Transition to EBT in WIC: Review of Impact and Examination of Participant Redemption Patterns

Final Report

Agreement # 59-5000-1-0032

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Abstract
Through a cooperative agreement with the Economic Research Service (ERS) of the U.S. Department of Agriculture (USDA) and in partnership with the Kentucky, Michigan, and Nevada Special Supplemental Nutrition Programs for Women, Infants, and Children (WIC), Altarum Institute conducted a study examining WIC food benefit redemption patterns using Electronic Benefits Transfer (EBT) systems, state policies related to EBT implementation, and vendor and participant perceptions of benefits and challenges with WIC EBT. The study uses WIC program issuance and redemption data from each state from January—March 2012. Quantitative methods include linking WIC participant characteristic data with issuance and redemption data. Results are further informed using qualitative information gathered through participant focus groups and vendor interviews. The study found a positive response to WIC EBT by state officials, vendors, and participants; discovered WIC foods most popular with participants; and revealed participant shopping patterns. Redemption patterns by race/ethnicity revealed different levels of full redemption.

Acknowledgements
This report was prepared by Diane Phillips, Loren Bell, Ruth Morgan and Jennifer Pooler of Altarum Institute for USDA’s ERS. Many individuals made important contributions to this report. From Altarum, the authors wish to thank Gloria Aponte-Clarke, Noelle Poirier, and Jennifer Peterson for their contributions to focus group facilitation and vendor interviews; Carol Normand for her contributions in editing; and Lynne Cullen for her graphic design contributions.

The authors would also like to sincerely thank Fran Hawkins, the Kentucky WIC Director, Stan Bien, the Michigan WIC Director, and Michelle Walker, the Nevada WIC Director, for their partnership and support of this study. Additionally, the authors would like to thank the WIC vendors that agreed to participate in interviews, and the WIC participants who agreed to participate in focus groups.

Finally, the authors would like to thank the following individuals for participating in our external review process: 1) Shannon Whaley, PhD, Public Health Foundation Enterprises, Inc. WIC Program, 2) Phillip Kaufman, PhD, independent consultant and formerly agricultural economist with USDA ERS, and 3) Betsy Frazao, PhD from the USDA ERS.

Disclaimer: This study was conducted by Altarum Institute under Cooperative Agreement # 59-5000-1-0032 with the USDA’s Economic Research Service (ERS). Altarum Institute was responsible for reviewing the report. The views expressed are those of the authors and are not necessarily those of ERS or USDA.
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Executive Summary

I. Background

In-store food purchasing transactions for the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) have for many years been conducted through the use of paper food instruments (FIs) in the form of checks or vouchers. The Child Nutrition and WIC Reauthorization Act of 2010 requires WIC State Agencies to change their method of conducting food purchasing transactions by implementing Electronic Benefits Transfer (EBT) systems with transactions conducted through the use of card technology. All WIC State Agencies are required to implement EBT by October 1, 2020. Over the past decade, 11 WIC State Agencies have fully developed and implemented EBT systems with the majority of other states in various stages of planning, developing or implementing EBT.

Use of EBT to transact food purchases is a revolutionary change for the WIC program that benefits participants, grocers authorized to transact WIC purchases (henceforth referred to as vendors), and WIC State Agencies. With the traditional FI delivery system, participants receive 3-4 paper FIs per month, each listing the foods that can be purchased. If they do not purchase all of the foods prescribed on the FI at the time of transaction, they lose the unused part of their food benefit. EBT provides participants with more flexibility and choice regarding when and whether to purchase WIC foods as they have the ability to purchase foods in any quantity at any time, subject to the limitations on total food quantity. Vendors benefit from being able to scan foods to ensure they are allowable for purchase by WIC customers and they also receive payment immediately with no wait for FIs to be processed through their banks. WIC State Agencies have access to timely data on food purchases and enhanced capacity to prevent or detect program abuse.

While there are many potential benefits to EBT, there are also numerous challenges facing WIC State Agencies in the planning, implementation, and maintenance of EBT as a food benefit delivery system. Since WIC only allows the purchase of certain types and quantities of specific nutritious foods and formula, systems must be developed to limit the use of WIC benefits for only those foods prescribed to a participant and authorized by the WIC program. As such, every EBT card is “loaded” with specific types and quantities of 14 different categories of WIC foods that can be purchased. In addition, WIC prescriptions for women and children include a cash value benefit (CVB) for purchasing only fruits and vegetables, which allows participants to redeem the dollar amount prescribed instead of a specified size and quantity of food. WIC State Agencies must establish and maintain information regarding authorized foods that can be purchased by WIC participants and provide that information to vendors on a routine basis. In addition to the technical challenges of prescriptive food benefits, WIC State Agencies independently develop their benefit delivery systems, whereas other public programs have a single system in place that is managed at the federal level. As a result, WIC State Agencies have multiple options for implementing EBT.

Two methods of WIC EBT are currently in use: (1) offline EBT in which the food benefit data is placed on a “smart card” (a plastic card with an embedded computer chip), and (2) online EBT in which access to the food benefit data occurs through a real-time communication between the WIC vendor and the entity maintaining the EBT prescription information. The decision on method of WIC EBT must be made in the context of each WIC State Agency’s unique
regulations and information systems capacity as well as consideration of the technology costs and benefits and the impact of the decisions on WIC vendors and participants.

II. Purpose of the Study

While 13 WIC State Agencies have implemented EBT, there have been no comprehensive assessments aimed at understanding the processes surrounding EBT transition and its impact on various stakeholders, including WIC State Agencies, WIC vendors, and WIC participants. The WIC State Agencies transitioning to EBT over the next few years could benefit from the timely dissemination of such information, helping them make informed decisions when planning and implementing EBT. At the same time, examination of current practices and policies, as well as challenges and benefits to using EBT, may aid WIC State Agencies that are already using EBT in improving their services. The timing of this study is therefore important for informing state administrators and other key stakeholders about critical elements of EBT implementation and their implications for WIC transactions and redemptions.

To better understand these factors and the impact of transitioning to an EBT system on key WIC stakeholders, this study examined four aspects of the program:

1. State policies and practices related to EBT implementation;
2. WIC vendor perceptions of the benefits and challenges with EBT;
3. WIC participant perceptions of the transition to EBT and associated benefits and challenges with using EBT; and
4. WIC family food benefit purchasing and redemption patterns using EBT.

Altarum conducted this study with funding from the USDA’s Economic Research Service (ERS) as part of the Food Assistance and Nutrition Research Programs (FANRP) and in partnership with three WIC State Agencies that had fully implemented online EBT by late 2011: Kentucky, Michigan, and Nevada.

III. Methodology

This study consisted of both qualitative and quantitative data analysis. Qualitative data were used to examine the operational aspects of EBT, including state policies, vendor perceptions of WIC EBT implementation, and WIC participant views of using EBT as compared to paper FIs. Qualitative data included:

▲ **WIC State Agency Interviews.** In-depth interviews were conducted with two to three WIC staff members in each state, including the WIC director and an EBT or IT (information technology) staff member. Interviews were conducted in person or by phone and lasted one hour. The purpose of the interviews was to understand each state’s EBT implementation process and policies, the challenges encountered during implementation, to hear of any identified best practices, and each state’s perceptions of vendor and participant acceptance of EBT.

▲ **WIC Vendor Interviews.** Identified from an up-to-date list of authorized vendors provided by each state, a convenience sample of authorized WIC vendors was established for 30- to 45-minute interviews. Vendors from both rural and urban locations throughout each state were selected and store owners or managers familiar with the
store’s transition to WIC EBT were asked to participate in an interview. All interviews were completed in person (at the store) or by phone. The purpose of the interviews was to better understand the vendor perspective of the benefits and barriers to WIC EBT implementation and the overall impact of WIC EBT. A total of 49 vendor interviews were conducted across the three study states.

▲ **WIC Participant Focus Groups.** WIC participants were recruited from select local WIC agencies in the three study states. They were asked to participate in focus groups to discuss their experience with WIC EBT and to identify key benefits and barriers to using it. Focus groups were held in both rural and urban locations near local WIC offices. One Spanish and two English focus groups were conducted in each state for a total of nine focus groups with 58 respondents.

The primary source of quantitative data for this study was WIC program EBT food purchase redemption data provided by the Kentucky, Michigan, and Nevada WIC Programs. Participant characteristics, benefit issuance, and benefit redemption data were obtained for all participants receiving WIC food benefits between January 1 and March 31, 2012. Independent variables were derived from individual characteristics contained in the participant file, including state, race and ethnicity, urban/rural geographic residence, number of people in the household, and the number of family members participating in WIC. Since the unit of analysis is the family, it was necessary to combine characteristics across WIC participants in a single family. Food purchasing patterns were then analyzed to determine the extent to which WIC participants utilized their benefits, the categories of foods for which benefit redemption was high or low, and the extent to which food purchasing patterns varied by demographic characteristics of participants. In addition, comparisons were conducted of benefit redemption rates by food types and participant demographics across the three states.

### IV. Analysis

All quantitative analyses were conducted using SAS version 9.3 (SAS Institute, Cary, NC). Analyses sought to assess the prevalence of and characteristics associated with WIC family benefit redemptions overall and for each WIC food category in Kentucky, Michigan, and Nevada. Descriptive statistics, including frequencies and means, were calculated for all outcome and independent variables of interest, including redemption variables, family characteristics, benefit issuances, and shopping patterns.

Bivariate statistics were used to examine differences in use and non-use of EBT benefits by participant characteristics and benefit issuance. This was done to assess whether participant redemptions varied by such characteristics as race and ethnicity, geographic location, the number of persons in the household, and the amount of WIC foods prescribed to the family. Similarly, multivariate analyses were conducted to determine whether differences existed in EBT redemption patterns among Kentucky, Michigan, and Nevada families overall and for individual foods.

Since the entire WIC participant populations of Kentucky, Michigan, and Nevada were included in this study (more than 850,000 families), the use of inferential statistics—used to infer findings from a representative sample to a larger population—is not imperative; however, we chose to report p values to highlight differences across the study populations in the three states. As such, Pearson’s chi-square test statistics were used to determine statistical significance between pairs of dichotomous variables; Mantel-Haenszel and Stuart’s tau-c test statistics were used to determine statistical significance between pairs of categorical and dichotomous variables.
Significance tests yielding a p value of <0.01 are reported as statistically significant in this report.

Multivariate logistic regression models were also explored to ascertain whether differences in redemption patterns among independent variables are maintained when others are controlled. Dependent variables in the models were dichotomous and included individual food and overall monthly full redemption variables. Independent variables were those found to be associated with full benefit use based on bivariate analyses. Throughout the report, results of multivariate logistic regression models are shown as a graphic; adjusted odds ratios and 95% confidence intervals for each model are presented in the appendices.

V. Summary of Findings

This section provides a summary of the major findings from the study. Data were analyzed for all aspects of the study, including EBT implementation, state policies, vendor and participant perspectives on EBT, and food purchasing patterns of WIC participants. The sections below provide highlights of these findings.

A. Key Features of State EBT Systems

Features of the EBT systems in the study states were examined for similarities and differences. Each of the study states used online EBT systems, so the method of transaction was the same. We examined similarities and differences in key areas, including:

1. Integrated Systems and Stand-Beside Devices

The two most common devices used by WIC retailers to complete a WIC transaction include the integrated Electronic Cash Register (ECR) system and the stand-beside device. The primary difference between the two is that the stand-beside device is separate from the cash register system, requiring an additional step in the WIC EBT transaction. The WIC purchase is first transacted in the cash register system, and then entered into the stand-beside system, which reconciles the transaction with WIC prescription benefits. Integrated systems tend to be used more commonly by large chain retailers that have been able to integrate the WIC software solutions into their POS devices whereas stand-beside devices are more common among smaller retailers that often have less infrastructure support to make the necessary changes with their ECR systems. Current WIC regulations restrict State Agencies from imposing costs for equipment on a retail store authorized as a WIC vendor, and as such, State Agencies have provided a limited number of stand-beside devices to authorized vendors.

During the study period, all study states reported having a mix of authorized WIC retailers operating both integrated and stand-beside WIC EBT devices. Allowing integrated and stand-beside systems is particularly important for ensuring that authorized WIC vendors are able to process benefits regardless of their infrastructure. At the same time, however, differences in the two systems directly affect the WIC participant shopping experience. The time it takes to complete the WIC transaction using the stand-beside device is typically longer than the integrated Point of Sale (POS) devices due to the additional step the store clerk must take to enter the information into the stand-beside device, almost rivaling the transaction time of the paper FIs.
2. Mixed-Basket Purchases

In states with paper FIs, separating WIC and non-WIC items is a necessary part of the WIC transaction since only the total amount of the WIC purchase can be entered onto the FI for reimbursement. With EBT, however, this separation is no longer necessary at vendors with an integrated system, allowing participants to place both WIC and non-WIC food items on the checkout lane belt—referred to as a ‘mixed basket.’ Integrated POS systems identify the WIC allowable foods via the scanned Universal Product Code (UPC) and carry out the appropriate match against the Authorized Product List (APL). WIC State Agency officials in the study states reported that vendors operating integrated systems allow mixed-basket purchases.

For vendors using stand-beside devices to process transactions, a mixed-basket approach is not feasible since WIC items must be entered into the stand-beside devices as a separate step.

3. Self-Checkout Lanes

Self-checkout stations are unattended, integrated POS systems in grocery stores at which customers can scan and transact their purchases without the involvement of a cashier. Permissible at the WIC State Agency’s discretion, FNS EBT operating rules allow self-checkout service to WIC EBT cardholders. At the time of the state interviews, Kentucky and Michigan permitted the use of self-checkout lanes for WIC purchases; Nevada had not yet approved self-checkout but was beginning to investigate allowing it.

4. Vendor Balance Inquiries

It may be more difficult with EBT for participants to track their remaining benefit balance and benefit expiration date than it is when they receive paper FIs. To help participants, WIC EBT operating rules require that authorized WIC vendors support balance inquiries prior to transactions. This balance inquiry capability can be supported either in a checkout lane or at a separate device in the store. All three study states established toll free phone numbers for participants to access, in addition to balance inquiries at check stand registers or store kiosks.

B. State Perceptions of EBT

State officials were asked their opinion on how well EBT was accepted by vendors and participants. The three study states reported hearing largely positive feedback from the vendor community, noting that vendors most often cited EBT benefits as:

▲ Having less responsibility in policing WIC purchases;
▲ Faster transactions during checkout;
▲ Knowing what they will be paid for authorized foods at the Not to Exceed (NTE) amount rather than having the payment rejected if it exceeds the NTE; and
▲ Quicker receipt of payments for WIC purchases and not having to appeal for payment.

The three study states reported receiving largely positive feedback from participants about EBT. State officials reported receiving anecdotal feedback from participants which included:
The convenience for participants to purchase WIC items as needed with EBT instead of having to delay an entire WIC purchase or omit an item that was unavailable (as was the case with paper FIs);

The ability to shop more frequently at the grocery store for foods needed by the family and the ability to transport the purchased foods home;

The ability of EBT to combine a family’s benefit on one EBT card (i.e., two or more participants on WIC from one family) has advantages for purchasing certain items by quantity (e.g., cereal); and

The reduced stigma, particularly in stores with integrated cash register systems, afforded by shopping with the EBT card and allowing a mixed-basket purchase.

C. Vendor Experience With WIC EBT

Vendors were asked about both their experience during implementation of EBT and their attitudes toward EBT now that they have had more experience. Key areas that were examined included satisfaction with training, the impact of EBT on stocking of WIC foods, changes in the checkout process, the impact on reimbursement and cash flow, and changes in participant shopping patterns.

1. EBT Implementation and Training

When EBT was implemented, each vendor made equipment updates based on its existing cash register system, its individual store or corporate chain infrastructure capacity, and selection of WIC EBT device best suited for the store. Most stores already had EBT transaction experience from SNAP transactions and were familiar with the technology. Some vendors reported experiencing initial WIC EBT implementation challenges, primarily due to a lack of consistency between their store products and the APL as well as missing UPCs. Vendors in the three study states noted that keeping UPCs updated is particularly difficult, especially for products with frequently changing package sizes or prices. However, many vendors reported a positive implementation experience, generally describing the process in their state as “streamlined,” “seamless,” or a “smooth transition.”

2. Impact on Stocking WIC Foods

Overall, vendors reported an improved ability to track changes in their store inventory, using the EBT system to generate reports of items and quantities sold. Also, the increased flexibility WIC customers have in being able to make more frequent purchases throughout the month with EBT may have a stabilizing effect on store inventories for some of the WIC foods. Some vendors reported that, since customers are opting to purchase fewer WIC foods in one trip, they are running out of WIC items less frequently, most notably milk and formula.

3. Impact on Checkout Procedures

Most vendors described the improved checkout experience for both customers and cashiers as one of the key benefits of WIC EBT, particularly noted by vendors operating integrated POS registers. Vendors noted that participant checkout is quicker and simpler for WIC customers and the checkout interaction between cashiers and customers has improved. Because WIC EBT can identify whether an item is WIC-approved, confusion over whether or not particular foods are allowed has lessened. Store managers report that they no longer need to verify WIC
transactions (as they often did with the paper FIs), and there are fewer errors in processing WIC purchases.

One of the primary barriers to EBT cited by vendors with stand-beside machines is length of time required in the checkout lane to transact WIC purchases. Since the WIC foods must be separated in these lanes from the other foods the WIC shopper is purchasing, and because everything must be scanned twice, some vendors reported that the checkout process with the stand-beside device takes just as long, if not longer, as it did with paper FIs.

4. Changes in Vendor Reimbursement Procedures

In addition to benefits of WIC EBT cited above, vendors also highlighted the reduced amount of administrative work necessary to be paid for WIC purchases. Since vendors no longer need to deposit checks at the bank to get paid, they receive their payments much more quickly; some vendors indicated that their payments now appear within a day or so as compared with several days with the paper FIs. Vendors also liked not having to spend the time processing corrections to rejected FIs.

5. Vendors’ Observations of Participant Shopping Patterns

To understand the general impact of WIC EBT on customer shopping patterns, vendors were asked what changes they had seen in their overall WIC business and in redemption of certain foods since the switch to EBT. While many vendors indicated that they were unsure whether their redemption rates had changed (since they were not tracking this when they had paper FIs) or reported that they saw no changes from pre- to post-EBT, an equal number of vendors reported some increases in their WIC business. Some Nevada vendors attributed the increase to the expansion of the integrated system to every checkout lane in their store.

Vendors also reported seeing a reduction in the amount or quantity of WIC items purchased during any given shopping trip. They observed customers spreading out their purchases and making more trips to the store throughout the month, which benefits their business since customers tend to purchase other items along with their WIC foods.

D. Participant Experiences with WIC EBT

The ultimate success of WIC EBT is determined based on participants’ acceptance of this method of shopping for WIC foods and their ability to access and consume the nutritious foods prescribed by the WIC program. As such, this study sought feedback from participants on their experiences in transitioning to and using WIC EBT. Participants in focus groups were asked to describe their shopping experiences with WIC and how EBT may have changed their shopping practices and overall perceptions of WIC.

1. Making the Transition to EBT

Overall, most participants found EBT to be a “welcome change” that allowed them to better use their benefits and minimize waste associated with having to purchase all the foods on the paper FIs at once. Compared with the FIs, nearly all participants seemed to prefer the WIC EBT card because of its convenience and portability. They described the card as being easier to carry around, compared with the folder (with paper FIs inside). Where allowed (e.g., stores with integrated POS registers), in most cases, respondents also appreciated no longer having to separate WIC foods from other groceries. Overall, they described the WIC EBT card as being
more practical for them, allowing them to get what they need when they need it. They also noted feeling less embarrassment with the EBT card because they felt it was not readily apparent that they were using WIC benefits.

2. Impact on the Shopping Experience

Focus group participants were asked to describe the frequency with which they make WIC purchases and the types of vendors where they shop. Respondents in the three study states indicated that they generally shop at between one and three grocery stores in a given month and that they tend to make more shopping trips for WIC items throughout the month, compared with when they used the FIs.

3. Benefit Balance Inquiries and Receipts

When preparing to do their WIC shopping, participants have a variety of options for checking their benefit balance. Focus group respondents in all three study states indicated that they like being able to call the toll-free number to determine how much of their benefits they have left. Others said the food benefit printout received at the WIC office, which includes both the food item and the quantity that can be purchased (e.g., ounces) was helpful and preferable for tracking their family benefit and food balances. Still others said they preferred to save their receipts with the WIC benefit balance printed on them. In Michigan, participants can also use a website to obtain their benefit balance along with its expiration date; many said they liked this option. Spanish-speakers noted that it is very important for them to be able to obtain their benefit balance because they have a hard time communicating with cashiers if there is an error or they select the wrong item.

Participants expressed interest in additional ways to check their remaining benefit balance, including receiving text alerts or emails when their benefits are about to expire; and being able to access their benefit lists from their smartphone.

4. Shopping with EBT

Participants reported incorporating more of their WIC shopping with their regular shopping since moving to EBT. Some respondents indicated that they still struggle to find the WIC items in the store (e.g., bread, juice), and, while shelf tags are helpful, they are not always evident on the shelves at some stores. Also, some participants purposefully try to make fruit and vegetable purchases at large chain stores to stretch their CVB benefit. They described that, in addition to being less expensive, large chain stores have more variety than they tend to find at a smaller corner store.

The EBT process of scanning WIC food items has helped some participants to become more aware and savvy about their WIC shopping. According to some participants, there are issues with some of the WIC-allowable items not being in a store’s system, and their perception is that some stores have not fully updated their system with WIC-allowable items available for purchase. Participants have had experiences trying to purchase allowable items that don’t scan as WIC-eligible.

5. Changes in the Checkout Line

Most participants felt that the checkout process is quicker with EBT, particularly because they no longer have to sign FIs. In Nevada, participants noted that the separate stand-beside devices
take longer to process the EBT transaction and, in these cases, they felt that the checkout process was faster with FIs.

One of the key benefits that participants mentioned about WIC EBT is that it is much less embarrassing for them to do their WIC shopping. Participants expressed that they no longer hold up the line because the card speeds up the checkout process and since they don’t have to sign their name on FIs, it is not as obvious as in the past that they are using WIC. The ability to use the self-checkout lanes was appreciated by several participants. Most, but not all, respondents in the states that allow self-checkout for WIC purchases at the time of the study (Kentucky and Michigan) were aware that these lanes could be used for WIC purchases. Those who used self-checkout lanes reported doing so because they are quick and more convenient and they liked not having to interact with cashiers. Others preferred to go to a cashier, but appreciated having the option to use the self-checkout lanes.

E. Redemption Patterns

Redemption patterns of WIC participants were analyzed to determine both trends in shopping patterns and popularity of individual WIC food items.

1. Number of Vendors and Shopping Trips

Since WIC families have much more flexibility in how often and when to shop for WIC foods with EBT (as compared with FIs), analyses were conducted to examine the average number of vendors at which benefits were used and the average number of shopping trips conducted in a given month. For families redeeming any monthly WIC benefits, families shopped at 1.8 vendors in an average month. This ranged from a minimum of 1 vendor to a maximum of 11 vendors. The average number of vendors shopped at did not differ dramatically between states. Figure 1 shows the proportion of WIC families that shop at one or more different WIC vendors in a month’s time. The majority of WIC families shopped at one or two vendors in a given month.

Figure 1. Number of Vendors Shopped At by WIC Families, by State, January–March 2012

While the majority of WIC families appeared to have chosen the same WIC vendors when shopping throughout the month, families made an average of 3.2 WIC shopping trips per month in January through March 2012. The total number of store visits made by families ranged from
one to 25; with the majority of families making three or fewer shopping trips per month. Figure 2 shows the number of shopping trips made by families in each state in an average month.

**Figure 2. Number of Monthly WIC Shopping Trips, by State, January–March 2012**

![Figure 2 showing number of shopping trips by state](image)

### 2. Overall Monthly Benefit Redemption

A WIC family’s monthly food benefits depend on the number of WIC participants as well as categories and ages of participants in the family. Overall redemption of monthly benefits indicates whether or not the foods prescribed to the family were used fully, partially, or not at all. A full redemption indicates that all of the foods prescribed were purchased in the quantities available; a partial redemption means that some amount of food was purchased, but the family had benefits remaining at the end of the month.

In January through March 2012, 12.6 percent of all WIC families in Kentucky, Michigan, and Nevada fully redeemed all of their WIC food benefits. This ranged from 9.5 percent of families in Kentucky to 16.4 percent of families in Nevada (see Figure 3). We are not able to draw any comparisons between the EBT redemption patterns and FI redemption patterns since FI data was not available.

**Figure 3. Percentage of WIC Families Redeeming None, Some, and All Monthly Benefits, by State, January-March 2012**

![Figure 3 showing redemption percentages by state](image)
Overall, more than 25 percent of Asian families redeemed all of their monthly food benefits, followed by 16.5 percent of Hispanic families and approximately 12.5 percent of White and American Indian/Alaska Native families. Black families and those of multiple races were least likely to have redeemed all of their foods (8.9 and 10.1 percent, respectively).

3. Most popular and least popular food items

When redemption rates were examined for each food item, the analysis revealed which foods were most popular with WIC participants and which were least purchased. Most popular foods (those with the highest redemption rates) included infant formula, milk, CVB (fruits and vegetables), and eggs. Those with the lowest redemption rates included jarred baby meats, beans/peanut butter, infant cereal and jarred fruits and vegetables, and whole grains.

Quantitative findings indicate that WIC participants, overall, use a majority, but not all, of their WIC benefit. These findings are supported by focus group reports that indicate that (1) participants are able to purchase WIC foods when needed during the month, and not by quantities designated on paper FIs, (2) some participants continue to have trouble finding some of the WIC-allowed foods, even at the large chain stores, and (3) participants find it challenging to keep store receipts, even though the receipts display the remaining benefits.

VI. Conclusions

WIC EBT is a successful method for issuing WIC benefits and preferred by vendors and participants over paper FIs. Simply having more information about participant food purchases reveals trends and patterns in redemptions that were unknown with paper FIs, as individual purchasing patterns could not be identified. These data are very revealing and can help states tailor and target efforts to promote full use of the benefits among those groups that under-redeem.

