median)	0.494 (0.040)	0.453 (0.038)	0.041 (0.283)	
Impact: high – low				0.164 (0.010)***
Barriers to eating fruits and vegetables (N=3913 recalls from 2009 respondents)				
High (above median)	0.565 (0.040)	0.395 (0.025)	0.169 (<0.001)***	
Low (below median)	0.585 (0.034)	0.496 (0.038)	0.089 (0.076)*	
Impact: high – low				0.080 (0.243)
Barriers to grocery shopping (N=3913 recalls from 2009 respondents)				
High (above median)	0.552 (0.052)	0.428 (0.044)	0.124 (0.013)**	
Low (below median)	0.599 (0.045)	0.460 (0.038)	0.139 (0.001)***	
Impact: high – low				-0.015 (0.816)
Fruits and vegetables at home (N=3913 recalls from 2009 respondents)				
Frequently	0.600 (0.047)	0.446 (0.041)	0.154 (0.003)***	
Infrequently	0.561 (0.038)	0.445 (0.033)	0.116 (0.005)***	
Impact: frequently – infrequently				0.038 (0.562)
Pre-HIP shopping patterns (N=2521 interviews from 1327 respondents)[a]				
Shopped primarily at HIP participating retailers	0.591 (0.040)	0.469 (0.041)	0.122 (0.026)**	
Shopped primarily at non-HIP participating retailers	0.641 (0.062)	0.432 (0.034)	0.209 (0.003)***	
Impact: HIP shoppers – non-HIP-shoppers				-0.087 (0.341)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted vegetable intake proxy measure includes intake of vegetables acquired from the store. It excludes white potatoes and legumes, as well as mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round.

Exhibit H8.5: Differences in Impacts of HIP on Consumption of Total Fruits and Vegetables, Cup-Equivalents, by Demographic Subgroup

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Respondent gender (N=3913 recalls from 2009 respondents)				
Females	2.568 (0.084)	2.211 (0.074)	0.357 (<0.001)***	
Males	2.708 (0.144)	2.458 (0.131)	0.250 (0.134)	
Impact: females – males				0.107 (0.578)
Respondent age group (N=3913 recalls from 2009 respondents)				
16-40 years	1.811 (0.309)	1.499 (0.330)	0.312 (0.006)***	
41+ years	2.902 (0.123)	2.569 (0.132)	0.333 (0.004)***	
Impact: 16-40 years – 41+ years				-0.021 (0.898)
Respondent educational attainment (N=3892 recalls from 2000 respondents)[a]				
Less than high school (including GED)	2.690 (0.087)	2.171 (0.077)	0.519 (<0.001)***	
High school diploma	2.447 (0.128)	2.337 (0.110)	0.110 (0.512)	
More than high school	2.595 (0.110)	2.503 (0.118)	0.092 (0.559)	
P-value for difference[c]				(0.045)**
Respondent race/ethnicity (N=3913 recalls from 2009 respondents)				
Hispanic	2.623 (0.098)	2.202 (0.080)	0.421 (<0.001)***	
Non-Hispanic white	2.540 (0.102)	2.225 (0.096)	0.315 (0.016)**	
Non-Hispanic black	2.594 (0.176)	2.589 (0.201)	0.004 (0.986)	
Non-Hispanic other	3.068 (0.306)	2.647 (0.305)	0.421 (0.329)	
P-value for difference[c]				(0.470)
Respondent disability status (N=3913 recalls from 2009 respondents)				
Disabled	2.619 (0.089)	2.379 (0.086)	0.240 (0.042)**	
Non-disabled	2.615 (0.091)	2.207 (0.073)	0.408 (<0.001)***	
Impact: disabled – non-disabled				-0.168 (0.306)
Primary shopper employment status (N=3751 recalls from 1916 respondents)[b]				
Working full or part-time	2.531 (0.118)	2.280 (0.108)	0.251 (0.106)	
Not working	2.643 (0.072)	2.300 (0.063)	0.343 (<0.001)***	
Impact: working – not working				-0.092 (0.611)
Household composition (N=3913 recalls from 2009 respondents)				
Children (and no elderly) in household	2.734 (0.122)	2.355 (0.109)	0.379 (0.002)***	
Other household	2.530 (0.094)	2.249 (0.087)	0.282 (0.010)**	
Impact: children in HH – other HH				0.097 (0.553)
Household WIC status (N=3744 recalls from 1915 respondents)[b]				
Participant	2.606 (0.148)	2.239 (0.122)	0.367 (0.032)**	
Non-participant	2.621 (0.070)	2.301 (0.062)	0.321 (0.001)***	
Impact: participant – non-participant				0.046 (0.812)
Household SNAP benefit amount (N=3913 recalls from 2009 respondents)				
$200 or less	2.625 (0.102)	2.277 (0.089)	0.347 (0.002)***	
Over $200	2.605 (0.110)	2.314 (0.101)	0.291 (0.010)**	
Impact: $200 or less – over $200				0.056 (0.726)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.

Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]Sample size is smaller for this subgroup analysis due to missing data on educational attainment for some sampled respondents.
[b]Sample size is smaller for this subgroup analysis because the primary shopper employment status and household WIC status items are included in the primary shopper survey, which was not completed in all households with a sampled respondent completing a dietary recall interview.
[c]For demographic characteristics with more than two subgroup categories (respondent educational attainment and respondent race/ethnicity), p-value in parentheses represents significance level for joint test across all categories.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round.

Exhibit H8.6: Differences in Impacts of HIP on Consumption of Total Fruits and Vegetables, Cup-Equivalents, by Baseline Fruit and Vegetable Behaviors and Preferences Subgroup

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline fruit and vegetable intake (screener) (N=3913 recalls from 2009 respondents)				
3+ servings/day	2.733 (0.104)	2.269 (0.089)	0.464 (<0.001)***	
<3 servings/day	2.501 (0.089)	2.319 (0.084)	0.182 (0.064)*	
Impact: 3+ servings – <3 servings				0.282 (0.083)*
Baseline TFV intake (predicted) (N=3162 recalls from 1604 respondents)				
High (above median)	2.717 (0.112)	2.357 (0.095)	0.360 (0.007)***	
Low (below median)	2.529 (0.111)	2.226 (0.102)	0.304 (0.010)***	
Impact: high – low				0.056 (0.750)
Baseline TFV spending (predicted) (N=3162 recalls from 1604 respondents)				
High (above median)	2.691 (0.105)	2.343 (0.085)	0.347 (0.006)***	
Low (below median)	2.563 (0.105)	2.240 (0.098)	0.323 (0.011)**	
Impact: high – low				0.025 (0.892)
Attitudes about food, fruits, and vegetables (N=3913 recalls from 2009 respondents)				
High (above median)	2.844 (0.095)	2.419 (0.091)	0.425 (<0.001) ***	
Low (below median)	2.327 (0.108)	2.123 (0.096)	0.204 (0.067)*	
Impact: high – low				0.221 (0.168)
Barriers to eating fruits and vegetables (N=3913 recalls from 2009 respondents)				
High (above median)	2.625 (0.094)	2.205 (0.083)	0.419 (0.001)***	
Low (below median)	2.597 (0.081)	2.383 (0.081)	0.214 (0.059)*	
Impact: high – low				0.205 (0.223)
Barriers to grocery shopping (N=3913 recalls from 2009 respondents)				
High (above median)	2.656 (0.137)	2.373 (0.118)	0.282 (0.027)**	
Low (below median)	2.584 (0.110)	2.225 (0.098)	0.359 (0.001)***	
Impact: high – low				-0.077 (0.642)
Fruits and vegetables at home (N=3913 recalls from 2009 respondents)				
Frequently	2.606 (0.114)	2.384 (0.106)	0.222 (0.074)*	
Infrequently	2.621 (0.098)	2.221 (0.098)	0.400 (<0.001)***	
Impact: frequently – infrequently				-0.178 (0.281)
Pre-HIP shopping patterns (N=2521 interviews from 1327 respondents)[a]				
Shopped primarily at HIP participating retailers	2.664 (0.095)	2.204 (0.081)	0.460 (<0.001)***	
Shopped primarily at non-HIP participating retailers	2.722 (0.130)	2.321 (0.112)	0.401 (0.019)**	
Impact: HIP shoppers – non-HIP-shoppers				0.058 (0.782)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a] Smaller N for this subgroup because pre-HIP status information was not available for all respondents.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round.

Exhibit H8.7a: Differences in Impacts of HIP on Consumption of Targeted Fruits and Vegetables (TFV) from Mixed Foods, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.294 (0.019)	0.303 (0.020)	-0.008 (0.733)	
<3 servings/day	0.319 (0.021)	0.306 (0.023)	0.013 (0.657)	
Impact: 3+ servings – <3 servings				-0.021 (0.566)
Attitudes about food, fruits, & vegetables				
High	0.295 (0.021)	0.287 (0.020)	0.008 (0.740)	
Low	0.321 (0.025)	0.328 (0.026)	-0.007 (0.797)	
Impact: high – low				0.016 (0.671)
Fruits & vegetables at home				
Frequently	0.337 (0.025)	0.320 (0.024)	0.017 (0.550)	
Infrequently	0.283 (0.023)	0.292 (0.020)	-0.009 (0.749)	
Impact: freq. – infreq.				0.025 (0.517)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted fruit and vegetable intake (TFV) includes intake of fruits and vegetables acquired from the store. It excludes white potatoes, legumes, and 100% juice. Mixed foods where the source of individual ingredients was not identified by the respondent are excluded from our preferred restricted TFV measure but included in our alternative inclusive TFV measure. The outcome described in this table is fruit and vegetable intake from mixed foods, excluding white potatoes, legumes, and 100% juice.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.7b: Differences in Impacts of HIP on Consumption of Targeted Fruits and Vegetables (TFV), Alternative Inclusive Proxy Measure, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	1.493 (0.079)	1.212 (0.067)	0.281 (0.003)***	
<3 servings/day	1.417 (0.067)	1.218 (0.059)	0.200 (0.004)***	
Impact: 3+ servings – <3 servings				0.082 (0.487)
Attitudes about food, fruits, & vegetables				
High	1.600 (0.072)	1.232 (0.059)	0.368 (<0.001) ***	
Low	1.271 (0.078)	1.191 (0.068)	0.080 (0.308)	
Impact: high – low				0.287 (0.013)**
Fruits & vegetables at home				
Frequently	1.458 (0.089)	1.260 (0.072)	0.198 (0.037)**	
Infrequently	1.451 (0.070)	1.178 (0.067)	0.273 (<0.001) ***	
Impact: freq. – infreq.				-0.075 (0.539)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted fruit and vegetable (TFV) intake proxy measures include intake of fruits and vegetables acquired from the store, excluding white potatoes, legumes, and 100% juice. The preferred restrictive proxy measure additionally excludes fruit and vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent, while the alternative inclusive proxy measure includes fruit and vegetable intake from all mixed foods.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.7c: Differences in Impacts of HIP on Consumption of 100% Juice, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.610 (0.049)	0.447 (0.034)	0.163 (0.005)***	
<3 servings/day	0.487 (0.038)	0.460 (0.035)	0.027 (0.532)	
Impact: 3+ servings – <3 servings				0.136 (0.066)*
Attitudes about food, fruits, & vegetables				
High	0.573 (0.042)	0.472 (0.041)	0.101 (0.028)**	
Low	0.517 (0.057)	0.428 (0.049)	0.090 (0.137)	
Impact: high – low				0.012 (0.880)
Fruits & vegetables at home				
Frequently	0.510 (0.047)	0.455 (0.046)	0.055 (0.284)	
Infrequently	0.578 (0.048)	0.452 (0.039)	0.126 (0.014)**	
Impact: freq. – infreq.				-0.071 (0.327)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.7d: Differences in Impacts of HIP on Consumption of White Potatoes, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.348 (0.028)	0.326 (0.022)	0.021 (0.540)	
<3 servings/day	0.326 (0.025)	0.393 (0.029)	-0.067 (0.047)**	
Impact: 3+ servings – <3 servings				0.089 (0.071)*
Attitudes about food, fruits, & vegetables				
High	0.356 (0.028)	0.406 (0.029)	-0.049 (0.153)	
Low	0.311 (0.029)	0.296 (0.027)	0.014 (0.649)	
Impact: high – low				-0.064 (0.169)
Fruits & vegetables at home				
Frequently	0.410 (0.033)	0.397 (0.035)	0.013 (0.713)	
Infrequently	0.278 (0.029)	0.329 (0.025)	-0.051 (0.099)*	
Impact: freq. – infreq.				0.064 (0.162)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.7e: Differences in Impacts of HIP on Consumption of Legumes, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.109 (0.011)	0.113 (0.011)	-0.004 (0.790)	
<3 servings/day	0.102 (0.011)	0.115 (0.010)	-0.013 (0.324)	
Impact: 3+ servings – <3 servings				0.009 (0.643)
Attitudes about food, fruits, & vegetables				
High	0.111 (0.011)	0.118 (0.011)	-0.007 (0.586)	
Low	0.099 (0.012)	0.108 (0.013)	-0.009 (0.496)	
Impact: high – low				0.002 (0.905)
Fruits & vegetables at home				
Frequently	0.090 (0.013)	0.095 (0.012)	-0.005 (0.669)	
Infrequently	0.119 (0.012)	0.129 (0.012)	-0.010 (0.445)	
Impact: freq. – infreq.				0.005 (0.788)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.7f: Differences in Impacts of HIP on Consumption of Other Fruits and Vegetables Acquired Outside Stores, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.172 (0.026)	0.171 (0.024)	0.001 (0.972)	
<3 servings/day	0.168 (0.025)	0.133 (0.023)	0.035 (0.222)	
Impact: 3+ servings – <3 servings				-0.034 (0.453)
Attitudes about food, fruits, & vegetables				
High	0.203 (0.027)	0.191 (0.028)	0.013 (0.693)	
Low	0.129 (0.030)	0.100 (0.027)	0.029 (0.326)	
Impact: high – low				-0.017 (0.697)
Fruits & vegetables at home				
Frequently	0.138 (0.027)	0.177 (0.029)	-0.039 (0.265)	
Infrequently	0.195 (0.028)	0.133 (0.024)	0.062 (0.033)**	
Impact: freq. – infreq.				-0.101 (0.024)**

