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# Assessment of WIC Cost-Containment Practices

## Final Report

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### Abstract

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) provides both nutrition education and supplemental foods for pregnant, breastfeeding, and postpartum women, infants, and children. These supplemental foods contain nutrients that nutritional research has found may otherwise be lacking in the diets of WIC recipients. State WIC agencies have implemented practices designed to reduce the cost of food packages containing these prescribed foods. For instance, one of the WIC program's primary cost-saving practices is negotiating rebate contracts with manufacturers of infant formula. Additional practices include limiting authorized vendors to stores with lower food prices; limiting approved brands, package sizes, forms, or prices; and negotiating rebates with food manufacturers or suppliers. There is concern that these practices may inadvertently counter the program's goal of providing supplemental foods and nutrition education. Based on a review of cost-containment practices in six States, including interviews with the various stakeholders and analysis of WIC administrative files, the study draws three major conclusions: (1) cost-containment practices reduced average food package costs by 0.2 to 21.4 percent, depending on practices implemented and local conditions; (2) the cost-containment practices had few adverse outcomes for WIC participants; and (3) administrative costs of the practices were low, averaging about 1.5 percent of food package savings.

A summary of this report, *Assessment of WIC Cost-Containment Practices: Executive Summary*, is also available online at [www.ers.usda.gov/publications/efan03004](http://www.ers.usda.gov/publications/efan03004).

**Keywords:** WIC Program, cost-containment, food-item restrictions, vendor restrictions, manufacturers' rebates, food package costs

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At the U.S. Department of Agriculture, Economic Research Service, Phil Kaufman served as Project Officer for the study. In this capacity, he played a major role in developing the study's statement of work and its overall research design. He coordinated all contacts with the Food and Nutrition Service of USDA, and offered valuable assistance during data collection and analysis. Finally, he led and coordinated the technical review of this final report; the scope and content of the report bear his imprint in many ways.

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A great appreciation goes to the WIC program directors and staff in the six States that participated in this study: California, Connecticut, North Carolina, Ohio, Oklahoma, and Texas. In addition to participating in lengthy interviews about their cost-containment practices, they provided data files and other critical information needed for the study. We thank them for their full cooperation and assistance, and for the comments they provided on a draft of this report.

We also wish to thank the many WIC participants, vendors, and other stakeholders who responded to our requests for information during the course of the study. We interviewed nearly 1,300 WIC participants, collected price data from over 100 WIC vendors, collected detailed point-of-sale information on WIC transactions in nearly 600 supermarkets, and conducted focus groups with participants who had dropped out of WIC. We also conducted interviews with representatives of the Food Marketing Institute, the Grocery Manufacturers of America, the National Grocers Association, the National WIC Association, the Private Label Manufacturers Association, and the national and regional offices of the FNS. To all these individuals, vendors, and groups, we extend our heartfelt thanks.

Many individuals at Abt Associates and its subcontractors for the study helped with the analysis or preparation of the final report. Charles Pappas of SmartSource Direct recruited the supermarkets that provided WIC transaction data, and Terry Stewart of Marketing Resources International conducted the focus groups with WIC dropouts. At Abt Associates, John Straubinger and Michael Harnett were survey directors for the study. Nancy McGarry and Ellie Lee served as the study's programmers, and Mary Kay Crepinsek, Dave Rodda, Joanna Golding, and Lisa Litin helped with the analyses. Chris Holm participated in the interviews with State and local officials. Finally, Fred Glantz and Nancy Burstein helped review the final report, and Susan Byers Paxson directed its production, with assistance from Jan Nicholson. Our thanks go to all our colleagues who worked with us on this project.

John A. Kirlin  
Project Director  
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## Summary

The Food and Nutrition Service of the U.S. Department of Agriculture (USDA), together with designated State agencies, administers the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). The WIC program provides both nutrition education and supplemental foods containing nutrients determined by nutritional research to be lacking in the diets of pregnant, breast-feeding, and postpartum women, infants, and children. Funding is provided by FNS to State WIC agencies through annual appropriations from Congress. Each State's cash grant includes a food grant and a Nutrition Services and Administration (NSA) grant. In FY2001, food grants totaled \$3.0 billion, or approximately 73 percent of the total cash grant. Cost savings through infant formula rebates provided an additional \$1.5 billion in funding; FNS estimates that the rebates would support about 28 percent of the WIC caseload.

In an effort to ensure the best use of available funds and to provide for participation by all eligible individuals, State WIC agencies have implemented practices designed to reduce the cost of food packages containing these prescribed foods. For instance, one of the WIC program's primary cost-saving practices is negotiating rebate contracts with manufacturers of infant formula. Additional practices include limiting authorized food vendors (such as supermarkets and grocery stores) to outlets with lower food prices; limiting food-item selection according to brand, package size, form, or price (for instance, requiring purchase of least cost items); and negotiating rebates with food manufacturers or suppliers.

Concerns have been raised that State cost-containment practices may have adverse effects on WIC participants. As part of the William F. Goodling Child Nutrition Reauthorization Act of 1998, the U.S. Congress directed the Economic Research Service, USDA, to assess the impacts of WIC cost-containment practices on the following outcome measures: program participation; access and availability of prescribed foods; voucher redemption rates and actual food selections by participants; participants on special diets or specific food allergies; participant use and satisfaction of prescribed foods; achievement of positive health outcomes; and program costs.

To estimate and understand the relationships between State WIC cost-containment practices, program costs, and WIC participant outcomes, the study selected six States for detailed examination: California, Connecticut, North Carolina, Ohio, Oklahoma, and Texas. These States represented a mixture of practices. Throughout this study, outcomes in States with specific practices are compared with outcomes in States without those practices. Information on practices and outcomes was collected from program administrative data, interviews with State and local officials, interviews with WIC participants, a survey of WIC food prices and item availability, supermarket transaction data, and focus groups of WIC dropouts.

Three major findings resulted from this study: (1) cost-containment practices implemented in California, Connecticut, Oklahoma, and Texas were successful in reducing average food package costs by substantial amounts; (2) cost-containment practices were associated with few adverse outcomes for WIC participants, and (3) State and local office administrative costs attributed to cost-containment practices were relatively minor compared with associated food cost savings.

Although the case study States represent the range of cost-containment practices in use, these findings may not apply to all States. Outcomes may differ depending on ongoing efforts by States to find those restrictions that both reduce food package costs and are acceptable to participants. Selecting

and managing appropriate cost-containment practices is therefore a dynamic process, requiring ongoing attention to price and availability of approved food items, as well as participant preferences. States therefore need the flexibility to find the right balance between food cost reductions and limits on participant choice and use.

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# Chapter 1

## Introduction

The Food and Nutrition Service (FNS) of the U.S. Department of Agriculture (USDA), together with designated State agencies, administers the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). The WIC program provides both nutrition education and supplemental foods containing nutrients determined by nutritional research to be lacking in the diets of pregnant, breastfeeding, and postpartum women, infants, and children. Funding is provided by FNS to State WIC agencies through annual appropriations from Congress. Each State's cash grant includes a food grant and a Nutrition Services and Administration (NSA) grant. In FY2001, food grants totaled \$3.0 billion, or approximately 73 percent of the total cash grant. Cost savings through infant formula rebates provided an additional \$1.5 billion in funding; FNS estimates that the rebates would support about 28 percent of the WIC caseload.

In an effort to ensure the best use of available funds and to provide for participation by all eligible individuals, State WIC agencies have implemented practices designed to reduce the cost of food packages containing these prescribed foods. For instance, one of the WIC program's primary cost-saving practices is negotiating rebate contracts with manufacturers of infant formula. Additional practices include limiting authorized food vendors (such as supermarkets and grocery stores) to outlets with lower food prices; limiting food-item selection according to brand, package size, form, or price (for instance, requiring purchase of least cost items); and negotiating rebates with food manufacturers or suppliers.