In this study, we found that certain individual WIC foods have low rates of full redemption. In focus groups, reasons participants provided for not purchasing some of the WIC foods included: they could not use them (i.e., they received too much); they or their children disliked the food; or they did not know how to prepare them. To help improve redemption of underused foods, a greater focus on the WIC foods may be needed during WIC visits. For example, local WIC staff could provide recipes (especially recipes that children will like) and nutrition education sessions and materials that help WIC families learn new ways to creatively use WIC foods in family meals.

While the use of EBT has significant benefits, such as improved convenience, portability, and less participant stigma (particularly in stores with integrated POS systems), it has created some new challenges. Tracking WIC food benefits through what is essentially a ‘virtual’ environment is a new experience for participants. In order to monitor food benefits available during the month prior to their expiration, participants must actively track their benefit use either through saving store receipts or checking balances via kiosks, websites, or toll-free numbers. Redemption may be improved through WIC program efforts to reinforce and support participants’ understanding of the various methods available to them to monitor their monthly food benefits.

Findings from this study suggest that regardless of ethnicity, full redemption of WIC benefits is low. Targeted educational efforts to promote full utilization of WIC benefits are important in all local WIC programs. This could include tailoring the nutrition education to include more
discussion or content around foods that are commonly underused and focusing on culturally relevant approaches to incorporating these foods into meals and snacks.
I. Introduction

A. Background

The Supplemental Nutrition Program for Women, Infants, and Children (WIC) provides nutrition assistance, nutrition education, and referrals for health and social services to low-income and nutritionally at-risk pregnant, breastfeeding, and postpartum women, as well as infants and children up to age five. The program is funded by the Food and Nutrition Service (FNS), a federal agency of the U.S. Department of Agriculture (USDA). FNS grants WIC State Agencies the resources to provide these services to eligible program participants along with food prescriptions offered either as paper food instruments (FIs) or electronic benefit transfer (EBT) cards that can be used to purchase supplemental, nutritious foods free of charge at authorized grocers (i.e. WIC vendors). For 40 years, the WIC program has issued food benefits in the form of paper FIs; by 2020, however, all WIC agencies will be required to provide food benefits through EBT.ii

The Child Nutrition and WIC Reauthorization Act of 2010 requires WIC State Agencies to implement EBT by October 1, 2020. As of May 2014, 13 WIC State Agencies have fully implemented EBT systems with many State Agencies engaged in various phases of EBT activities right.iii

EBT is a revolutionary change for the WIC program. With the traditional paper benefit delivery system, participants receive about 3 paper FIs per month, listing the foods that can be purchased. In order to take full advantage of their benefits, participants have to purchase all of the foods listed on a FI or lose that benefit. While difficult to track the exact foods purchased with any given FI, some studies identified consistent underutilization of WIC benefits with paper FIs, which may be linked to participants not needing all of the foods listed on the FI at the time of purchase.iv EBT, on the other hand, lets participants purchase WIC foods as needed throughout the month without having to purchase foods that they don’t need or risk losing them.

As EBT provides participants with more flexibility and choice regarding when and whether to purchase WIC foods, EBT is also expected to have benefits for other stakeholders as well. For instance, the EBT system pays retailers more quickly for foods purchased by participants, and allows states to reconcile food benefit costs in a timelier manner. With paper FIs, some WIC State Agencies allow WIC vendors to submit FIs for reimbursement as many as 90 days after the issue date with payment and reconciliation occurring as many as 3 months after a participants uses their benefit.

While there are many potential benefits to EBT, there are also numerous challenges facing WIC State Agencies in the planning, implementation, and maintenance of EBT as a benefit delivery system. Other public assistance programs have used EBT as their benefit delivery method for a number of years. The Supplemental Nutrition Assistance Program (SNAP) provides a specified dollar amount for the purchase of foods only. The Temporary Assistance for Needy Families (TANF) provides small amounts of emergency cash to poor families that may be used to purchase anything. While there may be some similarities between WIC EBT, SNAP, and TANF, the WIC EBT process is made more complex by the prescriptive nature of the WIC program. Since WIC only allows the purchase of certain types and quantities of specific nutritious foods

### WIC State Agency (SA) EBT Implementation Status

- **Statewide Implementation:** 13 SAs
- **Implementation/Piloting Phase:** 25 SAs
- **Planning Phase:** 32 SAs
and infant formula, systems must be developed to limit the use of WIC benefits for only those foods prescribed to a participant and authorized by the WIC program. As such, every EBT card is “loaded” with specific types and quantities of 14 different categories of WIC foods that can be purchased. In addition, WIC prescriptions for women and children include a cash value benefit (CVB) for purchasing only fruits and vegetables, which allows participants to draw upon the dollar amount prescribed, instead of a specified size and quantity of food.

Compounding the technical challenges of prescriptive food benefits, WIC State Agencies independently develop their benefit delivery systems, whereas other public programs have a single system in place that is managed at the federal level. As such, WIC State Agencies have multiple options for implementing EBT. Two methods of WIC EBT are currently in use by states: offline EBT, in which the food benefit data is placed on a “Smart Card” (a plastic card with an embedded computer chip), and online EBT, in which access to the food benefit data occurs through a real-time communication between the WIC vendor and the entity maintaining the EBT prescription information. The decision on method of WIC EBT must be made in the context of WIC State Agencies’ unique regulations and information systems capacity, while assessing the costs and benefits of the technology involved and how these decisions impact WIC vendors as well as the WIC participants they serve.

B. Purpose of the Study

While 13 WIC State Agencies have adopted EBT, there have been no comprehensive assessments aimed at understanding the processes surrounding EBT transition and its impact on various stakeholders, including state WIC programs, WIC vendors, and WIC participants. The WIC State Agencies transitioning to EBT over the next few years, however, could benefit from the timely dissemination of such information, helping them make informed decisions around planning and implementing EBT in their states. At the same time, examination of current practices and policies, as well as challenges and benefits to using EBT may aid WIC State Agencies with EBT in improving their services. The timing of this study is therefore important for informing state administrators and other key stakeholders about critical elements of EBT implementation and their implications for WIC transactions and redemptions.

To better understand these factors and the impact of transitioning to an online EBT system on key WIC stakeholders, this study examined four aspects of the program:

- State policies and practices related to EBT implementation;
- WIC vendor perceptions of the benefits and challenges with EBT;
- WIC participant perceptions of the transition to EBT and associated benefits and challenges with using EBT; and
- WIC family food benefit purchasing and redemption patterns using EBT.

Altarum conducted this study with funding from the USDA’s Economic Research Service (ERS) as part of the Food Assistance and Nutrition Research Programs (FANRP) and in partnership with three WIC State Agencies that had fully implemented online EBT by late 2011: Kentucky, Michigan, and Nevada.
II. Methodology

This study used a multi-method, cross-sectional design to explore the impact of the transition to EBT on key WIC stakeholders. Qualitative methods included in-depth interviews with state WIC officials and authorized vendors as well as focus groups with WIC participants. Quantitative methods included collection and analysis of WIC benefit issuance and redemption data. The primary sources of data collection and analysis are described in the following section.

A. Qualitative Data

Instruments and Recruitment

**State WIC Agency Interviews.** In-depth interviews were conducted with two to three WIC staff in each state, including the WIC director and an EBT or IT (information technology) staff member. Interviews were conducted in person or by phone and lasted one hour. The purpose of the interviews was to understand each state's EBT implementation process and policies, challenges encountered during implementation as well as best practices identified, and state perceptions of vendor and participant acceptance of EBT (see Appendix A for the state WIC official interview guide).

**WIC Vendor Interviews.** Authorized WIC vendors to be recruited for 30- to 45-minute interviews were identified from an up-to-date list of authorized vendors provided by each state. Vendors from both rural and urban locations throughout each state were recruited and store owners or managers familiar with the store's transition to WIC EBT were asked to complete an interview. All interviews were completed in person (at the store) or by phone. The purpose of the interviews was to better understand the vendor perspective of the benefits and barriers to WIC EBT implementation and the overall impact of WIC EBT on vendors (see Appendix A for the WIC vendor interview guide). A total of 49 vendor interviews were conducted across the three states.

**WIC Participant Focus Groups.** WIC participants were recruited from select local WIC agencies in all three states. They were asked to participate in focus groups to discuss their experience with WIC EBT and to identify key benefits and barriers to using WIC EBT (see Appendix A for the WIC participant focus group discussion guide). Focus groups were held in both rural and urban locations near local WIC offices in each study state. Focus groups were about 90 minutes long, and participants were offered a $20 incentive and refreshments for participating. One Spanish and two English focus groups were conducted in each state for a total of nine focus groups with 58 respondents.

Analysis

All in-depth interviews and focus groups were transcribed from an audio recording into a Microsoft® Word 2010 file. Qualitative responses for each vendor interview and focus group question were coded in QSR International NVivo version 8 to identify key themes by respondent type. Qualitative responses to each state interview question were reviewed for key themes and summarized across all three states.
B. Quantitative Data

Data Sources

The primary source of quantitative data for this study was WIC program administrative data provided by the Kentucky, Michigan, and Nevada WIC programs. Participant characteristics, benefit issuance, and benefit redemption data were obtained for all participants receiving WIC food benefits between January 1 and March 31, 2012.

The benefit issuance files contained detailed information about each food category prescribed to each participant, including the quantity or amount of each food prescribed, as well as the benefit issuance number (BIN; a number unique to each benefit issuance) and participant and family identification (ID) numbers. Redemption files contained detailed information on each food purchased with the EBT card, and it included the amounts, quantities, and prices of each food purchased, as well as food category codes, BIN, and family ID numbers. Participant characteristics provided uniformly by each of the WIC State Agencies included:

▲ Race/Ethnicity
▲ Age
▲ Food Package category
▲ Number of people living in the household
▲ ZIP code

These files were merged into a single analytic file using the benefit issuance and family ID numbers to pair issuance and redemption data and participant and family ID numbers to create a family-level monthly benefit.

Measures

The dependent variables of interest in this study included the use of WIC benefits overall and for each of the 14 individual WIC food categories. To determine whether benefits were used fully, the same method was applied to each of the food categories: The amount redeemed in a given month was subtracted from the amount issued to all participants in the family for that benefit month; if the remaining amount was zero or less than an approved minimum size food item, then the redemption was considered a full redemption. For example, if a family in Kentucky was issued 72 ounces of cereal and purchased 62 ounces, the remaining issuance (72 issued – 62 redeemed = 10 ounces) is less than the minimum size box approved in Kentucky (11 ounces). This was considered a full redemption, since the family could not use their benefits to purchase any more cereal. Alternatively, a family could have purchased 60 ounces of cereal, leaving a balance of 12 ounces of cereal. This would be considered a partial redemption in Kentucky because the family could have purchased an additional box of hot or cold cereal. This was repeated for each state and for each of the 14 food categories and multiple subcategories to produce three category variables: full redemption, partial redemption, and non-redemption of individual foods.

The final dependent variable, which indicated to what extent WIC foods issued to the family in a month had been fully redeemed, was created using the 14 individual food category redemption variables. To be categorized as having redeemed all WIC benefits in a given month, each type of food issued to a family would have been fully redeemed. If any foods were purchased, the
family was considered to have partially redeemed their monthly benefits. If they did not purchase any foods, the family was considered to have not redeemed any benefits in the month.

Independent variables were derived from individual characteristics contained in the participant file, and they included state, race and ethnicity, urban/rural geographic residence, number of people in the household, and the number of family members participating in WIC. Since the unit of analysis is the family, it was necessary to combine characteristics across WIC participants in a single family.

Family race and ethnicity was determined by recording the number of family members reporting Hispanic ethnicity and each race category. To develop mutually exclusive racial/ethnic categories for analytic purposes, families were assigned, first, the ethnicity and, second, the race(s) reported by each participant. Any families including at least one Hispanic participant were categorized as Hispanic. Among families with no Hispanic participants, if multiple races were identified, the family was considered to be non-Hispanic and of multiple races. All remaining families were non-Hispanic and had only participants with singular race groups reported, so families with participants identified as White only, Black only, American Indian/Alaska Native only, Asian only, Native Hawaiian/Other Pacific Islander only were categorized as such, resulting in seven mutually exclusive race categories.

WIC families’ home ZIP codes were used to categorize families into urban, large rural, small rural, and isolated rural towns based on the Rural Urban Commuting Area (RUCA) designations. Household size was a continuous variable measured as the number of people in the household reported by WIC participants during certification. Benefit issuance was also used as an independent variable when examining individual food category redemptions since multiple issuances for specific food categories (e.g., peanut butter) may influence the likelihood of all benefits being redeemed if a saturation point is reached for the family. This was calculated by summing the amount of each food issued to every participant in the family. For the same reason, the number of WIC family members was also included as a potential predictor of overall monthly benefit use, since multiple food package and food category issuances may influence the likelihood of full monthly benefit redemption. The number of WIC family members was calculated by summing the number of unique participant ID numbers for each family ID number.

The proportion of families that included each type of participant category (e.g., pregnant woman, child) was also calculated. The category of each participant in the family was recorded. Six non-mutually exclusive categories were presented for the family: pregnant woman, breastfeeding woman, postpartum woman (not breastfeeding), infant aged 0 to 5 months, infant aged 6 to 12 months, and child aged 1 to 5 years.

Analysis

All quantitative analyses were conducted using SAS version 9.3 (SAS Institute, Cary, NC). Analyses sought to assess the prevalence of and characteristics associated with WIC family benefit redemptions overall and for each WIC food category in Kentucky, Michigan, and Nevada. Descriptive statistics, including frequencies and means, were calculated for all outcome and independent variables of interest, including redemption variables, family characteristics, benefit issuances, and shopping patterns.

Bivariate statistics were used to examine differences in use and non-use of EBT benefits by participant characteristics and benefit issuance. This was done to assess whether participant redemptions varied by such characteristics as race and ethnicity, geographic location, the
number of persons in the household, and the amount of WIC foods prescribed to the family. Similarly, multivariate analyses were conducted to determine whether differences existed in EBT redemption patterns among Kentucky, Michigan, and Nevada families overall and for individual foods.

Since the entire WIC participant populations of Kentucky, Michigan, and Nevada were included in this study (more than 850,000 families), the use of inferential statistics—used to infer findings from a representative sample to a larger population—is not imperative; however, we chose to report p values to highlight differences across the study populations in the three states. As such, Pearson’s chi-square test statistics were used to determine statistical significance between pairs of dichotomous variables; Mantel-Haenszel and Stuart’s tau-c test statistics were used to determine statistical significance between pairs of categorical and dichotomous variables. Significance tests yielding a p value of <0.01 are reported as statistically significant in this report. Since the sample size was very large, a p value of <0.05 would result in much of the findings showing significance.

Multivariate logistic regression models were also explored to ascertain whether differences in redemption patterns among independent variables are maintained when others are controlled. Dependent variables in the models were dichotomous and included individual food and overall monthly full redemption variables. Independent variables were those found to be associated with full benefit use based on bivariate analyses. Throughout the report, results of multivariate logistic regression models are shown as a graphic; adjusted odds ratios and 95% confidence intervals for each model are presented in the appendices.
III. State Policies, Practices, and Perspectives Related to EBT

In implementing EBT systems, WIC agencies must follow certain operating rules outlined by FNS. Within these rules, states have some discretion in determining the structure and technology of their system (i.e., online or offline) and making other policy and operational decisions that impact EBT implementation and the EBT experience for vendors and participants in their state. This chapter summarizes information from interviews conducted with WIC officials in each of the study states and underscores factors often discussed at WIC EBT user group meetings and other WIC technology forums. Organized by topic, the chapter describes aspects of EBT systems and implementation processes that state officials suggest are important considerations. State perceptions of the vendor and participant experience with WIC EBT are also described.

A. EBT Planning and Implementation

Michigan and Nevada WIC were among the first WIC State Agencies to implement online WIC EBT while Kentucky implemented online EBT more recently. Table 1 shows a general timeline of the planning, pilot-testing, and implementation phases of EBT in the three study states.

Table 1. Timeline of EBT Planning, Piloting, and Implementation across the Three Study States

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<tr>
<th></th>
<th>Planning</th>
<th>Piloting</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nevada</td>
<td>Began 1999 (offline EBT)</td>
<td>1999</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Began 2006 (online EBT)</td>
<td>2008</td>
<td>Completed in 2009</td>
</tr>
<tr>
<td>Kentucky</td>
<td>Began 2006</td>
<td>2009</td>
<td>Completed in 2011</td>
</tr>
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Coordination of EBT and the MIS System

WIC State Agencies use Management Information Systems (MIS) for processing and tracking all WIC data, including participant information, benefit issuance, and redemption data. In order to successfully implement EBT, newly developed EBT systems must integrate effectively with existing MIS systems. The state officials we interviewed pointed out these factors to consider when planning and implementing WIC EBT:

▲ Understand the capacities of the existing MIS for integrating with EBT;
▲ Review the potential issues and complexities of merging data from an older MIS to a new MIS and implications for EBT system planning; and
▲ Evaluate potential challenges associated with pre-EBT MIS, which organize WIC food benefits by participant, to the EBT systems that aggregate food benefit by family or household.

Stakeholder Engagement

Each of the three study states highlighted the importance of engaging all key stakeholders in the planning and implementation phases. Suggestions that emerged from the interviews included:

▲ Engage all stakeholders—early and often—in the planning and implementation phases;
Stakeholders may include state IT staff, local WIC agencies, authorized WIC vendors (large retailers and small independent grocers), and grocer associations; Leverage the knowledge of SNAP EBT partners in understanding their ‘lessons learned’ in implementation processes with retailers in their SNAP EBT rollout; and, WIC State Agencies now have access to a larger number of experienced WIC State Agencies that have implemented EBT. Seek out these WIC State Agencies for their guidance and advice.

WIC officials also noted the importance of collaboration within the WIC program at all levels, including nationally, regionally and locally, and among state staff, such as within vendor management and IT sections.

B. Vendor Training

The transition to EBT for WIC vendors is a monumental change in process. It is incumbent upon WIC State Agencies to develop and provide training on the new WIC EBT procedures and transactions. Each of the study states trained their respective authorized vendors on the new online EBT processes in various ways, which included regional training, train-the-trainer models, and onsite training at vendor store locations.

All three WIC State Agencies developed training materials that incorporated key information about WIC EBT, including technology details and operational changes, highlighting differences that occur at checkout to process a WIC transaction.

Additional feedback gleaned from the interviews with state officials includes:

- Communicate EBT information and updates through quarterly newsletters or other alerts distributed via mail or posted on the WIC State Agency WIC website;
- Establish a vendor help desk resource during early implementation; and,
- Provide additional vendor resources, such as a guidebook with troubleshooting tips, via the WIC State Agency’s EBT contractor.

C. Maintenance of UPC Lists

When WIC EBT transactions are processed at the checkout counter, the scanned Universal Product Codes (UPC) and Price Lookup Codes (PLU) are assessed against an Authorized Product List (APL) created and updated by the WIC State Agency and regularly downloaded by the vendor. These are further assessed against the foods prescribed and available to the participant via the EBT card. If the scanned food items

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1Code used to identify fresh fruit and vegetables, including related items such as nuts and herbs that are sold in bulk.
satisfy both the APL and the food prescription requirements, the purchases are authorized and the food prescription is updated with the EBT processor to reflect the use of the benefits. With WIC EBT, items that do not match the APL and the participant’s prescription will not be paid by WIC. As such, it is critically important that the UPC and APL lists are updated and maintained frequently to reflect changes to WIC products and their UPSCs.

Each of the three study states underscored the importance of keeping UPC lists up to date to ensure that participants can purchase the items included in their WIC food prescriptions. This is especially important during transition to EBT to avoid having participants feel that they have less access to the WIC foods with EBT. Kentucky noted challenges with being able to obtain UPC codes for special therapeutic formulas. In some cases, this resulted in participants being unable to complete the purchase of infant formula through the use of the EBT card. The WIC office resorted to handwriting manual food instruments for the products. These situations have since been resolved due to diligence in working with formula manufacturers.

Nevada WIC officials reported similar challenges with cereal and other WIC foods, mentioning that there is a process in place for vendors to request that UPCs be added to the APL. If the UPC is WIC-allowable, the UPC will be added through the regular update process at the state office. Participants also occasionally notify the WIC program when UPCs are not scanning as WIC-allowable items (when the participant knows it is a WIC food).

To facilitate and encourage regular UPC list updates, Michigan WIC periodically reminds its vendors to run an update or scan certain items into its system. When changes are made to the state APL, Michigan WIC sends a formal notice to vendors, notifying them to update their lists. For vendors with integrated systems, this update typically occurs automatically, whereas vendors with stand-beside devices must be diligent and manually download the update to reflect the latest changes to the WIC-authorized foods and their UPSCs.

**Not-to-Exceed Amounts**

Regular maintenance of UPC lists is also important for vendor reimbursement purposes. With EBT, WIC State Agencies are able to set not-to-exceed (NTE) amounts for the price of each UPC. This is different from the systems in place with paper FIs. Since most paper FIs list several WIC foods, State Agencies typically establish NTE amounts for each paper FI. When a vendor transacts the FI, the total dollar amount indicated on the FI for reimbursement is the only indication to the State Agency that WIC foods were purchased – no detail on the exact foods purchased is included in the FI transaction. In some cases, vendors overcharged for items, which put the state in a “pay and chase” situation to retrieve the amount the vendor was overpaid for the items.

Because of these challenges with the paper FI system, both Kentucky and Nevada reported that one of the key benefits of implementing EBT is the ability to set NTE amounts for individual WIC food items. Each state establishes NTE amounts at the food-item level, and price adjustments are made for overages at the point-of-sale. States no longer have to make adjustments for prices charged by the vendor at the point of reimbursement (bank).

With EBT, states can also calculate NTE amounts more regularly and based on actual store prices to reflect shifting market prices. WIC State Agencies also mentioned a few other benefits associated with establishing NTEs at the individual product level:
Vendors operating integrated POS devices can view daily reports from their system to view the status of their WIC sales; and,

Since WIC vendors are paid up to the maximum price for a particular product with EBT, there are fewer instances in which there is a need for vendors to appeal for payment as there seemed to be with paper FIs.

D. Features of the EBT Shopping Experience

Integrated Systems and Stand-Beside Devices

States with online systems may choose to support different Card Acceptor Devices (CADs—referred to here as devices) for processing the WIC EBT card, based on its implementation plan and mix of retailer types. The two most common devices used by WIC retailers include the integrated Electronic Cash Register (ECR) system and the stand-beside device. While both can accept EBT and non-EBT transactions, the primary difference is that the stand-beside device is separate from the cash register system, requiring an additional step in the WIC EBT transaction. The WIC purchase is first transacted in the cash register system and then entered into the stand-beside system, which reconciles the transaction with WIC prescription benefits. Integrated systems tend to be used more commonly by large chain retailers, whereas stand-beside devices are more common among smaller retailers.

During the study period, the three study states reported having a mix of authorized WIC retailers operating both integrated and stand-beside WIC EBT devices. Allowing integrated and stand-beside systems is particularly important for ensuring that WIC vendors are able to process benefits regardless of their infrastructure and capabilities and without incurring extraordinary costs to do so. At the same time, however, differences in the two systems directly affect the WIC participant shopping experience. The time it takes to complete the WIC transaction using the stand-beside device is typically longer than the integrated POS devices due to the additional step the store clerk must take to enter the information into the stand-beside device, almost rivaling the transaction time of the paper FIs.

Mixed-Basket Purchases

In states with paper FIs, separating WIC and non-WIC items is a necessary part of the WIC transaction since only the total amount of the WIC purchase can be entered onto the FI for reimbursement. With EBT, however, this separation is no longer necessary at vendors with an integrated system, allowing participants to place WIC and non-WIC food items alike on the checkout lane belt—referred to as a “mixed basket.” Integrated POS systems identify the WIC allowable foods via the scanned UPC and carry out the appropriate match against the APL. WIC State Agency officials reported that vendors operating integrated systems allow mixed-basket purchases.

Among vendors that use stand-beside devices to process transactions, a mixed-basket approach is not feasible. WIC and non-WIC items still must be separated due to the step vendors with stand-beside devices need to take to enter the WIC items into these devices separately.
Self-Checkout Lanes

Self-checkout stations are unattended, integrated POS systems in grocery stores where customers can scan and transact their purchases without the involvement of a cashier or clerk. Self-checkout stations are typically offered in large chain retail supermarkets and ‘big box’ stores. FNS EBT operating rules allow self-checkout service to WIC cardholders; however, the use of self-checkout stations for WIC transactions is permissible at the WIC State Agency’s discretion. WIC State Agencies may also choose to certify WIC vendors for self-checkout separately from the standard EBT certification process.

With WIC EBT, participants are able to transact their WIC purchase with very little attention drawn to them from other shoppers, a key factor in alleviating anxiety felt by some WIC participants. At the time of the state interviews, both Kentucky and Michigan permitted the use of self-checkout lanes for WIC purchases, whereas Nevada WIC had not yet approved self-checkout (but was beginning to investigate incorporating this feature with authorized retailers).

Vendor Balance Inquiries

Without having the food benefit information printed on the FI itself, as was done with paper FIs, it may be more difficult for participants to track their remaining benefit balance and benefit expiration date. As a result, FNS has implemented certain requirements and WIC State Agencies have taken additional actions to provide participants with numerous opportunities for tracking their benefit balance. WIC EBT operating rules require that authorized WIC vendors support balance inquiries prior to transactions. This balance inquiry capability can be supported either in a checkout lane or at a separate device in the store. For instance, Kentucky WIC officials noted that one large chain store added special kiosks for participants to easily check their benefit balance instead of having to wait in line at the register.

WIC programs have or are in the process of developing additional methods by which participants can check their WIC benefit balance throughout the month, including:

- Websites (in place for some states);
- Text messages to inform participants when their benefits are near expiration (in process); and
- Smartphone applications for making benefit balance inquiries and for scanning products to determine whether they are WIC-approved (in process).

E. State Perceptions of the Impact of EBT on Vendors and Participants

Vendor Acceptance of EBT

When asked how vendors have responded to EBT in their state, the three study states reported hearing largely positive feedback from the vendor community. They noted that vendors appreciate:

- Having less responsibility in “policing” WIC purchases;
- Faster transactions during checkout especially when integrated POS registers are used; and
Quicker receipt of payments for WIC purchases and not having to appeal for payment.