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.8a: Differences in Impacts of HIP on Consumption of Targeted Fruit from Citrus Fruits, Melons, and Berries, Preferred Restrictive Proxy Measure, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.130 (0.018)	0.125 (0.024)	0.004 (0.872)	
<3 servings/day	0.132 (0.017)	0.112 (0.017)	0.020 (0.252)	
Impact: 3+ servings – <3 servings				-0.016 (0.623)
Attitudes about food, fruits, & vegetables				
High	0.140 (0.019)	0.115 (0.015)	0.025 (0.270)	
Low	0.121 (0.021)	0.124 (0.023)	-0.004 (0.859)	
Impact: high – low				0.029 (0.342)
Fruits & vegetables at home				
Frequently	0.111 (0.023)	0.118 (0.019)	-0.007 (0.795)	
Infrequently	0.147 (0.017)	0.120 (0.019)	0.027 (0.101)	
Impact: freq. – infreq.				-0.035 (0.268)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted fruit intake proxy measure includes intake of fruits acquired from the store. It excludes 100% juice, as well as fruit intake from mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.8b: Differences in Impacts of HIP on Consumption of Targeted Fruit from Other Fruits, Preferred Restrictive Proxy Measure, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.477 (0.047)	0.341 (0.032)	0.136 (0.011)**	
<3 servings/day	0.402 (0.034)	0.351 (0.032)	0.051 (0.129)	
Impact: 3+ servings – <3 servings				0.085 (0.178)
Attitudes about food, fruits, & vegetables				
High	0.521 (0.038)	0.391 (0.031)	0.130 (0.003)***	
Low	0.335 (0.042)	0.285 (0.033)	0.051 (0.244)	
Impact: high – low				0.079 (0.195)
Fruits & vegetables at home				
Frequently	0.411 (0.048)	0.376 (0.041)	0.035 (0.477)	
Infrequently	0.460 (0.042)	0.322 (0.034)	0.138 (0.001)***	
Impact: freq. – infreq.				-0.103 (0.115)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted fruit intake proxy measure includes intake of fruits acquired from the store. It excludes 100% juice, as well as fruit intake mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.8c: Differences in Impacts of HIP on Consumption of Targeted Vegetables from Dark Green Vegetables, Preferred Restrictive Proxy Measure, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.078 (0.014)	0.037 (0.010)	0.041 (0.003)***	
<3 servings/day	0.073 (0.013)	0.050 (0.011)	0.023 (0.025)**	
Impact: 3+ servings – <3 servings				0.018 (0.296)
Attitudes about food, fruits, & vegetables				
High	0.080 (0.011)	0.033 (0.008)	0.046 (<0.001) ***	
Low	0.071 (0.011)	0.057 (0.012)	0.013 (0.284)	
Impact: high – low				0.033 (0.068)*
Fruits & vegetables at home				
Frequently	0.072 (0.012)	0.049 (0.011)	0.023 (0.123)	
Infrequently	0.078 (0.011)	0.039 (0.007)	0.039 (<0.001) ***	
Impact: freq. – infreq.				-0.015 (0.430)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted vegetable intake proxy measure includes intake of vegetables acquired from the store. It excludes white potatoes and legumes, as well as vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.8d: Differences in Impacts of HIP on Consumption of Targeted Vegetables from Red and Orange Vegetables, Preferred Restrictive Proxy Measure, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.148 (0.016)	0.100 (0.012)	0.049 (0.011)**	
<3 servings/day	0.124 (0.013)	0.110 (0.012)	0.014 (0.313)	
Impact: 3+ servings – <3 servings				0.035 (0.141)
Attitudes about food, fruits, & vegetables				
High	0.160 (0.017)	0.101 (0.011)	0.059 (0.002)***	
Low	0.105 (0.011)	0.109 (0.014)	-0.004 (0.715)	
Impact: high – low				0.064 (0.004)***
Fruits & vegetables at home				
Frequently	0.146 (0.018)	0.100 (0.014)	0.046 (0.020)**	
Infrequently	0.128 (0.013)	0.108 (0.013)	0.020 (0.175)	
Impact: freq. – infreq.				0.027 (0.280)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted vegetable intake proxy measure includes intake of vegetables acquired from the store. It excludes white potatoes and legumes, as well as vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.8e: Differences in Impacts of HIP on Consumption of Targeted Vegetables from Tomatoes, Preferred Restrictive Proxy Measure, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.096 (0.010)	0.076 (0.010)	0.020 (0.127)	
<3 servings/day	0.077 (0.009)	0.063 (0.008)	0.014 (0.141)	
Impact: 3+ servings – <3 servings				0.006 (0.720)
Attitudes about food, fruits, & vegetables				
High	0.098 (0.010)	0.068 (0.008)	0.030 (0.014)**	
Low	0.071 (0.009)	0.071 (0.010)	0.001 (0.956)	
Impact: high – low				0.029 (0.058)*
Fruits & vegetables at home				
Frequently	0.108 (0.013)	0.083 (0.012)	0.025 (0.068)*	
Infrequently	0.070 (0.009)	0.059 (0.009)	0.011 (0.267)	
Impact: freq. – infreq.				0.014 (0.400)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted vegetable intake proxy measure includes intake of vegetables acquired from the store. It excludes white potatoes and legumes, as well as vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.8f: Differences in Impacts of HIP on Consumption of Targeted Vegetables from Other Red and Orange Vegetables, Preferred Restrictive Proxy Measure, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.052 (0.012)	0.023 (0.006)	0.029 (0.023)**	
<3 servings/day	0.047 (0.007)	0.047 (0.008)	>-0.001 (0.998)	
Impact: 3+ servings – <3 servings				0.029 (0.061)*
Attitudes about food, fruits, & vegetables				
High	0.062 (0.012)	0.033 (0.006)	0.029 (0.018)**	
Low	0.033 (0.007)	0.038 (0.008)	-0.005 (0.502)	
Impact: high – low				0.034 (0.015)**
Fruits & vegetables at home				
Frequently	0.038 (0.012)	0.017 (0.006)	0.021 (0.087)*	
Infrequently	0.058 (0.009)	0.050 (0.008)	0.009 (0.356)	
Impact: freq. – infreq.				0.012 (0.425)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted vegetable intake proxy measure includes intake of vegetables acquired from the store. It excludes white potatoes and legumes, as well as vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.8g: Differences in Impacts of HIP on Consumption of Targeted Vegetables from Starchy Vegetables, Preferred Restrictive Proxy Measure, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.092 (0.014)	0.079 (0.010)	0.014 (0.401)	
<3 servings/day	0.092 (0.012)	0.090 (0.011)	0.002 (0.891)	
Impact: 3+ servings – <3 servings				0.012 (0.587)
Attitudes about food, fruits, & vegetables				
High	0.105 (0.014)	0.088 (0.012)	0.017 (0.289)	
Low	0.075 (0.012)	0.079 (0.014)	-0.004 (0.784)	
Impact: high – low				0.021 (0.332)
Fruits & vegetables at home				
Frequently	0.091 (0.016)	0.077 (0.014)	0.014 (0.423)	
Infrequently	0.093 (0.013)	0.090 (0.012)	0.003 (0.826)	
Impact: freq. – infreq.				0.011 (0.631)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted vegetable intake proxy measure includes intake of vegetables acquired from the store. It excludes white potatoes and legumes, as well as vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.8h: Differences in Impacts of HIP on Consumption of Targeted Vegetables from Other Vegetables, Preferred Restrictive Proxy Measure, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.273 (0.022)	0.227 (0.024)	0.046 (0.124)	
<3 servings/day	0.275 (0.024)	0.199 (0.017)	0.077 (0.003)***	
Impact: 3+ servings – <3 servings				-0.031 (0.431)
Attitudes about food, fruits, & vegetables				
High	0.299 (0.025)	0.217 (0.020)	0.082 (0.008)***	
Low	0.244 (0.025)	0.208 (0.022)	0.036 (0.119)	
Impact: high – low				0.046 (0.236)
Fruits & vegetables at home				
Frequently	0.291 (0.029)	0.220 (0.025)	0.071 (0.021)**	
Infrequently	0.262 (0.023)	0.207 (0.020)	0.055 (0.032)**	
Impact: freq. – infreq.				0.016 (0.684)

Two-sided test: *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Targeted vegetable intake proxy measure includes intake of vegetables acquired from the store. It excludes white potatoes and legumes, as well as vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 respondents, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.9a: Differences in Impacts of HIP on Estimated Daily Intake from Fruit and Vegetable Screener, 100% Juice, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	1.142 (0.079)	1.025 (0.060)	0.117 (0.203)	
<3 servings/day	0.872 (0.071)	0.829 (0.070)	0.043 (0.501)	
Impact: 3+ servings – <3 servings				0.074 (0.510)
Attitudes about food, fruits, & vegetables				
High	1.060 (0.062)	0.998 (0.069)	0.062 (0.414)	
Low	0.947 (0.080)	0.834 (0.084)	0.112 (0.182)	
Impact: high – low				-0.050 (0.662)
Fruits & vegetables at home				
Frequently	0.984 (0.088)	0.864 (0.082)	0.120 (0.180)	
Infrequently	1.033 (0.069)	0.981 (0.072)	0.052 (0.464)	
Impact: freq. – infreq.				0.068 (0.558)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module, Modified Eating at America's Table Study (EATS) Fruit and Vegetable Screener), pooled Round 2 and Round 3 responses (unweighted N=3350 interviews from 1953 respondents).

Exhibit H8.9b: Differences in Impacts of HIP on Estimated Daily Intake from Fruit and Vegetable Screener, Fruit, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.734 (0.051)	0.632 (0.034)	0.103 (0.068)*	
<3 servings/day	0.617 (0.039)	0.584 (0.037)	0.033 (0.380)	
Impact: 3+ servings – <3 servings				0.069 (0.317)
Attitudes about food, fruits, & vegetables				
High	0.724 (0.044)	0.620 (0.038)	0.104 (0.036)**	
Low	0.617 (0.044)	0.592 (0.039)	0.025 (0.568)	
Impact: high – low				0.079 (0.242)
Fruits & vegetables at home				
Frequently	0.684 (0.049)	0.680 (0.042)	0.004 (0.931)	
Infrequently	0.668 (0.045)	0.550 (0.032)	0.118 (0.011)**	
Impact: freq. – infreq.				-0.113 (0.098)*

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module, Modified Eating at America's Table Study (EATS) Fruit and Vegetable Screener), pooled Round 2 and Round 3 responses, (unweighted N=3355 interviews from 1956 respondents).

Exhibit H8.9c: Differences in Impacts of HIP on Estimated Daily Intake from Fruit and Vegetable Screener, Salad, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.354 (0.019)	0.311 (0.017)	0.042 (0.070)*	
<3 servings/day	0.256 (0.014)	0.249 (0.016)	0.006 (0.707)	
Impact: 3+ servings – <3 servings				0.036 (0.219)
Attitudes about food, fruits, & vegetables				
High	0.328 (0.017)	0.290 (0.018)	0.037 (0.085)*	
Low	0.278 (0.017)	0.268 (0.017)	0.010 (0.569)	
Impact: high – low				0.027 (0.340)
Fruits & vegetables at home				
Frequently	0.324 (0.022)	0.261 (0.020)	0.063 (0.004)***	
Infrequently	0.293 (0.018)	0.297 (0.021)	-0.005 (0.811)	
Impact: freq. – infreq.				0.068 (0.023)**

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module, Modified Eating at America's Table Study (EATS) Fruit and Vegetable Screener), pooled Round 2 and Round 3 responses (unweighted N=3371 interviews from 1954 respondents).

Exhibit H8.9d: Differences in Impacts of HIP on Estimated Daily Intake from Fruit and Vegetable Screener, Fried Potatoes, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.056 (0.006)	0.078 (0.014)	-0.022 (0.162)	
<3 servings/day	0.055 (0.006)	0.066 (0.006)	-0.012 (0.067)*	
Impact: 3+ servings – <3 servings				-0.010 (0.546)
Attitudes about food, fruits, & vegetables				
High	0.051 (0.006)	0.084 (0.012)	-0.033 (0.022)**	
Low	0.061 (0.007)	0.056 (0.006)	0.005 (0.487)	
Impact: high – low				-0.038 (0.021)**
Fruits & vegetables at home				
Frequently	0.058 (0.007)	0.061 (0.007)	-0.004 (0.588)	
Infrequently	0.054 (0.006)	0.081 (0.015)	-0.027 (0.073)*	
Impact: freq. – infreq.				0.023 (0.174)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module, Modified Eating at America's Table Study (EATS) Fruit and Vegetable Screener), pooled Round 2 and Round 3 responses (unweighted N=3389 interviews from 1961 respondents).

Exhibit H8.9e: Differences in Impacts of HIP on Estimated Daily Intake from Fruit and Vegetable Screener, Other Potatoes, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.235 (0.018)	0.212 (0.014)	0.022 (0.326)	
<3 servings/day	0.194 (0.013)	0.199 (0.013)	-0.004 (0.738)	
Impact: 3+ servings – <3 servings				0.026 (0.304)
Attitudes about food, fruits, & vegetables				
High	0.199 (0.014)	0.207 (0.013)	-0.007 (0.660)	
Low	0.234 (0.018)	0.204 (0.018)	0.031 (0.122)	
Impact: high – low				-0.038 (0.142)
Fruits & vegetables at home				
Frequently	0.221 (0.018)	0.225 (0.019)	-0.004 (0.840)	
Infrequently	0.209 (0.017)	0.190 (0.013)	0.020 (0.256)	
Impact: freq. – infreq.				-0.024 (0.373)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module, Modified Eating at America's Table Study (EATS) Fruit and Vegetable Screener), pooled Round 2 and Round 3 responses (unweighted N=3379 interviews from 1961 respondents).

Exhibit H8.9f: Differences in Impacts of HIP on Estimated Daily Intake from Fruit and Vegetable Screener, Beans, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.217 (0.019)	0.208 (0.014)	0.009 (0.678)	
<3 servings/day	0.165 (0.012)	0.166 (0.011)	-0.001 (0.945)	
Impact: 3+ servings – <3 servings				0.010 (0.686)
Attitudes about food, fruits, & vegetables				
High	0.180 (0.014)	0.182 (0.012)	-0.002 (0.901)	
Low	0.207 (0.019)	0.194 (0.014)	0.012 (0.547)	
Impact: high – low				-0.014 (0.580)
Fruits & vegetables at home				
Frequently	0.183 (0.017)	0.178 (0.016)	0.004 (0.782)	
Infrequently	0.199 (0.018)	0.194 (0.014)	0.004 (0.811)	
Impact: freq. – infreq.				>-0.001 (0.999)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module, Modified Eating at America's Table Study (EATS) Fruit and Vegetable Screener), pooled Round 2 and Round 3 responses (unweighted N=3376 interviews from 1958 respondents).

Exhibit H8.9g: Differences in Impacts of HIP on Estimated Daily Intake from Fruit and Vegetable Screener, Other Vegetables, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.552 (0.032)	0.501 (0.028)	0.051 (0.204)	
<3 servings/day	0.458 (0.028)	0.450 (0.027)	0.009 (0.765)	
Impact: 3+ servings – <3 servings				0.042 (0.397)
Attitudes about food, fruits, & vegetables				
High	0.550 (0.031)	0.499 (0.028)	0.051 (0.145)	
Low	0.450 (0.032)	0.445 (0.031)	0.005 (0.879)	
Impact: high – low				0.047 (0.334)
Fruits & vegetables at home				
Frequently	0.535 (0.038)	0.508 (0.036)	0.027 (0.526)	
Infrequently	0.483 (0.030)	0.450 (0.027)	0.032 (0.262)	
Impact: freq. – infreq.				-0.005 (0.917)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module, Modified Eating at America's Table Study (EATS) Fruit and Vegetable Screener), pooled Round 2 and Round 3 responses (unweighted N=3350 interviews from 1948 respondents).

Exhibit H8.9h: Differences in Impacts of HIP on Estimated Daily Intake from Fruit and Vegetable Screener, Tomatoes, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.113 (0.010)	0.108 (0.007)	0.006 (0.645)	
<3 servings/day	0.090 (0.007)	0.106 (0.009)	-0.016 (0.074)*	
Impact: 3+ servings – <3 servings				0.021 (0.159)
Attitudes about food, fruits, & vegetables				
High	0.100 (0.009)	0.111 (0.008)	-0.010 (0.306)	
Low	0.103 (0.009)	0.102 (0.008)	0.002 (0.871)	
Impact: high – low				-0.012 (0.404)
Fruits & vegetables at home				
Frequently	0.105 (0.011)	0.107 (0.010)	-0.002 (0.881)	
Infrequently	0.099 (0.010)	0.107 (0.009)	-0.008 (0.448)	
Impact: freq. – infreq.				0.006 (0.680)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module, Modified Eating at America's Table Study (EATS) Fruit and Vegetable Screener), pooled Round 2 and Round 3 responses (unweighted N=3391 interviews from 1945 respondents).