Concerns have been raised that vendor-selection practices may reduce WIC participants' access to authorized vendors, and that item-selection practices and manufacturers' rebates may reduce participant satisfaction with allowed food items. Lower satisfaction may lead to lower consumption of certain foods or a decision to leave the program. In either case, the cost-containment practices may have the inadvertent effect of countering the program's goal: to provide supplemental foods and nutrition education in order to safeguard and improve nutritional intake, birth outcomes, child development, and health outcome measures.

### Purpose of Study

As part of the William F. Goodling Child Nutrition Reauthorization Act of 1998, the U.S. Congress directed the Economic Research Service (ERS), USDA, to assess the impacts of WIC cost-containment practices on the following outcome measures:<sup>1</sup>

- Program participation
- Access and availability of prescribed foods
- Voucher redemption rates and actual food selections by participants
- Participants on special diets or specific food allergies
- Participant use and satisfaction of prescribed foods

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<sup>1</sup> In accordance with the legislation authorizing this study, the impacts of infant formula rebates were not assessed during this research.

- Achievement of positive health outcomes
- Program costs

In a competitive bidding process, ERS contracted with Abt Associates Inc. in September 1999 to conduct this research study. This report presents the findings of the study.

## Study Approach

The study examines the relationships between State WIC cost-containment practices, program costs, and WIC participant outcomes. Prior research has identified possible practices to lower WIC program food costs,<sup>2</sup> but little is known about the specific impacts, both on participants and State WIC agencies, of various measures taken to ensure benefits to all eligible mothers and children.

There is considerable variation in cost-containment practices used by State WIC agencies. Because of the potential differences in the use and implementation of these practices by States, ERS decided upon a case study research design that would serve to identify the linkages between various types of cost-containment and Agency and participant outcomes. After a detailed State-by-State review of WIC cost-containment practices, six States were selected for case study: California, Connecticut, North Carolina, Ohio, Oklahoma, and Texas.<sup>3</sup> These States represent a mixture of practices and, in particular, they had practices that were thought to be restrictive enough to have measurable outcomes. Throughout this study, those outcomes in States with specific practices are compared with outcomes in States without those practices.

As displayed in table 1-1, five of the six States (all but North Carolina) applied competitive pricing criteria at vendor application to ensure that stores with excessive prices were not authorized to participate. Connecticut, Oklahoma, and Texas, however, were the only States with explicit thresholds for price above which stores could not be authorized; the study treats these three States as the “restrictive” States (with respect to vendor restrictions) when comparing outcomes between restrictive and nonrestrictive States.<sup>4</sup>

All six States imposed food-item restrictions according to price, brand, package size or form, or number of allowed types within a food category. North Carolina and Ohio, however, had relatively few food-item restrictions; they were selected for the study to represent States without such restrictions. The States imposing specific restrictions varied by food category, so the “restricted” group of States also varies by food category in the analyses.

California, Connecticut, and Texas contracted with a single manufacturer for rebates on infant cereal. From a participant’s perspective, such rebates are similar to State limits on allowed brands, and the study treats these two cost-containment practices similarly with regard to their impact on participants.

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<sup>2</sup> *Food Assistance: A Variety of Practices May Lower the Cost of WIC*, GAO/RCED-97-225, September 17, 1997.

<sup>3</sup> The study’s interim report describes the process followed in selecting the six case study States. See John A. Kirlin and Nancy Cole, *Assessment of WIC Cost-Containment Practices: An Interim Report to Congress*, Economic Research Service, Washington, DC, February 2001 (electronic publication E-FAN-01-005).

<sup>4</sup> In California, price thresholds were used to identify excessive prices for individual items, not to deny authorization to vendors. Ohio’s use of competitive pricing applied only when numeric limits were reached, a condition that had never been met at the time of the study.

**Table 1-1—Summary of State cost-containment practices in FY2001**

<b>State (WIC caseload<sup>a</sup>)</b>	<b>Vendor restrictions</b>	<b>Food-item restrictions<sup>b,c</sup></b>
California (1,243,509)	Applied competitive pricing criteria at application to ensure that stores with excessive prices were not authorized. <sup>d</sup>	No items subject to least expensive brand restriction Many food items subject to restrictions on package size or form Narrow choice for cheese, infant cereal, cereal, and juice Rebates on infant cereal
Connecticut (49,253)	Applied competitive pricing criteria at application to ensure that stores with excessive prices were not authorized.	Many food items subject to least expensive brand restrictions Few restrictions on package size or form Narrow choice for infant cereal and peanut butter Rebates on infant cereal
North Carolina (200,121)	None <sup>e</sup>	Only milk was subject to least expensive brand restrictions Milk and cereals subject to restrictions on package size or form
Ohio (247,092)	Applied competitive pricing criteria at application to ensure that stores with excessive prices were not authorized. <sup>f</sup>	No items subject to least expensive brand restriction Few restrictions on package size or form
Oklahoma (87,467)	Applied competitive pricing criteria at application to ensure that stores with excessive prices were not authorized.	Many food items subject to least expensive brand restrictions Milk and cereal subject to restrictions on package size or form Narrow choice for juice and cereal
Texas (750,122)	Applied competitive pricing criteria at application to ensure that stores with excessive prices were not authorized.	Milk and juice subject to least expensive brand restrictions Milk, cereal, and juice subject to restrictions on package size or form Narrow choice for juice Rebates on infant cereal

a Average participation level in FY2001.

b “Narrow” choice means that State was in bottom quartile in number of approved items, among all 50 States.

c Food-item restrictions are in addition to Federal WIC requirements.

d California’s competitive pricing policy did not restrict vendor authorization in practice, but assessed the reasonableness of individual item prices.

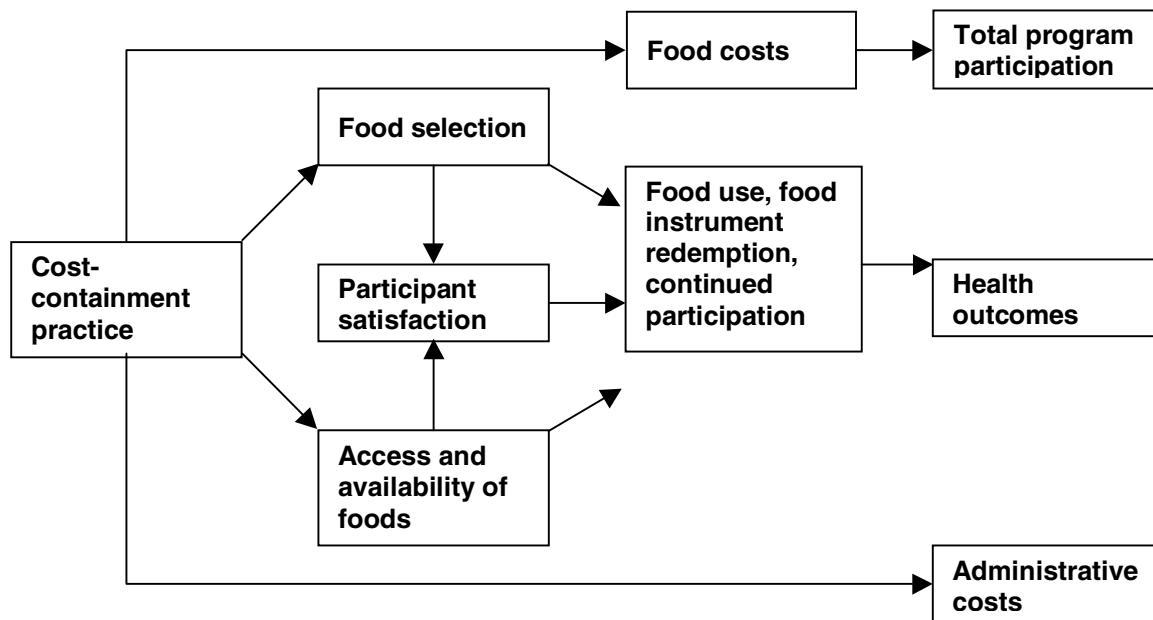
e North Carolina did not have a competitive pricing policy in place, but did require vendors to submit price lists at application, as well as twice a year thereafter. State officials did not have the authority to deny authorization due to high prices, but they could ask vendors to use “more reasonable” prices.

f Criteria used only when numeric limits were reached, a condition that had never been met at the time of the study.