An authorized vendor may choose at any time to opt out of participating in WIC. With the significant changes brought about by EBT, it is of interest to determine if there were differences in the numbers of participating authorized vendors in the study states during the transition to WIC EBT. Kentucky WIC reported some general declines in the total number of authorized vendors since the transition. State officials, however, noted that the majority of those vendors were pharmacies that, at the time of the study, felt the cost of Internet access and security issues related to HIPAA were barriers to continuing as a WIC vendor. Some of the small, independently owned retailers also left the Kentucky WIC program because they either felt ill-equipped to handle the technology changes required with EBT or they did not want to pay the costs associated with Internet connection.

While each of the states reported some challenges with transitioning vendors to EBT, they all reported that in the end EBT is a very popular option for vendors in their states.

F. Participant Acceptance of EBT

Each of the three study states reported receiving largely positive feedback from participants about WIC EBT. State officials reported receiving anecdotal feedback from participants, including:

- The convenience in being able to purchase WIC items as needed with EBT instead of having to delay an entire WIC purchase or omit an item that was unavailable, as was the case with paper FIs;
- The ability to shop more frequently at the grocery store depending on the foods needed by the family and the ability to transport the purchased foods home;
- The ability of EBT to combine a family's benefit on one EBT card has advantages for purchasing certain items by quantity (e.g., cereal), especially for those participants who can pool benefits across multiple family members receiving WIC; and
- The reduced stigma afforded by shopping with the EBT card and allowing a mix-basket purchase.
IV. Vendor Experiences with WIC EBT

WIC vendors are a critical part of the WIC process, providing participants with access to the nutritious foods that they are prescribed. Transitioning to EBT is a major change for vendors in the program and can present a number of challenges. Understanding the impact of EBT from the vendors’ perspective is important for WIC State Agencies in future planning and implementation processes. This chapter describes the findings from interviews conducted with vendors in each of the three states, beginning with a brief description of the vendors interviewed for the study. Vendors’ experiences in transitioning to EBT, including implementation and training processes as well as any intended or unintended consequences of the change, are then shared. The chapter concludes with vendors’ perceptions of how EBT has affected WIC participants’ purchasing patterns.

A. Study Population

A total of 49 WIC vendors from across the three study states participated in in-depth interviews about their transition to WIC EBT. In total, 19 vendors from Kentucky, 16 from Michigan, and 14 from Nevada participated in hour-long interviews. The majority of vendors interviewed in each of the three states represented small or medium-sized independent grocery stores; a few in each state represented large, chain supermarkets. Vendors selected for interviews were from a mix of urban and rural locations in each state.

Of the 49 vendors interviewed, the majority represented the owner and/or manager of the store; nearly all were serving in this role or working at the store when the state transitioned to WIC EBT. At the time of the interviews, Kentucky vendors reported using WIC EBT systems for up to 3 years, while Michigan and Nevada vendors reported using it for slightly longer (up to 8 years). Many vendors also reported prior exposure to EBT through the SNAP (Food Stamp) program and most indicated that having SNAP EBT prior to WIC made the transition easier since they were familiar with or already had the necessary equipment and had to follow similar checkout procedures.

B. EBT Implementation and Training

During interviews, WIC vendors were asked to describe the process of implementing WIC EBT in their store, including the technology updates they received and how store personnel were trained. In all three states a mix of vendors operating either stand-beside or integrated POS devices were interviewed. Among those reporting the type of WIC EBT device they had in their store, the majority of Michigan vendors we interviewed were using stand-beside devices, compared with equal numbers using integrated and stand-beside devices in Kentucky and Nevada.

When EBT was implemented, each vendor made different types of equipment updates to their store based on their existing cash register system, their individual store or larger corporate chain infrastructure capacity and selection of WIC EBT device best suited for their store. In some instances, for example, some vendors using stand-beside devices received the equipment by mail and had help with installation from the WIC State Agency. In other situations, vendors already processing SNAP EBT with integrated POS devices needed only a software update and scanning equipment added to their existing EBT system.
Some vendors reported experiencing initial WIC EBT implementation challenges, primarily due to a lack of consistency between their store products and the APL as well as missing UPCs. Vendors in the three study states noted that keeping UPCs updated is particularly difficult, especially when the package sizes or prices are frequently changing. Similar to feedback heard in the WIC State Agency interviews, vendors cited challenges with manufacturers not announcing changes to package sizes for WIC items (e.g., ounce amount for cereal) and in keeping up with price updates in their system to reflect sales or other fluctuations.

Vendors described the various training methods that were offered by the study WIC State Agencies and shared these thoughts:

▲ Some Kentucky vendors reported participating in a train-the-trainer model in which they attended offsite training offered by the state and were able to practice on “dummy” machines, then returned to their store to train employees;

▲ Most Michigan and Nevada vendors described a hands-on training experience, with opportunities for both offsite training and in-store training for themselves and their staff;

▲ Some Nevada vendors, at the time of the interviews, had participated in two EBT-related training sessions—one for stand-beside devices and another for the integrated machines; these vendors noted that the process for training on the integrated machines was much simpler and quicker compared with that for the stand-beside devices.

▲ Vendors in each study state liked being able to practice on their store machines in “training mode” and noted that this was helpful for learning the correct procedures on their store devices.

Overall, many vendors reported a positive implementation experience, generally describing the process in their state as “streamlined,” “seamless,” or a “smooth transition.”

C. Impact on Stocking WIC Foods

Vendors were asked about the impact of WIC EBT on their store, specifically what changes they made to their store inventory related to changes in their WIC customer shopping patterns. Overall, vendors reported an improved ability to track changes in their store inventory, using the EBT system to generate reports of items and quantities instead of reviewing the paper FI as some stores had done to manage their inventory prior to EBT.

In addition, EBT may have a stabilizing effect on some store inventories for some of the WIC foods due to the increased flexibility WIC customers have relative to being able to make more frequent purchases throughout the month. Some vendors reported that, since customers are opting to purchase fewer WIC foods in one trip, they are running out of WIC items less frequently (most notably milk and WIC formula).

Some vendors have experienced an increased demand for certain WIC items and have monitored inventories as a result (e.g., fruits and vegetables, wheat bread).

D. Impact on Checkout Procedures

Vendors were asked about the benefits of using WIC EBT compared with paper FIs. Overall, many vendors described the improved checkout experience for both customers and cashiers as one of the key benefits of WIC EBT. Vendors noted:
Checkout is quicker and simpler for WIC customers;  
Vendors appreciate having the ability to easily add or remove items to WIC purchases when a customer forgets to get an item or selects an unauthorized food item during checkout (as opposed to voiding the transaction, as with paper FIs);  
The checkout interaction between cashiers and participants has improved as a result of the WIC EBT scanning technology. Because WIC EBT can identify whether an item is WIC-approved when scanned, the cashier has less pressure to discern whether the correct WIC items have been selected for purchase;  
Cashiers experience increased flexibility in that managers are no longer needed to verify WIC transactions (as they often did with the paper FIs);  
There are fewer errors in processing WIC purchases, which has led to decreased issues with having to reprimand and terminate cashiers for processing WIC transactions incorrectly.

Despite the allowance of mixed-basket purchases, some vendors indicated that their WIC customers are still separating their WIC and non-WIC items at checkout, especially those who have received WIC for many years. This was reported by vendors in all three states, regardless of their type of WIC EBT system (integrated or stand-beside device).

One of the primary barriers to EBT cited by vendors is the functionality of the stand-beside devices. Some vendors feel that the checkout process takes just as long, if not longer, with these machines as with the paper FIs because everything must be rung up twice. Also, in stores with few stand-beside devices, it is more apparent that a customer is purchasing with WIC because they may need to be redirected to where a stand-beside device is located. This in essence creates WIC lanes at the store and heightens the stigma for participants.

E. Changes in Vendor Reimbursement Procedures

In addition to previously cited WIC EBT benefits, vendors also highlighted the reduced amount of administrative work necessary to be paid for WIC purchases. Since vendors no longer need to deposit checks at the bank to get paid, they receive their payments much more quickly; some vendors indicated that their payments now appear within a day or so as compared with several days with the paper FIs. Vendors also liked not having to spend time processing corrections to rejected FIs.

With the paper checks we had cashier training issues every now and then [where], if you entered everything, it was hard to correct. Then when we got the EBT system, it does all the work for [you]. The EBT is easier to fix if we need to. We also used to have problems with the banks rejecting [checks] because [they] were illegible.

—Kentucky WIC vendor

We get our money faster. It took the headache away of us handling the paper checks, saving them, mailing them, and stamping them. It used to take about a month for us to get our money, [and] now we get it the next day.

—Michigan WIC vendor
F. Vendors’ Observations of Participant Shopping Patterns

Changes in Participant Redemption of WIC Foods

To understand the general impact of WIC EBT on customer shopping patterns, vendors were asked about changes in their overall WIC business and in redemption of certain foods since the switch to the EBT system. While many vendors indicated that they were unsure whether their redemption rates had changed (since they were not tracking this when they had paper FIs) or saw no changes from pre- to post-EBT, an equal number of vendors saw some increases in their WIC business. Some Nevada vendors attributed the increase to the expansion of the integrated system to every checkout lane in their store.

“It’s increasing now a lot because we are taking WIC on every lane. I think there are only three companies that have it integrated in Vegas so they are coming here to use their WIC. I would estimate business has increased by about 30% over the last three weeks, when we got every lane to take WIC. It’s a big difference.”
—Nevada WIC vendor

A number of vendors expressed their support for the inclusion of fruit and vegetable benefits in the revised WIC food package implemented in 2009. Since Kentucky implemented EBT after the new food package was introduced which included the CVB, we asked Kentucky vendors if they had seen any differences in the amount of fruits and vegetables being redeemed since EBT. Altogether more than half said they had seen an increase in the fruit and vegetable purchases. Some vendors attributed the change to the simplified process in EBT.

“Yes [they buy] much more produce, I would say. I used to see the produce [paper FI] every now and again, but it seemed like they might forget to use them. But now that it is all on one card, they don’t have to spend it all at one time so I see them getting a lot more produce.”
—Kentucky WIC vendor

Changes in the Participant Approach to WIC Shopping

Vendors were also asked whether they had observed any differences in the way customers approach their WIC purchases since moving to WIC EBT. Overall, most vendors reported seeing a reduction in the amount or quantity of WIC items purchased during any given shopping trip. They also observed customers spreading out their purchases and making more trips to the store throughout the month, which benefited their business directly since customers tend to purchase other items along with their WIC foods. Vendors recognized that the participant’s ability to purchase fewer items more frequently with EBT has other benefits, such as reduced waste and improved potential for participant utilization of the perishable WIC foods (e.g., some items, such as milk and produce, spoil quickly and are better to buy in smaller quantities over time).

“The people are buying smaller amounts… I didn’t used to see that much produce being used with WIC. I think it is because it goes bad and you [may] not have room for it in your fridge. But now they can get fresher stuff.”
—Kentucky WIC vendor
Vendors also noted that EBT allows them to better serve customers and ultimately improve customer satisfaction. For example, if the vendor runs out of a WIC food, the participant no longer has to choose between omitting the item for that benefit period and coming back another day to redeem all of their items. Instead, they can purchase their other WIC items using their benefits and return another day to obtain the item that was out of stock.

Vendors were asked whether participants seemed more or less knowledgeable about the WIC foods when using EBT. Overall, vendors offered mixed responses about participant knowledge about EBT; while some vendors felt that their WIC customers were informed about what to purchase, others said they were not and felt that they did not receive adequate education from WIC about their benefits.

_I know WIC gives them a class on what they can get and what they can’t, but both parents don’t always go to the class and they may not be paying close attention. So for us it is about coaching, explaining, and listening._

—Nevada WIC vendor

Vendors noted that no longer having the exact items and quantities listed (as with the paper FIs) is a challenge in EBT, especially with participants making more frequent trips to the store. While many vendors observed some participants bringing in their receipts from the previous shopping trip or checking their benefit balance before shopping, others had to encourage this activity to ensure participants had all the correct items and sizes within their remaining benefits before reaching the checkout lane. Others, receiving questions from confused participants, review the remaining benefit balance and explain what can be purchased. One Nevada vendor cited challenges with participants using outdated receipts to determine what items remain in their benefits. This resulted in participants bringing the wrong amounts of certain WIC foods to the checkout counter. In reading and interpreting the WIC EBT receipts, a few Kentucky vendors cited particular confusion among participants in understanding certain quantities listed; three gallons and one quart of milk, for example, are listed on the receipt as 3.25, and some participants did not know that 0.25 denoted a quart size.

_The ounce size is a problem. The customers don’t know how to add them up [so they] get the wrong size on the shelf. And each person is different—some get whole milk, some get skim—so it’s just hard. The EBT receipt is harder to read. The paper checks used to be easier to read for the cashier and the customer. Now the way the EBT combines total amount like 2.25 gallons of milk—it confuses the cashier and the customer._

—Kentucky WIC vendor
V. Participant Experiences with WIC EBT

The ultimate success of WIC EBT will be determined based on participant acceptance and their ability to access and consume the nutritious foods prescribed by WIC. As such, this study sought feedback from participants in Kentucky, Michigan, and Nevada on their experiences in transitioning to and using WIC EBT as a benefit delivery method. This chapter describes the findings from focus groups conducted in each of the three states; the focus groups sought to assess WIC participants’ initial and ongoing experiences with WIC, as well as how EBT may have changed their shopping practices and overall perceptions of WIC.

A. Study Population

Nine focus groups were conducted, with a total of 58 WIC participants from across Kentucky, Michigan, and Nevada. Focus groups were held at or near WIC offices in urban/suburban areas (typically near a metropolitan area) in each state. The number of English and Spanish-speaking participants represented in the focus groups in each state are displayed in the box at the right.

The 58 participants reported having varied lengths of experience with WIC EBT, ranging from one month using the card to four years. With Michigan and Nevada being early WIC EBT implementers, focus group respondents from these states reported the most experience using the EBT card (from 4 months to 4 years). Kentucky respondents reported the least experience with EBT (from 1 month to 1 year).

Making the Transition to EBT

Participants’ initial and ongoing experiences with WIC EBT are important for considering facilitators and barriers to implementation. As such, we explored various topics in focus groups on the EBT transition, including preparedness for using the WIC EBT card; differences between the card and the paper checks; and benefits and drawbacks to using the card.

In terms of their preparedness for EBT, some participants reported feeling prepared because they had experience in using the SNAP/Food Stamp card. Others who had used the paper FIs (or “coupons” in Michigan) were somewhat confused by the WIC EBT card at first and weren’t sure whether to swipe the card before or after they scanned their food at checkout. While participants received printouts with their available benefits at the WIC office, many reported receiving minimal explanation and guidance about the EBT card. They recommended that the WIC staff encourage more questions from participants about EBT when they come for their appointments and that WIC provide more orientation on how to use the card and interact with cashiers.

Overall, most participants found the EBT card to be a “welcome change” that allowed them to better use their benefits and minimize waste associated with having to purchase all the foods on the checks at once. Compared with the paper FIs, nearly all participants seemed to prefer the WIC EBT card because of its convenience and portability. They described the card as being easier to carry around compared with the folder containing paper FIs. In most cases,
respondents also appreciated no longer having to separate WIC foods from other groceries. Overall, they described the WIC EBT card as being more practical for them, allowing them to get what they need when they need it. They also noted feeling less embarrassment with the EBT card because they felt it was not readily apparent that they were using WIC.

I'm very happy with the card because I don’t need to take everything at the same time. With the coupon [paper FIs], I had to take everything…. Now with the card, I get what I need and I keep on getting things as I run out. I am very pleased.

—Kentucky WIC participant

B. Impact on the Shopping Experience

Focus group participants were asked to describe the frequency with which they make WIC purchases, types of vendors where they shop, preparation for WIC purchases, and the overall shopping experience with EBT. Respondents in all three states indicated that they generally shop at between one and three major grocery stores or supermarkets (e.g., Walmart, Meijer) in a given month. Relative to frequency of shopping, most respondents said they tend to make more shopping trips for WIC items throughout the month, compared with when they used the paper FIs. Responses about vendor selection and purchasing patterns were similar across the three study states.

Benefit Balance Inquiries and Receipts

As mentioned in previous sections, when preparing to do their WIC shopping, participants have a variety of options for checking their benefit balance. In each state, participants can check their benefit via a toll-free number in addition to going to a check stand with register or kiosks at the store. Focus group respondents in each state indicated that they like being able to call a toll-free number to determine their benefit balance. Others said the food benefit printout received at the WIC office, which includes both the food item and the quantity that can be purchased (e.g., ounces), was helpful and preferable for tracking their family benefit and food balances. Still others said they preferred to save their receipts with the WIC benefit balance printed on them. In Michigan, participants can also use a website to obtain their benefit balance with an expiration date, an option liked by many participants.

Spanish-speakers noted that it is very important for them to be able to obtain their benefit balance because they have a hard time communicating with cashiers if there is an error or they bring up the wrong item. Spanish-speaking respondents in Michigan appreciated the toll-free phone assistance available in Spanish.

Participants express interest in additional ways to check their remaining benefit balance, which aligns with efforts that WIC State Agencies are currently undertaking, as previously mentioned. Participants said the following would be helpful:

▲ To receive text alerts or emails when their benefits are about to expire; and,
▲ To be able to access their WIC shopping list on their smartphone.

Shopping with EBT

Participants reported that they incorporate more of their WIC shopping with their regular shopping since moving to EBT. Some respondents indicated that they still struggle to find the
WIC items in the store (e.g., bread, juice), and, while shelf tags are helpful, they are not always evident on the shelves at some stores, especially large chain stores. Also, some participants purposefully try to make fruit and vegetable purchases at large chain stores to further stretch their $6 to $12 benefit. In addition to being less expensive, large chain stores have more variety than participants tend to find at a smaller corner store.

I go [shopping] on my regular grocery day, which is usually the day I get my Food Stamps. I go in and just get everything. I usually go through and get my WIC stuff first so I can have it already there in the cart and I don’t have to worry about it … and then do the rest of my shopping. At the end, checkout’s easy now so I just check out all at the same time.

—Kentucky WIC participant

The EBT process of scanning WIC food items has helped some participants to become more aware and savvy about their WIC shopping. According to some participants, there are issues with some of the WIC-allowable items not being in a store’s system, and their perception is that some stores have not fully updated their system with WIC-allowable items available for purchase. Participants have had experiences trying to purchase allowable items that don’t scan as WIC-eligible. Some explained the issue as a “glitch” because, if they returned another day to get the item, it was approved for purchase.

Occasionally with some of the fruits and vegetables … I would go up there and try to get a [container] of blueberries, which should be allowed, but sometimes it would say it wasn’t in their system that I could get that.

—Kentucky WIC participant

Changes in the Checkout Line

During implementation of EBT, respondents indicated that some stores took longer to transition than others, and some stores changed their swiping procedures during the implementation (e.g., swiping their EBT card before versus after foods are scanned). Now, most respondents feel that the checkout process is quicker with EBT, particularly because they no longer have to sign FIs. More specifically, participants in Kentucky and Michigan reported that checkout time has been reduced by between 1 and 10 minutes. In Nevada, participants noted that the separate stand-beside machines take longer to process the EBT transaction and, in these cases, they felt that the checkout process was faster with the paper FIs.

One of the key benefits that participants mentioned about WIC EBT is that it is much less embarrassing for them to do their WIC shopping. They expressed that they no longer hold up the line since the card makes the checkout process go quicker and they no longer have to sign their name on FIs, which in the past had made it more evident they were using WIC. The ability to use the self-checkout lanes was appreciated by several participants. Most, but not all, respondents in the states that allow self-checkout for WIC purchases at the time of the study (Kentucky and Michigan) were aware that these lanes could be used for WIC purchases. Those who used self-checkout lanes reported doing so because they are quick and more convenient and they liked not having to interact with cashiers. Others preferred to go to a cashier, but appreciated having the option to use the self-checkout lanes.
Even now [with self-checkout]...you can check out on your own [with] no hassle so you don’t have to worry about people or the cashier having a fit about [your WIC].

—Michigan WIC participant

Participants provided these additional comments:

▲ Many indicated that it’s much more convenient not to separate their WIC foods from non-WIC food purchases, and some shop at stores specifically because they don’t require separation of items;

▲ Most have been able to use coupons, including “buy one, get one free” promotional coupons when shopping for WIC and had no issues doing so with EBT; however, they noted that in most cases, coupons must be provided prior to scanning the WIC foods or they could not be used;

▲ Many recommended that stores with stand-beside devices move to integrated POS devices so that transactions would be quicker and easier;

▲ A lot of cashiers seem friendlier with EBT because the checkout process was less challenging for them. Some cashiers seem less familiar with the WIC foods with EBT and participants speculated that there may be less incentive for cashiers to know and understand the allowable WIC foods since with the POS scanning process makes these determinations.

And [when] the cashiers see you coming with WIC, they’re not like ‘Oh no.’ Before when they had to do everything ... it was kind of complicated for them, but now ... it’s a lot easier for them to check us out [and] a lot faster too.

—Nevada WIC participant

C. Impact on Food Choices

Some focus group respondents indicated that they buy less of the WIC foods with their EBT card, compared with their paper FIs, specifically omitting certain items they know their family will not consume, or they have some stock of the WIC item from previous months’ benefits. With FIs, it is intended that participants purchase all of the WIC food items in quantities listed. With EBT, as previously note, participants select the WIC foods from their benefit they wish to purchase at any given shopping trip. In the EBT environment, the most frequently reported items participants mentioned they under-redeemed were beans, cereal, and quarts of milk. With cereal, some indicated that they receive more than they need, and others said they or their children do not like the WIC cereal choices. For quarts of milk, specifically, respondents indicated that the gallon and half gallon sizes were a sufficient amount of milk and they felt the extra quart size was not worth the effort to find in the store. Respondents also felt it was inconvenient to have to buy multiple container sizes of milk (gallons, half gallons, and quarts), when they could simply purchase an equal number of gallons.

I have cereal left over because the kids just won’t [eat it] because there’s only a certain amount they’re going [to] eat. So I don’t want to get it and waste it. So I do leave the cereal on there from time to time, but they eat everything else.

—Michigan WIC participant
We heard from participants that it is challenging to use their full cereal benefit which is actually irrespective of the FI or EBT environment. Participants mention they often had ounces left over but could not use them (i.e., they had too few ounces left compared to the minimum cereal box size available or allowed). Participants recommended allowing leftover ounces of cereal to rollover into the next month for cases when some ounces may be unused if boxes are not purchased in size increments consistent with their full cereal benefit.
VI. Limitations

This study has a few noteworthy limitations relative to the data sources used and the inferences that can be drawn from the study findings. The following section summarizes some of the key study limitations by type of data source (qualitative and quantitative).

A. Qualitative Data

In-depth vendor interviews and focus groups with participants were conducted with respondents who were willing and able to participate in the study and located in targeted areas of the state. This yielded a small, non-representative sample of WIC vendors and participants in each of the three study states, which means that the qualitative findings cannot be used to generalize across the WIC program in each state and in other states. Similarly, in-depth interviews were conducted with key state WIC officials in each of the three study states; while findings from these interviews may be representative of the state’s views on EBT implementation, the states’ experiences may be different from those of other WIC EBT states and cannot be used to generalize across all WIC EBT states.

B. Quantitative Data

Due to the cross-sectional design and study population, inferences cannot be drawn to WIC populations in other states. The WIC populations in the three study states likely differ from the WIC populations in other states in ways that may affect the likelihood of benefit redemption. In addition, the Kentucky, Michigan, and Nevada WIC programs themselves may also differ from other WIC programs in ways that could affect benefit redemption, such as delivery of benefits via online EBT, nutrition education delivery, rules around authorized food lists and maximum allowable prices for WIC foods, and other factors that have not been measured or accounted for in this study.

Additionally, the study cannot assess the extent to which WIC participants consume WIC benefits, but only whether or not the items are purchased. While the study cannot ascertain the extent to which WIC foods are consumed by each WIC participant, the use of data collected at the point-of-sale to determine the exact foods purchased is a significant improvement on previous studies.

Another limitation exists specific to the cross-sectional study design, which provides only a point-in-time view of redemptions and purchasing patterns of WIC families. The study cannot take into account seasonal factors, which may increase or decrease the likelihood of WIC families purchasing all of the foods available to them. This may be particularly pertinent in rural areas with limited access to grocery stores during the winter months when transportation may be an issue as the data for the WIC food redemptions analysis was collected for the winter months of January through March 2012.

The cross-sectional design and limited time period for data collection also constrains our ability to draw conclusions regarding differences in redemptions between Kentucky and the other study states. At the time of data collection, Kentucky had only recently (within the prior year) fully implemented EBT statewide. The timeframe may not have allowed for Kentucky WIC, its WIC families, and its vendors to fully adjust to the new processes and procedures, which may have contributed to lower rates of full redemption. Future analyses should be conducted to...
determine whether Kentucky’s redemption rates bound upward as EBT becomes the new norm for the program, participants, and vendors.
VII. WIC Redemption Patterns in EBT

This chapter describes the findings of quantitative analysis of WIC families’ redemption patterns with EBT overall and within each of the three study states. Overall monthly benefit redemptions are discussed as well as redemptions for each of the individual WIC food categories. The section describing overall monthly benefit redemptions discusses the characteristics of families that purchase all of their WIC foods in a given month and the characteristics and purchasing patterns associated with partial redemptions and non-use of WIC food benefits. Each section on individual food items briefly describes the overarching federal food policies and choices the states have made on expanding or limiting specific food selections. Subsequently, data are presented on family redemption patterns overall, in each state, and by family characteristics. Where possible, each section concludes with the findings of a multivariate logistic regression model that explores the strength of association between state of participation, family characteristics, benefit issuance, and full redemptions when all factors are accounted for.

A. Study Population

In all, 859,198 families that participated in WIC in Kentucky, Michigan, and Nevada in January through March 2012 are included in these analyses. Families in Michigan made up 55.1 percent of the study population, while those in Kentucky accounted for 29.3 percent; the remaining 15.6 percent were families in the Nevada WIC program (see Figure 1).