Exhibit H8.9i: Differences in Impacts of HIP on Estimated Daily Intake from Fruit and Vegetable Screener, Salsa, Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.010 (0.002)	0.010 (0.001)	0.001 (0.823)	
<3 servings/day	0.007 (0.001)	0.007 (0.002)	>-0.001 (0.782)	
Impact: 3+ servings – <3 servings				0.001 (0.734)
Attitudes about food, fruits, & vegetables				
High	0.011 (0.003)	0.011 (0.002)	<0.001 (0.941)	
Low	0.006 (0.002)	0.005 (0.002)	<0.001 (0.926)	
Impact: high – low				>-0.001 (1.000)
Fruits & vegetables at home				
Frequently	0.009 (0.002)	0.009 (0.002)	0.001 (0.846)	
Infrequently	0.008 (0.001)	0.009 (0.001)	>-0.001 (0.815)	
Impact: freq. – infreq.				0.001 (0.792)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (respondent module, Modified Eating at America's Table Study (EATS) Fruit and Vegetable Screener), pooled Round 2 and Round 3 responses (unweighted N=3383 interviews from 1958 respondents).

Exhibit H8.10a: Differences in Impacts of HIP on Probability of Any Fruit and Vegetable Intake in Past 24 Hours, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.971 (0.007)	0.965 (0.007)	0.006 (0.462)	
<3 servings/day	0.957 (0.008)	0.945 (0.010)	0.012 (0.301)	
Impact: 3+ servings – <3 servings				-0.006 (0.682)
Attitudes about food, fruits, & vegetables				
High	0.972 (0.007)	0.960 (0.009)	0.012 (0.159)	
Low	0.956 (0.011)	0.948 (0.010)	0.007 (0.570)	
Impact: high – low				0.005 (0.762)
Fruits & vegetables at home				
Frequently	0.966 (0.010)	0.958 (0.011)	0.008 (0.437)	
Infrequently	0.964 (0.009)	0.953 (0.010)	0.011 (0.273)	
Impact: freq. – infreq.				-0.003 (0.842)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.10b: Differences in Impacts of HIP on Probability of Fruit and Vegetable Intake of One Cup-Equivalent or More in Past 24 Hours, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.740 (0.018)	0.712 (0.017)	0.028 (0.186)	
<3 servings/day	0.746 (0.019)	0.716 (0.018)	0.030 (0.194)	
Impact: 3+ servings – <3 servings				-0.002 (0.958)
Attitudes about food, fruits, & vegetables				
High	0.780 (0.017)	0.724 (0.018)	0.056 (0.004)***	
Low	0.697 (0.023)	0.701 (0.022)	-0.004 (0.868)	
Impact: high – low				0.060 (0.062)*
Fruits & vegetables at home				
Frequently	0.741 (0.023)	0.735 (0.022)	0.005 (0.822)	
Infrequently	0.745 (0.019)	0.697 (0.019)	0.047 (0.024)**	
Impact: freq. – infreq.				-0.042 (0.185)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.10c: Differences in Impacts of HIP on Probability of Fruit and Vegetable Intake of 2.5 Cup-Equivalents or More in Past 24 Hours, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.444 (0.020)	0.344 (0.019)	0.100 (<0.001) ***	
<3 servings/day	0.389 (0.020)	0.364 (0.019)	0.025 (0.293)	
Impact: 3+ servings – <3 servings				0.075 (0.032)**
Attitudes about food, fruits, & vegetables				
High	0.467 (0.021)	0.373 (0.019)	0.094 (<0.001) ***	
Low	0.351 (0.023)	0.326 (0.023)	0.025 (0.326)	
Impact: high – low				0.069 (0.047)**
Fruits & vegetables at home				
Frequently	0.415 (0.024)	0.360 (0.023)	0.055 (0.035)**	
Infrequently	0.417 (0.021)	0.348 (0.020)	0.068 (0.003)***	
Impact: freq. – infreq.				-0.013 (0.709)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.11a: Differences in Impacts of HIP on Total Number of Food Pattern Equivalent Fruit and Vegetable Groups Consumed in Past 24 Hours, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	3.614 (0.066)	3.324 (0.062)	0.290 (<0.001) ***	
<3 servings/day	3.361 (0.070)	3.225 (0.066)	0.136 (0.103)	
Impact: 3+ servings – <3 servings				0.153 (0.190)
Attitudes about food, fruits, & vegetables				
High	3.680 (0.066)	3.332 (0.066)	0.348 (<0.001) ***	
Low	3.246 (0.081)	3.198 (0.077)	0.048 (0.586)	
Impact: high – low				0.300 (0.011)**
Fruits & vegetables at home				
Frequently	3.411 (0.080)	3.224 (0.075)	0.187 (0.032)**	
Infrequently	3.550 (0.071)	3.316 (0.070)	0.234 (0.002)***	
Impact: freq. – infreq.				-0.047 (0.688)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.11b: Differences in Impacts of HIP on Total Number of Food Pattern Equivalent Fruit Groups Consumed in Past 24 Hours, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	1.249 (0.039)	1.115 (0.038)	0.133 (0.007)***	
<3 servings/day	1.199 (0.040)	1.103 (0.037)	0.096 (0.045)**	
Impact: 3+ servings – <3 servings				0.037 (0.594)
Attitudes about food, fruits, & vegetables				
High	1.332 (0.041)	1.156 (0.039)	0.177 (<0.001) ***	
Low	1.087 (0.046)	1.045 (0.046)	0.041 (0.419)	
Impact: high – low				0.135 (0.053)*
Fruits & vegetables at home				
Frequently	1.125 (0.049)	1.073 (0.044)	0.052 (0.328)	
Infrequently	1.301 (0.041)	1.138 (0.041)	0.163 (<0.001) ***	
Impact: freq. – infreq.				-0.111 (0.114)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.11c: Differences in Impacts of HIP on Total Number of Food Pattern Equivalent Vegetable Groups Consumed in Past 24 Hours, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	2.365 (0.045)	2.209 (0.043)	0.156 (0.004)***	
<3 servings/day	2.162 (0.050)	2.122 (0.045)	0.040 (0.498)	
Impact: 3+ servings – <3 servings				0.116 (0.151)
Attitudes about food, fruits, & vegetables				
High	2.348 (0.045)	2.176 (0.044)	0.172 (0.001)***	
Low	2.159 (0.058)	2.153 (0.053)	0.006 (0.918)	
Impact: high – low				0.165 (0.045)**
Fruits & vegetables at home				
Frequently	2.286 (0.055)	2.152 (0.053)	0.135 (0.019)**	
Infrequently	2.249 (0.052)	2.178 (0.048)	0.071 (0.204)	
Impact: freq. – infreq.				0.064 (0.426)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.12a: Differences in Impacts of HIP on Consumption of Total Grains, Ounce-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	5.267 (0.162)	5.710 (0.159)	-0.443 (0.032)**	
<3 servings/day	4.856 (0.162)	5.306 (0.166)	-0.450 (0.025)**	
Impact: 3+ servings – <3 servings				0.007 (0.981)
Attitudes about food, fruits, & vegetables				
High	5.264 (0.175)	5.523 (0.183)	-0.259 (0.162)	
Low	4.818 (0.224)	5.496 (0.199)	-0.678 (0.002)***	
Impact: high – low				0.419 (0.145)
Fruits & vegetables at home				
Frequently	4.732 (0.195)	5.235 (0.203)	-0.503 (0.020)**	
Infrequently	5.333 (0.165)	5.735 (0.173)	-0.402 (0.035)**	
Impact: freq. – infreq.				-0.101 (0.724)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.12b: Differences in Impacts of HIP on Consumption of Whole Grains, Ounce Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.660 (0.047)	0.666 (0.045)	-0.006 (0.920)	
<3 servings/day	0.602 (0.043)	0.628 (0.046)	-0.026 (0.631)	
Impact: 3+ servings – <3 servings				0.020 (0.805)
Attitudes about food, fruits, & vegetables				
High	0.663 (0.048)	0.656 (0.045)	0.006 (0.900)	
Low	0.592 (0.055)	0.635 (0.056)	-0.043 (0.486)	
Impact: high – low				0.049 (0.541)
Fruits & vegetables at home				
Frequently	0.649 (0.058)	0.647 (0.059)	0.002 (0.974)	
Infrequently	0.618 (0.045)	0.648 (0.047)	-0.029 (0.561)	
Impact: freq. – infreq.				0.031 (0.692)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.12c: Differences in Impacts of HIP on Consumption of Other Grains, Ounce-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	4.607 (0.151)	5.044 (0.148)	-0.437 (0.023)**	
<3 servings/day	4.254 (0.155)	4.678 (0.159)	-0.424 (0.026)**	
Impact: 3+ servings – <3 servings				-0.013 (0.962)
Attitudes about food, fruits, & vegetables				
High	4.601 (0.164)	4.867 (0.172)	-0.266 (0.129)	
Low	4.225 (0.209)	4.861 (0.187)	-0.635 (0.002)***	
Impact: high – low				0.370 (0.171)
Fruits & vegetables at home				
Frequently	4.083 (0.180)	4.588 (0.188)	-0.505 (0.011)**	
Infrequently	4.715 (0.158)	5.087 (0.166)	-0.372 (0.041)**	
Impact: freq. – infreq.				-0.133 (0.622)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.12d: Differences in Impacts of HIP on Consumption of Total Dairy (Milk, Yogurt, Cheese), Cup-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	1.643 (0.072)	1.656 (0.065)	-0.014 (0.879)	
<3 servings/day	1.512 (0.069)	1.460 (0.061)	0.052 (0.524)	
Impact: 3+ servings – <3 servings				-0.066 (0.597)
Attitudes about food, fruits, & vegetables				
High	1.673 (0.074)	1.573 (0.070)	0.100 (0.211)	
Low	1.462 (0.084)	1.543 (0.089)	-0.081 (0.378)	
Impact: high – low				0.181 (0.140)
Fruits & vegetables at home				
Frequently	1.450 (0.087)	1.502 (0.085)	-0.052 (0.593)	
Infrequently	1.682 (0.068)	1.607 (0.067)	0.075 (0.336)	
Impact: freq. – infreq.				-0.127 (0.314)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.12e: Differences in Impacts of HIP on Consumption of Meat, Poultry, Fish, Eggs, Soy, Nuts, Seeds, & Legumes, Ounce-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	5.011 (0.174)	5.004 (0.153)	0.007 (0.973)	
<3 servings/day	5.061 (0.193)	5.123 (0.180)	-0.062 (0.791)	
Impact: 3+ servings – <3 servings				0.069 (0.833)
Attitudes about food, fruits, & vegetables				
High	4.955 (0.183)	4.993 (0.165)	-0.038 (0.858)	
Low	5.136 (0.218)	5.158 (0.186)	-0.022 (0.923)	
Impact: high – low				-0.015 (0.961)
Fruits & vegetables at home				
Frequently	5.193 (0.206)	5.097 (0.202)	0.096 (0.669)	
Infrequently	4.912 (0.188)	5.035 (0.165)	-0.123 (0.562)	
Impact: freq. – infreq.				0.219 (0.476)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.12f: Differences in Impacts of HIP on Consumption of Discretionary Oils, Gram-Equivalents, by Baseline Intake and Attitude Subgroup

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	18.12 (0.73)	18.75 (0.69)	-0.63 (0.495)	
<3 servings/day	16.66 (0.74)	17.95 (0.82)	-1.29 (0.201)	
Impact: 3+ servings – <3 servings				0.67 (0.627)
Attitudes about food, fruits, & vegetables				
High	19.15 (0.86)	20.07 (0.92)	-0.91 (0.303)	
Low	15.19 (1.07)	16.03 (0.93)	-0.84 (0.409)	
Impact: high – low				-0.07 (0.959)
Fruits & vegetables at home				
Frequently	18.04 (0.93)	18.77 (0.98)	-0.73 (0.456)	
Infrequently	16.90 (0.83)	18.03 (0.86)	-1.13 (0.218)	
Impact: freq. – infreq.				0.40 (0.758)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.12g: Differences in Impacts of HIP on Consumption of Discretionary Solid Fats, Gram-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	30.29 (1.12)	32.34 (1.14)	-2.05 (0.165)	
<3 servings/day	29.13 (1.18)	30.48 (1.07)	-1.34 (0.333)	
Impact: 3+ servings – <3 servings				-0.71 (0.726)
Attitudes about food, fruits, & vegetables				
High	29.39 (1.10)	30.24 (1.14)	-0.85 (0.522)	
Low	30.18 (1.41)	33.04 (1.27)	-2.86 (0.062)*	
Impact: high – low				2.01 (0.320)
Fruits & vegetables at home				
Frequently	28.28 (1.41)	30.52 (1.39)	-2.25 (0.156)	
Infrequently	30.89 (1.11)	32.15 (1.18)	-1.26 (0.346)	
Impact: freq. – infreq.				-0.99 (0.637)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.12h: Differences in Impacts of HIP on Consumption of Added Sugar, Teaspoons, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	15.42 (0.72)	16.77 (0.68)	-1.35 (0.143)	
<3 servings/day	14.84 (0.72)	14.77 (0.67)	0.07 (0.935)	
Impact: 3+ servings – <3 servings				-1.42 (0.266)
Attitudes about food, fruits, & vegetables				
High	14.21 (0.69)	15.16 (0.64)	-0.95 (0.241)	
Low	16.35 (0.87)	16.64 (0.88)	-0.28 (0.783)	
Impact: high – low				-0.66 (0.614)
Fruits & vegetables at home				
Frequently	14.70 (0.83)	15.56 (0.82)	-0.86 (0.344)	
Infrequently	15.52 (0.78)	15.97 (0.71)	-0.45 (0.609)	
Impact: freq. – infreq.				-0.41 (0.750)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Added sugar includes, for example, the sugar added to sweetened soft drinks consumed.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.12i: Differences in Impacts of HIP on Consumption of Alcohol[a], Drinks, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	0.250 (0.049)	0.129 (0.024)	0.121 (0.022)**	
<3 servings/day	0.169 (0.040)	0.135 (0.027)	0.034 (0.467)	
Impact: 3+ servings – <3 servings				0.087 (0.222)
Attitudes about food, fruits, & vegetables				
High	0.208 (0.044)	0.147 (0.031)	0.060 (0.181)	
Low	0.211 (0.054)	0.110 (0.038)	0.101 (0.070)*	
Impact: high – low				-0.040 (0.575)
Fruits & vegetables at home				
Frequently	0.273 (0.058)	0.148 (0.034)	0.124 (0.047)**	
Infrequently	0.160 (0.032)	0.118 (0.026)	0.042 (0.292)	
Impact: freq. – infreq.				0.082 (0.266)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]Reflects alcohol content in beverages consumed.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents).

Exhibit H8.13: Differences in Impacts of HIP on Total Energy Intake, Kilocalories, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	1793 (44)	1841 (40)	-48 (0.385)	
<3 servings/day	1702 (43)	1751 (41)	-50 (0.339)	
Impact: 3+ servings – <3 servings				1 (0.985)
Attitudes about food, fruits, & vegetables				
High	1769 (43)	1794 (45)	-24 (0.629)	
Low	1722 (55)	1802 (50)	-80 (0.166)	
Impact: high – low				55 (0.469)
Fruits & vegetables at home				
Frequently	1723 (53)	1782 (52)	-59 (0.308)	
Infrequently	1769 (45)	1810 (45)	-41 (0.417)	
Impact: freq. – infreq.				-18 (0.816)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents.