This study does not provide national estimates of the impacts of WIC cost-containment practices because the six case study States were not randomly selected. In addition, the results of this study, for any of the six case study States, cannot be considered representative of any State outside of the study. Instead, as the case study approach allows, the focus is on understanding the linkages between specific cost-containment practices, or combinations of practices, and their outcomes.

Cost-containment practices are designed to lower the average cost of WIC food packages while maintaining Federal nutrition standards. These practices may have the desired impact on food costs, but they may also have unintended consequences for participant behavior and satisfaction. Figure 1-1 depicts the potential effects, direct and indirect, of cost-containment practices. The practices have direct effects on food and administrative costs. Food costs are expected to decrease as items and vendors are restricted to less expensive alternatives; administrative costs may increase in implementing and maintaining these procedures. In addition, cost-containment practices may have direct effects on participants through reduced food choice and restricted access and availability of prescribed foods. These direct, or “first-stage,” effects on participants may alter participant their with the WIC program, as indicated in the diagram.

**Figure 1-1—Impacts of cost-containment practices**



Direct effects of cost-containment practices on food selection, access to vendors, availability of food items, and participant satisfaction may lead to “second-stage,” or indirect, effects on several outcome measures: food use, food instrument redemption, and WIC participation. These second-stage outcomes each measure WIC food benefit use. In the diagram, all second-stage outcomes are grouped in one box because different outcomes represent different levels of response to cost containment.



Finally, figure 1-1 shows how cost-containment practices may have an effect on health outcomes. If cost-containment practices cause WIC participants to leave the program or to reduce their consumption of WIC foods, then potential health benefits of WIC supplemental foods may be lost. WIC foods, however, are only one of many factors that affect health, and it is beyond the scope of this study to isolate the singular impacts of changes in consumption of WIC foods on participants' health.<sup>5</sup> The study instead examines whether health outcomes are correlated with food instrument redemption rates, which in turn may be affected by cost-containment practices. If cost-containment practices are found to impact redemption rates, and if changes in health outcomes are correlated with redemption rates, then the possible link between cost-containment practices and health outcomes could be further explored in a separate study.

## Data Sources

The analysis of the impacts of WIC cost-containment practices relies on a variety of data sources, including both extant data and data collected from the case study States specifically for this study. These data include:

- State WIC administrative data
- Interviews with State and local WIC officials
- A survey of WIC participants
- A store survey of the price and availability of WIC food items
- WIC transaction data collected from supermarkets
- Focus groups with participants who dropped out of the WIC program
- Interviews with other concerned stakeholders

Each data source is summarized below.

### State WIC Administrative Data

Two types of State administrative data were collected: participant certification records and food instrument data.

Statewide administrative records for WIC participants were obtained from the six case study States at two points in time: November 2000 and April 2001. These files contain demographic characteristics of WIC participants and certification information such as nutritional risks, health status, food package prescription, and income level.

Statewide food instrument data were collected from each State for a 4-month period, from November 2000 through February 2001. The data typically include one record for each WIC food instrument issued, with data elements indicating its status (issued, paid, rejected, or void), date paid, and payment amount.

Administrative data on participants from November 2000 provided the sampling frame for the study. Three geographic areas were selected for primary data collection within each State, representing urban, suburban, and rural areas. Selection of geographic areas was based on caseload counts, with

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<sup>5</sup> It is important to note that WIC is designed to supplement the diet and does not provide for all dietary needs.

selection proportionate to caseload size. Primary data collections in the three geographic areas were the Survey of WIC Participants, the store survey, and the interviews with State and local WIC agencies.

Administrative data were also used for several lines of analyses. Statewide participant records were used to characterize participants for the analyses of food instrument redemption and to explore the association between redemption and change in health status (as measured from the November and April certification files). Food instrument data were used to measure food instrument redemption rates for each State and to examine the relationship between food instrument redemption and health outcomes.

### **Interviews with State and Local WIC Officials**

Interviews were conducted with representatives of all six State WIC Agencies selected for the study. These interviews, held between May and August 2001, provided information on the procedures for applying cost-containment measures, the results of the measures, staff time and other costs devoted to maintenance of the measures, and views of State staff on the impacts of cost-containment measures on program costs and participant outcomes.

In addition, three local agencies representing urban, suburban, and rural areas were selected in each State for telephone interviews. These agencies provided information on local agency involvement in, and experience with, cost-containment measures—principally the provision of training and assistance to participants about food-item restrictions. The local agency interviews were conducted between July and September 2001.

### **Survey of WIC Participants**

The Survey of WIC Participants interviewed a total of 1,285 WIC families in the six States.<sup>6</sup> All respondents were sampled from the same study sites selected for the interviews with local WIC officials. Interviews were conducted between February and June 2001. For the 12.3 percent of sampled participants who could not be reached by telephone, interviews were conducted by field staff at participants' homes. The overall survey response rate was 77 percent.

The Survey of WIC Participants collected information about the following topics:

- Satisfaction with WIC food items
- Food instrument pickup
- Food item purchase, consumption, and preferences
- Participant access to WIC vendors
- Program participation
- Presence of special diets or food allergies
- Health referrals
- Participant demographics

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<sup>6</sup> The Survey of WIC Participants was designed and conducted specifically for this study. It is not to be confused with USDA's National Survey of WIC Participants and Their Local Agencies (NSWP), conducted in 1998.

Appendix A presents information about sampling for the survey, as well as response rates by sampling stratum. A copy of the survey instrument is included at the end of the appendix.

### **Survey of the Price and Availability of WIC Food Items**

The Survey of Food Prices and Item Availability collected price information and data on food item availability from a sample of 150 food stores in the six case study States. Eighteen WIC-authorized vendors were sampled in each State, and up to 12 non-WIC food stores were sampled in four States with vendor restrictions: California, Connecticut, Ohio, and Texas.<sup>7</sup> WIC and non-WIC stores were sampled separately from two different population universes.<sup>8</sup>

Data collectors visited each sampled store and checked on the price and availability of over 400 food items approved for WIC under Federal guidelines. Differences in food prices between State-approved and nonapproved food items are used to estimate cost savings from food-item restrictions.

Sampling procedures for the Survey of Food Prices and Item Availability and a copy of the survey instrument are included in appendix B.

### **WIC Transaction Data from Supermarkets**

In retail food stores that scan food item bar codes at the checkout, the store's point-of-sale (POS) system automatically creates a record of the scanned item. The record typically includes a descriptor of the scanned item, the price paid for the item, the dollar amount of any manufacturer or store coupons/discounts applied to the item, the method of payment (for instance, cash, check, or credit card), the date and time of the transaction, and a store and checkout lane identifier. In many POS systems, the individual item records also contain a unique transaction identifier, enabling users to identify all items purchased during a single transaction.

The study contacted all the large supermarket chains in the six case study States to inquire whether their POS systems could identify food items paid for with WIC checks or vouchers. A number of POS systems could not, either because transaction identifiers were not used or the system grouped WIC checks with all other checks when identifying mode of tender. Supermarket chains whose POS systems could identify WIC transactions and the items included in those transactions were invited to participate in the study by providing copies of their WIC transaction data for a 5- to 6-week period in early 2001. Six supermarket chains agreed to provide data from some or all of their stores.<sup>9</sup> Together, these scanner data provide information for over one-half million WIC transactions in five of the six States; no supermarkets in Oklahoma were able to participate in the study.