Figure 1. WIC Population by State, January–March 2012

The three states differed in a number of family characteristics, including race and ethnicity and geographic location, but they were similar in household size (M = 3.9, SD = 1.5) and the number of persons in the family participating in WIC (M = 1.5, SD = 0.73). Kentucky families were predominantly non-Hispanic White (72.9 percent), followed by non-Hispanic Black and Hispanic (10.9 and 9.6 percent, respectively; see Table 2). Just over 50 percent of Michigan families were non-Hispanic White, while 25.5 percent were non-Hispanic Black, and 14.0 percent were Hispanic. In contrast, 62.1 percent of Nevada WIC families were Hispanic, while 20.6 percent were non-Hispanic White and 9.7 percent were non-Hispanic Black.
Table 2. Racial and Ethnic Distribution of WIC families, by State, January–March 2012

<table>
<thead>
<tr>
<th>Family Race/Ethnicity*</th>
<th>Total</th>
<th>Kentucky</th>
<th>Michigan</th>
<th>Nevada</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>449,300</td>
<td>52.4</td>
<td>183,798</td>
<td>72.9</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>160,911</td>
<td>18.8</td>
<td>27,554</td>
<td>10.9</td>
</tr>
<tr>
<td>Hispanic</td>
<td>173,535</td>
<td>20.2</td>
<td>24,304</td>
<td>9.6</td>
</tr>
<tr>
<td>Non-Hispanic American Indian/Alaska Native</td>
<td>2,115</td>
<td>0.3</td>
<td>172</td>
<td>0.1</td>
</tr>
<tr>
<td>Non-Hispanic Asian</td>
<td>12,192</td>
<td>1.4</td>
<td>1,972</td>
<td>0.8</td>
</tr>
<tr>
<td>Non-Hispanic Native Hawaiian/Other Pacific Islander</td>
<td>1,505</td>
<td>0.2</td>
<td>291</td>
<td>0.1</td>
</tr>
<tr>
<td>Non-Hispanic Multiple Races</td>
<td>57,766</td>
<td>6.7</td>
<td>13,887</td>
<td>5.5</td>
</tr>
</tbody>
</table>

*Race and ethnic groups are mutually exclusive.

There were also marked differences in the distribution of WIC families across the three states by rural and urban geographic location, as shown in Figure 2. More than 90 percent of WIC families in Nevada lived in urban areas, compared with 78.2 percent of families in Michigan and only 41.1 percent in Kentucky. Kentucky had the most evenly distributed population across the four geographic areas examined with 22.1 percent residing in large rural towns, 19.7 percent in small rural towns, and 17.1 percent of families in isolated rural towns. Michigan was only slightly less urban than Nevada with only 21.8 percent of families living in large rural, small rural, and isolated rural towns.

Figure 2. Percentage of WIC Families by Geographic Location and State, January–March 2012

B. Shopping Patterns

Since WIC families have much more flexibility in how often and when to shop for WIC foods with EBT (as compared with paper FIs), analyses were conducted to examine the average number of vendors at which benefits were used and the average number of shopping trips conducted in a given month. For families redeeming any monthly WIC benefits (n = 813,621), families shopped at 1.8 vendors in an average month (SD = 0.92). This ranged from a minimum of 1 vendor to a maximum of 11 vendors. The average number of vendors shopped at did not differ dramatically between states, ranging from 1.7 vendors in Kentucky to 1.8 in Michigan and Nevada. Figure 3 shows the proportion of WIC families that shop at 1 or more different WIC
vendors in a month’s time. The overwhelming majority of WIC families shopped at 1 or 2 vendors (81.3 percent), while less than 1.5 percent of families shop at 5 or more vendors in a given month.

Figure 3. Number of Vendors Shopped at by WIC Families, by State, January–March 2012

While the majority of WIC families appeared to have chosen the same WIC vendors when shopping throughout the month, families made an average of 3.2 WIC shopping trips per month in January through March 2012, ranging from 3.1 shopping trips in Kentucky and Michigan to 3.2 in Nevada. The total number of visits made by families ranged from 1 to 25; however, the majority of families made 3 or fewer shopping trips in total (63.6 percent), and just over 5 percent of families made 6 or more shopping trips (data not shown). Figure 4 shows the number of shopping trips made by families in each state in an average month. The number of shopping trips made by families in each of the three states follows a similar trend—with the highest proportion of families making 2 or 3 shopping trips, then tapering off dramatically after that.

Figure 4. Number of Monthly WIC Shopping Trips, by State, January–March 2012

C. Overall Monthly Benefit Redemption

A WIC family’s monthly food benefits depend on the number of WIC participants as well as categories and ages of participants in the family. Overall redemption of monthly benefits indicates whether or not the foods prescribed to the family were used fully, partially, or not at all. A full redemption indicates that all of the foods prescribed were purchased in the quantities
available, while a partial redemption means that some amount of food was purchased and the family had benefits remaining at the end of the month. This section describes the proportion and characteristics of families that fully use their benefits and provides information on partial redemptions and non-redeeming families. The remaining sections of this chapter describe individual food category redemption, which greatly impacts full redemption of monthly benefits.

In January through March 2012, 12.6 percent of all WIC families in Kentucky, Michigan, and Nevada fully redeemed their WIC food benefits. This ranged from 9.5 percent of families in Kentucky to 16.4 percent of families in Nevada. At the same time, however, Nevada had the highest proportion of WIC participants who did not use any of their benefits in a given month (8.0 percent), followed by Kentucky and Michigan (6.1 and 4.1 percent, respectively; see Figure 5).

Figure 5. Percentage of WIC Families Redeeming None, Some, and All Monthly Benefits, by State, January-March 2012

<table>
<thead>
<tr>
<th>State</th>
<th>Non-Redemption</th>
<th>Partial Redemption</th>
<th>Full Redemption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>5.3</td>
<td>82.1</td>
<td>12.6</td>
</tr>
<tr>
<td>Kentucky</td>
<td>6.1</td>
<td>84.4</td>
<td>9.5</td>
</tr>
<tr>
<td>Michigan</td>
<td>11.1</td>
<td>82.7</td>
<td>13.2</td>
</tr>
<tr>
<td>Nevada</td>
<td>8.0</td>
<td>75.6</td>
<td>16.4</td>
</tr>
</tbody>
</table>

Full redemption

A number of family characteristics were found to be associated with full redemption of monthly WIC benefits across the three states, including race and ethnicity, urban/non-urban geography, the number of WIC family members and number of persons in the household (see detailed tables in Appendix B).

▲ Family race/ethnicity. Overall, more than 25 percent of non-Hispanic Asian families redeemed all of their monthly food benefits, followed by 16.5 percent of Hispanic families and approximately 12.5 percent of non-Hispanic White and non-Hispanic American Indian/Alaska Native families. Non-Hispanic Black families and those of multiple races were least likely to have redeemed all of their foods (8.9 and 10.1 percent, respectively). There were significant differences in rates of full redemption for some racial and ethnic groups across the three states, including non-Hispanic White and Hispanic families. More than 19 percent of Hispanic families in Nevada redeemed all of their monthly benefits, compared with 15.5 percent in Michigan and 9.6 percent in Kentucky. Similarly, 14.4 percent of non-Hispanic White families in Michigan fully redeemed their benefits, followed by 12.4 percent of those in Nevada and 9.8 percent in Kentucky.

▲ Geographic location. There was a small difference in full redemption between families residing in urban areas and those in large, small, or isolated rural areas, with urban families showing a slight edge over rural families (13.6 versus 10 percent, respectively).
**Household size.** As the number of people in the household increased, full monthly benefit redemption also increased. Eleven percent of families with 1 or 2 household members fully redeemed their benefits, compared with 14.8 percent of families with 5 or 6 people and 17.4 percent of those with 7 or more people in the household. This varied, however, across the three states, with full redemption increasing steadily among families in Michigan from 10.65 percent among families with 1 or 2 household members to 21.1 percent among those with 7 or more. Nevada saw only a slight increase from 1 or 2 household members to 5 or 6 (13.5 to 19.3 percent, respectively) at which point redemptions leveled off. Finally, this relationship was not apparent in Kentucky, which saw no overall rise in redemption with increased household size.

**Number of WIC family members.** Overall and in every state, full redemption of monthly benefits dropped sharply as the number of WIC family members receiving benefits increased from 1 to 2 participants and then declined slightly as the number increased. More than 15 percent of WIC families that had only one participant receiving benefits fully redeemed them, which is nearly double the proportion of families with 2, 3, and 4 or more participants receiving benefits (see Figure 6). This drop was driven largely by infants aged 6 to 11 months who were the sole WIC participant in the family; this group accounted for 30 percent of full redemptions, despite only accounting for 17 percent of single-participant families. Even without this population, however, there is a notable decrease in redemption with increasing participation within the family.

![Figure 6. Percentage of WIC Families Redeeming All Monthly Food Benefits, by Number of WIC Participants and State, January–March 2012](image)

Taking all of these factors into account, a multivariate logistic regression model was used to determine whether some factors were more or less strongly associated with the likelihood of a full redemption of all monthly benefits (see Figure 7). Controlling for family characteristics, families in Michigan and Nevada were approximately 1.5 times as likely as families in Kentucky to fully use their monthly WIC benefits. As noted previously, the fact that Kentucky had recently implemented EBT statewide compared to Michigan and Nevada may have influenced the full use of WIC benefits by Kentucky families simply due to the transition to the new way to transact WIC at the stores.

Compared with non-Hispanic White families, Asian families were nearly twice as likely to have redeemed all of their benefits, while non-Hispanic Black families were 41 percent less likely to do so. Similar to the frequencies reported above, each additional household member increased
the odds of a full redemption by 15 percent, and each additional WIC participant decreased the likelihood of a full redemption by 44 percent.

With respect to geographic location, Figure 7 shows that families in rural areas (i.e. large, medium and isolated rural areas combined) were 23% less likely than urban families to fully redeem their benefits.

**Figure 7. Odds of WIC Families Redeeming All Monthly Food Benefits, Controlling for Family Characteristics, Benefit Issuance, and State, January–March 2012**

Since the number of WIC participants in the household and their respective food package categories determines the types and quantities of foods prescribed to the family, a second logistic regression model was used to include the types of food package categories prescribed to the family (i.e., pregnant woman, child, infant aged 6 to 11 months), in addition to the predictors identified above. The relative effects of family characteristics were unchanged; however, the adjusted odds of redemption for the number of WIC participants in the family was tempered with the inclusion of these new variables (aOR = 0.69; 95% CI [0.68, 0.71]). The odds of redemption were nearly three times higher among families with infants under 6 months of age, compared with those without, while the odds of redemption were lowered greatly by the inclusion of a woman or child’s food package (see Table 3).
Table 3. Adjusted Odds of WIC Families Redeeming All Monthly Food Benefits, by Food Package Prescriptions, Controlling for Family Characteristics and State

<table>
<thead>
<tr>
<th>Food Packages Prescribed to Family*</th>
<th>Adjusted Odds Ratio</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant woman</td>
<td>0.33</td>
<td>0.32, 0.34</td>
</tr>
<tr>
<td>Breastfeeding women</td>
<td>0.37</td>
<td>0.35, 0.38</td>
</tr>
<tr>
<td>Postpartum woman</td>
<td>0.18</td>
<td>0.17, 0.19</td>
</tr>
<tr>
<td>Infant (0-5 months)</td>
<td>2.84</td>
<td>2.74, 2.95</td>
</tr>
<tr>
<td>Infant (6-11 months)</td>
<td>1.25</td>
<td>1.21, 1.28</td>
</tr>
<tr>
<td>Child (1-5 years)</td>
<td>0.55</td>
<td>0.54, 0.57</td>
</tr>
</tbody>
</table>

*Families may receive more than one of the food package categories listed. Reference groups are families that do not receive that food package prescription.

Partial redemption

Partial redemption of monthly benefits is by far the prevalent practice among WIC shoppers. For the three states combined, 82.1 percent of families partially redeemed their WIC benefits. Partial redemption of monthly benefits include instances in which families purchase less than the full quantity of foods prescribed to them, omit specific food items, or some combination of the two. Looking deeper into the partial redemption category, overall, nearly one-third of families did not fully use their monthly benefits simply because they did not purchase the maximum quantities of food prescribed to them (30.7 percent), whether due to accessibility and availability, family food preferences, or not purchasing the foods prior to their benefit expiration. 51.3 percent of families omitted at least one food category from their monthly purchase.

Non-redemption

As noted above, there were variations in non-redemption of monthly food benefits across the three study states, with rates of non-redemption in Nevada nearly twice those in Michigan (8.0 versus 4.1 percent, respectively). When looking at family characteristics, rates of non-redemption did not vary with geographic location in Kentucky and Michigan, while families living in isolated rural areas in Nevada had significantly higher rates of non-redemption than those in other areas (11.8 versus 8 percent, respectively).

Similarly, non-redemption did not differ across racial and ethnic groups in Kentucky, though slight differences were apparent in Michigan and more prominent differences were seen in Nevada. Rates of non-redemption in Michigan generally hovered around 3 to 5 percent of families for each racial and ethnic group, except for American Indian/Alaska Natives and Native Hawaiian/Other Pacific Islanders for whom non-redemption occurred among 6.0 and 8.7 percent of families, respectively. In Nevada, Hispanic and non-Hispanic Asian families were least likely to not redeem any foods (6.4 and 6.8 percent, respectively), while more than 14 percent of American Indian/Alaska Native families did not redeem any benefits. Non-Hispanic Black and non-Hispanic White families also had relatively high rates of non-redemption in Nevada with 11.9 and 10.4 percent, respectively, failing to use any WIC benefits.

Rates of non-redemption were highest for families with 1 to 2 household members in each of the three states. In Kentucky, 8.2 percent of families with 1-2 household members did not redeem any WIC benefits, while about 5 to 6 percent of families with 3 or more household members were non-redeemers. A similar trend was seen in Michigan, where 6.4 percent of families with 1 to 2 household members did not redeem benefits, compared with 3.9 percent of those with 3 or
4 people, and 3 percent of families with 5 or more household members. Nevada saw the largest percentage point decline in non-redemptions by household size, from 12.2 percent among families with 1 to 2 people to 6.1 percent among families with 5 or 6 people.

D. Summary of WIC Foods Redemptions

WIC foods have varying redemption levels. Table 4 shows, for each WIC food item, the average percentage redeemed, and percentages of full, partial and zero redemption. The WIC foods for women and children are displayed separately from the WIC foods for infants.

Table 4. Average Percentage of WIC Foods Redeemed (for Women, Children, Infants) and Percent of None, Partial and Full Redemption for Families Prescribed Benefits, January–March 2012

<table>
<thead>
<tr>
<th>WIC Food Item: Women and Children</th>
<th>Average % Redeemed</th>
<th>% None Redeemed</th>
<th>% Partial Redeemed</th>
<th>% Full Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy Milk</td>
<td>75.1</td>
<td>8.4</td>
<td>53.8</td>
<td>37.8</td>
</tr>
<tr>
<td>CVB</td>
<td>72.7</td>
<td>14.6</td>
<td>48.7</td>
<td>36.7</td>
</tr>
<tr>
<td>Eggs</td>
<td>78.1</td>
<td>19.5</td>
<td>4.9</td>
<td>75.6</td>
</tr>
<tr>
<td>Juice</td>
<td>72.8</td>
<td>21.0</td>
<td>13.2</td>
<td>65.8</td>
</tr>
<tr>
<td>Cheese</td>
<td>73.3</td>
<td>22.3</td>
<td>9.2</td>
<td>68.5</td>
</tr>
<tr>
<td>Cereal</td>
<td>64.0</td>
<td>27.3</td>
<td>19.6</td>
<td>53.1</td>
</tr>
<tr>
<td>Canned Fish</td>
<td>65.4</td>
<td>32.1</td>
<td>7.1</td>
<td>60.9</td>
</tr>
<tr>
<td>Whole Grains</td>
<td>58.8</td>
<td>34.0</td>
<td>14.7</td>
<td>51.3</td>
</tr>
<tr>
<td>Beans/Peanut Butter</td>
<td>56.3</td>
<td>38.7</td>
<td>10.0</td>
<td>51.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WIC Food Item: Infants</th>
<th>Average % Redeemed</th>
<th>% None Redeemed</th>
<th>% Partial Redeemed</th>
<th>% Full Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant Cereal</td>
<td>57.3</td>
<td>36.3</td>
<td>14.2</td>
<td>49.5</td>
</tr>
<tr>
<td>Infant Jarred Fruits and Vegetables</td>
<td>64.7</td>
<td>36.3</td>
<td>14.2</td>
<td>49.5</td>
</tr>
<tr>
<td>Infant Jarred Meats</td>
<td>42.8</td>
<td>46.0</td>
<td>23.1</td>
<td>30.9</td>
</tr>
</tbody>
</table>

The WIC foods are displayed in the following sections in order of their popularity with the WIC shoppers in the three study states, as measured by ascending order of percent of the food item not redeemed (see Table 4). Dairy milk is presented first, followed by CVB, etc. The medical foods category is presented after the beans/peanut butter food item. Infant formula and infant foods are presented after the food items for women and children.

Similar to the multivariate logistic model in Figure 7 (p. 30) which displays the odds of WIC families redeeming all monthly food benefits controlling for various features, for each of the WIC foods displayed, the multivariate logistic regression model was also used to determine whether some factors were more or less strongly associated with the likelihood of a full redemption. Kentucky was used as the reference state. The trend in each of the WIC foods followed the Figure 7 display in that families in Michigan and Nevada were more likely to fully redeem their food benefits than were families in Kentucky – with notable exceptions in juice, canned fish,
whole grains, medical foods, and infant jarred fruits, vegetables and meats. The differences in trends will be noted in the respective food item section.

With respect to geographic location, Figure 7, which showed urban families with a slightly greater likelihood of fully redeeming their benefits, a similar trend occurred for most all of the individual WIC foods, with a few exceptions. There are some exceptions to this trend by WIC food item and by state, and are noted in the respective food item section. For example, isolated rural families overall, outperformed urban families in fully redeeming dairy milk, canned fish, and beans/peanut butter. It is important to note, as well, that Nevada’s geography is such that even though it is a very rural state, with large swatches of desert, the two main urban locations in the state have the majority inhabitants.

E. Dairy Milk Redemption

Dairy milk is issued to all women and children in quantities and types identified to align with the U.S. Dietary Guidelines for Americans. Children are generally prescribed 4 gallons of milk per month: whole milk is issued to children aged 1, while lowfat milk is prescribed to children between 2 and 5 years of age. Women are prescribed lowfat milk in varying quantities based on their food package category: pregnant and partially breastfeeding women are prescribed 5.5 gallons, postpartum women are prescribed 4 gallons, and fully breastfeeding women are prescribed 6 gallons of milk per month. These quantities may differ, based on WIC-allowable substitutions, which are described in the next section. While the quantities are based on federal regulations, some states have restricted allowable brands to the least expensive brand available, as Kentucky and Nevada have done. Additionally, Michigan allows buttermilk to be purchased as a lowfat milk option, which Kentucky and Nevada do not permit.

In January through March 2012, WIC families were issued an average of 4.7 gallons of milk and redeemed an average of 3.5 gallons. These quantities did not differ across the three states. Overall, families redeemed 75.1 percent of their milk benefits on average, and this varied only slightly across the three states, from 73.1 percent of benefits in Kentucky to 77.2 percent of benefits in Nevada (see Table 5).

Table 5. Average Issuance and Redemption Amounts (in Gallons) for Families Prescribed Milk, January–March 2012

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean (SD)</th>
<th>Min–Max</th>
<th>Mean (SD)</th>
<th>Min–Max</th>
<th>Average % Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>750,424</td>
<td>4.7 (2.1)</td>
<td>0.25–26.5</td>
<td>3.5 (2.2)</td>
<td>0.0–20.75</td>
<td>75.1</td>
</tr>
<tr>
<td>Kentucky</td>
<td>218,855</td>
<td>4.7 (2.1)</td>
<td>0.25–26.5</td>
<td>3.5 (2.3)</td>
<td>0.0–20.75</td>
<td>73.1</td>
</tr>
<tr>
<td>Michigan</td>
<td>413,135</td>
<td>4.6 (2.0)</td>
<td>0.25–17.75</td>
<td>3.5 (2.2)</td>
<td>0.0–17.75</td>
<td>75.5</td>
</tr>
<tr>
<td>Nevada</td>
<td>118,434</td>
<td>4.7 (2.0)</td>
<td>0.25–19.5</td>
<td>3.6 (2.3)</td>
<td>0.0–19.5</td>
<td>77.2</td>
</tr>
</tbody>
</table>

*Milk is one of the most highly used WIC benefits, with extremely low rates of non-redemption (8.4 percent); however, this does not mean that all benefits are fully redeemed. Just under 38 percent of families redeem all of the milk benefits that are issued to them, while 53.8 percent of families redeem some, but not all, of the benefit (see Figure 8). Families in Nevada were considerably more likely than those in Kentucky and Michigan to redeem the full benefit (48.7 versus 35.7 percent, respectively).
There were notable differences in milk benefit redemption across family characteristics, as well as between the three states.

▲ **Family race/ethnicity.** Non-Hispanic Asian and Hispanic families were most likely to redeem all milk benefits (50.3 and 48.0 percent, respectively), while non-Hispanic Black families were least likely to do so (25.2 percent). This same trend was observed within each of the states.

▲ **Geographic location.** Kentucky and Michigan families in isolated rural areas were more likely than those in other areas to fully redeem their milk benefits. In Nevada, urban families were most likely to redeem all of their milk benefits, compared with those in other geographic areas.

▲ **Household size.** The number of people in the WIC household considerably increased the likelihood of full milk redemption, overall and in each state. Only 29.3 percent of all families with 1 to 2 people in the household fully redeemed their milk benefit, while 49.0 percent of those with 7 or more people did so (see Figure 9). Both Michigan and Nevada saw about a 22 percentage point difference between redemption rates among families with 1 to 2 household members and those with 7 or more.
**Number of WIC family members.** The number of WIC family members receiving benefits also impacts the likelihood of a full redemption. More than 40 percent of families with 1 WIC participant redeemed all of their milk benefits, compared with 35 percent of those with 2 WIC participants and 29.8 percent of families with 4 or more participants. This was similar across all three states, with the greatest percentage point decrease realized in Nevada: full redemptions ranged from 52.9 percent of families with 1 WIC participant to 38.0 percent of families with 4 or more participants.

**Total amount of milk prescribed.** Reflecting findings related to the number of WIC family members, the amount of milk prescribed was also negatively associated with full redemption. However, each gallon of milk prescribed reduced the odds of a full redemption by only 3 percent (aOR = 0.97, 95% CI [0.96, 0.97]). This did not differ greatly across the states.

While the total amount of milk prescribed has a marginal impact on the likelihood of a full redemption, issuance of gallons, half-gallons, and quarts, has a much stronger impact. A typical WIC milk prescription (described in detail in the introduction to this section), calls for 4 gallons to be issued to children and postpartum women, 5½ gallons for pregnant and partially breastfeeding women, and 6 gallons for fully breastfeeding women. Since families may substitute some portion of their milk benefits for cheese and other milk alternatives however, the amount of milk prescribed may differ. For instance, one pound of cheese may be substituted for three quarts of milk in a children’s food package, leaving them with 3¼ gallons of milk prescribed. State policies also impact whether families will need to purchase half-gallons or quarts: Kentucky issues a total number of ounces (summing multiple participants issuances), which can be used to purchase larger size containers, while Nevada does not allow families to combine prescriptions. Taking, for instance, a family with 2 children, both may receive 3½ gallons of milk, which would result in 6½ gallons prescribed in total. In Kentucky and Michigan, this family would need to purchase 6 gallons plus a half-gallon to fully use their WIC benefits, while in Nevada, the same family would need to purchase 6 gallons plus 2 quarts to do so.

The proportions of families issued half-gallons and quarts depend on the type of food package issued, substitutions allowed, and state policies. Table 6 shows that about 20 percent of families were issued at least one half-gallon of milk and 78.4 percent of families were issued at least one quart. There were wide variations across states: 22 percent of families in both Kentucky and Michigan were issued half-gallons, while 6.1 percent were issued half-gallons in Nevada. Conversely, more than 80 percent of families in Nevada and Michigan were issued quarts, compared with 64.1 percent of families in Kentucky.

**Table 6. Proportion of Families Issued Gallons, Half-Gallons, and Quarts of Milk Among Families Issued Any Milk, By State, January–March 2012**

<table>
<thead>
<tr>
<th></th>
<th>Gallon n</th>
<th>Gallon %</th>
<th>Half-gallon n</th>
<th>Half-gallon %</th>
<th>Quart n</th>
<th>Quart %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>750,079</td>
<td>87.3</td>
<td>170,133</td>
<td>19.8</td>
<td>673,958</td>
<td>78.4</td>
</tr>
<tr>
<td><strong>Kentucky</strong></td>
<td>218,822</td>
<td>86.8</td>
<td>57,175</td>
<td>22.7</td>
<td>161,647</td>
<td>64.1</td>
</tr>
<tr>
<td><strong>Michigan</strong></td>
<td>412,933</td>
<td>87.3</td>
<td>104,715</td>
<td>22.1</td>
<td>401,648</td>
<td>84.9</td>
</tr>
<tr>
<td><strong>Nevada</strong></td>
<td>118,324</td>
<td>88.3</td>
<td>8,243</td>
<td>6.1</td>
<td>110,663</td>
<td>82.6</td>
</tr>
</tbody>
</table>

Figure 10 shows the proportion of families fully redeeming their gallon, half-gallon, and quart milk benefits. Overall, gallons are much more likely to be fully redeemed by families (60.7
percent), while fewer than half of families fully use their half-gallon and quart benefits. While the proportion of benefits differed across the three states, the trend was generally the same, except in Nevada, where about 50 percent of families fully redeemed both half-gallons and quarts.

Figure 10. Percentage of WIC Families Fully Redeeming Gallons, Half-Gallons, and Quarts of Milk, by State, January–March 2012

Controlling for family characteristics and the amount and quantities of benefits issued, families in Michigan and Nevada were more likely than those in Kentucky to redeem all of their milk benefits (aOR = 1.34, 95% CI [1.33, 1.36] and aOR = 1.64, 95% CI [1.31, 1.67], respectively). The number of people in the household continues to be strongly associated with full redemption, increasing the odds of redemption by 16% for every additional person in the family (aOR = 1.16, 95% CI [1.16, 1.16]). Conversely, the amount of milk prescribed continues to decrease the odds of redemption by about 4 percent for every gallon prescribed (aOR = 0.96, 95% CI [0.95, 0.96]). Of particular interest are half-gallons and quarts: Having a half-gallon prescribed reduced the likelihood of a full redemption by 42 percent (aOR 0.58, 95% CI [0.57, 0.58]), while having a quart prescribed reduced the likelihood of a full redemption by 58 percent (aOR = 0.42, 95% CI [0.41, 0.42]). Alternatively, one could say that families not prescribed a quart are almost 1.6 times more likely to fully redeem their benefits (see Figure 11).
Figure 11. Odds of WIC Families Redeeming Milk Benefits, Controlling for Family Characteristics, Benefit Issuance, and State

NOTE: Adjusted odds ratios and corresponding 95% confidence intervals are presented in the appendices.
*Race and ethnic groups are mutually exclusive. †Adjusted odds of redemption do not differ from the reference group.