Exhibit H8.14a: Differences in Impacts of HIP on Total Fiber Intake, Grams, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	13.65 (0.39)	13.08 (0.37)	0.58 (0.237)	
<3 servings/day	13.28 (0.41)	13.11 (0.36)	0.18 (0.699)	
Impact: 3+ servings – <3 servings				0.40 (0.552)
Attitudes about food, fruits, & vegetables				
High	14.10 (0.39)	13.31 (0.40)	0.80 (0.063)*	
Low	12.66 (0.50)	12.79 (0.49)	-0.14 (0.799)	
Impact: high – low				0.93 (0.177)
Fruits & vegetables at home				
Frequently	13.11 (0.46)	12.88 (0.43)	0.23 (0.646)	
Infrequently	13.75 (0.41)	13.26 (0.42)	0.49 (0.281)	
Impact: freq. – infreq.				-0.26 (0.694)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents.

Exhibit H8.14b: Differences in Impacts of HIP on Total Beta Carotene Intake, Micrograms, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	1702 (167)	1340 (114)	363 (0.052)*	
<3 servings/day	1678 (122)	1651 (171)	27 (0.872)	
Impact: 3+ servings – <3 servings				336 (0.188)
Attitudes about food, fruits, & vegetables				
High	1945 (165)	1563 (144)	382 (0.050)*	
Low	1356 (111)	1397 (130)	-41 (0.727)	
Impact: high – low				423 (0.065)*
Fruits & vegetables at home				
Frequently	1580 (177)	1490 (165)	91 (0.664)	
Infrequently	1766 (138)	1495 (128)	272 (0.052)*	
Impact: freq. – infreq.				-181 (0.467)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents.

Exhibit H8.14c: Differences in Impacts of HIP on Total Vitamin A Intake, Micrograms RAE, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	578 (25)	558 (21)	20 (0.514)	
<3 servings/day	595 (30)	584 (30)	11 (0.777)	
Impact: 3+ servings – <3 servings				9 (0.852)
Attitudes about food, fruits, & vegetables				
High	613 (28)	583 (26)	29 (0.387)	
Low	552 (30)	554 (27)	-2 (0.961)	
Impact: high – low				31 (0.511)
Fruits & vegetables at home				
Frequently	584 (38)	580 (38)	4 (0.928)	
Infrequently	588 (26)	564 (25)	24 (0.371)	
Impact: freq. – infreq.				-20 (0.697)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents.

Exhibit H8.14d: Differences in Impacts of HIP on Total Vitamin C Intake, Milligrams, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	111 (6)	92 (4)	19 (0.005)***	
<3 servings/day	103 (5)	94 (5)	9 (0.078)*	
Impact: 3+ servings – <3 servings				10 (0.251)
Attitudes about food, fruits, & vegetables				
High	109 (5)	92 (5)	17 (0.002)***	
Low	104 (6)	94 (6)	10 (0.148)	
Impact: high – low				8 (0.390)
Fruits & vegetables at home				
Frequently	110 (6)	99 (6)	11 (0.079)*	
Infrequently	104 (6)	88 (5)	16 (0.005)***	
Impact: freq. – infreq.				-5 (0.542)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents.

Exhibit H8.15a: Differences in Impacts of HIP on Intake of Sodium in Foods with Fruits & Vegetables, Milligrams, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	930 (39)	967 (44)	-37 (0.484)	
<3 servings/day	929 (42)	995 (45)	-66 (0.235)	
Impact: 3+ servings – <3 servings				29 (0.706)
Attitudes about food, fruits, & vegetables				
High	952 (43)	1002 (49)	-50 (0.330)	
Low	901 (55)	952 (51)	-52 (0.361)	
Impact: high – low				1 (0.984)
Fruits & vegetables at home				
Frequently	937 (54)	973 (54)	-35 (0.521)	
Infrequently	923 (47)	987 (49)	-64 (0.248)	
Impact: freq. – infreq.				28 (0.720)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents.

Exhibit H8.15b: Differences in Impacts of HIP on Intake of Discretionary Oils in Foods with Fruits & Vegetables, Gram-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	7.64 (0.45)	7.61 (0.44)	0.03 (0.954)	
<3 servings/day	6.45 (0.44)	7.72 (0.53)	-1.27 (0.039)**	
Impact: 3+ servings – <3 servings				1.31 (0.120)
Attitudes about food, fruits, & vegetables				
High	8.23 (0.49)	8.74 (0.58)	-0.51 (0.387)	
Low	5.54 (0.55)	6.20 (0.57)	-0.66 (0.257)	
Impact: high – low				0.14 (0.862)
Fruits & vegetables at home				
Frequently	8.04 (0.58)	8.04 (0.65)	-0.01 (0.993)	
Infrequently	6.27 (0.51)	7.36 (0.53)	-1.09 (0.049)**	
Impact: freq. – infreq.				1.09 (0.178)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents.

Exhibit H8.15c: Differences in Impacts of HIP on Intake of Discretionary Solid Fats in Foods with Fruits & Vegetables, Gram-Equivalents, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	6.33 (0.46)	7.36 (0.61)	-1.03 (0.144)	
<3 servings/day	6.74 (0.50)	6.54 (0.48)	0.21 (0.725)	
Impact: 3+ servings – <3 servings				-1.24 (0.169)
Attitudes about food, fruits, & vegetables				
High	6.65 (0.46)	6.88 (0.57)	-0.23 (0.710)	
Low	6.42 (0.60)	7.05 (0.57)	-0.63 (0.330)	
Impact: high – low				0.40 (0.649)
Fruits & vegetables at home				
Frequently	6.19 (0.59)	6.89 (0.65)	-0.70 (0.319)	
Infrequently	6.82 (0.50)	7.01 (0.62)	-0.18 (0.784)	
Impact: freq. – infreq.				-0.51 (0.609)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents.

Exhibit H8.15d: Differences in Impacts of HIP on Intake of Added Sugar in Foods with Fruits & Vegetables, Teaspoons, by Baseline Intake and Attitude Subgroups

	Regression-adjusted treatment mean (SE)	Regression-adjusted control mean (SE)	Treatment-control impact (P-value)	Difference in impacts (P-value)
Baseline respondent fruit & vegetable intake (screener)				
3+ servings/day	2.86 (0.25)	2.78 (0.23)	0.08 (0.782)	
<3 servings/day	3.04 (0.24)	2.94 (0.29)	0.11 (0.751)	
Impact: 3+ servings – <3 servings				-0.02 (0.956)
Attitudes about food, fruits, & vegetables				
High	2.93 (0.27)	2.61 (0.24)	0.32 (0.241)	
Low	2.98 (0.29)	3.20 (0.44)	-0.22 (0.590)	
Impact: high – low				0.54 (0.256)
Fruits & vegetables at home				
Frequently	2.54 (0.28)	2.36 (0.26)	0.18 (0.481)	
Infrequently	3.28 (0.28)	3.26 (0.30)	0.02 (0.951)	
Impact: freq. – infreq.				0.16 (0.730)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported impacts (T-C differences) and reported differences in impacts across subgroups may differ from differences between reported regression-adjusted means for the treatment and control groups and subgroups.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=3913 recalls from 2009 respondents.

Appendix I: Supplementary Non-Experimental Analyses

This appendix presents two supplementary sets of non-experimental analyses intended to provide additional context for understanding our main random assignment findings. First, our mediator analyses yield evidence on potential mechanisms by which HIP may work to increase fruit and vegetable intake. Second, within-treatment group analyses of the relationship between self-reported experiences with HIP and observed spending and consumption outcomes provide suggestive evidence on how outcomes might be affected by differences in awareness and understanding of HIP.

I.1 Mediation Analyses

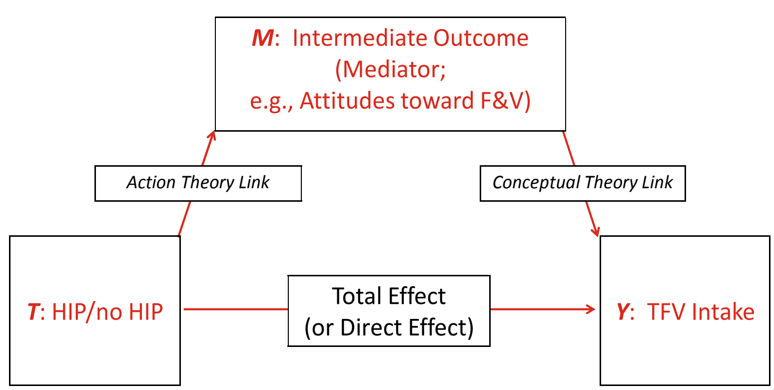
We conducted mediation analysis to provide insight into the question of *how* HIP works to ultimately increase consumption of fruits and vegetables. The mediation analysis uses multivariate regression models to explore a variety of pathways through which HIP may be linked to fruit and vegetable consumption. In contrast to the main HIP impact estimates in the body of this Final Report, which capitalize on the random assignment research design and require fewer and more robust assumptions, this mediation analysis requires strong assumptions to infer causality, and thus should be interpreted with caution.

This appendix section begins with an overview of the single-mediator modeling approach that we use to address the question of how HIP works. The second subsection describes the particular models we estimated. The third subsection provides our mediation results. The fourth subsection explains the assumptions required to interpret the estimates from mediator models as addressing the question of how HIP works, as well as the corresponding limitations to the conclusions we can make based on our results. Acknowledging these limitations, the final section provides an overall discussion of the mediation analyses.

Single Mediator Models

To test the pathways through which HIP may affect intake of targeted fruits and vegetables, we estimated single mediator models, testing one mediator at a time. Exhibit I.1 presents a depiction of a single mediator model.

Exhibit I.1: Example of a Single Mediator Model



Our primary analyses, presented in Chapter 8, estimate the "total effect" of HIP (*T*/Treatment) on the ultimate outcomes of interest (*Y*/TFV Intake).

From a theoretical perspective, it is sometimes insightful to conceptualize this total effect as a combination of two distinct pathways:

1. *The Mediated Effect* through *M*. For example, HIP may cause an increase in positive attitudes toward fruits and vegetables, and in turn, more positive attitudes may be linked to higher TFV intake. This mediated effect would suggest that HIP affects TFV intake through changes in attitudes.
2. *The Direct Effect*; HIP affects TFV intake directly without, for example, changing attitudes, or through other unmeasured intermediate variables.

In equations, we can express these ideas as follows. First, we express the *Total Effect* (i.e., the overall effect of HIP on the outcome, including the direct effect and any mediated effects) as:

$$(1)\quad Y_i = \delta_0 + \delta_1 T_i + \delta_3 X_i + u_i^{\delta}$$

Second, we express the *Action Theory Link* (i.e., the effect of HIP on the mediator) as:

$$(2)\quad M_i = \alpha_0 + \alpha_1 T_i + \alpha_3 X_i + u_i^{\alpha}$$

Third, we express the *Conceptual Theory Link* (i.e., the effect of the mediator on the outcome) as:

$$(3)\quad Y_i = \gamma_0 + \gamma_2 M_i + \gamma_3 X_i + u_i^{\gamma}$$

Fourth, we express the *Mediator Model* (from which we derive the direct effect and the mediator effect, net of HIP) as:

$$(4)\quad Y_i = \beta_0 + \beta_1 T_i + \beta_2 M_i + \beta_3 X_i + u_i^{\beta}$$

Where each of the equations includes other covariates measured at baseline, *X*, and a regression residual, *u* (with appropriate superscript).

In terms of this formulation, we can explain mediation as follows: Equation 2 implies that the intervention (*T*, in our case HIP) increases the mediator by α_1. In addition, Equation 4 implies that each additional unit increase in the mediator, *M* (attitudes, in our example), increases the outcome by β_2, net of the direct effect of *T* on the outcome. Thus, the mediated effect of *T* on *Y* can be expressed as $\alpha_1\beta_2$. The direct effect (i.e., the effect of HIP on the outcome, net of the mediating effect) can be expressed as β_1, or calculated by subtracting the mediated effect from the total effect as $\delta_1 - \alpha_1\beta_2$.

Finally, note that all four of these expressions are written in terms of observable variables and in linear form. It follows that they can be estimated by linear regression. Furthermore, we can calculate standard errors and p-values for $\alpha_1\beta_2$ by the delta method (Cramer, 1946; Oehlert, 1992; Greene, 2003).

Testing Single Mediator Models

To test single mediator models, a common approach is the Baron and Kenny (1986) method. Following this method, for each single mediation model, three regression equations are estimated, corresponding to equations 1, 2, and 4 above. To establish mediation, the following conditions must be met:

1. The predictor (e.g., treatment/HIP) must affect the outcome in equation 1 (i.e., the total effect must be significant).[175]
2. The predictor (e.g., treatment/HIP) must affect the mediator in equation 2 (i.e., the effect of the predictor on the mediator, α_1, must be significant).
3. The mediator must affect the outcome in equation 4 (i.e., the effect of the mediator on the outcome, β_2, net of the effect of the predictor on the outcome, must be significant).
4. The effect of the predictor (e.g., treatment/HIP) on the outcome must be smaller in equation 4 (when the mediator is included) than in equation 1 (i.e., the direct effect, β_1, must be smaller than the total effect, δ_1). When the direct effect is smaller than the total effect, this suggests that the mediator is accounting for some of the association between the predictor and the outcome, thereby providing support for the mediated pathway.

In addition, the MacKinnon (1994) method, using the Sobel (1982) test, calculates the mediated effect and allows us to test the significance of the mediated effect. The mediated effect can be calculated by multiplying the effect of the predictor on the mediator (from equation 2 above) by the effect of the mediator on the outcome (net of the effect of the predictor on the outcome, from equation 4 above), or $\alpha_1\beta_2$ according to the above notation[176]. If the mediated effect is significant, we conclude that some of the link between the predictor and the outcome occurs through the mediator. If the mediated effect is not significant, but the conditions above are met, we conclude that there is some suggestive evidence of mediation. If the mediated effect is not significant and the conditions above are not met, we conclude that we have no evidence that the link between the predictor and the outcome occurs through mediator in question.

Mediation Models Estimated

All single mediator models for this report used the Baron & Kenny (1986) method to test the appropriate paths and the MacKinnon (1994) method, using the Sobel (1982) test, to test the significance of the mediated effect. All models were run on the primary shopper sample, using primary shopper weights, and restricted so that observations with missing data on the predictor, mediator, or outcome of a given mediator model were excluded. This implies that all equations for a particular mediator model are estimated on a common set of observations.

---

175 Over time, this condition has been relaxed, because mediators may operate in opposite directions, making the total effect of the treatment on the outcome non-significant.

176 This is also equivalent to subtracting the direct effect from the total effect, $\delta_1 - \beta_1$, according to the above notation.

Mediation of the Link between HIP and Fruit and Vegetable Consumption

We first tested mediation of the link between HIP and fruit and vegetable consumption. HIP was the predictor in all cases, and outcomes were Targeted Fruits and Vegetables (TFV), Targeted Vegetables (TV), Targeted Fruits (TF), and Total Fruit and Vegetable Intake [177]. The mediators considered were:

1. Positive attitudes toward fruits and vegetables[178]
2. Fruits and vegetables in the home[178]
3. Perceived barriers to fruit and vegetable consumption[178]
4. Perceived barriers to grocery shopping[178]
5. Fruit and vegetable spending[179]
6. Received messages about eating fruits and vegetables[180]
7. Attended nutrition education[181]

Other Mediation Pathways

We also tested other mediation pathways, which were motivated by our logic model (reproduced from Chapter 1 as Exhibit I.2 below). For these models we tested all single mediator paths that applied to participants (i.e., mediation through retailers was not tested).

[177] We tested all four fruit and vegetable consumption outcomes, but only our confirmatory fruit and vegetable consumption outcome (targeted fruits and vegetables, preferred restrictive proxy measure) is presented in the results. Findings for the other fruit and vegetable consumption outcomes were similar, however.