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<sup>7</sup> Two States, Connecticut and Ohio, did not have enough non-WIC stores in the study areas to sample 12 stores in each State. At the time the survey was designed, it was not clear that Oklahoma also had a policy restricting high-cost vendors.

<sup>8</sup> WIC-authorized stores were sampled from lists of WIC vendors obtained from each State WIC agency. The sample frame includes all WIC vendors, except pharmacies and WIC-only stores, located in the three study sites in each State. Non-WIC stores are defined as supermarkets and grocery stores authorized to participate in the Food Stamp Program but not the WIC program. The FNS Store Tracking and Redemption Subsystem (STARS) database, which includes records for all FSP-authorized retailers, was used to draw the sample of non-WIC stores.

<sup>9</sup> These WIC transaction data cannot be matched to individual participants or food instruments because the store POS systems do not capture the serial number of the WIC check or voucher. For this reason the scanned food item data cannot be used to examine whether WIC participants fully redeem their food prescriptions.

Because most supermarket chains either could not provide the requested data or decided not to participate in the study, the WIC transaction data cannot be viewed as a representative data set. The data are used to inform the study about WIC participants' shopping patterns, especially the distribution of purchased types and brands of food items in States with and without food item restrictions. Appendix C describes the WIC transaction data.

### **Focus Group Discussions with WIC Program Dropouts**

Focus groups were conducted with WIC participants who did not pick up their WIC food instruments and who indicated, during a screener survey, that this was related to dissatisfaction with either WIC food items or access to WIC vendors.

Six focus groups were conducted in five States, collecting in-depth, qualitative information on the reasons WIC participants fail to make full use of their WIC food benefits.<sup>10</sup> Abt Associates contracted with Marketing Resources International (MRI) to recruit WIC participants for focus groups, provide facilities for focus group sessions, conduct the sessions, and report on the results.

A focus group moderator used the same topic guide in all States. Topics were broadly focused on WIC participants' satisfaction with the selection of WIC-approved foods, access to WIC vendors, and ease of using WIC food instruments (that is, WIC checks or vouchers). The goal of the focus groups was to determine the extent to which cost-containment practices affected these participants' decisions to stop picking up their WIC checks and vouchers.

Although focus groups do not provide data that can be compared across States in a quantitative way, they provide in-depth qualitative insights about WIC participants' satisfaction. The stories told by the focus group members allow the study to determine whether particular aspects of cost-containment practices are singled out by WIC participants when they describe their experiences with the program.

### **Interviews with Concerned Stakeholders**

In addition to collecting information from WIC agencies, the study contacted representatives from food industry associations and from the National WIC Association (NWA), formerly the National Association of WIC Directors (NAWD). These organizations, listed in appendix D, have expressed concerns in the past about WIC cost-containment practices. Many of these concerns, summarized below, were investigated as part of the study:

- The NWA is a voluntary membership organization representing State and local WIC agencies nationwide. NWA members expressed two main concerns about cost-containment practices: (1) the negative impact of food-item restrictions on program participation; and (2) obstacles to States' utilization of food cost savings to increase Federal NSA funds in support of higher WIC participation levels.<sup>11</sup> They stressed that States needed flexibility in designing food packages to attract and retain program participants.

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<sup>10</sup> A planned focus group in Hartford, Connecticut was cancelled because not enough participants who met the screening criteria could be recruited.

<sup>11</sup> NWA's concern with States' use of food cost savings has been addressed by FNS since the interview was conducted. In December 1999, FNS published a rule expanding conversion authority for cost-containment savings to NSA funds. According to the rule, a State WIC agency "may now convert food funds to NSA funds based on projected increases in

- The Grocery Manufacturers of America (GMA) is a trade organization representing companies that manufacture and market most of the best known national brand products. Their biggest concern with cost-containment efforts is those practices that reduce WIC participants' choices among brands of WIC-approved products, especially breakfast cereals. They believe that such restrictions reduce participant satisfaction and can lead to decreased participation in WIC.
- Members of the Private Label Manufacturers Association (PLMA) are pleased that private-label, or store-brand, items are being added to WIC-approved food lists in many States. They perceive, however, that some State WIC agencies are biased against private-label foods. Members also are concerned with policies that require WIC-approved food items to be available statewide, because not all food chains operate throughout a State. Finally, PLMA members believe that limiting vendors may (unintentionally) eliminate many private-label products from the WIC program and lead to increased costs and reduced product availability for the WIC program and participants.
- The Food Marketing Institute (FMI) and the National Grocers Association (NGA) are trade associations representing food retailers and wholesalers. These groups do not like cost-containment practices designed to limit the number of WIC-authorized vendors, arguing that such practices are inefficient and expensive to implement. These groups believe that the practices tend to reduce participation of smaller neighborhood stores, which in turn affects WIC participants' accessibility to WIC-authorized stores. The associations also do not like price ceilings, which they claim are unfair to small retailers whose cost structures are higher, and least expensive brand policies, which they claim confuse store clerks and WIC customers.

## **Report Organization**

This report on WIC cost-containment practices contains 11 chapters, including this introduction. Chapter 2 provides a description of the cost-containment practices used in each of the six case study States, as well as of their administrative costs. Chapters 3 and 4 then present the estimated relationships between cost-containment practices, food selection, and WIC food package costs.

The estimated relationships between WIC cost-containment practices and participant access to WIC vendors, and the availability of prescribed foods, are presented in chapter 5. Chapter 6 describes participant satisfaction with and use of prescribed foods. Chapter 7 provides information on the percentage of WIC participants in the six States who have food allergies or are on special diets, together with evidence on the extent of problems these participants encounter when shopping for WIC foods.

Chapters 8 and 9 present the study's findings on, respectively, food instrument redemption rates and program participation. Chapter 10 discusses the relationship between redemption rates and changes in participant health measures. Based on findings on all of the outcome measures specified in the authorizing legislation, chapter 11 summarizes what has been learned about each cost-containment

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participation instead of just actual participation increases.” The NSA expenditure standard was reduced to 10 percent to improve accountability for the new conversion authority and to prevent this expanded conversion authority from being used to substantially shift food money to NSA spending without increased cost-containment savings and participation.

practice implemented by the case study States. Technical appendixes are found at the end of the report.

# Chapter 2

## State Cost-Containment Practices and Their Administrative Costs

### Introduction

This chapter describes the cost-containment practices in the six case study States and presents estimates of their associated administrative costs. The information was obtained from State WIC program documents and interviews with officials of State and local WIC agencies in the six States. The interviews were conducted in spring and summer 2001. All data refer to practices in place in Spring 2001, when other data were collected for the study.<sup>1</sup>

State WIC agencies use three main types of cost-containment practices: vendor restrictions, food-item restrictions, and manufacturer rebates. These practices consist of various policies, depending on the State, as follows:

- **Vendor restrictions:**
  - Using competitive price comparisons to select stores for authorization and reauthorization as WIC vendors.
  
- **Food-item restrictions:**
  - Limiting the choice of WIC foods within certain categories to brands or types that meet both cost and nutritional standards.
  - Requiring the purchase of the least expensive brand of certain WIC foods.
  - Requiring the purchase of private-label or store-brand items for certain WIC foods.
  - Specifying minimum package sizes or forms for WIC foods.
  
- **Manufacturer rebates**
  - Contracting with manufacturers to obtain rebates on WIC sales in exchange for exclusive use of the manufacturer's product.

Cost-containment practices not addressed by this study include infant formula rebates and substitution of food package items. All States have rebate contracts governing the purchase of infant formula. The mandate for this study explicitly excluded this practice from consideration. States may also substitute food packages items to contain costs, particularly when experiencing unexpected increases in food prices. These adjustments in the types of foods prescribed must be made in a way that is consistent with the nutritional needs of participants, as required by FNS regulations. **Tailoring** of food quantities for individuals or categories of participants (i.e., prescribing less than the maximum authorized amount) is permitted only for nutritional reasons.