F. Cash Value Benefit Redemption

Nearly 90 percent of WIC families in Kentucky, Michigan, and Nevada were issued a cash value benefit for purchasing fruits and vegetables during the study period. Fruit and vegetable cash value benefits are issued to pregnant, postpartum, and breastfeeding women and children, however, the amount of benefit issued varies—at the time of this study, children were allotted a $6 benefit, while pregnant, postpartum, and breastfeeding women were generally issued a $10 benefit. In certain cases, such as women pregnant with multiples or breastfeeding multiples, participants may be issued more than $10. States have the option to allow participants to purchase fresh, canned, and frozen fruits and vegetables that meet specific federal guidelines. Participants in Michigan and Kentucky may purchase only fresh fruits and vegetables, while those in Nevada may purchase fresh, frozen, or canned fruits and vegetables. All three states allow split tender transactions with the CVB, thereby offering the participant the ability to pay the difference via another payment option should their purchase of fruits or vegetables exceed the dollar amount of the WIC CVB.

Cash value benefits issued to families are a function of the number of women and children participating in WIC and their food package category. Benefits may also be prorated if a participant is added to the family in the middle of a benefit issuance month or misses their appointment for recertification. In these cases, participants may be issued less than the $6 or $10 benefit. Across the three states, families issued cash value benefits received an average of $9.59 for purchasing fruits and vegetables. This varied slightly, from $9.39 in Kentucky to $9.68 per family in Nevada (see Table 7). In aggregate, families redeemed an average of 72.7 percent of cash value benefits issued in January through March 2012.
Table 7. Average Issuance and Redemption Amounts (in Dollars) for Families Prescribed Fruit and Vegetable Cash Value Benefits, January–March 2012

<table>
<thead>
<tr>
<th></th>
<th>Amount Issued per WIC Family*</th>
<th>Amount Redeemed per WIC Family*</th>
<th>Average % Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD) Min-Max</td>
<td>Mean (SD) Min-Max</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>767,047 9.59 (4.22) 0.10 – 76.00</td>
<td>7.06 (4.97) 0.00 – 75.72</td>
<td>72.7</td>
</tr>
<tr>
<td>Kentucky</td>
<td>221,752 9.39 (4.12) 0.11 – 50.00</td>
<td>6.45 (4.84) 0.00 – 45.88</td>
<td>68.0</td>
</tr>
<tr>
<td>Michigan</td>
<td>423,986 9.68 (4.26) 1.34 – 44.00</td>
<td>7.27 (4.99) 0.00 – 40.85</td>
<td>74.0</td>
</tr>
<tr>
<td>Nevada</td>
<td>121,309 9.66 (4.28) 0.10 – 76.00</td>
<td>7.47 (5.03) 0.00 – 75.72</td>
<td>76.6</td>
</tr>
</tbody>
</table>

*In dollars; for families issued any cash value benefit.

Overall, 36.7 percent of WIC families used their entire cash value benefit, while nearly 50 percent used some portion of the benefit (see Figure 12). Full use of the cash value benefit ranged from 45.8 percent of families in Nevada to 32.4 percent of families in Kentucky. Among families that used some, but not all, of the cash value benefit, 74.3 percent of the dollars available were redeemed on average. Again, families in Nevada appeared to take the greatest advantage of this benefit, using 76.8 percent of available benefits, followed by Michigan (75.2 percent) and Kentucky families (71.4 percent; data not shown).

Fewer than 15 percent of WIC families did not use their cash value benefit at all in the months under review, making this the third most used benefit among the WIC foods. Only with regard to milk and infant formula prescriptions did a smaller proportion of families choose to not redeem any of the benefit.

Figure 12. Percentage of WIC Families Redeeming None, Some, and All Cash Value Benefits, by State, January–March 2012

Despite low rates of non-redeemption, the cash value benefit also had the lowest rate of full redemptions of any WIC food item prescribed to women and children. This resulted in the second highest rate of partial redemptions, where some, but not all of the benefit was redeemed.

Unlike other WIC foods, the cash value nature of this benefit requires attention paid to the types of fruits and vegetables desired by the participant, their cost (per unit or pound) and the overall CVB amount during the benefit month. For WIC shoppers who do not want to purchase produce beyond the amount of their CVB via the split tender capability, there is additional scrutiny involved. As such, a partial cash value benefit redemption indicates that some dollars/cents of the CVB remains unused, and could be as low as $0.01.
Full redemptions of cash value benefits varied across a number of family characteristics, including race and ethnicity, geographic location, and the number of people in the household. In general, non-Hispanic Asian and Hispanic families were more likely than other families to redeem all of their cash value benefits as were families in urban locations and those living in larger households.

**Family race/ethnicity.** For family race and ethnicity, non-Hispanic Asian families were most likely to redeem all of their cash value benefits, followed by Hispanic families (54.2 and 46.9 percent, respectively). Non-Hispanic Black families were least likely to redeem all of the cash value benefit (28.8 percent). Similar trends could be seen across states, with some exceptions: In Nevada, non-Hispanic Asian and Hispanic families were about equally likely to redeem all of the cash value benefit (50 percent); in Kentucky, non-Hispanic White and non-Hispanic Black families were least likely to have redeemed the entire benefit (30.5 percent); and in Michigan, non-Hispanic American Indian/Alaska Native families were least likely to do so (26.2 percent).

**Geographic location.** Families in urban areas were more likely than those in rural areas to redeem all of their cash value benefits overall. Among the three states, the greatest differential in redemptions occurred in Nevada, where 46.5 percent of families in urban areas redeemed all of the cash value benefit, compared with 31.6 percent of those in isolated rural areas.

**Household size.** Full redemption of the cash value benefit increased as the number of people in the household increased. For instance, 29.8 percent of WIC families with 1 to 2 household members redeemed all of the cash value benefit, compared with 42.2 percent of those families with 7 or more people in the household. This trend was driven by families in Michigan, however, and was not the case for those in Kentucky or Nevada. In both of those states, redemptions increased with household size up to 5 or 6 people and then leveled off or declined for families with 7 or more people (see Figure 13).

Figure 13 Percentage of WIC Families Redeeming All Cash Value Benefits, by Number of People in Household and State, January–March 2012
▲ **Number of WIC family members.** The number of family members receiving WIC benefits was also associated with the likelihood of redeeming the full cash value benefit, with full redemptions decreasing as the number of family members on WIC increased. For example, overall, 37.8 percent of families with only one WIC participant redeemed all of the cash value benefit, compared with 33.3 percent of those with 4 or more family members in the program. This trend persisted in all three states and was most pronounced in Kentucky, which saw about a 10 percentage point decline in full cash value benefit redemption between families with one WIC participant and those with 4 or more.

▲ **Dollars of cash value benefit prescribed.** Consistent with findings on the number of family members in WIC, full redemptions generally declined as the total amount of cash value benefits increased. Families issued less than $10 in cash value benefits were most likely to redeem the full amount of the benefit (39.7 percent overall) than those receiving more; this was true in every state (data not shown).

Additional analysis suggests, however, that the average proportion of cash value benefits redeemed by families increased with higher total cash value benefits (see Figure 14). Overall, 71.9 percent of cash value benefits issued for less than $10 was redeemed, while 79.3 percent of benefits issued for $20 or more was redeemed. This trend was similar across the three states, with a clear breaking point for increased redemptions occurring between the $10 to $15 and $16 to $19 benefit issuance categories.

![Figure 14. Proportion of Total Cash Value Benefits Redeemed, by Dollars Prescribed and State, January–March 2012](image)

To further explore the relationship between family characteristics and cash value benefit redemption, two regression models were developed. A logistic regression model was used to determine whether specific family characteristics are associated with an increased or decreased likelihood of redeeming all of the family’s cash value benefits. The second linear regression model was used to determine whether family characteristics and benefit issuance were associated with the proportion of cash value benefits redeemed.

The results of Model 1, shown in Figure 15, indicate that after adjusting for all family characteristics, the odds of families in Michigan and Nevada redeeming all of their cash value benefits are 11 and 20 percent higher, respectively, than families in Kentucky. Non-Hispanic Asian families are nearly 81 percent more likely than non-Hispanic White families to redeem all
of their benefits (aOR = 1.81, 95% CI [1.74, 1.89]), while Hispanic families are 31 percent more likely (aOR = 1.31, 95% CI [1.29, 1.33]). The number of people in the household continues to be strongly associated with increased redemption (aOR = 1.11, 95% CI [1.10, 1.11]), and the odds of a full redemption does not vary greatly with the amount of cash value benefit dollars issued (aOR = 0.97, 95% CI [0.97, 0.97]).

Figure 15. Odds of WIC Families Redeeming All Cash Value Benefits, Controlling for Family Characteristics, Benefit Issuance, and State, January–March 2012

The results of the multivariate linear regression model (Model 2) are shown in Table 8. When considering the proportion of the CVB used as the outcome and controlling for other factors, families in Michigan were associated with a 5.8 percentage point increase in the proportion of benefits used, while those in Nevada were associated with a 3.4 percentage point increase in utilization. Compared with non-Hispanic White families, non-Hispanic Asians saw a 9.9 percentage point increase and Hispanics saw a 5.1 percentage point increase in utilization, while non-Hispanic Black families were associated with a 7.6 percentage point decrease in the proportion of benefits redeemed. Each additional person in the household was associated with a nearly 2 percentage point increase in utilization, while every additional dollar prescribed was associated with only a .3 percentage point increase. This would translate to about a 1.8 percentage point increase in the proportion of CVB redeemed for an additional $6 benefit added to the family’s prescription.

NOTE: Adjusted odds ratios and corresponding 95% confidence intervals are presented in the appendices. *Race and ethnic groups are mutually exclusive. †Adjusted odds of redemption does not differ from the reference group.
Table 8. Relative Impact of Family Characteristics on Proportion of CVB Benefits Redeemed, Controlling for Family Characteristics, Benefit Issuance, and State

<table>
<thead>
<tr>
<th>Model 2: Proportion of Benefits Redeemed</th>
<th>Coefficient Estimate</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kentucky</td>
<td>REF</td>
<td>REF</td>
</tr>
<tr>
<td>Michigan</td>
<td>5.8</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Nevada</td>
<td>3.4</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Family Race/Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>REF</td>
<td>REF</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>-7.6</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Hispanic</td>
<td>5.1</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Non-Hispanic American Indian/Alaska Native</td>
<td>-5.2</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Non-Hispanic Asian</td>
<td>9.9</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Non-Hispanic Native Hawaiian/Other Pacific Islander</td>
<td>-1.4</td>
<td>0.1598</td>
</tr>
<tr>
<td>Non-Hispanic Multiple Races</td>
<td>-2.8</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Geographic location</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>REF</td>
<td>REF</td>
</tr>
<tr>
<td>Large rural</td>
<td>-3.3</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Small rural</td>
<td>-3.1</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Isolated</td>
<td>-3.2</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Number of persons in household</strong></td>
<td>1.9</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Dollars prescribed</strong></td>
<td>0.3</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

*Race and ethnic groups are mutually exclusive.

**G. Egg Redemption**

During the study months, 89.1 percent of WIC families in the three states were issued eggs. Eggs are issued to women and children and most participants are prescribed one dozen eggs per month, except for fully breastfeeding women, women pregnant with multiples, and women partially or fully breastfeeding multiples, who may be prescribed up to two dozen eggs per benefit-month. Kentucky, Michigan, and Nevada WIC authorize only one-dozen-sized cartons, and allow white eggs only. Kentucky and Michigan allow small, medium, and large eggs to be purchased. Nevada requires that the least expensive brand of eggs be purchased and limits the size to large eggs, with medium being allowed only if large eggs are unavailable.

Since WIC families vary in their composition, on average, 1.4 dozen eggs were issued to families with women and children, and this did not vary across the states (see Table 9). Approximately 1.1 dozen eggs were redeemed, on average, and overall WIC families redeemed three-quarters of the eggs available to them. This varied slightly, from 75.2 percent redeemed in Kentucky to 81.4 percent of eggs redeemed in Nevada.
Table 9. Average Issuance and Redemption Amounts (in Dozens) for Families Prescribed Eggs, January–March 2012

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Amount Issued per WIC Family*</th>
<th>Amount Redeemed per WIC Family*</th>
<th>Average % Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean (SD)</td>
<td>Min-Max</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Total</td>
<td>765,920</td>
<td>1.4 (0.6)</td>
<td>1.0 – 7.0</td>
<td>1.1 (0.7)</td>
</tr>
<tr>
<td>Kentucky</td>
<td>221,541</td>
<td>1.3 (0.6)</td>
<td>1.0 – 7.0</td>
<td>1.0 (0.7)</td>
</tr>
<tr>
<td>Michigan</td>
<td>423,519</td>
<td>1.4 (0.6)</td>
<td>1.0 – 7.0</td>
<td>1.1 (0.7)</td>
</tr>
<tr>
<td>Nevada</td>
<td>120,860</td>
<td>1.4 (0.6)</td>
<td>1.0 – 6.0</td>
<td>1.1 (0.8)</td>
</tr>
</tbody>
</table>

*In dozens; for families issued any eggs.

Overall, 75.6 percent of WIC families across the three states purchased all of the eggs that they were prescribed, and nearly one in five families (19.5 percent) did not purchase any prescribed eggs. A very small proportion of families redeemed only part of their egg benefit, largely due to the fact that the majority of WIC families were issued one dozen eggs, creating an all-or-nothing redemption option. Full redemption of eggs was greater than 70 percent in each of the states, and it reached 80.0 percent among families in Nevada (see Figure 16).

Figure 16. Percentage of WIC Families Redeeming None, Some, and All Egg Benefits, by State, January–March 2012

Certain family characteristics are also associated with the likelihood of redeeming all egg benefits across the states.

▲ **Family race/ethnicity.** Similar to other food benefits, Hispanic and non-Hispanic Asian families were most likely to have redeemed all of their egg benefits (82.3 and 85.4 percent, respectively), and this was true for each of the states. Full redemptions among non-Hispanic Asians exceeded 80 percent in each of the states, as did full redemptions for Hispanics in Michigan and Nevada. Just under 79 percent of Hispanic families in Kentucky had fully redeemed their egg benefits. Full redemption was lowest overall and in each state among non-Hispanic Black families (70.0 percent).

▲ **Geographic location.** Overall, families in urban areas were just slightly more likely than those in other areas to fully redeem their egg benefits. However, the differential was more dramatic in Nevada: 80.5 percent of families in urban areas redeemed all of their WIC benefits, compared with 69.9 percent of families in isolated rural areas.

▲ **Household size.** Generally, full egg redemptions increased as the number of people in the household increased: from 72.6 percent among WIC families with 1 to 2 household members to 79.6 percent among families with 7 or more household members. While there was an increase in Kentucky, it was only slight, amounting to a few percentage points in all. In Michigan and Nevada, however, the increase in full egg redemption was more dramatic, ranging from about 73 percent of WIC families with 1 to 2 people in the...
household to more than 80 percent of those with 7 or more household members. In Nevada, in particular, the overall increase was 10.6 percentage points.

▲ **Number of WIC family members.** In each state and overall, the proportion of families redeeming all of their egg benefits decreased as the number of family members on WIC increased. For example, 78.0 percent of families with 1 person on WIC across the three states redeemed all of their eggs, while only 65.2 percent of families with 4 or more people on WIC did so.

▲ **Dozens of eggs prescribed.** The total number of eggs prescribed to a WIC family was significantly associated with how likely they were to redeem all of their egg prescription. Overall, families issued one dozen eggs were most likely to redeem their full egg prescription (77.5 percent), and this decreased for each additional dozen eggs prescribed. Only 64.0 percent of families issued 4 or more dozen eggs redeemed all of their benefits. While families in Nevada saw a decrease with increasing egg prescription, the results were not as dramatic. More than 80 percent of families in Nevada issued 1 or 2 dozen eggs fully redeemed their benefit, and slightly less than 75 percent redeemed their benefits for 3 or 4 or more dozen eggs (see Figure 17).

**Figure 17. Percentage of WIC Families Redeeming All Eggs, by Dozens of Eggs Prescribed and State, January–March 2012**

After controlling for family characteristics, the same indicators were found to be associated with the likelihood of a full egg redemption (see Figure 18). Non-Hispanic Asian and Hispanic families were 1.7 and 1.4 times more likely than non-Hispanic White families to make a full redemption, while non-Hispanic Black families were 27 percent less likely to have done so (aOR = 0.73, 95% CI [0.72, 0.74]). Each additional household member increased the odds of redemption by 12 percent (aOR = 1.12, 95% CI [1.11, 1.12]), while each additional carton of eggs reduced the odds of redemption by 32 percent (aOR = 0.68, 95% CI [0.68, 0.69]).
Figure 18. Odds of WIC Families Redeeming All Eggs Benefits, Controlling for Family Characteristics, Benefit Issuance, and State

<table>
<thead>
<tr>
<th>State (compared to families in Kentucky)</th>
<th>Less likely to redeem</th>
<th>More likely to redeem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michigan</td>
<td>0.73</td>
<td>1.22</td>
</tr>
<tr>
<td>Nevada</td>
<td></td>
<td>1.21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Family Race/Ethnicity* (compared to White families)</th>
<th>Less likely to redeem</th>
<th>More likely to redeem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td></td>
<td>0.87</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.92</td>
<td>1.42</td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td></td>
<td>1.03†</td>
</tr>
<tr>
<td>Asian</td>
<td></td>
<td>0.94</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td></td>
<td>1.71</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Geographic location (compared to Urban families)</th>
<th>Less likely to redeem</th>
<th>More likely to redeem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large rural</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>Small rural</td>
<td>0.94</td>
<td></td>
</tr>
<tr>
<td>Isolated</td>
<td>0.98†</td>
<td></td>
</tr>
</tbody>
</table>

| For each person in household                      | 0.68                  | 1.12                  |
| For every dozen prescribed                       |                       |                       |

NOTE: Adjusted odds ratios and corresponding 95% confidence intervals are presented in the appendices.

*Race and ethnic groups are mutually exclusive. †Adjusted odds of redemption do not differ from the reference group.

H. Juice Redemption

In January through March 2012, 89.2 percent of WIC families were issued juice, and the proportion of families issued juice was similar in each state. Pregnant, partially breastfeeding, and fully breastfeeding women were issued up to 144 fluid ounces of 100% fruit juice, children were issued 128 ounce, and postpartum women are issued 96 fluid ounces. States may elect to issue a combination of single-strength juice and juice from concentrate up to these maximum allotments. Information was provided by Michigan and Nevada that allowed us to identify single-strength juice prescriptions from concentrate: About 36 percent of families in both states were issued juice from concentrate and 67 to 68 percent were issued single-strength juice. For single-strength juices, Kentucky and Michigan allowed 46-, 48-, and 64-ounce plastic bottles with the purchase sizes specified on the EBT shopping list, while Nevada only allowed 64-ounce plastic bottles.

During the study period, families were issued an average of 2.9 containers of juice, which could be either single-strength bottles or concentrate (see Table 10). Families issued juice redeemed 2.1 containers on average, and overall families redeemed 72.8 percent of their juice benefit. The proportion of benefits redeemed ranged from 69.0 percent in Nevada to 75.5 percent in Michigan.
Table 10. Average Issuance and Redemption Amounts for Families Prescribed Juice, January–March 2012

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Amount Issued per WIC Family*</th>
<th>Amount Redeemed per WIC Family*</th>
<th>Average % Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean (SD)</td>
<td>Min–Max</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Total</td>
<td>766,401</td>
<td>2.9 (1.3)</td>
<td>1.0–15.0</td>
<td>2.1 (1.5)</td>
</tr>
<tr>
<td>Kentucky</td>
<td>221,634</td>
<td>2.8 (1.2)</td>
<td>1.0–15.0</td>
<td>2.0 (1.5)</td>
</tr>
<tr>
<td>Michigan</td>
<td>423,798</td>
<td>2.9 (1.3)</td>
<td>1.0–12.0</td>
<td>2.2 (1.5)</td>
</tr>
<tr>
<td>Nevada</td>
<td>120,969</td>
<td>2.9 (1.3)</td>
<td>1.0–12.0</td>
<td>2.0 (1.6)</td>
</tr>
</tbody>
</table>

*In containers (e.g., concentrate or single-strength bottles); for families issued any juice.

More than 65 percent of WIC families purchased all of the juice that was issued to them, while 21.0 percent did not purchase any, and the remaining 13.2 percent purchased some of the juice that was issued (see Figure 19). Families in Michigan were most likely to have redeemed all of their juice benefits (68.9 percent) and least likely to have not redeemed any of the benefit (18.5 percent). Families in Kentucky and Nevada were similar, with about 62 percent redeeming all of their juice benefits, and about one-quarter not redeeming any of the benefit.

Figure 19. Percentage of WIC Families Redeeming None, Some, and All Juice Benefits, by State, January–March 2012

For the two states with available data, there were stark differences in redemptions for single-strength juice redemption compared with concentrated juice redemption. More than 70 percent of families issued single-strength juice in both states redeemed the entire benefit (see Figure 20), while 51.4 percent of families in Nevada and 60.6 percent of families in Michigan redeemed the entire concentrated juice benefit. Conversely, non-redemption of concentrated juice was extraordinarily high, at 43.3 percent of Nevada WIC families and 30.7 percent of Michigan WIC families. Since this level of detail was only available for two states, the rest of this section will focus on overall juice redemption (single-strength and concentrate combined). See Appendix C for more detailed information on juice redemption.
While juice prescriptions had moderate levels of full redemption overall, redemption rates varied with family characteristics across the three states:

▲ **Family race/ethnicity.** Overall, non-Hispanic Asian families were most likely to redeem all of their juice benefits (72.7 percent), while non-Hispanic Native Hawaiian/Other Pacific Islanders were least likely to do so (57.4 percent). While this trend was seen in Michigan, it varied somewhat across Kentucky and Nevada. Non-Hispanic Black families were least likely to fully redeem juice benefits in Kentucky (59.5 percent) and Nevada (52.4 percent), and Hispanic families were most likely to do so in Nevada (66.0 percent).

▲ **Geographic location.** There was little to no variation in full juice redemption by geographic location, with the exception of Nevada. WIC families in urban areas of the state were much more likely than those in isolated rural areas to have fully redeemed their juice benefit (63.1 versus 56.4 percent, respectively).

▲ **Household size.** Full redemption of juice benefits increased as the number of people in the household increased. Overall, 62.9 percent of families with 1 to 2 household members redeemed all of the juice benefit, and this steadily increased up to 70.1 percent of families with 7 or more household members. While this was true in each state, the magnitude of the increase varied. Kentucky families saw a 4.5 percentage point increase from 1 to 2 household members to 7 or more, and Nevada families realized a 10.7 percentage point increase between these same groups.

▲ **Number of WIC family members.** Conversely, the likelihood of full juice redemption decreased as the number of family members participating in WIC increased. Among WIC families with only one WIC participant, 70.3 percent redeemed the entire juice benefit, compared with 51.1 percent of families with 4 or more participants. This trend repeated for each state and the greatest decrease occurred in Nevada, which saw a 39 percent decline in redemption between families with 1 participant and those with 4 or more participants.

▲ **Containers of juice prescribed.** Figure 21 shows redemption rates by the number of containers of juice prescribed. Only 56.3 percent of families issued one container of juice used that benefit, while families issued two containers were most likely to use their entire benefit (70.7 percent). With issuance amounts greater than two containers, full redemption declined as the number of containers increased.
When controlling for these family and benefit issuance characteristics, families in Michigan were 1.4 times more likely to redeem all of their juice benefits than those in Kentucky (95% CI 1.39–1.42), and Nevada families were slightly less likely to do so (aOR = 0.92, 95% CI [0.91, 0.94]). Compared with non-Hispanic White families, non-Hispanic Asian (aOR = 1.27, 95% CI [1.22, 1.33]) and Hispanic (aOR = 1.13, 95% CI [1.1, 1.15]) families were most likely to use the full juice benefit, while non-Hispanic Black and non-Hispanic Native Hawaiian/Other Pacific Islander families were about 20% less likely to use the benefit. Each container of juice prescribed reduced the likelihood of a full redemption by 19% while every additional person in the WIC family’s household increased the odds of a full redemption by 12% (see Figure 22).

Figure 22. Odds of WIC Families Redeeming Juice Benefits, Controlling for Family Characteristics, Benefit Issuance, and State

NOTE: Adjusted odds ratios and corresponding 95% confidence intervals are presented in the appendices.

*Race and ethnic groups are mutually exclusive.
I. Cheese Redemption

Cheese is issued to fully breastfeeding women up to one year postpartum and may also be offered to children, pregnant, partially breastfeeding, and postpartum women as a substitute for milk. Pregnant, postpartum, and partially breastfeeding women and children may substitute three quarts of milk for one pound of cheese. Fully breastfeeding women may substitute up to six quarts of milk for two pounds of cheese.

In January through March 2012, 83.2 percent of WIC families in Kentucky, Michigan, and Nevada were issued cheese. In addition to federal guidelines, there are slight variations across these three states regarding the allowable types and quantities of cheese: Kentucky and Michigan allow 8- and 16-ounce packages to be purchased, while Nevada requires participants to purchase only 16-ounce packages. Kentucky requires participants to purchase the least expensive brand of cheese, while Michigan participants are given a maximum price per pound. Across the three states, families with at least one child or one woman were issued an average of 1.38 pounds of cheese. Overall, about 1.0 pound of cheese was redeemed by these families (see Table 11), and families redeemed 73.3 percent of the cheese issued to them. This ranged from a low of 66.9 percent of cheese benefits in Kentucky to 78.5 percent of benefits in Nevada.