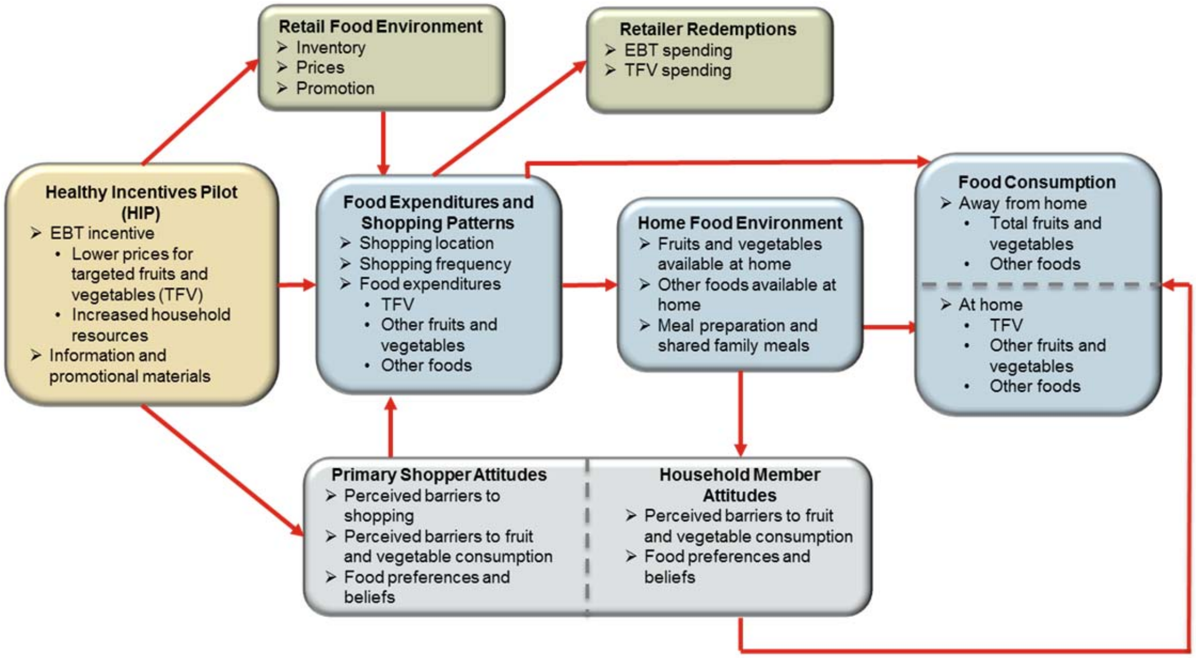
[178] This variable is a scale that was created from multiple survey questions, as detailed in Appendix E.

[179] Measured with the question "What has been your household's usual MONTHLY expense for fruits and vegetables?"

[180] Measured with the question "In the past three months, have you heard or seen any messages about eating more fruits and vegetables or the importance of fruits and veggies in a healthy diet?" Responses were binary (yes/no).

[181] Measured with the question "In the past three months, did you attend any nutrition education or healthy eating programs or classes?" Responses were binary (yes/no).

Exhibit I.2: Conceptual Model



Timing of Mediation

We tested each set of mediator models in two different ways. In order to take advantage of the added power from two rounds of follow-up data collection, we pooled Round 2 and Round 3 data (as we did for all impact analysis, resulting in 2-4 observations per household) for the mediator and outcome variables. These models assume that mediation occurs *concurrently*. For example, HIP influences fruit and vegetable spending, which influences fruit and vegetable consumption during the same time period; or spending influences fruits and vegetables in the home, which influences fruit and vegetable consumption, all during the same time period. These models used the normalized weights for Round 2 or Round 3, where the normalization is the same as is used in the main analysis (i.e., forcing the sum of the weights in each round to equal the number of completed interviews).

To test whether certain mediation pathways occur over a longer time period, we also examined *temporal* mediator models which assume that outcomes today were influenced by mediators earlier in time. For example, HIP may influence attitudes and then over time, changes in attitudes may influence fruit and vegetable consumption. For these models, Round 2 and Round 3 data were not pooled (resulting in 1 observation per household, or two for the 10 percent subsample that completed a second dietary recall), and the two rounds of data collection represented the two time points in the mediation pathways. We only tested temporal models for pathways that might plausibly occur over longer time periods. We assumed that links between fruit and vegetable spending, fruits and vegetables in the home, and fruit and vegetable consumption would only occur over a short time period (e.g., one would not consume fresh fruits and vegetables months after they were acquired), so these links were not examined at different time points in the temporal mediator models. In contrast, we hypothesized that the pathways of change involving attitudes and perceived barriers might take longer to occur. We therefore examined attitudes and barriers at different time points from other variables in temporal models. These models use the normalized Round 3 shopper weights.

Covariates

All models contain the following covariates:

1. Gender of respondent
2. Race of respondent
3. Age of respondent
4. Location
5. Household size
6. Gender of household head
7. Household composition (elderly/children in the household)
8. Number of adults in the household
9. HIP wave
10. Round 1 values of fruit and vegetable screener variables (estimated servings of juice, fruit, leafy green salad, fried potatoes, other potatoes, beans, other vegetables, tomato sauce, salsa)
11. Round 1 values of all mediator variables collected at Round 1, including attitudes, fruits and vegetables in the home, barriers to fruit and vegetable consumption, barriers to grocery shopping, and fruit and vegetable spending

For models predicting fruit and vegetable consumption, the following covariates were also included:

1. Day of dietary recall interview (day 1 or day 2)
2. Intake relative to usual levels (intake was more, less, or about the same as usual)

Due to missing data for some covariates (fruit and vegetable screener variables, baseline attitudes, fruits and vegetables in the home, barriers to fruit and vegetable consumption, barriers to grocery shopping, and fruit and vegetable spending), the sample's mean value for each of these variables was imputed when there was missing data. All models also include a flag for each imputed variable, which indicates whether the value for an observation was imputed.[182]

Mediation Results

This section presents the results of the mediator analyses. The first section describes the information included in the tables, the second section describes the concurrent and temporal mediator models linking HIP to fruit and vegetable consumption, and the third section describes the concurrent and temporal mediator models that involve other pathways in our logic model.

Information Included in the Tables

Within each table, there is one row for each mediation analysis. Columns indicate the mediator in the model linking HIP to fruit and vegetable consumption, and the predictor, mediator, and outcome in the models of additional pathways. In the temporal models of additional pathways, the round in which

[182] There was only one case in this sample where the attitudes scale was imputed and this observation had a unique combination of all other imputation flags, such that the attitudes scale flag was perfectly predicted by all other flags and did not provide unique estimates. Therefore, the attitudes scale imputation flag was removed from all models.

each variable was collected is also noted.[183] The remaining columns in the tables are labeled as follows (see MacKinnon, 1994 for further reference to these terms in the context of a mediation model):

- N = The sample size for each mediation tested
- Total Effect (T) = effect of predictor on the outcome (δ_1 in the above equations)
- Direct Effect (T') = effect of predictor on the outcome controlling for the mediator (β_1 in the above equations)
- α = effect of the predictor on the mediator
- β = effect of the mediator on the outcome (when the predictor is included in the model)
- $\alpha\beta$ = the mediated effect ($\alpha * \beta$)
- Proportion Mediated = proportion of the total effect that is mediated ($\alpha\beta / (\alpha\beta + T')$)[184]

For each effect, we present the estimate along with its standard error and p-value to indicate the statistical significance level of the impact estimate for a two-sided test. Asterisks indicate the level of statistical significance (*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$).

Mediation of the Link between HIP and Fruit and Vegetable Consumption

Exhibit I.3 presents the concurrent mediation models linking HIP to fruit and vegetable consumption. Not surprisingly, these findings indicate that there is evidence that *fruit and vegetable spending serves as a mediator between HIP and fruit and vegetable consumption* (Exhibit I.3, model 5). In other words, HIP affects spending, such that HIP participants spend a greater amount on fruits and vegetables. In turn, greater spending on fruits and vegetables predicts more fruit and vegetable consumption. There is also suggestive evidence that having *fruits and vegetables in the home serves as a mediator between HIP and fruit and vegetable consumption* (Exhibit I.3, model 2; $0.05 < p < 0.10$); HIP causes participants to have more fruits and vegetables in the home, and when there are more fruits and vegetables in the home, there is more fruit and vegetable consumption.

Over time (see temporal mediation models linking HIP to fruit and vegetable consumption in Exhibit I.4), there is also suggestive evidence that *attitudes toward fruits and vegetables may serve as a mediator between HIP and fruit and vegetable consumption* (Exhibit I.4, model 1; $0.05 < p < 0.10$). HIP caused more positive attitudes toward fruits and vegetables among participants at Round 2, and more positive attitudes toward fruits and vegetables at Round 2 predicted more fruit and vegetable consumption at Round 3. No evidence emerged suggesting that barriers or messages about fruits and vegetables (including nutrition education) directly mediate the effect of HIP on fruit and vegetable consumption either concurrently or over time.

---

183 In the temporal models linking HIP to fruit and vegetable consumption, all mediators were measured at Round 2 and all fruit and vegetable consumption variables were measured at Round 3.

184 Calculated by dividing the absolute value of the mediated effect by the absolute value of the total effect. The accuracy of this proportion mediated measure is a function of the parameter values, and the proportion mediated measure is more accurate when there are large direct effects (MacKinnon, 1994).

Additional Pathways through Which HIP May Operate

Exhibit I.5 presents the concurrent mediation models that represent the additional pathways in the logic model. These analyses revealed evidence that *fruit and vegetable spending serves as a mediator between HIP and fruits and vegetables in the home* (Exhibit I.5, model 1). HIP participants spend more on fruits and vegetables, and more spending on fruits and vegetables is, in turn, linked to more fruits and vegetables in the home. Following this mediation of the effect of HIP on fruits and vegetables in the home by fruit and vegetable spending, there is also evidence that *fruits and vegetables in the home serve as a mediator between spending and fruit and vegetable consumption* (model 4), such that greater spending on fruits and vegetables predicts more fruits and vegetables in the home, which, in turn, predicts more fruit and vegetable consumption.

There is also evidence that *fruits and vegetables in the home serves as a mediator between spending and attitudes and barriers*. Greater spending on fruits and vegetables predicts more fruits and vegetables in the home, which, in turn, predicts more positive attitudes toward fruits and vegetables (Exhibit I.5, model 3), fewer perceived barriers to eating fruits and vegetables (Exhibit I.5, model 10), and fewer perceived barriers to grocery shopping (Exhibit I.5, model 11). There is also evidence for these mediation pathways over time (see temporal mediation models of additional pathways in Exhibit I.6). Those who spent more on fruits and vegetables at Round 2 also had more fruits and vegetables in the home at Round 2; in turn, those who had more fruits and vegetables in the home at Round 2 had more positive attitudes toward fruits and vegetables (Exhibit I.6, model 2), fewer barriers to eating fruits and vegetables (Exhibit I.6, model 9), and fewer barriers to grocery shopping at Round 3 (Exhibit I.6, model 10)

Following the above mediation of the link between spending and attitudes by fruits and vegetables in the home, evidence also emerged indicating that *attitudes serve as a mediator between fruits and vegetables in the home and fruit and vegetable consumption* (Exhibit I.5, model 16). When there are more fruits and vegetables in the home, there are more positive attitudes toward fruits and vegetables, and more positive attitudes are linked to more fruit and vegetable consumption. Temporal models also provided evidence for this mediation pathway over time. More fruits and vegetables in the home at Round 2 predicted more positive attitudes at Round 2, which predicted more fruit and vegetable consumption at Round 3 (Exhibit I.6, model 15). Similarly, there was suggestive evidence ($0.05 < p < 0.10$) that those with more fruits and vegetables in the home at Round 2 also had more positive attitudes toward fruits and vegetables at Round 3, and those with more positive attitudes at Round 3 consumed more fruits and vegetables at Round 3 (Exhibit I.6, model 16).

There is some suggestive evidence[185] that, over time, *attitudes also serve as a mediator between HIP and fruit and vegetable spending*[186] (Exhibit I.6, model 1). The mediated effect in this case was not significant. However, HIP participants reported more positive attitudes toward fruits and vegetables at Round 2, and those with more positive attitudes at Round 2 tended to spend more on fruits and vegetables at Round 3.

---

185 In cases where the mediated effect ($\alpha\beta$) did not reach the level of significance at $p < .10$, but the conditions required by Baron and Kenny (1986) were met, we concluded that there was some suggestive evidence of mediation.

186 The total and direct effects are not significant in these cases. However, as noted above, this condition is often relaxed.

Exhibit I.3: Concurrent Mediation Models Linking HIP to Fruit and Vegetable Consumption (TFV, Cup-Equivalents)

			Total Effect (T)			Direct Effect (T')			α			β			αβ			Proportion
	Mediator	*N*	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Mediated
1	Attitudes	3783	0.232	[0.057]	(<0.001)***	0.225	[0.057]	(<0.001)***	0.027	[0.022]	(0.221)	0.237	[0.058]	(<0.001)***	0.006	[0.006]	(0.241)	0.028
2	FV home	3782	0.231	[0.057]	(<0.001)***	0.220	[0.057]	(<0.001)***	0.063	[0.029]	(0.031)**	0.176	[0.042]	(<0.001)***	0.011	[0.006]	(0.055)*	0.048
3	FV barriers	3774	0.228	[0.057]	(<0.001)***	0.226	[0.057]	(<0.001)***	-0.026	[0.022]	(0.244)	-0.052	[0.059]	(0.377)	0.001	[0.002]	(0.482)	0.006
4	Shop barriers	3750	0.238	[0.057]	(<0.001)***	0.235	[0.057]	(<0.001)***	0.051	[0.045]	(0.256)	0.040	[0.036]	(0.264)	0.002	[0.003]	(0.426)	0.009
5	FV spending	3287	0.261	[0.061]	(<0.001)***	0.242	[0.061]	(<0.001)***	8.130	[2.731]	(0.003)***	0.002	[0.001]	(<0.001)***	0.018	[0.008]	(0.018)**	0.070
6	Messages	3770	0.229	[0.057]	(<0.001)***	0.225	[0.057]	(<0.001***	0.078	[0.019]	(<0.001)***	0.051	[0.067]	(0.448)	0.004	[0.005]	(0.455)	0.017
7	Nutrition ed.	3787	0.231	[0.057]	(<0.001)***	0.231	[0.057]	(<0.001)***	-0.001	[0.013]	(0.940)	0.130	[0.116]	(0.261)	>-0.001	[0.002]	(0.940)	0.001

*p<.10; **p<.05; ***p<.01.Targeted fruit and vegetable (TFV) intake proxy measures include intake of fruits acquired from the store. It excludes white potatoes, legumes, and 100% juice as well as mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey, pooled Round 2 and Round 3 sample.

Exhibit I.4: Temporal Mediation Models Linking HIP to Fruit and Vegetable Consumption (TFV, Cup-Equivalents)

			Total Effect (T)			Direct Effect (T')			α			β			αβ			Proportion
	Mediator	*N*	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Mediated
1	Attitudes	1625	0.239	[0.087]	(0.006)***	0.218	[0.088]	(0.014)**	0.070	[0.029]	(0.017)**	0.279	[0.086]	(0.001)***	0.020	[0.010]	(0.054)*	0.082
2	FV barriers	1621	0.240	[0.088]	(0.006)***	0.240	[0.088]	(0.006)***	>-0.001	[0.032]	(0.995)	-0.102	[0.100]	(0.306)	<0.001	[0.003]	(0.995)	<0.001
3	Shop barriers	1613	0.246	[0.088]	(0.005)***	0.243	[0.088]	(0.006)***	0.033	[0.062]	(0.596)	0.067	[0.041]	(0.105)	0.002	[0.004]	(0.614)	0.009
4	Messages	1619	0.251	[0.088]	(0.004)***	0.245	[0.088]	(0.005)***	0.093	[0.026]	(<0.001)***	0.067	[0.102]	(0.510)	0.006	[0.010]	(0.517)	0.025
5	Nutrition ed.	1628	0.238	[0.087]	(0.006)***	0.238	[0.087]	(0.007)***	-0.002	[0.018]	(0.917)	-0.123	[0.124]	(0.322)	<0.001	[0.002]	(0.918)	0.001

*p<.10; **p<.05; ***p<.01.
Mediators measured at Round 2; fruit and vegetable consumption measured at Round 3.
Targeted fruit and vegetable (TFV) intake proxy measures include intake of fruits acquired from the store. It excludes white potatoes, legumes, and 100% juice as well as mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey, Round 2 and Round 3 sample.