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<sup>1</sup> Appendix E provides general information on the cost-containment practices used by all State WIC agencies, as of late 1999. This information is not discussed in the chapter, because the report focuses on the six States selected for the case studies. The information is useful, however, for placing the selected States in the broader context of State cost-containment practices.

## Summary of Findings

The principal findings on the patterns of cost-containment practices in the six States covered by this study are described below.

### Vendor Restrictions

- All six States collected price data from retailers applying for authorization or reauthorization as WIC vendors. The States used this information for vendor management and, in some States, to ensure that retailers with excessive prices were not authorized as WIC vendors.
- Four of the six States (all except North Carolina and Ohio) used competitive price comparisons when they determine whether to authorize or reauthorize stores as WIC vendors.<sup>2</sup>
- In practice, States using competitive price comparisons rarely denied vendor authorization based on price. Instead, the States required a modest number of stores to reduce excessive prices in order to obtain or maintain authorization.
- North Carolina and Ohio also notified vendors if WIC item prices were considered excessive and encouraged the vendors to reduce these prices.
- All six States also collected data on the prices of participating vendors between authorization cycles. This practice was used for monitoring vendors and did not directly affect vendor authorization. Thus, although it was intended to reduce food costs, it is not considered a cost-containment practice that might limit participants' choice of WIC vendors.

### Food-Item Restrictions

- Four States required purchase of the least expensive brand of item for certain food categories, as follows: Connecticut (milk, eggs, cheese, citrus juice, and peanut butter); North Carolina (milk); Oklahoma (milk, cheese, eggs, and dried beans/peas); and Texas (milk and juice).
- Oklahoma was the only State that required purchase of private-label or store-brand items for cereal and juice (with some exceptions).
- California and Oklahoma had relatively narrow ranges of participant choice among cereals, as a result of price criteria and other factors considered when authorizing cereals for WIC use. California authorized 11 cereals, Oklahoma authorized 12, and the other States authorized 18 or more cereals.
- California also offered narrow ranges of choice among authorized juices (five types) and cheeses (four types), as the result of price and other food selection criteria. Oklahoma offered a narrow range of choice among authorized cheeses (five types). Texas offered a narrow range of choice among authorized juices (eight types).

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<sup>2</sup> North Carolina adopted WIC regulations requiring vendors to meet competitive price criteria effective July 1, 2002. All States are required to use competitive pricing as a criterion for WIC authorization as of October 1, 2002.



- All six States set minimum package sizes for at least one WIC food group, most commonly milk. California, Oklahoma, and Texas had the most package-size restrictions.

### **Manufacturer Rebates**

- California, Connecticut, and Texas received rebates on sales of infant cereal through contracts that specified a single authorized brand. Ohio received a voluntary grant from a national juice manufacturer equal to \$1 for each 46-ounce can of the manufacturer's juice sold in the State.

### **Administrative Costs**

- Cost-containment practices were quite inexpensive to operate, compared with the overall cost of program operations. Estimated total administrative costs ranged from \$0.14 per participant per year (PPY) to \$1.03 PPY, with a cross-State average of \$0.58 PPY.<sup>3</sup>
- On average, the administrative cost of cost-containment practices was about 0.4 percent of the total FY2001 nutritional services and administrative (NSA) cost in the study States. The range was from 0.1 percent to 0.6 percent.

This chapter describes the policies and procedures of the six States as of Spring 2001. Some States indicated during the interviews that they planned changes to cost-containment policies. For example, after June 2001, Oklahoma added four national-brand cereals to its food list in July 2001, and California increased its number of authorized juice labels to 84. Changes after June 2001 are not reflected in this chapter.

## **Data Sources**

Basic information on cost-containment practices was obtained by reviewing State WIC program documents, including the following: the WIC State plan submitted annually to FNS; vendor application forms, handbooks, and other communication materials; and food lists and buying guides for participants. The review followed a standard guide for abstracting specific information. Materials for the six study States were collected in March and April 2001.<sup>4</sup>

Interviews were conducted with representatives of all six State WIC agencies selected for the study. Connecticut interviews were held in person at the State's offices in Hartford in May 2001. All other interviews were conducted between June and August 2001 through a combination of telephone interviews (using a detailed questionnaire) and written correspondence.

Additional interviews were conducted with local WIC agency officials regarding the impact of cost containment on their operations. In each State, three local agencies were selected for telephone inter-

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<sup>3</sup> These totals are affected by missing values, as discussed in the text.

<sup>4</sup> Earlier versions of some of these materials had been collected from all WIC State agencies in the fall of 1999 for use in planning the study and selecting the sample. That information is summarized in the interim report. (See *Assessment of WIC Cost-Containment Practices: An Interim Report to Congress*. USDA, Economic Research Service, E-FAN-01-005, February 2001.)

views, representing one “urban,” one “suburban,” and one “rural” site.<sup>5</sup> Local agency interviews were conducted between July and September 2001.

### **Interview Topics**

The topics of the State agency questionnaire were:

- Vendor selection and management practices
- Food-item selection practices
- Administration of manufacturer rebates
- Food cost savings and their utilization
- Opinions and evidence regarding the impacts of cost-containment practices on participants.

Appropriate respondents were identified in each State, based on which staff had responsibility for the areas to be covered in the interview. Respondents were asked about their current cost-containment practices, including procedures and associated staff roles, changes in policies and procedures over time, and reasons for using or not using various cost-containment practices. To guide the interviews, a structured, open-ended questionnaire was used.<sup>6</sup> The researchers identified a comprehensive list of tasks associated with each cost-containment practice. States were also asked for quantitative data on administrative costs associated with cost containment, but generally were unable to provide these data.

State agency respondents estimated the staff time and other costs devoted to the administration of cost-containment practices. The respondents provided estimates to the extent that they were able to separate these costs from related program management functions (for example, to separate the use of price in vendor selection from other application-processing activities). In some cases, respondents estimated staff time for each individual task associated with one of the major cost-containment practices. More often, the respondents provided overall time estimates for the administration of each cost-containment practice.

The local agency interviews included questions about local responsibilities and administrative costs associated with orienting WIC participants about cost-containment restrictions. In North Carolina, these interviews included local agency roles in vendor training and food-instrument processing, activities that were centralized in the other States. The local agency respondents were also asked their views on the effects of cost-containment on participants and on the impediments to using savings in food costs to maintain or increase participation. In addition, these interviews gathered background information on the local agency to help understand the respondent’s perspective.

The descriptive data collected in the interviews with State and local WIC staff are summarized in the text of this chapter and in tables showing key similarities and differences among States. Quantitative data on staff time and other costs related to cost-containment were used to estimate administrative costs associated with each cost-containment practice. The chapter gives only an overall summary of

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<sup>5</sup> Appendix A describes sampling procedures and provides a list of the sampled offices.

<sup>6</sup> See appendix F for further information on these interviews.

the administrative cost results because of data limitations. Appendix F presents administrative cost estimates by State for each cost-containment practice.

## Overview of Vendor Authorization Process and Criteria

Under WIC regulations, food retailers must apply for authorization from the State WIC agency before redeeming WIC food instruments.<sup>7</sup> When a store changes ownership, the new owner must apply for authorization. For new stores and new owners, WIC regulations require a written application, a visit by State WIC personnel to the store, and a written agreement setting forth the terms of the store's participation as a WIC vendor. After authorization is received, WIC vendors must apply every 1 to 3 years, depending on the State's policies, to renew this agreement.