Table 11. Average Issuance and Redemption Amounts (in Pounds) for Families Prescribed Cheese, January–March 2012

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Amount Issued per WIC Family*</th>
<th>Amount Redeemed per WIC Family*</th>
<th>Average % Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Min-Max</td>
<td>Mean (SD)</td>
<td>Min-Max</td>
</tr>
<tr>
<td>Total</td>
<td>715,031</td>
<td>1.38 (0.67) 0.5 - 10.0</td>
<td>1.01 (0.79) 0.0 - 10.0</td>
<td>73.3</td>
</tr>
<tr>
<td>Kentucky</td>
<td>185,648</td>
<td>1.27 (0.54) 0.5 - 6.0</td>
<td>0.86 (0.69) 0.0 - 6.0</td>
<td>66.9</td>
</tr>
<tr>
<td>Michigan</td>
<td>413,443</td>
<td>1.43 (0.73) 0.5 - 10.0</td>
<td>1.07 (0.82) 0.0 - 10.0</td>
<td>74.7</td>
</tr>
<tr>
<td>Nevada</td>
<td>115,940</td>
<td>1.38 (0.62) 1.0 - 7.0</td>
<td>10.9 (0.77) 0.0 - 7.0</td>
<td>78.5</td>
</tr>
</tbody>
</table>

*In lbs.; for families issued any cheese.

More than two-thirds of WIC families redeemed all of the cheese benefits they were issued (68.5 percent), while 22.3 percent did not redeem any cheese benefits (see Figure 23). This varied somewhat across the states, with 77.2 percent of WIC families in Nevada redeeming all of their cheese benefits, and 60.7 percent of families in Kentucky doing so. Nevada and Michigan had similar rates of non-redemption (20.2 and 20.7 percent, respectively), while nearly 27.2 percent of Kentucky families did not redeem any of their cheese benefits. Nevada families were least likely to have only redeemed some of their cheese benefits (2.7 percent), which may be due, in part, to the allowance of only 16-ounce packages of cheese. For WIC families issued only one pound of cheese, this would create an all-or-nothing redemption opportunity, whereas the allowance of an 8-ounce package could increase the likelihood that a family purchases some but not all of the cheese prescribed to them.
For family characteristics, cheese redemption patterns are similar to redemption of other food categories. Namely, there are a number of differences in full redemption across family race and ethnic groups as well as a high correlation between full redemption and the number of WIC family members, amount of benefit issuance, and number of persons in the household (see Appendix C for detailed statistics):

▲ **Family race/ethnicity.** Families characterized as Hispanic and non-Hispanic White were most likely to have redeemed all of their cheese benefits overall (75.8 and 68.7 percent, respectively) and across the three states, while non-Hispanic Native Hawaiian/Other Pacific Islander and non-Hispanic Black families were least likely to do so (57.6 and 61.4 percent, respectively). These trends were similar across the states, however, non-Hispanic Black and non-Hispanic Asian families in Kentucky had disproportionately low rates of full redemption (48.3 and 50.2 percent, respectively), both within the state and across the three states.

▲ **Geographic location.** Overall, there was little variation in full cheese redemption by geographic location.

▲ **Household size.** Full cheese redemption increased with the number of people in the household. For instance, 64.5 percent of WIC families with 1 or 2 people in the household redeemed all of their cheese benefits, while 74.7 percent of families with 7 or more people in the household did so. This trend was similar in Kentucky and Michigan, while full cheese redemption increased in Nevada from 68.9 percent of families with 1 or 2 people in the household to reach a threshold of 82.0 percent among families with 5 or 6 people.

▲ **Number of WIC family members.** Full redemption of cheese benefits decreased as the number of family members on WIC increased. While this was true for each of the three states, the relationship was most prominent in Michigan, which saw a 15.3 percentage point difference between families with 1 WIC participant (71.7 percent) and those with 4 or more participants (58.1 percent).

▲ **Pounds of cheese prescribed.** Since the amount of cheese issued to a family is a function of the number of WIC family members, similar results are found for the amount of cheese prescribed: Full redemption declines as the amount of cheese prescribed increases. Overall, 70.6 percent of families issued one pound or less of cheese redeemed the entire benefit, while 64.6 percent of those issued more than one to less than three pounds redeemed that much, and only 59.5 percent of families issued three or more pounds of cheese fully redeemed their benefit. This trend persisted in Kentucky.
and Michigan, although there was little difference among Nevada families issued up to three pounds of cheese, and those issued three or more pounds still had very high rates of redemption (see Figure 24).

Results of the logistic regression model provide further evidence of the associations between family characteristics and the odds of full cheese redemption (see Figure 25). Non-Hispanic Native Hawaiian/Other Pacific Islander families were much less likely than non-Hispanic White families to have redeemed all of their cheese benefits (aOR = 0.45, 95% CI [0.40, 0.50]), while Hispanic families were somewhat more likely to have done so (aOR = 1.10, 95% CI [1.08, 1.11]). Non-Hispanic Black and non-Hispanic Asian families were about 35% less likely than non-Hispanic White families to have redeemed all of their benefits (aOR = 0.64, 95% CI [0.63 – 0.65] and aOR = 0.67, 95% CI [0.64, 0.69], respectively). There were virtually no differences by geographic location, with only families in large rural towns being slightly less likely than those in urban areas to fully redeem their benefits. Families in Nevada were more than twice as likely as those in Kentucky to have redeemed all of their cheese benefits (aOR = 2.13, 95% CI [1.68, 1.72]), while families in Michigan were 1.7 times more likely (95% CI [1.68, 1.72]). For the number of people in the household, each additional person increased the likelihood of full cheese redemption by 14 percent (aOR = 1.14, 95% CI [1.13, 1.14]), while each additional pound of cheese prescribed reduced the likelihood of a full redemption by 30 percent (aOR = 0.70, 95% CI [0.70, 0.71]).
Figure 25. Odds of WIC Families Redeeming All Cheese Benefits, Controlling for Family Characteristics, Benefit Issuance, and State

<table>
<thead>
<tr>
<th>State</th>
<th>Less likely to redeem</th>
<th>More likely to redeem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michigan</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>Nevada</td>
<td>0.73</td>
<td></td>
</tr>
</tbody>
</table>

**Family Race/Ethnicity** *(compared to White families)*

<table>
<thead>
<tr>
<th>Group</th>
<th>Less likely to redeem</th>
<th>More likely to redeem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>0.67</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>1.10</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>Multiple Races</td>
<td>1.00 '</td>
<td></td>
</tr>
</tbody>
</table>

**Geographic location** *(compared to Urban families)*

<table>
<thead>
<tr>
<th>Location</th>
<th>Less likely to redeem</th>
<th>More likely to redeem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large rural</td>
<td>0.94</td>
<td></td>
</tr>
<tr>
<td>Small rural</td>
<td>1.00 '</td>
<td></td>
</tr>
<tr>
<td>Isolated</td>
<td>1.00 '</td>
<td></td>
</tr>
</tbody>
</table>

**For each person in household**

<table>
<thead>
<tr>
<th>For every lb. prescribed</th>
<th>Adjusted odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.70</td>
<td></td>
</tr>
<tr>
<td>1.14</td>
<td></td>
</tr>
</tbody>
</table>

**For every lb. prescribed**

<table>
<thead>
<tr>
<th>Adjusted odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.70</td>
</tr>
<tr>
<td>1.14</td>
</tr>
</tbody>
</table>

NOTE: Adjusted odds ratios and corresponding 95% confidence intervals are presented in the appendices.

*Race and ethnic groups are mutually exclusive. †Adjusted odds of redemption do not differ from the reference group.

**J. Cereal Redemption**

In January through March 2012, 89.2 percent of WIC families across Kentucky, Michigan, and Nevada were issued dry cereal. Cereal is generally issued to participants categorized as pregnant, postpartum, or breastfeeding women and children, and each participant is frequently prescribed up to 36 ounces of cereal. Cereal can be purchased in a variety of quantities—for example, (2) 18-ounce boxes or (3) 12-ounce boxes—although states can limit the size of the boxes eligible for purchase. Kentucky requires cold cereals to be at least 10 ounces, while Michigan requires a minimum size of 11 ounces, and Nevada’s minimum size is 12 ounces with a 36-ounce maximum.

Family WIC benefits for cereal may include prescriptions for one or more participants, depending on the makeup of the family. Families with women and/or children were prescribed 47.9 ounces of cereal on average across the three states. This did not differ greatly by state (see Table 12). Among families issued cereal, the average amount redeemed was 29.0 ounces, ranging from 26.5 ounces on average in Kentucky to 32.1 ounces in Nevada. WIC families redeemed 64.0 percent of their cereal benefits on average during the study months.
Table 12. Average Issuance and Redemption Amounts (in Ounces) for Families Prescribed Cereal, January–March 2012

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Amount Issued per WIC Family*</th>
<th>Amount Redeemed per WIC Family*</th>
<th>Average % Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Min-Max</td>
<td>Mean (SD)</td>
<td>Min-Max</td>
</tr>
<tr>
<td>Total</td>
<td>766,667</td>
<td>47.9 (20.5)</td>
<td>10.0—252.0</td>
<td>29.0 (24.3)</td>
</tr>
<tr>
<td>Kentucky</td>
<td>221,636</td>
<td>46.9 (19.9)</td>
<td>10.0—252.0</td>
<td>26.5 (23.6)</td>
</tr>
<tr>
<td>Michigan</td>
<td>423,803</td>
<td>48.3 (29.5)</td>
<td>12.0—180.0</td>
<td>29.5 (24.5)</td>
</tr>
<tr>
<td>Nevada</td>
<td>121,228</td>
<td>48.5 (20.8)</td>
<td>12.0—216.0</td>
<td>32.1 (24.5)</td>
</tr>
</tbody>
</table>

*In ounces; for families issued any cereal.

Overall, 53.1 percent of WIC families across the three states purchased all of the cereal that they were prescribed, while 19.6 percent purchased some cereal (partial redemption), and more than one-quarter did not purchase any of the cereal they were issued (27.3 percent; see Figure 26). Families in Kentucky were least likely to redeem all of their cereal (47.1 percent) followed by those in Michigan (53.7 percent), while Nevada WIC families were most likely to do so (62.2 percent). Michigan and Kentucky had similar rates of partial redemptions (21.9 and 19.9 percent, respectively), while only 14.7 percent of Nevada families partially redeemed their cereal benefits. The proportion of families not redeeming any cereal benefits ranged from 23.1 percent in Nevada to 31.0 percent in Kentucky.

Figure 26. Percentage of WIC Families Redeeming None, Some, and All Cereal Benefits, by State, January–March 2012

The extent to which WIC families’ redeemed all of their cereal benefits varied greatly with family characteristics across three states. Two noteworthy observations can be made across family characteristics: Generally speaking, Kentucky families were usually the least likely to have used all of their cereal benefits, and the trends in redemption by family characteristics were similar across the three states, with few exceptions (see Appendix C for detailed statistics):

- **Family race/ethnicity.** Across the three states, families characterized as non-Hispanic Asian and Hispanic were most likely to redeem all of their cereal (64.8 and 62.6 percent, respectively), while non-Hispanic Black families were least likely to have done so (43.4 percent). This general trend persisted for Michigan and Nevada WIC families; however in Kentucky, non-Hispanic White families also had rates similar to non-Hispanic Asian and Hispanic families (48.2–50.4 percent).

- **Geographic location.** Overall, families residing in urban locations were somewhat more likely than families in rural areas to redeem all of their cereal benefits (54.4 versus 50.7 percent).
▲ **Household size.** The likelihood of using all cereal benefits generally increased with the number of people in the WIC family’s household. Overall, 50.0 percent of families with 1 to 2 people in the household redeemed all of their benefits, while 57.3 percent of those with 5 to 6 people, and 62.1 percent of families with 7 or more household members did so. This trend was similar for Michigan and Nevada; however Kentucky’s rates generally remained the same for families with up to 6 household members (46 to 48 percent) and increased with 7 or more household members (52.0 percent; see Figure 27).

Figure 27. Percentage of WIC Families Redeeming All Cereal Benefits, by Number of People in Household and State, January–March 2012

![Bar chart showing redemption rates by number of people in household and state.]

▲ **Number of WIC family members.** Unlike the number of people in the household, the number of WIC family members receiving benefits was inversely associated with the likelihood of redeeming all cereal benefits: 58.9 percent of WIC families with only one WIC participant redeemed all benefits, compared with 48.9 percent of WIC families with two participants, 40.9 percent with three WIC participants, and 36.3 percent with four or more WIC participants. This trend remained true for WIC families in each of the three states.

▲ **Ounces of cereal prescribed.** Perhaps more telling than the number of WIC family members are the redemption trends based on the ounces of cereal prescribed, which corresponds to the number of women and child participants in the WIC family. Figure 28 shows that, as the amount of cereal prescribed increases, the proportion of families redeeming all cereal benefits decreases. Overall, the decline is most significant from 36 ounces or less to 36 to 72 ounces (from 57.3 to 43.7 percent of families fully redeeming cereal benefits)—a nearly 14 percentage point decrease. This large initial drop in redemptions was true for all three states. Nevada realized the largest overall percentage point decline (32.7 percentage points), from 67.0 percent of families with prescriptions no greater than 36 ounces redeeming all cereal to 34.3 percent with cereal prescriptions exceeding 108 ounces redeeming all of their cereal benefits.
Since cereal redemptions vary across states and for a number of family characteristics, logistic regression models were developed to examine the odds of full cereal redemption while accounting for differences in WIC populations across the three states. The results of the analyses are presented in Figure 29. While the relationships noted above are maintained, of particular interest are the contributions of two characteristics to the odds of a full redemption: the number of household members and ounces of cereal prescribed. Overall, each additional person in the household increased the odds of a full redemption by 16 percent (95% CI [1.16, 1.17]), while each additional ounce of cereal prescribed decreased the likelihood of a full redemption by 1.8 percent (aOR = 0.98, 95% CI [0.98, 0.98]). This amounts to about an 18 percent decrease in the odds of full redemption for every 10 ounces prescribed.

NOTE: Adjusted odds ratios and corresponding 95% confidence intervals are presented in the appendices. *Race and ethnic groups are mutually exclusive.
K. Canned Fish Redemptions

WIC offers canned fish options to fully breastfeeding women, women pregnant with multiples, and women partially or fully breastfeeding multiples. In all, 3.5 percent of WIC families were issued canned fish during the study period. Historically, WIC has allowed only canned tuna to be purchased, but in 2009 they expanded the allowable types of fish to include sardines, mackerel, and salmon; however, it is up to each state WIC program to determine which of these types of fish can be purchased with WIC benefits. Kentucky is the least restrictive of the three states, allowing tuna, sardines, and pink salmon, while Nevada allows tuna and sardines, and Michigan allows tuna and pink salmon.

A typical prescription for canned fish is for 30 ounces (or six 5-ounce cans); however, this may be increased if the woman is pregnant with or breastfeeding multiples. This may also be reduced if women express a desire not to receive that much canned fish at the WIC clinic, a process commonly referred to as “tailoring” food packages based on individual food preferences. On average, families receiving tuna benefits were issued 29.6 ounces, and this did not differ across the three states. About 19 ounces were redeemed on average among those families, and overall 65.4 percent of canned fish benefits were redeemed by families receiving canned fish benefits (see Table 13).

| Table 13. Average Issuance and Redemption Amounts for Families Prescribed Canned Fish, January–March 2012 |
|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| Amount Issued per WIC Family* | Amount Redeemed per WIC Family* | Average % Redeemed |
| Mean (SD) | Min-Max | Mean (SD) | Min-Max | |
| Total | 30,125 | 29.6 (3.0) | 5.0 – 60.0 | 19.4 (13.8) | 0.0 – 60.0 | 65.4 |
| Kentucky | 5,808 | 30.1 (1.2) | 15.0 – 45.0 | 18.3 (14.2) | 0.0 – 45.0 | 60.9 |
| Michigan | 19,306 | 29.3 (3.5) | 5.0 – 60.0 | 19.8 (13.7) | 0.0 – 55.0 | 67.2 |
| Nevada | 5,011 | 30.0 (2.0) | 6.0 – 60.0 | 19.0 (13.9) | 0.0 – 60.0 | 63.4 |

*In ounces.

Across the three states, just over 60 percent of families redeemed all of the canned fish benefits issued to them, ranging from 54.7 percent in Kentucky to 63.8 percent in Michigan (see Figure 30). Interestingly, while a majority of families fully redeemed their canned fish benefit, nearly one-third of families did not purchase any of the canned fish available to them. Partial redemption of this benefit was chosen by a few (7.1 percent).
Family characteristics were less strongly associated with differences in canned fish redemption across the three states, largely due to the small populations of subgroups within each of the categories. However, some noteworthy trends emerged overall:

▲ **Family race/ethnicity.** More than 62 percent of Hispanic and non-Hispanic White families redeemed all of their canned fish benefits, while less than 50 percent of non-Hispanic Black and non-Hispanic American Indian/Alaska Native families did so.

▲ **Geographic location.** Bucking the trend, families in isolated rural areas were overall more likely than families in urban areas to have used the full canned fish benefit (69.1 percent versus 59.9, respectively).

▲ **Household size.** As for other WIC foods, the proportion of families redeeming all canned fish benefits increased as the number of persons in the household increased, from 52.8 percent of families with 1 to 2 people in the household to 68.9 percent among those with households of 7 or more people.

▲ **Number of WIC family members.** Unlike most other WIC foods, the number of family members participating in WIC was positively associated with full redemption. This is likely because only one family member could be issued canned fish, strictly limiting the amount that could be issued to any given family. Nearly 56 percent of families with 1 family member on WIC (not counting breastfed infants not receiving food benefits) used the full canned fish benefit, compared with 66.1 percent of those with 4 or more WIC family members.

▲ **Ounces of canned fish prescribed.** Also unlike most other WIC foods, the amount issued is limited to only one category of participant (breastfeeding women), with few exceptions. Therefore, nearly all families were issued the same amount of canned fish, which does not lend itself to analyses that examine whether the amount issued is associated with higher or lower redemption rates.

After controlling for family characteristics, there was no difference in the odds of fully redeeming the canned fish benefit between WIC families in Nevada and Kentucky, while Michigan families were 1.6 times more likely to have fully redeemed this benefit (aOR = 1.58, 95% CI [1.48, 1.68]). Compared with families in urban areas, those in isolated rural towns were about 43 percent more likely to fully redeem the canned fish benefit (aOR = 1.43, 95% CI [1.29, 1.60]), while there was no difference among families in large and small rural areas (see Figure 31).
Similar to other WIC foods, each additional household member increased the odds of redemption by 12 percent as well (aOR = 1.12, 95% CI [1.10, 1.14]).

Figure 31. Odds of WIC Families Redeeming Canned Fish Benefits, Controlling for Family Characteristics and State

NOTE: Adjusted odds ratios and corresponding 95% confidence intervals are presented in the appendices.
*Race and ethnic groups are mutually exclusive. †Adjusted odds of redemption do not differ from the reference group.

L. Whole Grains Redemption

More than 81 percent of WIC families in the three states were issued whole grain benefits. Whole grains are prescribed to pregnant and breastfeeding women and children aged 1 to 4 years at amounts of one and two pounds per month, respectively. Whole grains include whole wheat bread and other alternatives determined by the state within federal guidelines. Nevada allows whole grain breads, brown rice, and whole wheat or corn tortillas to be purchased in 16-ounce packages. Michigan allows participants to purchase 16-ounce loaves of whole grain bread, 16-ounce containers of oatmeal, and 14- to 16-ounce or 28- to 32-ounce bags of brown rice. Kentucky is the only one of the three states that allows participants to buy larger size loaves of bread, having approved 12-, 16-, and 24-ounce loaves, as well as 14- to 16-ounce packages of brown rice and 16-ounce packages of whole wheat and corn tortillas.

In January through March 2012, WIC families were issued 2.3 pounds of whole grains on average per month, and this did not differ across the three states. Families also redeemed an average of 1.4 pounds per family, averaging 1.1 pounds in Kentucky and 1.5 pounds in Michigan and Nevada. Among families issued whole grains, 58.8 percent of the whole grain benefit was redeemed on average, ranging from 47.6 percent of the benefit being redeemed by the average family in Kentucky to more than 60 percent of the benefit in Nevada and Michigan (see Table 14).
Table 14. Average Issuance and Redemption Amounts (in Pounds) for Families Prescribed Whole Grains, January–March 2012

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Amount Issued per WIC Family*</th>
<th>Amount Redeemed per WIC Family*</th>
<th>Average % Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Min-Max</td>
<td>Mean (SD)</td>
<td>Min-Max</td>
</tr>
<tr>
<td>Total</td>
<td>699,106</td>
<td>2.3 (1.1)</td>
<td>1.0 – 12.0</td>
<td>1.4 (1.3)</td>
</tr>
<tr>
<td>Kentucky</td>
<td>199,058</td>
<td>2.3 (1.1)</td>
<td>1.0 – 12.0</td>
<td>1.1 (1.2)</td>
</tr>
<tr>
<td>Michigan</td>
<td>383,869</td>
<td>2.4 (1.1)</td>
<td>1.0 – 10.0</td>
<td>1.5 (1.3)</td>
</tr>
<tr>
<td>Nevada</td>
<td>116,179</td>
<td>2.3 (1.1)</td>
<td>1.0 – 11.0</td>
<td>1.5 (1.3)</td>
</tr>
</tbody>
</table>

*In pounds, for families issued any whole grains.

Overall, 51.3 percent of WIC families fully redeemed their whole grain benefit, though more than one-third did not use the benefit at all (see Figure 32). Whole grains were the second least-used benefit among all foods for women and children, with rates of non-redemption that were surpassed only by beans and peanut butter benefits. Non-redemption was highest among WIC families in Kentucky (44.1 percent), where only 39.3 percent of families redeemed the entire whole grain benefit. Michigan and Nevada had similar rates of redemption, with about 30 percent non-redemption and more than 55 percent of WIC families using the full whole grain benefit.

There were great differences in full redemption within subpopulations of WIC families across the three states; however, these associations were not consistent within each state:

▲ **Family race/ethnicity.** Non-Hispanic Asian and Hispanic families were most likely to redeem the full whole grain benefit (61.5 and 56.3 percent, respectively), while non-Hispanic Black families were least likely to do so (44.4 percent). A similar trend was seen in Nevada, where more than 60 percent of Hispanic and non-Hispanic Asian families and 46.4 percent of non-Hispanic Black families redeemed the full whole grain benefit. Among families in Michigan, however, non-Hispanic Asian and non-Hispanic White families were most likely to redeem the full benefit (67.2 and 59.5 percent, respectively), while in Nevada non-Hispanic Asian and non-Hispanic American Indian/Alaska Native families were most likely (42.8 and 42.4 percent, respectively) to redeem it.
▲ **Geographic location.** There was only slight variation in full whole grain redemption by geographic location, with urban families being somewhat more likely to fully redeem their benefits than non-urban families.

▲ **Household size.** Household size was positively associated with full redemption, increasing from 48.0 percent of families with 1 to 2 people in the household to 58.3 percent of families with 7 or more household members. Similarly large increases were apparent in both Michigan (50.0 to 64.9 percent) and Nevada (53.5 to 60.7 percent). Kentucky, however, saw no increase in redemption as household size increased, with redemption ranging around 40 percent for each group.

▲ **Number of WIC family members.** Overall, full redemptions of whole grains decreased slightly as the number of WIC family members increased: 52.3 percent of families with only 1 WIC participant redeemed the full whole grain benefit, compared with 50.3 percent of those with 2 and 3 WIC participants and 45.3 percent of families with 4 or more participants. This trend was reflected in both Kentucky and Michigan, which saw declines of 8.2 and 4.6 percentage points across the groups in total. The trend was most pronounced in Nevada, where 60.6 percent of families with 1 WIC participant redeemed the full benefit, followed by 56.9 percent of families with 2 WIC participants, 52.0 percent of those with 3 participants, and 44.8 percent of families with 4 or more WIC participants.

▲ **Pounds of whole grains prescribed.** Findings based on the amount of whole grains prescribed are somewhat more confounding. The highest rates of full redemption in every state were seen among families issued only one pound of whole grains, followed by a sharp decline for families issued two or three pounds of whole grains. While each of the three states trended downward with increasing issuance, Nevada was the only state that saw a clear decline with every additional pound of whole grains prescribed (see Figure 33).

Figure 33. Percentage of WIC Families Redeeming All Whole Grains, by Pounds of Whole Grains Prescribed and State, January–March 2012

The findings of the logistic regression model support those noted above, with families in Michigan and Nevada being more than twice as likely as those in Kentucky to fully redeem their whole grain benefit, after controlling for family characteristics and benefit issuance (see Figure 34). Non-Hispanic Asian families were considerably more likely than non-Hispanic White families to redeem the full benefit \((aOR = 1.16, 95\% CI [1.12, 1.22])\), while non-Hispanic Native Hawaiian/Other Pacific Islander and non-Hispanic Black families were more than 30 percent...
less likely to do so (aOR = 0.69, 95% CI [0.62, 0.78] and aOR = 0.62, 95% CI [0.61, 0.63], respectively). Families in urban areas were also more likely than those in non-urban areas to have fully redeemed the whole grain benefit. Each person in the household accounted for a 13 percent increase in the odds of a full redemption (aOR = 1.13, 95% CI [1.13, 1.13]), while each pound of whole grains resulted in a 29 percent decrease in the likelihood of a full redemption (aOR = 0.81, 95% CI [0.81, 0.82]).

Figure 34. Odds of WIC Families Redeeming Whole Grain Benefits, Controlling for Family Characteristics, Benefit Issuance, and State

NOTE: Adjusted odds ratios and corresponding 95% confidence intervals are presented in the appendices.

*Race and ethnic groups are mutually exclusive.

M. Beans and Peanut Butter Redemptions

During the study period, 89.1 percent of families were issued beans and peanut butter. Children and postpartum women receive one pound of dry legumes (beans) or 18 ounces of peanut butter as part of a standard prescription. Fully breastfeeding and pregnant women receive both one pound of beans and 18 ounces of peanut butter. States may choose to authorize canned beans, which can be substituted at the rate of one pound of dry beans to four 16-ounce cans of beans. Kentucky and Michigan allow participants to substitute dry beans for canned, while Nevada does not.