Exhibit I.5: Concurrent Mediation Models of Additional Pathways

					Total Effect (T)			Direct Effect (T')			α			B			αβ			Proportion
	Predictor	Mediator	Outcome	N	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Mediated
1	HIP	FV Spending	FV Home	3285	0.065	[0.031]	(0.033)**	0.055	[0.030]	(0.068)*	8.095	[2.732]	(0.003)***	0.001	[<0.001]	(<0.001)***	0.010	[0.004]	(0.013)**	0.153
2	HIP	Attitudes	FV Spending	3284	8.182	[2.729]	(0.003)***	8.096	[2.723]	(0.003)***	0.023	[0.024]	(0.328)	3.746	[2.948]	(0.204)	0.087	[0.112]	(0.438)	0.011
3	FV Spending	FV Home	Attitudes	3281	<0.001	[<0.001]	(0.210)	<0.001	[<0.001]	(0.668)	0.001	[<0.001]	(<0.001)***	0.133	[0.023]	(<0.001)***	<0.001	[<0.001]	(<0.001)***	0.663
4	FV Spending	FV Home	TFV	3284	0.002	[0.001]	(<0.001)***	0.002	[0.001]	(<0.001)***	0.001	[<0.001]	(<0.001)***	0.137	[0.044]	(0.002)***	<0.001	[<0.001]	(0.010)**	0.075
5	Attitudes	FV Spending	FV Home	3281	0.208	[0.036]	(<0.001)***	0.204	[0.035]	(<0.001)***	3.815	[2.956]	(0.197)	0.001	[<0.001]	(<0.001)***	0.005	[0.004]	(0.215)	0.022
6	Attitudes	FV Spending	TFV	3283	0.236	[0.064]	(<0.001)***	0.228	[0.063]	(<0.001)***	3.833	[2.954]	(0.195)	0.002	[0.001]	(<0.001)***	0.009	[0.007]	(0.218)	0.036
7	FV Home	Attitudes	FV Spending	3281	12.238	[2.262]	(<0.001)***	12.064	[2.374]	(<0.001)***	0.134	[0.023]	(<0.001)***	1.301	[3.018]	(0.666)	0.175	[0.407]	(0.667)	0.014
8	HIP	FV Barriers	FV Spending	3282	8.177	[2.731]	(0.003)***	8.027	[2.724]	(0.003)***	-0.040	[0.024]	(0.096)*	-3.735	[3.178]	(0.240)	0.150	[0.156]	(0.337)	0.018
9	HIP	Shop Barriers	FV Spending	3266	8.030	[2.732]	(0.003)***	8.148	[2.734]	(0.003)***	0.047	[0.047]	(0.321)	-2.517	[1.849]	(0.174)	-0.118	[0.147]	(0.422)	0.015
10	FV Spending	FV Home	FV Barriers	3279	>-0.001	[<0.001]	(0.233)	>-0.001	[<0.001]	(0.661)	0.001	[<0.001]	(<0.001)***	-0.138	[0.022]	(<0.001)***	>-0.001	[<0.001]	(<0.001)***	0.641
11	FV Spending	FV Home	Shop Barriers	3265	-0.001	[<0.001]	(0.175)	>-0.001	[<0.001]	(0.396)	0.001	[<0.001]	(<0.001)***	-0.195	[0.045]	(<0.001)***	>-0.001	[<0.001]	(0.002)***	0.373
12	FV Barriers	FV Spending	FV Home	3279	-0.205	[0.032]	(<0.001)***	-0.200	[0.031]	(<0.001)***	-3.884	[3.186]	(0.223)	0.001	[<0.001]	(<0.001)***	-0.005	[0.004]	(0.239)	0.023
13	Shop Barriers	FV Spending	FV Home	3265	-0.077	[0.018]	(<0.001)***	-0.074	[0.017]	(<0.001)***	-2.472	[1.852]	(0.182)	0.001	[<0.001]	(<0.001)***	-0.003	[0.002]	(0.202)	0.038
14	FV Barriers	FV Spending	TFV	3281	-0.070	[0.056]	(0.209)	-0.062	[0.056]	(0.270)	-3.874	[3.185]	(0.224)	0.002	[0.001]	(<0.001)***	-0.009	[0.008]	(0.245)	0.125
15	Shop Barriers	FV Spending	TFV	3265	0.034	[0.033]	(0.300)	0.040	[0.032]	(0.218)	-2.473	[1.852]	(0.182)	0.002	[0.001]	(<0.001)***	-0.006	[0.005]	(0.205)	0.168
16	FV Home	Attitudes	TFV	3778	0.180	[0.042]	(<0.001)***	0.149	[0.042]	(<0.001)***	0.149	[0.021]	(<0.001)***	0.203	[0.058]	(<0.001)***	0.030	[0.010]	(0.002)***	0.169
17	FV Home	FV Barriers	TFV	3769	0.178	[0.042]	(<0.001)***	0.175	[0.045]	(<0.001)***	-0.130	[0.020]	(<0.001)***	-0.021	[0.062]	(0.742)	0.003	[0.008]	(0.742)	0.015
18	FV Home	Shop Barriers	TFV	3747	0.179	[0.043]	(<0.001)***	0.189	[0.043]	(<0.001)***	-0.188	[0.043]	(<0.001)***	0.055	[0.036]	(0.125)	-0.010	[0.007]	(0.148)	0.058
19	FV Home	FV Barriers	FV Spending	3279	12.268	[2.265]	(<0.001)***	12.071	[2.297]	(<0.001)***	-0.140	[0.022]	(<0.001)***	-1.414	[3.209]	(0.660)	0.197	[0.449]	(0.660)	0.016
20	FV Home	Shop Barriers	FV Spending	3265	12.289	[2.301]	(<0.001)***	11.979	[2.328]	(<0.001)***	-0.200	[0.045]	(<0.001)***	-1.550	[1.851]	(0.403)	0.310	[0.377]	(0.411)	0.025

*p<.10; **p<.05; ***p<.01.

Targeted fruit and vegetable (TFV) intake proxy measures include intake of fruits acquired from the store. It excludes white potatoes, legumes, and 100% juice as well as mixed foods where the source of individual ingredients was not identified by the respondent.

Standard errors and test statistics are adjusted for clustering at the individual respondent level.

Source: Participant Survey, pooled Round 2 and Round 3 sample.

Exhibit I.6: Temporal Mediation Models of Additional Pathways

	Predictor	Mediator	Outcome	N	Total Effect (T)			Direct Effect (T')			α			β			αβ			Proportion Mediated
					Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	
1	HIP	Attitudes (R2)	FV spending (R3)	1425	5.398	[3.646]	(0.139)	4.957	[3.674]	(0.178)	0.068	[0.031]	(0.031)**	6.505	[3.856]	(0.092)*	0.441	[0.331]	(0.184)	0.082
2	FV spending (R2)	FV home (R2)	Attitudes (R3)	1393	0.001	[<0.001]	(0.019)**	0.001	[<0.001]	(0.071)*	0.002	[<0.001]	(<0.001)***	0.113	[0.035]	(0.001)***	<0.001	[<0.001]	(0.012)**	0.263
3	Attitudes (R2)	FV spending (R3)	FV home (R3)	1425	0.182	[0.049]	(<0.001)***	0.175	[0.049]	(<0.001)***	6.663	[3.844]	(0.083)*	0.001	[<0.001]	(0.006)***	0.007	[0.005]	(0.142)	0.041
4	Attitudes (R2)	FV spending (R3)	TFV (R3)	1425	0.232	[0.088]	(0.009)***	0.209	[0.086]	(0.016)**	6.663	[3.844]	(0.083)*	0.003	[0.001]	(<0.001)***	0.023	[0.014]	(0.106)	0.097
5	FV home (R2)	Attitudes (R3)	FV spending (R3)	1427	9.095	[3.351]	(0.007)***	8.775	[3.292]	(0.008)***	0.113	[0.033]	(0.001)***	2.824	[3.679]	(0.443)	0.320	[0.428]	(0.454)	0.035
6	FV home (R2)	Attitudes (R2)	FV spending (R3)	1425	9.043	[3.352]	(0.007)***	8.369	[3.339]	(0.012)**	0.139	[0.031]	(<0.001)***	4.849	[3.782]	(0.200)	0.674	[0.546]	(0.218)	0.074
7	HIP	FV barriers (R2)	FV spending (R3)	1420	5.312	[3.655]	(0.146)	5.242	[3.652]	(0.151)	-0.012	[0.035]	(0.740)	-6.070	[3.446]	(0.078)*	0.070	[0.215]	(0.745)	0.013
8	HIP	Shop barriers (R2)	FV spending (R3)	1416	5.306	[3.670]	(0.149)	5.268	[3.680]	(0.153)	0.019	[0.067]	(0.780)	2.059	[2.410]	(0.393)	0.038	[0.144]	(0.790)	0.007
9	FV spending (R2)	FV home (R2)	FV barriers (R3)	1391	>-0.001	[<0.001]	(0.257)	>-0.000	[<0.001]	(0.755)	0.002	[<0.001]	(<0.001)***	-0.140	[0.034]	(<0.001)***	>-0.001	[<0.001]	(0.005)***	0.716
10	FV spending (R2)	FV home (R2)	Shop barriers (R3)	1384	>-0.001	[0.001]	(0.459)	>-0.000	[0.001]	(0.866)	0.002	[<0.001]	(<0.001)***	-0.205	[0.064]	(0.001)***	>-0.001	[<0.001]	(0.013)**	0.780
11	FV barriers (R2)	FV spending (R3)	FV home (R3)	1420	-0.119	[0.042]	(0.005)***	-0.112	[0.041]	(0.007)***	-6.096	[3.446]	(0.077)*	0.001	[<0.001]	(0.004)***	-0.007	[0.005]	(0.133)	0.060
12	Shop barriers (R2)	FV spending (R3)	FV home (R3)	1416	-0.061	[0.024]	(0.012)**	-0.063	[0.024]	(0.008)***	2.070	[2.408]	(0.390)	0.001	[<0.001]	(0.002)***	0.003	[0.003]	(0.408)	0.042
13	FV barriers (R2)	FV spending (R3)	TFV (R3)	1420	-0.108	[0.105]	(0.306)	-0.086	[0.105]	(0.411)	-6.096	[3.446]	(0.077)*	0.003	[0.001]	(<0.001)***	-0.021	[0.013]	(0.099)*	0.198
14	Shop barriers (R2)	FV spending (R3)	TFV (R3)	1416	0.067	[0.039]	(0.086)*	0.059	[0.039]	(0.125)	2.070	[2.408]	(0.390)	0.004	[0.001]	(<0.001)***	0.007	[0.009]	(0.398)	0.110
15	FV home (R2)	Attitudes (R2)	TFV (R3)	1624	0.181	[0.072]	(0.013)**	0.146	[0.069]	(0.034)**	0.139	[0.029]	(<0.001)***	0.255	[0.080]	(0.001)***	0.036	[0.013]	(0.008)***	0.196
16	FV home (R2)	Attitudes (R3)	TFV (R3)	1627	0.182	[0.072]	(0.012)**	0.159	[0.072]	(0.028)**	0.121	[0.031]	(<0.001)***	0.192	[0.089]	(0.032)**	0.023	[0.012]	(0.060)*	0.127
17	FV home (R2)	FV barriers (R2)	TFV (R3)	1620	0.184	[0.072]	(0.011)**	0.175	[0.075]	(0.020)**	-0.119	[0.029]	(<0.001)***	-0.072	[0.103]	(0.486)	0.009	[0.012]	(0.492)	0.047
18	FV home (R2)	FV barriers (R3)	TFV (R3)	1622	0.184	[0.073]	(0.012)**	0.179	[0.080]	(0.025)**	-0.135	[0.030]	(<0.001)***	-0.036	[0.109]	(0.743)	0.005	[0.015]	(0.744)	0.026
19	FV home (R2)	Shop barriers (R2)	TFV (R3)	1612	0.188	[0.073]	(0.010)**	0.198	[0.074]	(0.008)***	-0.122	[0.058]	(0.034)**	0.077	[0.043]	(0.069)*	-0.009	[0.007]	(0.168)	0.050
20	FV home (R2)	Shop barriers (R3)	TFV (R3)	1613	0.183	[0.072]	(0.012)**	0.189	[0.074]	(0.011**)	-0.158	[0.062]	(0.012)**	0.040	[0.060]	(0.506)	-0.006	[0.010]	(0.520)	0.034
21	FV home (R2)	FV barriers (R2)	FV spending (R3)	1420	9.265	[3.383]	(0.006)***	8.659	[3.452]	(0.012)**	-0.137	[0.032]	(<0.001)***	-4.437	[3.498]	(0.205)	0.606	[0.498]	(0.224)	0.065

	Predictor	Mediator	Outcome	N	Total Effect (T)			Direct Effect (T')			α			β			αβ			Proportion Mediated
					Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	Estimate	[S.E.]	(P-value)	
22	FV home (R2)	Shop barriers (R2)	FV spending (R3)	1416	9.253	[3.359]	(0.006)***	9.583	[3.322]	(0.004)***	-0.130	[0.062]	(0.037)**	2.543	[2.424]	(0.294)	-0.330	[0.352]	(0.349)	0.036
23	FV home (R2)	FV barriers (R3)	FV spending (R3)	1425	9.140	[3.356]	(0.007)***	8.476	[3.459]	(0.014)**	-0.148	[0.033]	(<0.001)***	-4.483	[4.200]	(0.286)	0.663	[0.639]	(0.300)	0.073
24	FV home (R2)	Shop barriers (R3)	FV spending (R3)	1421	9.381	[3.348]	(0.005)***	9.399	[3.287]	(0.004)***	-0.220	[0.066]	(0.001)***	0.079	[2.372]	(0.974)	-0.017	[0.522]	(0.974)	0.002

*p<.10; **p<.05; ***p<.01.
Targeted fruit and vegetable (TFV) intake proxy measures include intake of fruits acquired from the store. It excludes white potatoes, legumes, and 100% juice as well as mixed foods where the source of individual ingredients was not identified by the respondent.
Standard errors and test statistics in models with TFV outcome are adjusted for clustering at the individual respondent level.
Source: Participant Survey, Round 2 and Round 3 sample.

There is also some suggestive evidence that, over time, *spending serves as a mediator between both attitudes and perceived barriers to eating fruits and vegetables and having fruits and vegetables in the home.* Again, these mediated effects were not significant, but those with more positive attitudes toward fruits and vegetables (Exhibit I.6, model 3) and those with fewer perceived barriers to eating fruits and vegetables (ExhibitI.6, model 11) at Round 2 tended to spend more on fruits and vegetables at Round 3; those who spent more on fruits and vegetables at Round 3 also had more fruits and vegetables in the home at Round 3.