In the vendor authorization process, the State seeks to promote several WIC program objectives: participant access to prescribed foods, vendor integrity, conservation of administrative resources, and containment of food costs. Other participant service considerations include the availability of an adequate inventory of WIC foods and the quality of service. In addition to these objectives, States have reason to be selective, where possible, in authorizing WIC vendors, because they have limited administrative resources for vendor-management activities.

Table 2-1 summarizes the criteria used for vendor authorization in the six States in this study. All the States examined retailers' prices, inventories of WIC foods, and business integrity. At the time of the study, North Carolina and Ohio did not require competitive prices as a condition of authorization. Under USDA regulations effective October 1, 2002, however, all States are required to use competitive prices as a condition of authorization. Ohio and Oklahoma restricted the number of WIC vendors in each county.<sup>8</sup> Ohio, Oklahoma, and Texas required WIC vendors to be authorized by the FSP. Ohio and Texas also required WIC vendors to maintain minimum levels of WIC redemption volume as a condition for renewal of agreements. In North Carolina, Oklahoma, and Texas the vendor agreement is valid for 1 year. In California, the agreement is valid for 1 to 2 years, and in Connecticut and Ohio the agreement period is 1 to 3 years, depending on the vendor's record of program participation and compliance.

Ohio and Oklahoma restricted the number of WIC vendors in each county. According to FNS, this policy of numeric limitation of vendor authorizations is not a cost-containment practice, because it is intended to conserve vendor-management resources, not to reduce food costs. The policy appears to have had little or no impact in the two States that used it. Numeric vendor limits in Oklahoma resulted in only about three denials per year from 1999 to 2001. Ohio had not denied any vendor applications based on numeric limits, although one county had reached its designated vendor total when data for the study were collected.

Ohio had a unique system of "cost-containment" vendor contracts, not reflected in table 2-1. In Ohio, each county has a designated application period every 3 years. A vendor entering the WIC program

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<sup>7</sup> The food delivery regulations (7 CFR 246.12) include rules on WIC vendor authorization and management. A final rule amending these regulations was published on December 12, 2000. All States must comply with the amended regulations by October 1, 2002.

<sup>8</sup> The number of vendors authorized per county is based on minimum ratios of participants to vendors for different types of counties, with more participants per vendor expected in urban areas.

outside the designated application period for the county must agree to charge no more than 90 percent of the “not-to-exceed” amount printed on the food instruments. (The “not-to-exceed amount” is part of the practice of limiting payments to vendors, as discussed later in this chapter.) In these cases, the cost-containment contract applies for 1 or 2 years until the next regular contracting cycle, when the vendor can apply for a regular contract allowing up to the full “not-to-exceed” amount. This may be a minor deterrent to WIC participation for some high-priced stores, but the State does not believe that it had a significant effect on vendor applications.

**Table 2-1—Vendor authorization criteria and frequency in the study States**

Criteria	CA	CT	NC	OH	OK	TX
Competitive prices <sup>a</sup>	✓	✓	<sup>b</sup>	<sup>c</sup>	✓	✓
Number of WIC vendors per area				✓	✓	
Minimum inventory <sup>a</sup>	✓	✓	✓	✓	✓	✓
Business integrity <sup>a</sup>	✓	✓	✓	✓	✓	✓
FSP authorization				✓	✓	
WIC redemption volume		✓		✓		✓
Authorization period	1-2 years	1-3 years	1 year	1-3 years	1 year <sup>d</sup>	1 year

a Competitive pricing, minimum inventory, and business integrity became mandatory criteria under the final food delivery rule to be implemented in all States by October 1, 2002.

b North Carolina reviewed vendor prices and occasionally asked vendors to reduce prices considered excessive, but competitive prices were not required as a condition for authorization.

c Ohio reviewed all vendor prices at application but did not deny applications on this basis unless the number of applicants in the area exceeded the maximum number of vendors under the State’s numeric limiting criteria.

d Oklahoma conducted annual review and renewal of vendor agreements. Vendors had to reapply for reauthorization every three years.

## Use of Food Prices in Vendor Authorization

The use of price criteria in vendor authorization and reauthorization is one of the principal practices used to contain food package costs. All six of the States in the study collected prices from vendors and reviewed them as part of the authorization process, both for new vendors and for reauthorization of current vendors. The States differed, however, in the process for collecting prices, the standards for assessing them, and the actions taken when vendor prices were considered excessive. Table 2-2 summarizes each State’s practices.

### Collecting Price Information

All States collected vendor price data to evaluate applications for initial authorization. Texas collected the data through in-store price surveys completed by WIC staff. The five other States required vendors to submit price surveys with their applications. The price surveys required vendors to provide current nonsale prices for some or all WIC foods that they stocked. Most of these States

checked vendor prices through onsite review by WIC staff (for example, during preauthorization visits).

Between authorizations, five of the States monitored vendor prices through surveys or store visits. Four of the States—Connecticut, North Carolina, Ohio, and Oklahoma—required authorized vendors to submit price surveys two to four times a year.<sup>9</sup> In California, Ohio, and Oklahoma, WIC staff members checked prices during annual monitoring visits. Texas used redemption item prices instead of price surveys to monitor vendor pricing, as described below.

Vendor prices were also examined at reauthorization. Ohio and Oklahoma used their quarterly price surveys to check prices of stores applying for reauthorization. California, Connecticut, and North Carolina conducted separate price surveys for vendor reauthorization. WIC staff members checked prices during reauthorization visits in California, Connecticut, Ohio, and Oklahoma.

The food instrument redemption process also provided information about price. All of the States monitored redemptions for a variety of purposes, but two of the States explicitly used the prices of redeemed food instruments for vendor reauthorization. Oklahoma used redemption data along with vendor surveys in its price review for reauthorization.<sup>10</sup> Texas required vendors to record the price of each item on each food instrument, and the State analyzed the price information twice a year to identify vendors with excessive prices.<sup>11</sup> These vendors received warnings and risked nonrenewal of their WIC contracts.

### **Standards for Vendor Prices**

States examined vendor prices to determine whether prices were in an acceptable range. The standard for the acceptable range, however, varied by State (table 2-2). Three States used well-defined standards, whereas three relied primarily on analysts' judgment.<sup>12</sup>

Connecticut, Oklahoma, and Texas compared a vendor's prices for a standard combination of items to the average for the vendor's peer group. The standard combination of items typically included selected items from each category of WIC foods (such as a gallon of whole milk, a dozen large white eggs, and so on). These "food baskets" for price comparisons included infant formula and infant cereal, as well as the foods prescribed for women and children. The peer group was defined by area (county or other geographic unit served by the local WIC agency) and store type (defined by number of registers or monthly food sales). The threshold for excessive prices was 5 percent above the peer group average in Oklahoma, 7.5 percent in Connecticut, and 8 percent in Texas.

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<sup>9</sup> These surveys were used both to monitor individual vendors' prices and to set limits on the value of food instruments.

<sup>10</sup> Connecticut examined food instrument redemptions if it suspected a vendor to be overcharging. The State compared the vendor's redemptions against the expected cost of food instruments, based on the vendor's reported prices. If overcharges were found, the State billed the vendor for the excess. This practice, however, did not directly affect the vendor's continued participation.

<sup>11</sup> Texas was the only State that obtained item prices on food instruments; the other States obtained only the total cost of the combination of items on the food instrument.

<sup>12</sup> "Analyst" is the typical job category for WIC vendor-management staff members who review applications.