On average, each family was issued about 1.6 units of beans or peanut butter in January through March 2012; a unit is equivalent to a single prescription of one pound of dry beans, one jar of peanut butter, or 4 cans of beans. There was little variation in the average amount issued across the three states as well as the average amount redeemed (0.9 units per family). Overall, 56.3 percent of each family’s benefits were redeemed; however, this ranged from 48.7 percent of family bean and peanut butter benefits in Kentucky to 59.7 percent of those benefits in Michigan (see Table 15).
Table 15. Average Issuance and Redemption Amounts (in Units) for Families Prescribed Peanut Butter, by State, January–March 2012

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Amount Issued per WIC Family*</th>
<th>Amount Redeemed per WIC Family*</th>
<th>Average % Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Min-Max</td>
<td>Mean (SD)</td>
<td>Min-Max</td>
</tr>
<tr>
<td>Total</td>
<td>765,698</td>
<td>1.6 (0.8)</td>
<td>0.9 (0.9)</td>
<td>0.0 – 7.0</td>
</tr>
<tr>
<td>Kentucky</td>
<td>221,341</td>
<td>1.5 (0.7)</td>
<td>0.8 (0.8)</td>
<td>0 – 7.0</td>
</tr>
<tr>
<td>Michigan</td>
<td>423,742</td>
<td>1.6 (0.8)</td>
<td>1.0 (0.9)</td>
<td>0 – 6.0</td>
</tr>
<tr>
<td>Nevada</td>
<td>120,615</td>
<td>1.6 (0.8)</td>
<td>0.9 (0.9)</td>
<td>0.0 – 7.0</td>
</tr>
</tbody>
</table>

*Amounts are represented as one unit of prescription equal to one pound of dry beans or 18 ounces of peanut butter or (4) 15-16 ounce cans of beans.

Prescriptions for beans are one of the most underused benefits in WIC despite their high nutritional value. Only half of WIC families redeemed all of their beans and peanut butter benefits (51.3 percent), while 38.7 percent did not use any of that benefit (see Figure 35). Kentucky WIC families were least likely to fully redeem the benefit (40.9 percent), while those in Michigan were most likely to have done so (56.0 percent).

![Figure 35. Percentage of WIC Families Redeeming None, Some, and All Bean/Peanut Butter Benefits, by State, January–March 2012](image)

While rates of full bean and peanut butter redemption were already relatively low, they also varied with family characteristics.

▲ **Family race/ethnicity.** Overall, non-Hispanic Asian families were most likely to use the full bean benefit (62.8 percent), followed by Hispanic families (57.2 percent). While this held true in Nevada (60.3 and 58.7 percent, respectively), there were differences in the other two states. In Kentucky, Hispanic and non-Hispanic American Indian/Alaska Native families were most likely to redeem the full benefit (47.8 and 46.3 percent, respectively), while non-Hispanic Asian and non-Hispanic White families were most likely to do so in Michigan (69.1 and 63.2 percent, respectively). Non-Hispanic Black families, however, were least likely to redeem the full benefit overall (37.7 percent) and in every state.

▲ **Geographic location.** There was little variation overall in rates of full redemption by geographic location, although this masks significant differences within each of the three states. In Kentucky, families in urban areas were less likely than those in small rural and isolated rural areas to have fully redeemed their bean benefit (38.9 versus 43.2 and 45.3...
percent, respectively). Michigan also had slightly higher redemption rates in rural areas compared with urban areas. The reverse was true in Nevada, however, where 54.4 percent of families in urban areas used the full benefit, compared with 47.7 percent of those in small rural areas and 45.9 percent of families in isolated rural areas.

- **Household size.** Overall and within the three states, the likelihood of full bean redemption generally increased with household size (see Figure 36). Just over 46 percent of families with 1 to 2 household members redeemed all their bean benefits, compared with 58.1 percent of families with 4 or more people. This trend was most prominent in Michigan, which saw a 6.1 percentage point increase across subgroups. Nevada saw increases in full redemption from 47.5 percent of families with 1 to 2 people up to 59.1 percent among those with 5 to 6 people; after that redemption rates appear to have leveled off.

Figure 36. Percentage of WIC Families Redeeming All Beans and Peanut Butter, by Household Size and State, January–March 2012

- **Number of WIC family members.** Full bean redemption decreased with each additional WIC family member: 54.0 percent of families with 1 WIC participant redeemed the full benefit, compared to 41.9 percent of families with 4 or more WIC participants. This trend was most pronounced in Kentucky, which realized a 32 percent decrease in full redemption between families with 1 WIC participant and those with 4 or more participants (43.7 versus 29.6 percent, respectively).

- **Units of beans and peanut butter prescribed.** Units of beans and peanut butter were created so that one unit is the equivalent of one pound of dry beans, one jar of peanut butter, or four 16-ounce cans of beans. Figure 37 shows full redemption by the quantities issued overall and for each state. Families issued one unit or less of beans were most likely to use that full amount (55.4 percent), and full redemption decreased as the amount of beans and peanut butter issued increased. While this trend was true for all three states, the decrease was most dramatic in Kentucky, where 47.7 percent of families issued one unit of beans redeemed that benefit, compared to only 33.2 percent of families issued two units, and about a quarter of families issued three or units.
Figure 37. Percentage of WIC Families Redeeming All Beans and Peanut Butter, by Units Prescribed and State, January–March 2012

*One unit is equal to one pound of dry beans or 18 ounces of peanut butter or four 15-16 ounce cans of beans. Nevada does not allow canned beans, in which case each unit is equivalent to one jar of peanut butter or one pound of dry beans.

Controlling for family characteristics, families in Michigan and Nevada were both much more likely than those in Kentucky to redeem all of their bean benefits (see Figure 38), while non-Hispanic Asian families were about 21% more likely than non-Hispanic White families to do so (aOR = 1.21, 95% CI [1.16, 1.26]). On the other hand, non-Hispanic Black families were more than half as likely as non-Hispanic White families to use the entire benefit (aOR = 0.42, 95% CI [0.42, 0.43]). While each additional person in the WIC family’s household increased the odds of redemption by about 13 percent (aOR = 1.13, 95% CI [1.13, 1.13]), each additional unit prescribed decreased the likelihood of full redemption by 29 percent (aOR = 0.71, 95% CI [0.70, 0.71]).
Figure 38. Odds of WIC Families Redeeming Bean/Legume Benefits, Controlling for Family Characteristics, Benefit Issuance, and State

NOTE: Adjusted odds ratios and corresponding 95% confidence intervals are presented in the appendices.
*Race and ethnic groups are mutually exclusive. †Adjusted odds of redemption do not differ from the reference group.

N. Dairy Milk Substitutions

Federal guidelines allow state WIC programs to offer substitutions for dairy milk to meet participants’ medical needs and preferences. In addition to cheese, which is described in a previous section, Kentucky, Michigan, and Nevada each allow lactose-free milk, soy milk, and evaporated milk as a substitution for dairy milk. Michigan and Nevada also allow goat milk, and Kentucky and Nevada permit the substitution of tofu within federal guidelines. The proportion of families issued each of these substitutions are shown in Table 16.

Table 16. Proportion of WIC Families Issued Dairy Milk Substitutions, By State, January – March 2012

<table>
<thead>
<tr>
<th>Substitution</th>
<th>Total n</th>
<th>Total %</th>
<th>Kentucky n</th>
<th>Kentucky %</th>
<th>Michigan n</th>
<th>Michigan %</th>
<th>Nevada n</th>
<th>Nevada %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactose-free milk</td>
<td>17,107</td>
<td>2.0</td>
<td>3,027</td>
<td>1.2</td>
<td>11,421</td>
<td>2.4</td>
<td>2,659</td>
<td>2.0</td>
</tr>
<tr>
<td>Soy milk</td>
<td>5,254</td>
<td>0.6</td>
<td>1,123</td>
<td>0.4</td>
<td>3,029</td>
<td>0.6</td>
<td>1,102</td>
<td>0.8</td>
</tr>
<tr>
<td>Goat milk</td>
<td>396</td>
<td>0.1</td>
<td>N/A</td>
<td>N/A</td>
<td>328</td>
<td>0.1</td>
<td>68</td>
<td>0.1</td>
</tr>
<tr>
<td>Evaporated milk</td>
<td>217</td>
<td>&lt;0.01</td>
<td>8</td>
<td>&lt;0.01</td>
<td>168</td>
<td>&lt;0.01</td>
<td>41</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Tofu</td>
<td>156</td>
<td>&lt;0.01</td>
<td>120</td>
<td>&lt;0.01</td>
<td>N/A</td>
<td>N/A</td>
<td>36</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

N/A = Not authorized by state WIC program.

Figure 39 shows the proportion of families fully redeeming each of the types of dairy milk substitutions. Overall, full redemptions are relatively low, compared with other WIC foods and with dairy milk itself. Lactose-free milk and soy milk, which account for the majority of dairy milk substitutions, had full redemptions of only 20.0 and 34.3 percent, respectively. Tofu and evaporated milk, on the other hand, had relatively high rates of full redemption, with nearly 50 and 60 percent of families, respectively, redeeming the full benefit issued to them.
O. WIC-Eligible Medical Food for Women and Children Redemption

WIC is able to provide medically necessary foods to those meeting certain medical conditions as prescribed by a doctor. Such foods must provide a source of calories, one or more nutrients, and provide a supplemental source of nutrition through concentrated liquid, powdered, or ready-to-use formula (i.e., a nutritional drink). Overall, only 1.5 percent of the families in this study had a participant receiving a WIC-eligible medical food, ranging from 1.3 percent of families in Kentucky and Michigan to 2.4 percent of families in Nevada. Since issuance of nutritional drinks varied across and within the states to include dry ounces, fluid ounces, and liquid concentrate, depending on the type of food prescribed, it was not feasible to calculate the average amount issued to each family overall or within each state. Federal guidelines, however, have set a maximum threshold of 455 fluid ounces of concentrate per participant with powdered and ready-to-use substitutions that provide comparable nutritional value. Overall, families issued medical foods redeemed 74.5 percent of the full amount issued to them (see Table 17). This ranged from 81.3 percent of benefits issued in Nevada to 69.4 percent of benefits in Kentucky.

Table 17. Proportion of Families Issued WIC-Eligible Medical Foods, By State, January–March 2012

<table>
<thead>
<tr>
<th>State</th>
<th>WIC Families</th>
<th>Average % of Benefits Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Total</td>
<td>12,597</td>
<td>1.5</td>
</tr>
<tr>
<td>Kentucky</td>
<td>3,286</td>
<td>1.3</td>
</tr>
<tr>
<td>Michigan</td>
<td>6,102</td>
<td>1.3</td>
</tr>
<tr>
<td>Nevada</td>
<td>3,209</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Just over half of families issued WIC-eligible medical foods redeemed all of the benefits prescribed to them (54.0 percent). This ranged from less than 50 percent of families in Kentucky and Michigan to more than 70 percent in Nevada (see Figure 40). The three states had similarly low rates of non-redeemption of medically necessary foods with 14.3 percent of families not utilizing the benefit overall.
Overall, there were some notable differences in full redemption of medically necessary foods by state and family characteristics.

▲ **Family race/ethnicity.** Overall and within each state, non-Hispanic Asian and non-Hispanic White families were most likely to fully redeem their benefit for medically necessary foods, while non-Hispanic Black families were least likely to do so.

▲ **Geographic location.** In total, families in urban areas were more likely than those in non-urban areas to redeem the full medical foods benefit. More than 72 percent of families in urban areas redeemed the full benefit, compared with 53.3 percent in large rural areas and 57.1 percent in small rural areas.

▲ **Household size.** Full redemption of medical foods generally increased as household size increased both overall and within each state (Figure 41). Large increases were seen in Michigan, in particular, where 41.2 percent of WIC families with 1 to 2 household members redeemed the full benefit, while 58.4 percent of WIC families with 7 or more household members did so. Nevada also saw a significant increase, from 62.4 percent among families with 1 to 2 household members to 75.3 percent of those with 5 to 6 people in the household, and 72.0 percent of families with 7 or more people. These increases were much less pronounced in Kentucky.
Number of WIC family members. The number of family members participating in WIC was not associated with full redemption overall but was associated with decreasing redemptions in Nevada. Families with only one WIC participant were much more likely than those with 3 or 4 or more participants to have fully redeemed their benefits for medical foods (72.7 versus 68.8 and 59.8 percent, respectively).

After controlling for family characteristics, families in Nevada were still 1.87 times more likely to fully redeem benefits for medical foods than those in Kentucky (95% CI [1.65, 2.12]), while families in Michigan were about 10 percent less likely to do so (aOR = 0.90, 95% CI [0.83, 0.99]). Figure 42 shows that, compared with non-Hispanic White families, non-Hispanic Asians were 5.5 times more likely to have made a full redemption (95% CI [3.92, 7.65]), while Hispanic families were 1.4 times more likely (95% CI [1.26, 1.57]). Families in large rural and isolated rural areas were nearly 20 percent less likely than those in urban areas to have fully redeemed the benefit (aOR = 0.78, 95% CI [0.69, 0.96]). Finally, each additional person in the household increased the likelihood of a full redemption by about 7 percent (aOR = 1.07, 95% CI [1.05, 1.10]).
Figure 42. Odds of WIC Families Redeeming Medical Foods Benefits, Controlling for Family Characteristics, and State

<table>
<thead>
<tr>
<th>State</th>
<th>Less likely to redeem</th>
<th>More likely to redeem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michigan</td>
<td>0.90</td>
<td>1.87</td>
</tr>
<tr>
<td>Nevada</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.73</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td></td>
<td>1.41</td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td></td>
<td>1.38</td>
</tr>
<tr>
<td>Multiple Races</td>
<td>0.94†</td>
<td></td>
</tr>
<tr>
<td>Geographic location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large rural</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>Small rural</td>
<td>0.97†</td>
<td></td>
</tr>
<tr>
<td>Isolated</td>
<td>0.81</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Adjusted odds ratios and corresponding 95% confidence intervals are presented in the appendices.
*Race and ethnic groups are mutually exclusive. †Adjusted odds of redemption does not differ from the reference group.

P. Infant Formula Redemption

Infant formula is generally issued to partially breastfed and non-breastfed infants in different quantities and forms (liquid or powdered), depending on both the infant's age and the amount of breast milk they are consuming. Full formula fed (non-breastfed) infants can receive up to 870 fluid ounces of reconstituted powder formula at 0 to 3 months, 960 fluid ounces of reconstituted powder formula at 4 to 5 months, and 696 fluid ounces of reconstituted powder formula at 6 to 11 months. Likewise, partially breastfed infants can receive up to 104 fluid ounces of reconstituted powder formula at 0 to 1 month, 435 fluid ounces of reconstituted powder formula at 1 to 3 months, 522 fluid ounces of reconstituted powder formula at 4 to 5 months, and 384 fluid ounces of reconstituted powder formula at 6 to 11 months. In January through March 2012, 34.2 percent of WIC families across Kentucky, Michigan, and Nevada were issued infant formula, and the proportion of families issued formula was similar in each state.

Infant formula is one of the most highly used WIC benefits, with extremely low rates of non-redemption (4.9 percent) and high rates of full redemption (87.6 percent; see Figure 43). Families in Michigan were most likely to redeem all of their infant formula benefits (90.1 percent), as compared with those in Kentucky and Nevada (83.8 and 86.2 percent, respectively).
While infant formula prescriptions had high rates of full redemption overall, there were some small variations in redemption rates by family characteristics across the three states.

▲ **Family race/ethnicity.** Overall, non-Hispanic Asian and Hispanic families were most likely to redeem their infant formula benefit (91.9 and 89.5 percent, respectively), while non-Hispanic American Indian/Alaska Native families were least likely to do so (81.7 percent). While this trend was amplified in Nevada, variations by race and ethnicity were minimal in Kentucky and Michigan.

▲ **Geographic location.** There was little to no variation in full infant formula redemption by geographic location, with urban families being slightly more likely to fully redeem their benefits than non-urban families. This trend held true in every state, with the exception of Kentucky, where WIC families in small rural and isolated rural areas were slightly more likely to fully redeem infant formula benefits, compared with their large rural and urban counterparts.

▲ **Household size.** Household size was somewhat positively associated with full redemption of infant formula, increasing from 85.7 percent of families with 1 to 2 people in the household to 89.0 percent of families with 7 or more household members (see Figure 44). Similarly, slight increases in full redemption by household size were apparent in both Kentucky (81.7 to 84.7 percent) and Michigan (88.2 to 92.0 percent). Nevada, however, saw this trend drop-off at 5 to 6 household members (81.8 to 88.8 percent), where full redemptions then decreased somewhat with 7 or more household members (87.6 percent).
Q. Infant Cereal Redemption

Infant cereal is generally issued to all infants aged 6 to 11 months, regardless of breastfeeding status, and infants can receive up to 24 ounces of plain, dry cereal. In addition to the federal guidelines, there were slight variations across the three states for the allowable types and quantities of infant cereal: Kentucky and Nevada allow only 8-ounce boxes to be purchased, and Michigan allows for both 8- and 16-ounce boxes to be purchased. In January through March 2012, 17.9 percent of WIC families were issued infant cereal, and the proportion of families issued infant cereal was similar in each state.

Across the three states, WIC families with at least one infant were issued 24.3 ounces of infant cereal on average. This did not differ greatly by state (see Table 18). Among families issued infant cereal during the study months, the average amount redeemed was 13.9 ounces, and WIC families redeemed, on average, 57.3 percent of their infant cereal benefit. This ranged from 52.5 percent in Kentucky to 60.7 percent in Michigan.

Table 18. Average Issuance and Redemption Amounts (in Ounces) for Families Prescribed Infant Cereal, January–March 2012

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Amount Issued per WIC Family*</th>
<th>Amount Redeemed per WIC Family*</th>
<th>Average % Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Min-Max</td>
<td>Mean (SD)</td>
<td>Min-Max</td>
</tr>
<tr>
<td>Total</td>
<td>154,145</td>
<td>24.3 (3.7)</td>
<td>8.0—96.0</td>
<td>13.9 (11.6)</td>
</tr>
<tr>
<td>Kentucky</td>
<td>43,928</td>
<td>24.4 (3.2)</td>
<td>8.0—72.0</td>
<td>12.8 (11.5)</td>
</tr>
<tr>
<td>Michigan</td>
<td>86,238</td>
<td>24.2 (3.9)</td>
<td>8.0—96.0</td>
<td>14.7 (11.4)</td>
</tr>
<tr>
<td>Nevada</td>
<td>23,979</td>
<td>24.4 (3.4)</td>
<td>8.0—72.0</td>
<td>13.2 (11.8)</td>
</tr>
</tbody>
</table>

*In ounces; for families issued any infant cereal.

Overall, 49.5 percent of WIC families across the three states purchased all of the infant cereal that they were prescribed, while 14.2 percent purchased some infant cereal (partial redemption), and more than one-third did not purchase any of the infant cereal they were issued (36.3 percent; see Figure 45). Families in Kentucky were least likely to redeem all of their infant cereal (44.3 percent) followed by those in Nevada (47.3 percent), while Michigan WIC families were most likely to do so (52.7 percent). The proportion of families partially redeeming their infant cereal

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The extent to which WIC families redeemed all of their infant cereal benefit varied with family characteristics across three states, and there was a high association between full redemptions and the number of WIC participants in the household (see Appendix C):

▲ **Family race/ethnicity.** Across the three states, families characterized as non-Hispanic Asian and White were most likely to redeem all of their infant cereal (62.1 and 50.8 percent, respectively), while non-Hispanic American Indian/Alaska Native families were least likely to have done so (38.4 percent). This general trend persisted for Michigan and Nevada WIC families; however in Kentucky, non-Hispanic Native Hawaiian/Other Pacific Islander families also had rates similar to non-Hispanic Asian and White families (52.5 percent versus 59.9 and 45.3 percent, respectively).

▲ **Geographic location.** Overall, families residing in urban locations were somewhat more likely than families in rural and isolated areas to redeem all of their infant cereal benefit (50.9 versus 46.4 percent or less). This trend was consistent across all three states.

▲ **Household size.** Overall, there was little to no variation in full redemption of infant cereal by household size. While this was true for Kentucky and Nevada, more pronounced differences in full redemption of infant cereal by number of persons in the household were observed in Michigan, where 50.6 percent of households with 1 to 2 people fully redeemed their infant cereal benefit, compared with 58.8 percent of households with 7 or more people.

▲ **Number of WIC family members.** The number of WIC family members receiving benefits was positively associated with the likelihood of redeeming all infant cereal benefits, increasing from 48.4 percent of WIC families with only 1 WIC participant to 52 percent of families with 3 or more WIC participants. This trend remained true for WIC families in Michigan, but was not present in Nevada and Kentucky.

▲ **Ounces of infant cereal prescribed.** Overall, no significant correlation was observed between the amount (in ounces) of infant cereal prescribed and the odds of full redemption (see Figure 46).
Controlling for family characteristics and the amount of infant cereal benefits issued, families in Michigan and Nevada were considerably more likely than those in Kentucky to redeem all of their infant cereal benefit (aOR = 1.38, 95% CI [1.35, 1.41] and aOR = 1.14, 95% CI [1.10, 1.19], respectively; see Figure 47). The number of people in the household was only weakly associated with full infant cereal redemptions, increasing the odds of redemption by only 3% for every additional person in the family (aOR = 1.03, 95% CI [1.02, 1.04]), and the amount of infant cereal prescribed (in ounces) had no bearing on the odds of full redemption (aOR = 1.00, 95% CI [0.99, 1.00]).
R. Infant Jarred Food Redemptions

Infant Jarred Fruits and Vegetables

In January through March 2012, 17.9 percent of WIC families were issued jarred infant fruits and vegetables, and the proportion of families issued infant fruits and vegetables was similar in each state. Infant fruits and vegetables are generally issued to all infants aged 6 to 11 months, regardless of breastfeeding status. Similar to infant formula, infant fruits and vegetables are issued in different quantities based on the amount of breast milk the infant is consuming. Whereas fully breastfed infants can receive up to 256 ounces of jarred infant fruits and vegetables, partially breastfed and fully formula fed (non-breastfed) infants, can receive up to half that amount (128 ounces). In addition to the federal guidelines, there are slight variations across the three states regarding the allowable types and container sizes for infant fruits and vegetables: Kentucky and Michigan allow 4-ounce containers to be purchased and Nevada allows for both 3.5- and 4-ounce containers.

During the study period, WIC families with infants aged 6 to 11 months were issued an average of 138.3 ounces of jarred fruits and vegetables per month, and this differed only slightly across the three states (see Table 19). Families redeemed an average of 89.6 ounces of infant fruits and vegetables. Overall, WIC families redeemed 64.7 percent of the benefit on average. The proportion of benefits redeemed ranged from 61.2 percent among families in Nevada to 65.7 percent in Michigan.
Table 19. Average Issuance and Redemption Amounts (in Ounces) for Families Prescribed Infant Fruits and Vegetables, January–March 2012

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Amount Issued per WIC Family*</th>
<th>Amount Redeemed per WIC Family*</th>
<th>Average % Redeemed†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Min-Max</td>
<td>Mean (SD)</td>
<td>Min-Max</td>
</tr>
<tr>
<td>Total</td>
<td>153,940</td>
<td>138.3 (38.1)</td>
<td>8.0—640.0</td>
<td>89.6 (62.7)</td>
</tr>
<tr>
<td>Kentucky</td>
<td>43,901</td>
<td>136.4 (32.4)</td>
<td>8.0—512.0</td>
<td>88.0 (61.0)</td>
</tr>
<tr>
<td>Michigan</td>
<td>86,044</td>
<td>139.0 (40.5)</td>
<td>8.0—640.0</td>
<td>91.7 (63.4)</td>
</tr>
<tr>
<td>Nevada</td>
<td>23,995</td>
<td>139.5 (38.7)</td>
<td>18.0—512.0</td>
<td>84.9 (62.9)</td>
</tr>
</tbody>
</table>

*In ounces; for families issued any infant fruits and vegetables. †Average is based on the proportion of benefits redeemed by each family.

Overall, about half (49.5 percent) of WIC families purchased all of the infant fruits and vegetables that were issued to them, while 36.3 percent did not purchase any, and the remaining 14.2 percent purchased some of the infant fruits and vegetables that were issued (see Figure 48). Families in Michigan were most likely to have redeemed all of their infant fruit and vegetable benefits (52.7 percent), compared to 47.3 percent of Nevada families, and 44.3 percent of Kentucky families. Kentucky and Nevada WIC families were more likely to have not redeemed any of the infant fruit and vegetable benefit (39.9 and 40.4 percent, respectively), compared with Michigan families (33.4 percent).

Figure 48. Percentage of WIC Families Redeeming None, Some, and All Infant Fruit and Vegetable Benefits, by State, January–March 2012

The extent to which WIC families redeemed all of their infant fruit and vegetable benefits varied somewhat based on family characteristics, including race/ethnicity, and there was a high correlation between full redemptions, the number of persons in the household, and the amount of benefit issuance (see Appendix C for detailed statistics).

▲ **Family race/ethnicity.** Families characterized as non-Hispanic Asian were most likely to have redeemed all of their infant fruit and vegetable benefits (49.0 percent), while non-Hispanic American Indian/Alaska Native, non-Hispanic Native Hawaiian/Other Pacific Islander, and non-Hispanic Black families were least likely to do so (28.4, 29.8, and 33.1 percent, respectively). This trend was similar across the three states.

▲ **Geographic location.** Overall, there was little variation in full infant fruit and vegetable redemption by geographic location. However, in each of the three states, families in...
urban areas were more likely than those in rural and isolated areas to have redeemed all of their infant fruit and vegetable benefit.

▲ **Household size.** Full infant fruit and vegetable redemptions increased slightly with the number of people in the household. For example, 35.4 percent of WIC families with 1 or 2 people in the household redeemed all of their infant fruit and vegetable benefit, while 41.0 percent of families with 7 or more people in the household did so. This trend was most pronounced in Michigan where full redemption increased nearly 12 percentage points between families with 1 to 2 household members and those with 7 or more. No such changes were seen, however, in Kentucky and Nevada (see Figure 49).

![Figure 49. Percentage of WIC Families Redeeming All Infant Fruit and Vegetable Benefits, by Household Size and State, January–March 2012](image)

▲ **Ounces of infant jarred fruits and vegetables prescribed.** The amount of infant fruits and vegetables issued to a family corresponds to the number of infants aged 6 to 11 months that were receiving benefits and whether or not they are fully breastfeeding. As already described, fully breastfed infants receive up to 256 ounces of jarred infant fruits and vegetables; partially breastfed and fully formula fed infants receive up to half that amount (128 ounces). When considering the proportion of families redeeming all of their all infant fruit and vegetable benefit by prescription category, a greater proportion of those prescribed 128 ounces or less fully redeemed their benefit, compared with those prescribed more than 128 ounces, overall (38.6 and 31.9 percent, respectively). This trend was observed in Michigan and Nevada, whereby Nevada had the largest percentage point decline between categories, compared with Michigan (13.0 and 6.7 percent, respectively).