Some suggestive evidence also indicates that, over time, *spending* serves *as a mediator between both attitudes and perceived barriers to eating fruits and vegetables and fruit and vegetable consumption.* Those with more positive attitudes towards fruits and vegetables (Exhibit I.6, model 4, mediated effect not significant) and those with fewer barriers to eating fruits and vegetables (Exhibit I.6, model 13, $0.05 < p < 0.10$) at Round 2 tended to spend more on fruits and vegetables at Round 3, and those who spent more on fruits and vegetables at Round 3 consumed more fruits and vegetables at Round 3.

Implications, Limitations, and Assumptions

The mediation analyses presented help us to understand how HIP works. However, these insights provided by the mediation analyses require a set of implicit assumptions. To understand those assumptions, this section considers three questions. First, if these findings have a causal interpretation, how could we use them for advancing theory and policy? Second, what assumptions are required to give these estimates a causal interpretation? Third, how valid are these assumptions?

With respect to theory, knowledge of "how HIP works" can be useful for designing future interventions. Given that mediation analyses suggest that HIP may operate through changing attitudes, in addition to through prices, future programs might emphasize attitudinal change in addition to the incentive. Future experimental work would be needed, however, to establish an impact of any other program design and to further inform policy aimed at increasing fruit and vegetable consumption.

Crucially, this use of mediation models requires a causal interpretation of the regression parameters. In particular, in order for the effect of HIP through the mediator to be expressible as $\alpha\beta$, two conditions must be satisfied. First, it must be true that α gives the causal effect of the predictor on the mediator, where by "causal effect," we mean the change in the mediator with an exogenous (i.e., outside the system) change in the predictor. Second, it must be true that β gives the causal effect of the mediator on the outcome; where by "causal effect," we mean the change in the outcome with an exogenous (i.e., outside the system) change in the mediator variable.

It is not clear that both these conditions are satisfied. In a best linear predictor sense, regression gives the best fit between the included covariates and the dependent variable. However, standard analysis for linear regression suggests that only when there are no unobservable variables correlated with the included variables will regression estimate the causal effect (e.g., Greene, 2003). HIP treatment status is randomly assigned. So for α, the conditions required for a causal interpretation are minimal when HIP treatment status is the predictor. As long as randomization was properly conducted (as appears to be true; see the discussion in Chapter 2) and the other regressors are measured before random assignment (as they are), no omitted variable can be correlated with HIP treatment status. Thus, we can conclude that α gives the causal effect of HIP on the mediator.[187]

With respect to β, the assumptions are more problematic. The value of the mediator is determined by (randomly specified) intervention status, but also by anything else that affects the mediator. Anything that affects the mediator directly may also affect the outcome directly. To some extent observed covariates (i.e., X), included in the regression model, control for such factors that affect the mediator and the outcome directly. However, a causal interpretation would require that any omitted variables have no (or at least only a small) direct impact on the outcome. Given our limited covariates, this condition may not be met, and the assumption may be too strong to infer causality. For example, we only have limited proxies for underlying tastes for fruits and vegetables (i.e., baseline attitudes toward fruits and vegetables), which may be a key variable when predicting fruit and vegetable consumption in the absence of HIP.

Similarly, measurement error in the mediator will induce problems with a causal interpretation. Classical measurement error biases coefficients toward zero. In addition, it induces omitted variable bias. Even if an effect works totally through a mediator, if the mediator is measured with error, then omitted variables will matter. Several of our mediators have been measured with multiple items to create scales with adequate reliability. However, we are unable to ensure that there is no measurement error.

These issues have been widely noted in the literature on path analysis. The discussion in MacKinnon's (2008, pp. 365-366) standard textbook on mediation is careful:

> *The [Rubin Causal Model] demonstrates the problems in the interpretation of the relation between* M *and* Y *in mediation models, at least in part because this relation is not randomized but is self-selected in* most *applications. The main benefit of all these detailed causal approaches is the causal consideration of the limitations and strengths of different types of evidence of causal inference. … At a minimum the causal inference approaches force researchers to consider the assumptions under which mediation is investigated. For the most part, the sensitivity of the estimates to violation of assumptions is not generally known[.]*

Several other scholars note the problematic assumptions required to infer causality from mediation analyses (see Imai, Keele, & Yamamoto, 2010; Bullock, Green, & Ha, 2010), even in the context of an experimental design, such as HIP. For example, in their abstract, Bullock, Green, and Ha (2010) note their skepticism:

> *[E]xperiments cannot overcome certain threats to inference that arise chiefly or exclusively in the context of mediation analysis….* Our *conclusion is that inference about mediators is far more difficult than previous research suggests, and best tackled by an experimental research program that is specifically designed to address the challenges of mediation analysis.*

It is important to note that the evaluation of HIP was not "specifically designed to address the challenges of mediation analysis." Despite the strength of the random assignment design in that it requires only minimal assumptions to infer causality, these limited assumptions are not sufficient to

187 When the predictor is not HIP treatment status, the assumptions are more problematic as detailed for the link between the mediator and the outcome.

satisfy the assumptions required for mediation models. Thus, these mediation results should be interpreted with caution.

Discussion

Keeping in mind the limitations and necessary assumptions mentioned above, the analyses presented in this appendix section provide insight into *how* HIP might work by revealing several pathways through which HIP may influence its end goal of increasing fruit and vegetable consumption. Several pathways in our logic model were supported by these mediation analyses. Consistent with a price effect, HIP was shown to influence fruit and vegetable consumption through spending, and combining findings from several of the single mediator models implies that HIP increases fruit and vegetable spending which increases the amount of fruits and vegetables in the home, which then increases fruit and vegetable consumption. This is the expected primary pathway of HIP's impact.

Beyond this expected primary pathway, the mediation analyses also suggest that in addition to the presumed price effect, over time HIP may also operate to increase fruit and vegetable consumption by changing attitudes toward fruits and vegetables. HIP was shown to affect attitudes toward fruits and vegetables, and more positive attitudes were subsequently linked to greater fruit and vegetable consumption. In addition, the above-mentioned price effect may also involve a change in attitudes; by combining multiple mediator models, we infer that HIP increases fruit and vegetable spending, which increases fruits and vegetables in the home, which improve attitudes toward fruits and vegetables, and then more positive attitudes are linked to greater fruit and vegetable consumption. These findings imply that HIP may work in a way that goes beyond a pure price effect.

It is also important to note that the percent of the effect of HIP on fruit and vegetable consumption that was mediated by any one of the mediators examined was quite low, leaving a large portion of this effect to be explained. However, some of our additional pathways revealed larger mediated proportions, which may indicate, as our logic model suggests, that HIP operates through multiple mediators and multiple steps.

Overall, the mediation analyses presented in this appendix section contribute to the understanding of *how* HIP works to increase fruit and vegetable consumption. However, given the limitations and assumptions required of these models, it is important to keep in mind that any causal interpretations are only as valid as the required assumptions.

I.2 HIP Awareness and Understanding

The descriptive results on HIP participant experiences presented in Chapter 5 suggest varying and far from perfect awareness and understanding of HIP. It is therefore natural to ask to what extent impacts vary for those with greater or lesser awareness and understanding of the program.

Chapter 5 showed that even at Round 3, nearly a quarter of treatment group respondents reported that they had not heard of HIP. To the extent that this reflects a true lack of awareness about the existence of HIP in this group (as opposed to, for example, simple confusion about the name of the pilot), one might expect impacts to be diminished as it is difficult to see how HIP could successfully change perceptions or behavior in a group that was completely unaware of the pilot's existence!

Similarly, HIP participants who reported that it was difficult to understand how HIP worked might be less affected by the pilot—if they truly could not understand what they needed to do to earn the incentive and therefore did not change their behavior at all. Alternatively, for some outcomes, those

HIP participants who reported that it was difficult to understand how HIP worked might be more affected by the pilot, if they thought, for example, that they could earn the HIP incentive on fruit and vegetable purchases with cash and/or at non-participating retailers.

Likewise, HIP participants who understood that they could earn the HIP incentive by purchasing fruits and vegetables in general, but found it difficult to understand exactly *which* fruits and vegetables qualified, might increase purchases of non-qualifying foods under the mistaken impression that those foods (e.g., white potatoes, 100% juice) did in fact earn the incentive.

To explore these questions, we performed a series of non-experimental analyses within the treatment group only to assess how key spending and intake outcomes varied with available measures of HIP awareness and understanding. In particular, we examined differences in outcomes across the following subgroups of treatment group respondents:

1. Respondents who reported that they had heard of HIP (67 percent) versus respondents who reported that they had never heard of HIP (33 percent)
2. Respondents who reported that it was "very easy" or "easy" to understand how HIP works (61 percent) versus respondents who reported that it was "somewhat easy," "somewhat difficult," "difficult," or "very difficult" (39 percent)
3. Respondents who reported that it was "very easy" or "easy" to remember which fruits and vegetables qualified to earn the HIP incentive (52 percent) versus respondents who reported that it was "somewhat easy," "somewhat difficult," "difficult," or "very difficult" (48 percent)
4. Respondents who reported that they kept track of their HIP incentive earnings (39 percent) versus those who did not keep track (61 percent)[188]

We estimate these within-treatment subgroup differences for each of the four sets of subgroups using linear regression, in a parallel approach to our main impact analyses. The key explanatory variable in these regressions is not HIP participation status, but a binary indicator equal to 1 for those with greater understanding/awareness as measured by the above proxies, and 0 for those with lesser understanding/awareness. All regressions additionally include the same set of covariates as in the main impact models.

When interpreting these findings, it is important to note several key caveats. First, observed differences by HIP awareness or understanding do not necessarily imply a causal relationship. In the main body text and in Appendix H, we presented a number of analyses for subgroups defined exogenously; i.e., for characteristics defined from before HIP began. These subgroup analyses are intended to describe characteristics of participants associated with greater or lesser HIP impacts. These subgroup comparisons are unbiased within the random assignment framework because they depend on characteristics measured in both the treatment and control groups during the baseline period, prior to the start of HIP.

[188] This measure might be thought of as a proxy for the "intensiveness" of awareness/understanding and/or involvement with HIP; it seems likely that only those respondents who are most aware of and savvy about HIP would keep track of earnings.

The situation is quite different for HIP awareness and understanding. For these measures, we can define HIP experiences within the treatment group only after the start of implementation, such that differences in both experiences and outcomes could plausibly be influenced by some third, unobserved factor. For example, someone who purchased a lot of fruits and vegetables even without HIP might have paid more attention to program details. Alternatively, a very budget-conscious person might be more responsive to the HIP incentive, and simultaneously more likely to take the time to understand exactly how the program works to make sure he or she is maximizing potential earnings. Thus, even if we observe greater TFV spending among those respondents with greater self-reported understanding of how HIP works, it is not necessarily the case that the greater understanding *caused* greater spending.

Second, in addition, it is important to note that our measures of awareness and understanding were not specifically developed to facilitate this type of subgroup analysis. For example, the survey asked respondents: “Have you heard of the Healthy Incentives Pilot?” As noted above, whether or not a respondent has “ever heard of HIP” is an imperfect measure of HIP “awareness” – we do not know whether the respondent is truly unaware of the pilot’s existence, or simply does not know it by name.

In the remainder of this appendix subsection, we present results for spending measures (both survey-reported and EBT-transactions-based), followed by results for consumption measures. We conclude with a brief discussion of possible interpretations for these findings.

Expenditures

Exhibits I.7 through I.10, respectively, describe differences in expenditures for each of the four HIP awareness and understanding measures.

There were no statistically significant differences in spending by our key awareness measure, i.e. whether or not HIP participants reported that they had heard of HIP (Exhibit I.7). This finding is somewhat counterintuitive, as one would not expect HIP to have any impacts on those who were unaware of its existence; it is possible, however, that this measure does not effectively capture true “awareness” about the pilot.

EBT TFV expenditures in participating supermarkets were significantly higher for HIP participants who said that it was easy to understand HIP (Exhibit I.8), for those who said that it was easy to remember which fruits and vegetables qualified to earn the incentive (Exhibit I.9), and for those who reported that they tracked incentive earnings (Exhibit I.10). This pattern is consistent with the hypothesis that those who better understood the program were more likely to shift EBT spending in participating retailers toward TFV. (Though, as noted above, it is also possible that these correlations are explained by some other, unobserved factor.) For those who said it was easy to remember which fruits and vegetables qualified to earn the incentive, total EBT expenditures in participating supermarkets were additionally higher; point estimates for the other two understanding measure followed a similar pattern, though differences were not statistically significant.

There were no differences in survey-based, self-reported spending measures by degree of understanding. This is not surprising. In Chapter 6, we noted that these measures appear to be imprecisely estimated relative to EBT based measures.

Exhibit I.7: Differences in Survey- and EBT-Transactions-Based Spending Measures, by Awareness of HIP, Treatment Group

	Regression-adjusted mean (S.E.)		Difference			
	Heard of HIP	Never heard of HIP	Difference	[S.E.]	{t-statistic}	(P-value)
Usual survey-reported monthly spending for...[a]						
Groceries using only SNAP (N=1548 interviews over 922 respondents)	269.530 (4.565)	278.506 (8.109)	-8.977	[8.881]	{-1.011}	(0.312)
Groceries not using SNAP (N=1513 interviews over 903 respondents)	146.410 (4.065)	145.175 (6.926)	1.235	[8.072]	{0.153}	(0.878)
Food items (N=1460 interviews over 876 respondents)	103.147 (3.647)	101.294 (5.796)	1.853	[6.816]	{0.272}	(0.786)
Nonfood items (N=1460 interviews over 876 respondents)	41.868 (1.762)	45.781 (3.062)	-3.913	[3.589]	{-1.090}	(0.276)
Restaurants (N=1545 interviews over 921 respondents)	35.185 (1.483)	33.104 (2.184)	2.081	[2.669]	{0.780}	(0.436)
Fruits and vegetables (N=1361 interviews over 833 respondents)	74.504 (2.036)	80.339 (3.582)	-5.835	[4.161]	{-1.402}	(0.161)
EBT-recorded expenditures per household per month (N=1709 observations over 1001 respondents)						
Total EBT purchases	281.567 (5.317)	290.849 (7.448)	-9.281	[8.616]	{-1.077}	(0.282)
EBT IECR purchases at HIP participating supermarkets & superstores	146.158 (4.291)	139.727 (4.734)	6.431	[5.701]	{1.128}	(0.260)
EBT IECR TFV purchases at HIP participating supermarkets & superstores	13.419 (0.517)	13.463 (0.734)	-0.045	[0.863]	{-0.052}	(0.959)

Weighted means (standard errors).
Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported differences between subgroups may differ from differences between reported regression-adjusted means.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]Continuous outcomes: self-reported expenses in dollars per month; "don't know" and "refused" responses coded as missing.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 responses, and EBT Transactions Data, pooled across Round 2 (average of March - July 2012) and Round 3 (average of August - October 2012), for survey respondents only.