**Table 2-2—Use of food prices in vendor authorization**

<b>Practice</b>	<b>CA</b>	<b>CT</b>	<b>NC</b>	<b>OH</b>	<b>OK</b>	<b>TX</b>
Collecting price information at initial authorization	Vendor submits survey	Vendor submits survey	Vendor submits survey	Vendor submits survey WIC staff check prices in store	Vendor submits survey	WIC staff complete survey in store
Collecting price information between authorizations	WIC staff annually check prices in store (for vendors with 2-year agreements)	Vendor submits survey 2-3 times a year	Vendor submits survey twice a year	Vendor submits survey 4 times a year WIC staff annually check prices in store (for vendors with 2- to 3-year agreements)	Vendor submits survey 4 times a year WIC staff annually check prices in store	Vendors record item prices on vouchers WIC agency reviews redemption data twice a year
Collecting price information at re-authorization	Vendor submits survey WIC staff check prices in store Reauthorization is every 1-2 years	Vendor submits survey WIC staff check prices in store Reauthorization is every 1-3 years	Vendor submits survey Reauthorization is every year	WIC agency uses latest quarterly survey data WIC staff check prices in store Reauthorization is every 1-3 years	WIC agency uses latest quarterly survey data and analyzes redemption data WIC staff check prices in store Reauthorization is every 3 years	WIC agency reviews redemption data and response to notice of excessive prices (if any) Reauthorization is every year
Standards for vendor prices	Analyst determines that individual prices exceed maximum or are too high relative to average for store type and area, taking other factors into account	Cost of a standard combination of items is more than 7.5% above average for store type and area	Analyst judges individual prices to be excessive based on knowledge of prices	Analyst judges that cost of a standard combination of items is high relative to average	Cost of a standard combination of items is more than 5% above average for store type and area	Cost of a standard combination of items is more than 8% above average for store type and area
Response to excessive vendor prices	Survey returned with instruction to revise or justify prices	Survey returned with instruction to revise or justify prices	Analyst asks vendor to revise or justify prices	Analyst advises vendor that prices are high	Survey returned with instruction to revise or justify prices	Vendor notified that prices are excessive and given one chance to revise
Can application be denied if vendor does not reduce excessive prices?	Yes, but vendors always reduce prices and qualify	Yes, but vendors almost always reduce prices; only one denial in 3 years	No	No, unless number of applicants exceeds limit for area; no denials to date	Yes, but vendors always revise prices or are denied for other reasons	Yes, but vendors almost always revise prices; small number denied

In California, North Carolina, and Ohio, a WIC staff analyst reviewed vendors' prices and applied judgment and experience rather than a fixed standard. Ohio compared a vendor's total price for a combination of foods with an average, but the determination that a vendor's prices were high was based on the analyst's judgment. Vendors would be ranked by price if the number of applicants exceeded the State's limit on the number of vendors in the county, but this did not happen. In California, the analyst checked individual item prices against a standard based on location and store type, but the State's policy required the analyst to consider several other factors when determining whether prices were excessive.<sup>13</sup> In North Carolina, an analyst identified a problem only when a vendor submitted a price that was exceptionally high, based on the analyst's knowledge of prices for the item.

### **Response to Excessive Vendor Prices**

When excessive prices were found, four of the six States (California, Connecticut, Oklahoma, and Texas) returned the price survey forms and instructed the vendor to reduce the excessive prices or risk exclusion from the WIC program. In these cases, the vendor had the opportunity to justify high prices on the basis of high wholesale prices or other considerations, but the States rarely granted exceptions to their price standards.

The incidence of excessive-price determinations appears to vary among these four States, but none of them could quantify it. California estimated that, aside from chain stores, the vast majority of new vendor applicants had at least one or two prices identified as high. (The State finds that most chain stores have competitive prices for all WIC items.) Connecticut estimated that a small but nontrivial proportion of applications had excessive prices (approximately 10 to 30 of a total of 100 to 200 applications a year). Oklahoma indicated that high prices on vendor applications were not common. In contrast, Texas indicated that it was not uncommon for even chain stores to have some prices "out of line" when they first submitted their applications.<sup>14</sup>

Actual denials of applications based on price criteria occurred rarely in these States, because vendors cooperated and reduced their prices. California and Oklahoma had never denied an application on this basis, and Connecticut had denied only one, in 1998. Texas indicated that denials of vendor applications were rare, but that excessive prices were the most frequent reason when denials occurred. (The State agency was unable to identify the number of denials for this or other reasons at the time of the study.) Texas also declined to renew vendor agreements if the vendor had failed to reduce prices after a warning (based on semiannual analyses of redemption data), but no count of these cases was available.

State policies in North Carolina and Ohio, as implemented, did not permit the denial of authorization or reauthorization due to high prices. Ohio would have used price criteria if the number of vendors in a county exceeded specified limits, but these limits were never reached. Instead, Ohio reminded vendors that they would not be reimbursed for more than the maximum value specified by the State

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<sup>13</sup> In California, if a store's prices were high relative to its peers, the analyst considered whether the store had high transportation costs, low WIC volume, an extreme rural setting, or current wholesale costs that justified the prices. The California WIC agency plans to implement a system with more fixed criteria for vendor prices based on peer group averages, which will also be used to set maximum reimbursement levels for food instruments. At the time of the data collection, the State expected to implement this system by October 2002.

<sup>14</sup> Texas revised the criteria for categorizing vendors between 1996 and 2001 so that independent stores would not be compared with chain stores having much lower wholesale costs.

on WIC food instruments.<sup>15</sup> When high prices were identified in North Carolina, WIC officials tried to persuade the vendors to reduce them. North Carolina WIC staff indicated that these situations were rare, and that vendors usually agreed to lower prices or provided justification for existing prices.

### **Summary of Vendor Restrictions Based on Prices**

Among the States in the study, Connecticut, Oklahoma, and Texas had the most stringent policies regarding competitive pricing as a condition of vendor authorization. These States had quantitative price standards for new applicants and renewals. Retailers clearly could be excluded from WIC in these States based on excessive prices, although the incidence of such denials was very low.

California, North Carolina, and Ohio either did not use price criteria for authorizations or had less stringent policies regarding competitive pricing. North Carolina did not apply price criteria for authorizations. Ohio's price criteria were not actually applied, because they depended on numeric limits that had not been reached. California asked some retailers to adjust prices when they appeared high, but the State's relatively flexible price criteria were used solely to obtain adjustments in individual prices. None of these three States had ever denied vendor authorizations based on price.

For the purpose of this study, Connecticut, Oklahoma and Texas have been categorized as "restrictive" with respect to requiring competitive prices as a condition of vendor authorization, whereas California, North Carolina, and Ohio have been categorized as "nonrestrictive". The difference between the "restrictive" and "nonrestrictive" States in the number of actual denials of vendor authorization is quite small. The principal effect of the competitive pricing policy appears to be that modest numbers of vendors reduce some of their prices. Nevertheless, the competitive pricing policy in the "restrictive" States might conceivably influence vendor participation, because of the explicit standards applied by these States with the known possibility of the State denying vendor authorization. It does not seem likely that vendor participation would be influenced by the more limited use of price information in the "nonrestrictive" States.

### **Use of Food Price Information to Limit Payments to Vendors**

Under USDA regulations effective October 1, 2002, all State WIC agencies are required to establish price limitations on the amount that they will pay vendors. Prior to that date, the use of price limitations was at the discretion of the individual States. As described below, all six States in the study used price limitations when data for the study were collected in the spring and summer 2001.

As a practice for managing authorized vendors and ensuring the integrity of the food delivery system, all six States in the study used price standards for individual WIC foods to set limits on allowable payments for redeemed food instruments, otherwise known as maximum, or "not-to-exceed," values. In all of these States except Texas, each food instrument had a maximum total value that depended on the items on the instrument. Texas, on the other hand, set a maximum price for each item on the food instrument.

Maximum values for food instruments have two purposes. First, the process catches errors and deliberate overcharging by vendors. For example, if a clerk enters an extra zero on the price, so that the

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<sup>15</sup> All six States specified maximum values for food instruments, but Ohio relied more on this policy to restrain vendor prices than the States with the authority to deny vendor applications based on prices.



vendor deposits a WIC check for two gallons of milk for \$45.00 instead of \$4.50, this error will be detected if the State has a maximum value of \$6.00 for the check. Second, the maximum value limits the charges by vendors whose actual prices are high relative to the standard used by the State. This practice allows the State to ensure that food package costs are consistent with competitive prices among WIC vendors, particularly under the Texas model.