After controlling for family characteristics and the amount of infant jarred fruit and vegetable benefit issued, families in Nevada were 31 percent less likely to fully redeem their infant fruit and vegetable benefits than those in Kentucky (aOR = 0.69, 95% CI [0.66, 0.72]), while families in Michigan were about 7 percent less likely to do so (aOR = 0.93, 95% CI [0.91, 0.95]). Figure 50 shows that, compared with non-Hispanic White families, non-Hispanic Asians were 1.4 times more likely to have made a full redemption (95% CI [1.30, 1.55]), while non-Hispanic Black, American Indian/Alaska Native, and Native Hawaiian/Pacific Islander families were between 31 and 34 percent less likely. Families in small and large rural areas were nearly 20 percent less likely than those in urban areas to have had a full redemption (aOR = 0.81, 95% CI [0.78, 0.85].
and aOR = 0.82, 95% CI [0.79, 0.85], respectively). Finally, each additional person in the household increased the likelihood of a full redemption by about 5 percent (aOR = 1.05, 95% CI [1.04, 1.05]).

Figure 50. Odds of WIC Families Redeeming Infant Jarred Fruit and Vegetable Benefits, Controlling for Family Characteristics, Benefit Issuance, and State

<table>
<thead>
<tr>
<th>State (compared to families in Kentucky)</th>
<th>Less likely to redeem</th>
<th>More likely to redeem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michigan</td>
<td>0.69</td>
<td>0.93</td>
</tr>
<tr>
<td>Nevada</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Family Race/Ethnicity* (compared to White families)</th>
<th>Adjusted odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>0.69</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.67</td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>0.66</td>
</tr>
<tr>
<td>Asian</td>
<td>0.81</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td></td>
</tr>
<tr>
<td>Multiple Races</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Geographic location (compared to Urban families)</th>
<th>Adjusted odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large rural</td>
<td>0.82</td>
</tr>
<tr>
<td>Small rural</td>
<td>0.81</td>
</tr>
<tr>
<td>Isolated</td>
<td>0.86</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>For each person in household</th>
<th>Adjusted odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issued up to 128 oz. (compared to more than 128 oz.)</td>
<td>1.41</td>
</tr>
</tbody>
</table>

NOTE: Adjusted odds ratios and corresponding 95% confidence intervals are presented in the appendices.

*Race and ethnic groups are mutually exclusive. †Adjusted odds of redemption does not differ from the reference group.

Infant Jarred Meats

In January through March 2012, only 1.3 percent of WIC families were issued infant jarred meats, and these proportions were similar in each state. Infant jarred meats are issued only to fully breastfed infants aged 6 to 11 months, and these infants can receive up to 77.5 ounces, or 31 containers, of infant jarred meat. Across all three states, only 2.5-ounce containers of infant jarred meats are authorized for purchase. WIC families with fully breastfed infants aged 6 to 11 months were issued 30.8 jars of infant jarred meats on average per month, and this differed only slightly across the three states. Families redeemed an average of 13.2 jars of infant jarred meat per month: ranging from 10.7 jars in Nevada, to 14.2 jars in Michigan (see Table 20). Among families issued infant jarred meats, 42.8 percent of benefits were redeemed on average, ranging from 34.6 percent of the benefit being redeemed by families in Nevada to more than 46 percent of the benefit in Michigan.
Table 20. Average Issuance and Redemption Amounts (in Jars) for Families Prescribed Infant Jarred Meats, January–March 2012

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Amount Issued per WIC Family*</th>
<th>Amount Redeemed per WIC Family*</th>
<th>Average % Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean (SD)</td>
<td>Min–Max</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Min–Max</td>
<td></td>
<td>Min–Max</td>
</tr>
<tr>
<td>Total</td>
<td>10,857</td>
<td>30.8 (3.5)</td>
<td>3.0–62.0</td>
<td>13.2 (14.2)</td>
</tr>
<tr>
<td>Kentucky</td>
<td>2,150</td>
<td>30.9 (3.1)</td>
<td>4.0–62.0</td>
<td>11.9 (13.8)</td>
</tr>
<tr>
<td>Michigan</td>
<td>6,870</td>
<td>30.7 (3.6)</td>
<td>5.0–62.0</td>
<td>14.2 (14.4)</td>
</tr>
<tr>
<td>Nevada</td>
<td>1,837</td>
<td>31.0 (3.6)</td>
<td>3.0–62.0</td>
<td>10.7 (13.3)</td>
</tr>
</tbody>
</table>

*In jars; for families issued any infant jarred meats.

Overall, 30.9 percent of WIC families fully redeemed their infant jarred meat benefit; however, nearly half (46.0 percent) did not redeem the benefit at all, making infant jarred meats the least used benefit among all infant foods. Non-redemption was highest among WIC families in Nevada and Kentucky (50.9 and 48.9 percent, respectively), where less than 27 percent of families redeemed the entire infant jarred meat benefit. Michigan had a slightly lower rate of non-redemption (43.7 percent), with 34.7 percent of WIC families using the full infant jarred meat benefit (see Figure 51).

Figure 51. Percentage of WIC Families Redeeming None, Some, and All Infant Jarred Meat Benefits, by State, January–March 2012

Family characteristics were less strongly associated with differences in infant jarred meat redemption across the three states, largely due to the small populations of subgroups within each of the categories that receive the benefit. However, some noteworthy trends emerged overall.

- **Family race/ethnicity.** More than 33 percent of non-Hispanic White families redeemed all of their infant jarred meat benefits, while fewer than 25 percent of non-Hispanic Black and non-Hispanic Native Hawaiian/Other Pacific Islander families did so.

- **Geographic location.** Families in isolated rural areas were overall more likely than those in urban areas to have used the full infant jarred meat benefit (35.2 versus 30.0 percent, respectively). The most pronounced redemption difference occurred in Nevada where 54.5 percent of families in isolated areas fully redeemed their infant jarred meat benefits compared with 20.3 percent in urban areas.
**Household size.** Similar to other WIC foods, the proportion of families redeeming all infant jarred meat benefits increased slightly as the number of persons in the household increased, from 30.8 percent of families with 1-2 people in the household to 35.4 percent among those with households of 7 or more people.

When controlling for family characteristics, families in Michigan were considerably more likely than those in Kentucky to redeem all of their infant jarred meat benefits (aOR = 1.49, 95% CI [1.34, 1.67]) and families in Nevada were 21 percent less likely to full redeem this benefit (aOR = 0.79, 95% CI [0.68, 0.93]). Geographic location and the number of persons in the household had no bearing on the odds of full redemption, when controlling for other characteristics (see Figure 52).

**Figure 52. Odds of WIC Families Redeeming Infant Jarred Meat Benefits, Controlling for Family Characteristics, and State**

<table>
<thead>
<tr>
<th>State (compared to families in Kentucky)</th>
<th>Less likely to redeem</th>
<th>More likely to redeem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michigan</td>
<td>0.79</td>
<td>1.49</td>
</tr>
<tr>
<td>Nevada</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Family Race/Ethnicity* (compared to White families)

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Less likely to redeem</th>
<th>More likely to redeem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>0.61</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0.77†</td>
<td></td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td>0.29†</td>
<td></td>
</tr>
<tr>
<td>Multiple Races</td>
<td>0.98†</td>
<td></td>
</tr>
</tbody>
</table>

Geographic location (compared to Urban families)

<table>
<thead>
<tr>
<th>Geographic Location</th>
<th>Less likely to redeem</th>
<th>More likely to redeem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large rural</td>
<td>0.97†</td>
<td></td>
</tr>
<tr>
<td>Small rural</td>
<td>0.93†</td>
<td></td>
</tr>
<tr>
<td>Isolated</td>
<td>1.14†</td>
<td></td>
</tr>
</tbody>
</table>

For each person in household

<table>
<thead>
<tr>
<th>Adjusted odds ratio</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Adjusted odds ratios and corresponding 95% confidence intervals are presented in the appendices.

*Race and ethnic groups are mutually exclusive. †Adjusted odds of redemption does not differ from the reference group.
VIII. Discussion

Overall, WIC State Agencies, authorized WIC vendors, and WIC participants across Kentucky, Michigan, and Nevada highly value EBT over the previous paper FI system, although some challenges still remain in practice. This section describes the overarching themes that were identified across findings reported in this study, which may be important for WIC State Agencies and the WIC community in general to consider when moving forward with implementation of EBT. The discussion is organized by themes related to lessons learned during and throughout EBT implementation, the benefits and challenges realized by vendors, and the benefits and challenges WIC families’ experience.

A. Lessons Learned Throughout EBT Implementation

▲ Stakeholder engagement is key to success.

Each of the three study states noted that engaging stakeholders in the planning and design of the EBT system, as well as ongoing improvement efforts, is critical to its success. Kentucky specifically noted that engaging the retail community and the Kentucky Grocers’ Association was beneficial in enhancing comprehension and adoption of EBT. Nevada further noted that involving all stakeholders, including IT staff, local agencies, vendors, and contractors, early in the planning phases is critical to successful implementation of EBT. Michigan WIC reiterated that multiple stakeholder involvement in the EBT retailer certification process is helpful in preparing retailers for in-store testing and review.

▲ SNAP experience may provide critical insights for WIC EBT implementation.

WIC State Agencies, vendors, and participants noted that prior experience with EBT in the SNAP program offered a valuable benefit when transitioning to EBT in WIC. Both the Nevada and Michigan WIC programs noted that it is important to examine how SNAP benefits are transacted in the state while in the planning phases of EBT. In leveraging the knowledge of SNAP EBT partners in the state, WIC can gain valuable insight into adaptable processes for WIC since SNAP will have retailers using similar processes, equipment, and contractors. WIC vendors also noted that having SNAP prior to WIC EBT made the transition easier because most of the processes were already familiar to them. Similarly, WIC participants reported that having had experience with the SNAP card made the transition from paper FIs to EBT easy for them.

▲ Transition to EBT may have unintended impact for vendors.

Having implemented EBT most recently of the study states, the Kentucky WIC program reported that the transition had unintended impacts on smaller vendors. Some vendors opted to leave the program instead of paying for the cost of Internet service, which would be required to process EBT sales. This decision ultimately resulted in a small decrease in the number of vendors authorized by WIC. Additionally, Kentucky WIC had initially thought that EBT would benefit smaller retailers because WIC families could purchase smaller quantities of WIC foods from the corner store on a more convenient basis instead of seeking out retailers with larger inventories to buy most of their foods at once. Instead, anecdotal evidence suggests that families shopping at the smaller retailers
purchase fewer items since they are no longer forced to “use or lose” the paper FI benefits in a single transaction.

Many vendors participating in the study reported that they have seen increases in WIC sales since implementation of EBT. A number of Nevada vendors also reported that expanding the integrated EBT system to all checkout lanes resulted in a boost to their WIC sales, which may be the result of participants selecting vendors with integrated devices for the perceived swifter process at checkout.

▲ WIC-allowable UPCs pose numerous challenges.

Maintaining an accurate UPC database is critical to the ongoing success of the WIC EBT system, and is a key challenge when food products rapidly enter and exit the marketplace, or change characteristics.

All three states mentioned issues with UPCs changing or not being uploaded to the stores frequently enough. This was particularly problematic initially for Kentucky WIC with special formulas that are not prescribed frequently and may not be in stock for many WIC vendors. Nevada WIC also mentioned that having “least cost” food items on their food list, which requires participants to purchase the lowest cost of a specific WIC food such as milk, posed an additional challenge. Different vendors carry different brands of milk, resulting in multiple UPCs for milk being authorized on the state’s APL. It is beyond the scope of WIC EBT systems to account for the complexity of verifying the least cost milk purchase across the different vendors. Nevada WIC continues to address this challenge through vendor education and requiring vendors to be diligent in only selling the least-cost brand of foods when required to do so.

B. Benefits and Challenges for WIC-Authorized Vendors

▲ Processing of the WIC transaction is faster for vendors.

WIC vendors and WIC State Agencies reported benefitting from the swifter processing of WIC transactions and reimbursements that EBT provides. Vendors reported appreciating the ease with which they are reimbursed for selling WIC foods, which now occurs within days and no longer requires paper FIs to be deposited in the bank. WIC State Agencies’ policies of paying vendors up to a maximum allowable reimbursement level or not-to-exceed value for food items at the time of transaction additionally streamlines the payment process for vendors.

▲ Maintaining accurate UPC database is key for successful store transaction.

Maintaining the most current UPC database from the WIC State Agency’s APL can be challenging for vendors, particularly if the vendor operates stand-beside devices that typically do not have automatic download features from the host database. Given that there are thousands of UPCs on a state’s APL, coupled with changes to sizes and food composition of WIC foods that are on an APL, it is not uncommon for UPCs to be added or dropped during any given benefit month. In fact, vendors reported having ongoing challenges with UPCs after EBT implementation because package sizes and UPCs in the retail environment change frequently. Vendors often see the changes in a package size and labeling before the WIC State Agency is aware. Without the correct UPC added
into the state’s APL, and the subsequent download of that data to the vendor, the POS scan at the checkout lane will be unsuccessful.

To ensure timely updates to the UPC database and enhance its accuracy, Michigan WIC, for example, has procedures in place to remind vendors to run an update from the host system to maintain accuracy within their store systems so WIC transactions in the checkout lane will be successful.

C. Benefits and Challenges for WIC Participants and Families

▲ EBT reduces stigma.

WIC State Agencies, vendors, and participants reported that EBT overall reduces feelings of stigma and embarrassment. With EBT and particularly in stores with integrated POS systems, it is no longer obvious to other shoppers when WIC participants are purchasing foods. In Kentucky and Michigan, participants no longer have to interact with a cashier to complete a WIC purchase and can instead use the self-checkout lanes for WIC at participating chain retailers. The self-checkout option further reduces stigma for participants who may not want to make it known to store personnel that they are making a purchase with WIC or for those who have had challenges with cashiers.

▲ EBT allows for greater convenience in doing WIC shopping.

Participants reported that they appreciate the latitude that EBT gives them to choose only the WIC foods that they need when they are shopping instead of trying to buy every food listed on the paper FI or losing the benefit altogether. Similarly, both the WIC State Agencies and WIC vendors noted that EBT allows WIC families to shop more frequently and spread out their food purchases over the course of the month, compared with when they were issued a specific number of paper FIs that could only be used once. Vendors highlighted the benefits of participants making more frequent shopping trips and purchasing less WIC food at once with EBT, noting that this allows them to maintain a stable inventory of WIC foods instead of having all of one food purchased during a single transaction, which caused periodic drops in stock of WIC foods. Quantitative analyses support these findings as the majority of WIC families in each of the three states used their WIC benefits during three or fewer shopping trips in a given month (64 percent), with the range being one to 25 shopping trips per month.

▲ EBT improves the checkout process but separation of items still occurs.

As noted above, retail transactions are much smoother with EBT in general, and participants appreciate being able to mix their WIC and non-WIC groceries when in the checkout lane. While all three WIC State Agencies allow mixed-basket purchases with integrated systems, Nevada WIC still encourages participants to separate purchases when possible to avoid confusion at checkout, which can occur when cashiers are not properly trained. While using a mixed basket is the preferred method of shopping, some WIC participants reported continuing to separate WIC foods from other groceries because they are unsure which WIC vendors have integrated versus stand-beside systems for processing WIC EBT. Since the stand-beside system requires foods to be
separated, participants feel it is easier to keep them separate. A number of vendors also reported seeing participants separate foods when it was unnecessary.

▲ **Stand-beside POS units pose challenges that may negate some of the benefits to EBT.**

One of the primary challenges impacting participants and vendors is the use of the stand-beside units versus integrated systems. While the stand-beside units serve an important purpose in allowing smaller, independent retailers to transact WIC EBT, most vendors and participants report that integrated systems are preferable. Nevada vendors especially emphasized that the integrated system is much easier for participants and cashiers and facilitates a much easier transaction at checkout. One vendor noted that having expanded its integrated system to all cash registers (from a few stand-beside units prior). Vendors and participants reported that stand-beside units can take as long, if not longer, than processing paper FIs, negating the benefit of reduced stigma with EBT.

Some participants reported issues specifically with the CVB, which requires multiple stand-beside and regular cash register transactions if the amount of the CVB is exceeded. In these cases, the cashier would ring up the WIC purchase at the register, then at the WIC EBT stand-beside unit, then ring up the overage on the CVB at the regular cash register again to be paid by non-WIC funds; participants’ note that it was in their best interest to purchase less than the value of the CVB to reduce the time spent at checkout.

▲ **Certain WIC foods have low rates of redemption.**

Quantitative findings indicate that certain individual WIC foods have low rates of full redemption in each of the three states, and it varies by race and ethnicity. The WIC foods that are least popular, evidenced by lowest redemption rates, include jarred baby meats, beans/peanut butter, infant cereal and jarred fruits and vegetables, and whole grains. Contributors to less than full redemptions, per focus group reports, are (1) participants are able to purchase foods when needed during the month from their monthly prescription of WIC foods and are by quantities designated on paper FIs, (2) keeping track of foods remaining in their benefit month is challenging for participants; remembering to keep store receipts for WIC food balances is difficult, and (3) some participants have trouble finding some of the WIC allowed foods, even in large chain stores.

Of particular concern are the racial and ethnic disparities in WIC benefit redemptions both overall and for individual foods. Compared with non-Hispanic White WIC families, and controlling for other demographic characteristics, non-Hispanic Black, non-Hispanic American Indian/Alaska Native, and non-Hispanic Native Hawaiian/Other Pacific Islander families were less likely to have fully redeemed nearly every WIC food prescribed to them, suggesting that these populations are not benefitting as much from nutritious WIC foods. On the other hand, Hispanic and non-Hispanic Asian families had comparable or higher rates of redemptions for nearly every WIC food, compared with non-Hispanic White families. These findings confirm previous research that found higher rates of WIC benefit use among Hispanic and non-Hispanic Asian families and lower rates among other minority populations."
WIC participants continue to need education and support.

While participants reported that familiarity with SNAP EBT made the transition to WIC EBT smoother and that EBT is preferable to the paper FIs, a number of focus group participants reported some confusion about the WIC EBT process at checkout and that more practical information about the store transaction at the WIC office would have been helpful. Vendors also reported that it can be challenging for participants to know what they can purchase now that the exact items and quantities are not listed on a paper FI; vendors have addressed this challenge to some extent by helping participants check their benefit balance while in the store. Participants and vendors suggested that ongoing education with mock WIC shopping scenarios at the WIC offices may help alleviate some of the issues faced at the checkout.
IX. Recommendations

This study demonstrates that key WIC stakeholders, including participants, vendors, and WIC State Agencies, are satisfied with the changes EBT offers for the WIC experience and the program as a whole. However, some challenges and opportunities for improvement were also identified. These will be important considerations for the many WIC State Agencies beginning the implementation process over the next few years. The following recommendations and suggestions are relevant for WIC State Agencies, and in some cases, for the WIC program as a whole.

▲ Outline a plan for stakeholder engagement before planning and implementing EBT.

The three study states found stakeholder engagement to be a critical element of successful implementation of WIC EBT. To ensure that all key stakeholders are included, states should consider outlining a list of all stakeholders that need to be involved and the stages when they should be involved before EBT planning begins. Based on the feedback provided by the three study states, the list of stakeholders may include: local agencies, vendors (large chain retailers and independent owners), grocers' associations, IT staff, EBT and quality assurance contractors, and SNAP EBT partners. States may benefit from considering the specific stakeholders be involved at the different stages of EBT implementation, such as the pilot phase and the certification and training phase for retailers. Stakeholders may also need to be involved to provide input on certain activities, including materials development and communication with retailers and cashiers.

The study states also emphasized the importance of seeking input from states with experience in WIC EBT implementation that can provide guidance throughout the process. States that are planning or beginning to plan how EBT will be implemented in their state should consider working with states who have implemented similar EBT systems for help in reviewing their list of stakeholders, stages at which these stakeholders should be involved, and other planned EBT implementation activities.

▲ Expand communication efforts with authorized vendors during the WIC EBT planning and implementation phases to ensure they are prepared to adopt the necessary changes.

During EBT implementation in Kentucky, there was a slight decrease in the number of authorized vendors, particularly small stores/pharmacies, despite the expectation that small stores would benefit from EBT. Kentucky thought this decline may have resulted from a general reluctance to adopt the technology changes necessary for EBT and from smaller stores losing WIC business to larger, chain retailers. While this may not have been encountered by Michigan and Nevada, it may be an issue for other states to consider and prepare for when transitioning to EBT.

To sufficiently prepare vendors for the changes necessary with EBT, WIC State Agencies should expand their communications with authorized vendors well in advance of piloting and implementation. States may want to focus on small vendors whose businesses are more vulnerable to technology changes or those vendors serving priority areas where there may be a need to maintain food access for WIC participants.
Altogether, these vendor communications should describe the additional technology and time commitment required to implement EBT and the added benefits of EBT reported by vendors, such as:

- Inventory stabilization—vendors are less likely to run out of WIC foods with EBT since participants spread shopping out over the entire month;
- Less administrative work since there is no need to deposit checks and there are no rejected checks;
- Faster receipt of payments; and,
- Potential for increased sales since participants make more frequent trips to the store and tend to pick up non-WIC foods when shopping for WIC foods.

▲ Encourage transition from stand-beside to integrated devices among vendors, where feasible.

Vendors and participants highlighted the diminished benefits of WIC EBT when using stand-beside devices due to their association with a lengthier checkout process and embarrassment for participants. States should strongly encourage WIC-authorized vendors to use integrated POS devices in their stores when possible so that the full advantages of WIC EBT can be realized by WIC participants and vendors. State Agencies can cite findings from this study based on vendor and participant reports that there are many benefits to embracing this integrated technology, including improved ability to track inventory; decreased concerns about cashier errors since a fully functioning integrated POS scans the WIC UPCs properly; and quicker, simpler checkout processes that enhance WIC customer satisfaction. States that have yet to implement WIC EBT should make every effort early in planning to provide information to vendors about the benefits of using integrated POS devices so that they have enough time to weigh their options, schedule software changes within their existing POS systems, or identify funds to purchase POS devices, if they choose to do so.

▲ Encourage expanded education on EBT use at WIC offices to address participant knowledge gaps.

To ensure participants have all the knowledge and skills to do their WIC shopping, state and local WIC agencies may benefit from evaluating the education they provide to participants on making WIC purchases with EBT. Participant and vendor feedback suggests that there may be opportunities to expand participant education about using the WIC EBT card, understanding beginning WIC food balances and interpreting debits to the food balance during the month, completing the WIC transaction in the lane (e.g., separation of foods versus market basket, when to slide the card). The education provided to participants should also include strategies for resolving issues encountered in a store, particularly during checkout (e.g., what should be done if the vendor’s system does not scan a WIC food on the food list, sale items, and use of coupons). States should also ensure that EBT-related guidance and information provided to participants is consistent with that provided to WIC vendors, and may be offered in languages other than English. Regularly polling participants about their WIC shopping experience, such as during secondary or group education visits, or certification appointments, will help to support participants’ successful shopping experiences in the stores.
▲ Ensure easy access to WIC EBT benefit balance information and expand methods by which participants can access their benefit balances.

Participants and vendors highlighted the importance of having easy access to the benefit balance information with WIC EBT as participants no longer have paper FIs that list the items and quantities that can be purchased. Food balances are more difficult to track with participants making more trips to the store for WIC purchases with EBT, particularly when store receipts are easily misplaced or lost. While authorized vendors are required to support on-demand balance inquiries in their stores and all WIC receipts must include remaining balance information, these options are not always the most convenient for participants to check and track their benefit balance.

State Agencies should seek to offer a variety of methods by which participants can check their WIC food balance outside of the store to accommodate individual preferences and situations. Some methods that states in this study are exploring include online access to a printable list of available foods, text message reminders, and a smartphone application. We encourage State Agencies planning to implement EBT to survey WIC participants about their preferred methods for checking benefit balances and work to develop access to benefit balances that young WIC shoppers will embrace. More formative research is also needed on the best options and technologies for providing participants access to their benefit balance.

▲ Develop and evaluate efforts to increase benefit redemptions, especially as it affects redemption among underserved populations.

In this study we found that certain individual WIC foods have low rates of full redemption. To help improve redemption of underused WIC foods, local WIC staff could provide recipes (especially recipes that children will like), conduct easy food demos, and share food preparation ideas with WIC families through the nutrition education sessions and materials they provide to address new ways to creatively use WIC foods in family meals. In situations where there is more than one participant in the family on WIC and food benefits are combined on the EBT card, we encourage local WIC staff to renew conversations about the options that the family may have with substitution foods. Depending on a State Agency’s approved foods, combined with recent changes to the WIC food package and pending future changes, additional options may be available to families to add more variety to the WIC foods prescribed, which may boost interest in full redemption of their WIC foods.

Findings from this study suggest that families from certain minority populations are less likely to fully redeem their WIC benefits; these included non-Hispanic Black families and those of multiple races. Targeted educational efforts to promote full utilization of WIC benefits with EBT may be especially important in local programs serving these specific minority populations. This could include tailoring the nutrition education and materials to include more discussion or content around foods that are commonly underused and focusing on culturally relevant approaches to incorporating these foods into meals and snacks.
Plan early for utilization of EBT redemption data in program management.

WIC State Agencies, once having implemented EBT, have a rich source of detailed data on participants’ food redemptions. During the course of this study, the researchers and analysts learned a great deal about the nuances of EBT files and properly interpreting the data within those files. Merging databases, such as participant issuance data, basic demographics, vendor location at which WIC shopping occurred, and even nutrient data on WIC foods purchased could provide new understanding of the ‘look and feel’ of the WIC program around the nation.

Similar to the analysis we conducted as part of this study, answers to questions in which WIC programs may be interested include:

- Finding out redemption of specific WIC foods by family size, ethnicity, number of WIC participants in the family (e.g., similar to results displayed in this report)
- Learning how introduction of new WIC foods impacts participant redemptions (e.g. introduction to yogurt as a new WIC food)
- Understanding participants’ shopping patterns
- Understanding characteristics of participants who underutilize their benefits and use this to target nutrition education interventions

Planning to utilize the EBT data is the first step; acquiring and training staff to access the various databases for analysis can be daunting. We encourage State Agencies planning their EBT implementation project to talk with other WIC State Agencies who have some experience using their data to learn strategies from them. The WIC data, when appropriately cleansed of individually identifiable references, can also be used by researchers to investigate the positive impacts of the program and serve to strengthen the understanding of best practices in program operations.
References