Exhibit I.8: Differences in Survey- and EBT-Transactions-Based Spending Measures, by Self-Reported Understanding of How HIP Works, Treatment Group

	Regression-adjusted mean (S.E.)		Difference			
	Easy to understand	Not easy to understand	Difference	[S.E.]	{t-statistic}	(P-value)
Usual survey-reported monthly spending for...[a]						
Groceries using only SNAP (N=1298 interviews over 840 respondents)	272.670 (5.600)	267.949 (6.726)	4.721	[8.377]	{0.564}	(0.573)
Groceries not using SNAP (N=1268 interviews over 826 respondents)	145.867 (4.796)	149.212 (5.708)	-3.344	[7.397]	{-0.452}	(0.651)
Food items (N=1225 interviews over 799 respondents)	101.464 (4.301)	106.757 (4.940)	-5.293	[6.371]	{-0.831}	(0.406)
Nonfood items (N=1225 interviews over 799 respondents)	43.110 (2.019)	42.943 (2.822)	0.166	[3.554]	{0.047}	(0.963)
Restaurants (N=1292 interviews over 834 respondents)	34.107 (1.649)	35.944 (2.148)	-1.837	[2.653]	{-0.692}	(0.489)
Fruits and vegetables (N=1144 interviews over 757 respondents)	76.422 (2.328)	75.837 (2.939)	0.585	[3.744]	{0.156}	(0.876)
EBT-recorded expenditures per household per month(N=1298 observations over 840 respondents)						
Total EBT purchases	279.467 (5.917)	289.906 (6.949)	-10.439	[8.345]	{-1.251}	(0.211)
EBT IECR purchases at HIP participating supermarkets & superstores	148.834 (4.838)	140.812 (5.530)	8.022	[6.710]	{1.196}	(0.232)
EBT IECR TFV purchases at HIP participating supermarkets & superstores	14.187 (0.612)	12.328 (0.629)	1.859	[0.809]	{2.298}	(0.022)**

Weighted means (standard errors).
Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported differences between subgroups may differ from differences between reported regression-adjusted means.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]Continuous outcomes: self-reported expenses in dollars per month; “don’t know” and “refused” responses coded as missing.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 responses, and EBT Transactions Data, pooled across Round 2 (average of March - July 2012) and Round 3 (average of August - October 2012), for survey respondents only.

Exhibit I.9: Differences in Survey- and EBT-Transactions-Based Spending Measures, by Self-Reported Understanding of Which Fruits & Vegetables Qualify to Earn the HIP Rebate, Treatment Group

	Regression-adjusted mean (S.E.)		Difference			
	Easy to understand	Not easy to understand	Difference	[S.E.]	{t-statistic}	(P-value)
Usual survey-reported monthly spending for… [a]						
Groceries using only SNAP (N=1415 interviews over 878 respondents)	276.361 (5.534)	269.375 (6.067)	6.986	[7.524]	{0.929}	(0.353)
Groceries not using SNAP (N=1382 interviews over 860 respondents)	136.298 (4.630)	159.825 (5.379)	-23.527	[6.820]	{-3.449}	(0.001)***
Food items (N=1333 interviews over 834 respondents)	91.729 (4.027)	116.476 (4.715)	-24.746	[5.963]	{-4.150}	(<0.001)***
Nonfood items (N=1333 interviews over 834 respondents)	43.847 (2.233)	43.451 (2.304)	0.397	[3.211]	{0.124}	(0.902)
Restaurants (N=1406 interviews over 875 respondents)	34.491 (1.832)	35.622 (1.810)	-1.13	[2.566]	{-0.441}	(0.660)
Fruits and vegetables (N=1251 interviews over 794 respondents)	79.557 (2.520)	74.707 (2.688)	4.851	[3.624]	{1.339}	(0.181)
EBT-recorded expenditures per household per month (N=1549 observations over 951 respondents)						
Total EBT purchases	285.361 (5.918)	288.735 (6.444)	-3.374	[7.935]	{-0.425}	(0.671)
EBT IECR purchases at HIP participating supermarkets & superstores	152.676 (4.871)	139.721 (4.809)	12.956	[6.196]	{2.091}	(0.037)**
EBT IECR TFV purchases at HIP participating supermarkets & superstores	14.896 (0.632)	12.359 (0.599)	2.537	[0.810]	{3.133}	(0.002)***

Weighted means (standard errors).
Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported differences between subgroups may differ from differences between reported regression-adjusted means.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]Continuous outcomes: self-reported expenses in dollars per month; “don’t know” and “refused” responses coded as missing.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 responses, and EBT Transactions Data, pooled across Round 2 (average of March - July 2012) and Round 3 (average of August - October 2012), for survey respondents only.

Exhibit I.10: Differences in Survey- and EBT-Transactions-Based Spending Measures, by Whether Primary Shopper Keeps Track of HIP Rebate, Treatment Group

	Regression-adjusted mean (S.E.)		Difference			
	Track rebate	Don't track rebate	Difference	[S.E.]	{t-statistic}	(P-value)
Usual survey-reported monthly spending for...[a]						
Groceries using only SNAP (N=1435 interviews over 886 respondents)	270.922 (6.740)	276.749 (5.377)	-5.828	[8.079]	{-0.721}	(0.471)
Groceries not using SNAP (N=1406 interviews over 870 respondents)	148.558 (5.770)	147.121 (4.594)	1.437	[7.301]	{0.197}	(0.844)
Food items (N=1354 interviews over 843 respondents)	103.306 (4.945)	105.298 (4.090)	-1.992	[6.205]	{-0.321}	(0.748)
Nonfood items (N=1354 interviews over 843 respondents)	43.759 (2.530)	42.357 (2.047)	1.402	[3.374]	{0.416}	(0.678)
Restaurants (N=1431 interviews over 884 respondents)	33.488 (2.244)	36.268 (1.656)	-2.78	[2.892]	{-0.961}	(0.337)
Fruits and vegetables (N=1261 interviews over 797 respondents)	77.864 (2.708)	76.162 (2.449)	1.702	[3.637]	{0.468}	(0.640)
EBT-recorded expenditures per household per month (N=1578 observations over 963 respondents)						
Total EBT purchases	285.714 (6.962)	287.076 (5.940)	-1.362	[8.672]	{-0.157}	(0.875)
EBT IECR purchases at HIP participating supermarkets & superstores	152.181 (5.718)	142.209 (4.552)	9.972	[6.946]	{1.436}	(0.151)
EBT IECR TFV purchases at HIP participating supermarkets & superstores	14.946 (0.747)	12.593 (0.518)	2.353	[0.849]	{2.770}	(0.006)***

Weighted means (standard errors).
Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported differences between subgroups may differ from differences between reported regression-adjusted means.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
[a]Continuous outcomes: self-reported expenses in dollars per month; "don't know" and "refused" responses coded as missing.
Source: Participant Survey (primary shopper module), pooled Round 2 and Round 3 responses, and EBT Transactions Data, pooled across Round 2 (average of March - July 2012) and Round 3 (average of August - October 2012), for survey respondents only.

Consumption

Exhibits I.11-I.14 provide results on differences in fruit and vegetable intake by awareness and understanding. In particular, we present findings for our primary TFV measure and other intake measures. Considering our primary TFV measure allows us to assess potential differences in intake of foods that qualified to earn the HIP incentive. Presenting results for other fruit and vegetable aggregates (white potatoes, legumes, 100% fruit juice, and other fruits and vegetables purchased outside stores) allows us to assess differences in intake of foods that did *not* qualify for the incentive.

We find that TFV intake was higher among those who kept track of their HIP rebate earnings (Exhibit I.14), though there were no statistically significant differences in TFV intake by awareness of HIP (Exhibit I.11) or by the other two understanding measures (Exhibits I.12 and I.13).

Interestingly, intakes of 100% fruit juice and of legumes were significantly higher among those who said they found it difficult to remember how HIP worked (Exhibit I.12). This finding would be consistent with confusion on the part of participants about exactly which foods qualified – that is, those that were confused about how HIP worked might think that juice and legumes earned the rebate. However, TFV intake was also lower in this group, though not significantly so. Thus, it may be that the types of respondents who had difficulty understanding HIP also had lower fruit and vegetable intake more generally for unrelated reasons. Additionally, we did not observe a statistically significant difference in intake of 100% fruit juice or legumes by whether or not the participant specifically reported that it was hard to remember which foods qualified to earn the rebate (Exhibit I.13).

Discussion

On balance, and subject to the important caveats noted above, these exploratory findings provide some limited evidence that confusion about HIP was associated with lower spending on TFVs, as well as higher intake of some categories of fruits and vegetables that did not qualify to earn the HIP incentive, though the evidence on the latter point is even more mixed. Where appropriate in the main text, we make reference to this exploratory evidence to provide further context for key findings.

Exhibit I.11: Differences in Consumption of Fruits & Vegetables and Disaggregated Components, Cup-Equivalents, by Awareness of HIP, Treatment Group

	Regression-adjusted mean (S.E.)		Difference			
	Heard of HIP	Never heard of HIP	Difference	[S.E.]	{t-statistic}	(P-value)
Targeted Fruits & Vegetables (preferred restrictive proxy)	1.099 (0.048)	1.208 (0.075)	-0.109	[0.087]	{-1.260}	(0.208)
Plus TFV from mixed foods	0.306 (0.016)	0.316 (0.021)	-0.010	[0.026]	{-0.377}	(0.707)
Targeted Fruits & Vegetables (alternative inclusive proxy)	1.405 (0.051)	1.524 (0.080)	-0.119	[0.092]	{-1.289}	(0.198)
Plus additional components						
100% fruit juice	0.563 (0.038)	0.476 (0.039)	0.087	[0.056]	{1.559}	(0.119)
White potatoes	0.337 (0.019)	0.353 (0.031)	-0.015	[0.036]	{-0.422}	(0.673)
Legumes	0.102 (0.008)	0.111 (0.013)	-0.009	[0.016]	{-0.582}	(0.561)
Other fruits & vegetables acquired outside stores	0.168 (0.019)	0.167 (0.026)	0.001	[0.033]	{0.042}	(0.967)
All fruits and vegetables	2.575 (0.073)	2.630 (0.102)	-0.055	[0.125]	{-0.439}	(0.661)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported differences between subgroups may differ from differences between reported regression-adjusted means.
Targeted fruit and vegetable (TFV) intake proxy measures include intake of fruits acquired from the store, excluding white potatoes, legumes, and 100% juice. The preferred restrictive proxy measure additionally excludes fruit and vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent, while the alternative inclusive proxy measure includes fruit and vegetable intake from all mixed foods.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=1,870 recalls from 979 respondents).

Exhibit I.12: Differences in Consumption of Fruits & Vegetables and Disaggregated Components, Cup-Equivalents, by Self-Reported Understanding of How HIP Works, Treatment Group

	Regression-adjusted mean (S.E.)		Difference			
	Easy to understand	Not easy to understand	Difference	[S.E.]	{t-statistic}	(P-value)
Targeted Fruits & Vegetables (preferred restrictive proxy)	1.092 (0.053)	1.256 (0.084)	-0.164	[0.100]	{-1.632}	(0.103)
Plus TFV from mixed foods	0.302 (0.017)	0.344 (0.027)	-0.042	[0.033]	{-1.294}	(0.196)
Targeted Fruits & Vegetables (alternative inclusive proxy)	1.394 (0.056)	1.600 (0.088)	-0.206	[0.104]	{-1.972}	(0.049)**
Plus additional components						
100% fruit juice	0.484 (0.033)	0.658 (0.062)	-0.174	[0.070]	{-2.488}	(0.013)**
White potatoes	0.338 (0.020)	0.350 (0.031)	-0.013	[0.038]	{-0.337}	(0.736)
Legumes	0.090 (0.008)	0.115 (0.012)	-0.025	[0.016]	{-1.600}	(0.110)
Other fruits & vegetables acquired outside stores	0.158 (0.020)	0.159 (0.027)	-0.001	[0.034]	{-0.039}	(0.969)
All fruits and vegetables	2.464 (0.077)	2.883 (0.119)	-0.419	[0.144]	{-2.913}	(0.004)***

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported differences between subgroups may differ from differences between reported regression-adjusted means.
Targeted fruit and vegetable (TFV) intake proxy measures include intake of fruits acquired from the store, excluding white potatoes, legumes, and 100% juice. The preferred restrictive proxy measure additionally excludes fruit and vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent, while the alternative inclusive proxy measure includes fruit and vegetable intake from all mixed foods.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=1,538 recalls from 879 respondents).

Exhibit I.13: Differences in Consumption of Fruits & Vegetables and Disaggregated Components, Cup-Equivalents, by Self-Reported Understanding of Which Fruits & Vegetables Qualify to Earn the HIP Rebate, Treatment Group

	Regression-adjusted mean (S.E.)		Difference			
	Easy to understand	Not easy to understand	Difference	[S.E.]	{t-statistic}	(P-value)
Targeted Fruits & Vegetables (preferred restrictive proxy)	1.113 (0.053)	1.160 (0.066)	-0.046	[0.083]	{-0.562}	(0.574)
Plus TFV from mixed foods	0.302 (0.018)	0.325 (0.021)	-0.023	[0.028]	{-0.808}	(0.419)
Targeted Fruits & Vegetables (alternative inclusive proxy)	1.415 (0.058)	1.485 (0.070)	-0.069	[0.088]	{-0.786}	(0.432)
Plus additional components						
100% fruit juice	0.512 (0.035)	0.584 (0.048)	-0.072	[0.059]	{-1.227}	(0.220)
White potatoes	0.343 (0.024)	0.345 (0.025)	-0.002	[0.036]	{-0.066}	(0.947)
Legumes	0.102 (0.009)	0.104 (0.010)	-0.002	[0.014]	{-0.128}	(0.898)
Other fruits & vegetables acquired outside stores	0.133 (0.019)	0.187 (0.024)	-0.053	[0.031]	{-1.734}	(0.083)*
All fruits and vegetables	2.505 (0.079)	2.704 (0.097)	-0.199	[0.124]	{-1.603}	(0.109)

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported differences between subgroups may differ from differences between reported regression-adjusted means.
Targeted fruit and vegetable (TFV) intake proxy measures include intake of fruits acquired from the store, excluding white potatoes, legumes, and 100% juice. The preferred restrictive proxy measure additionally excludes fruit and vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent, while the alternative inclusive proxy measure includes fruit and vegetable intake from all mixed foods.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=1,686 recalls from 925 respondents).

Exhibit I.14: Differences in Consumption of Fruits & Vegetables and Disaggregated Components, Cup-Equivalents, by Whether Primary Shopper Keeps Track of HIP Rebate, Treatment Group

	Regression-adjusted mean (S.E.)		Difference			
	Tracks rebate	Does not track rebate	Difference	[S.E.]	{t-statistic}	(P-value)
Targeted Fruits & Vegetables (preferred restrictive proxy)	1.299 (0.077)	1.036 (0.047)	0.262	[0.088]	{2.995}	(0.003)***
Plus TFV from mixed foods	0.319 (0.022)	0.308 (0.018)	0.011	[0.029]	{0.381}	(0.703)
Targeted Fruits & Vegetables (alternative inclusive proxy)	1.618 (0.080)	1.344 (0.051)	0.273	[0.092]	{2.986}	(0.003)***
Plus additional components						
100% fruit juice	0.584 (0.055)	0.507 (0.036)	0.077	[0.068]	{1.139}	(0.255)
White potatoes	0.364 (0.029)	0.341 (0.022)	0.024	[0.037]	{0.641}	(0.522)
Legumes	0.098 (0.010)	0.106 (0.009)	-0.008	[0.013]	{-0.618}	(0.537)
Other fruits & vegetables acquired outside stores	0.134 (0.023)	0.182 (0.020)	-0.048	[0.031]	{-1.556}	(0.120)
All fruits and vegetables	2.798 (0.108)	2.480 (0.073)	0.318	[0.129]	{2.470}	(0.014)**

Two-sided test; *p<0.1, **p<0.05, ***p<0.01.
Due to rounding, reported differences between subgroups may differ from differences between reported regression-adjusted means.
Targeted fruit and vegetable (TFV) intake proxy measures include intake of fruits acquired from the store, excluding white potatoes, legumes, and 100% juice. The preferred restrictive proxy measure additionally excludes fruit and vegetable intake from mixed foods where the source of individual ingredients was not identified by the respondent, while the alternative inclusive proxy measure includes fruit and vegetable intake from all mixed foods.
Standard errors and test statistics are adjusted for clustering at the individual respondent level.
Source: Participant Survey (AMPM dietary recall module), pooled Round 2 and Round 3 responses, including 10% second-day subsamples for each round (unweighted N=1,725 recalls from 941 respondents).