The “maximum value” policy is closely related to the use of food prices in vendor selection. As noted in the previous section, States notified vendors if the prices they submitted at the time of application exceeded the standards used by the State to set maximum values for food instruments. Price surveys of vendors and redemption data were the principal sources of market data for setting maximum values. The use of maximum values, in turn, provided feedback to the vendors: if their prices were high, the State rejected or reduced their requests for reimbursement.

The use of maximum values was not among the cost-containment restrictions on which this study focused. Maximum values are not intended to affect vendor participation or participants’ choice of WIC foods. Therefore, the study did not look for any such effects or compare participant outcomes on the basis of differences in the implementation of this practice.

Nevertheless, the study collected information on the use of maximum values in the study States because of the possibility that this practice could have an impact on vendor participation. A stringent set of maximum values might have the effect of discouraging participation by small independent stores whose prices are high because of high costs for wholesale food and other expenses. This effect would help hold down food costs, but it could also reduce access to WIC foods for participants lacking access to large chain stores, including those in inner-city and rural communities. Thus, use of stringent maximum values could result in the State failing to comply with Federal rules requiring adequate geographic dispersion of WIC vendors.

Evidence suggested that limits to store participation in WIC were minimal or nonexistent. Very few food instruments were rejected or adjusted because they exceeded the maximum values. Furthermore, a high proportion of broad-line retailers were authorized as WIC vendors in the six States. The States regularly adjusted their maximum values when rejection rates rose or when they had evidence of wholesale price increases. Further information on the practices of the six States regarding maximum values and on the incidence of rejected food instruments appears in appendix G.

## **Food-Item Restrictions**

To contain food package costs, the six States in the study used a variety of restrictions on the food items authorized for purchase with WIC benefits. These restrictions were in addition to the Federal and State requirements for the nutritional content of WIC foods and the restrictions related to the States’ contracts for infant formula rebates. Thus, each State’s list of WIC-authorized foods reflected a combination of nutritional and cost considerations. This section describes how the six States applied cost criteria when establishing their WIC food lists and how they implemented each of these restrictions.

All six States take the cost of foods into account when they choose products for their food lists. Cost criteria were put in place in the early 1990s (or earlier in some of the States). The importance of food cost has varied over time, as program growth has slowed and issues of outreach and participant

retention have become more important. Other criteria applied to WIC food lists include nutritional standards, participant satisfaction, and ease of administration. Some States impose more stringent nutritional standards than the Federal WIC standards. For example, California does not authorize any cereals containing fruit and has a preference for cereals with higher folic acid content. Participant satisfaction is important for two reasons: first, ensuring that participants will buy and consume the prescribed foods, and second, maintaining interest in the WIC program so that participants get its other benefits. States also seek to keep their food lists manageable in size, because they must educate local staff members, vendors, and participants about the lists on an ongoing basis. Another administrative factor is limited space on food instruments to specify prescribed foods.

The formulation of WIC food lists focuses mainly on breakfast cereal and juice. These food categories have much more variety, both in formulation and in price, than the categories of milk, eggs, peanut butter, and dried beans/peas. Consumers are believed to have stronger brand loyalties and taste preferences in cereals and juices than in the other categories. (Cheese is another food category with considerable variety in types of products and preferences, but Federal WIC regulations authorize only nine specific types of cheese.) Cereals and juices vary considerably in their nutrient content, by both brand and type, so the States have to check that each product meets WIC standards.<sup>16</sup>

The cycle for reviewing and revising food lists varied among the study States. All six States reviewed and updated their food lists at least every 2 years. Connecticut and Ohio had a regular 2-year cycle for their entire food lists. California did a review every 2 years of food selection criteria, market share of WIC foods, nutrient contents, and cereal costs. Oklahoma revised its food list every 1 to 2 years, and North Carolina revised its food list every year. Texas did a full review every year.

In addition to the regular review cycle, the States made changes if needed during the year. For example, when orange juice prices rose several years ago, several States temporarily took orange juice off their food lists. California made two revisions to its list of authorized juices within a period of several months as it made the transition from its exclusive rebate contracts for juice to having several authorized brands of each type (as discussed later in this section).

The basic process for reviewing and revising the food lists was quite similar in the six States. WIC staff reviewed the prices, nutritional content, and popularity of the currently authorized foods and other products that might be added. All of the States except Texas used data from vendor price surveys to identify the current prices of authorized WIC foods; Texas used the prices on redeemed WIC food instruments for this purpose. Other resources used by the States to determine food costs and sales volume included manufacturers' suggested retail prices, wholesalers' prices, market research data, and redemption data. Manufacturers' and suppliers' specifications and review of sample product labels were used to check nutritional contents. California, Connecticut, Ohio, and Texas used participant surveys, focus groups, or taste tests to provide input on food preferences and acceptability. This review could be done exclusively by State staff, with separate local office input, or by a joint team of State and local staff. For example, California solicited input from local agencies via regional meetings and a task force.

The six States differed in their approaches to incorporating cost considerations in their food lists. Oklahoma and Texas relied primarily on broad policies requiring least expensive or store brands,

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<sup>16</sup> WIC regulations set a minimum level of vitamin C in juice and iron in cereal. The regulations also limit the amount of sucrose and other sugars in cereals (see appendix H).

although Texas also set minimum package sizes for different cereals based on cost. Connecticut would not authorize foods that exceeded 125 percent of the average cost for foods of the same type. (For example, the State’s food list excluded foil-packet tuna, because the cost per ounce was more than 125 percent of the cost per ounce of canned tuna in water.) North Carolina ranked products by price within each food category and set a price limit for the category, although particularly popular brands or types that were considered important (such as rice cereals) might have been included even if they exceeded the limit. North Carolina described its price limits as “very liberal” because the State had not found it necessary to manage closely the average food package cost. In an effort to create a list with the best balance of cost, nutrition, and acceptance, California assembled alternative combinations of cereals and projected costs of these combinations, including both popular but more expensive products and less expensive ones. Ohio ranked food costs as the least important criterion for selecting foods for the WIC program; the State found that its vendor management practices ensured adequate control of food costs.

### **Restrictions on Authorized Food Types**

California and Texas were more restrictive than the other States with regard to the types of foods authorized on the WIC food list. In California, considerations of cost, nutrition and ease of administration led the State to offer the fewest types of cereal (11), cheese (4), and juice (6).<sup>17</sup> Oklahoma authorized fewer types of cheese (5) than any other State besides California. The State conducted more extensive cost analysis of cereals than cheese and juice. Texas authorized relatively few types of juice (8) as part of its multifaceted approach to containing juice costs.

The States varied in the types of eggs they allowed. Only North Carolina permitted purchase of brown eggs as well as white, and four States—California, Connecticut, Oklahoma, and Texas—prohibited purchase of extra large eggs.

### **Least Expensive Brand Requirements**

Connecticut, North Carolina, Oklahoma, and Texas required participants to select the least expensive brand of milk. Except for North Carolina, these States also required the purchase of the least expensive brand of one or more other foods. Connecticut applied this restriction to the most foods: milk, eggs, cheese, citrus juice, and peanut butter. Oklahoma had four categories in which the least expensive brand was required: milk, eggs, cheese, and dried beans/peas.<sup>18</sup> Texas required purchase of the least expensive brands of juice and milk. These policies had been in place in the four States since the early 1990s or before.

The foods for which these States had established least expensive brand requirements are generally commodity items that are quite similar across brands. For this reason, the States view the least expensive brand as a reasonable substitute for more expensive brands that participants may prefer. The differences among the States in the range of foods subjected to this policy reflect, in part, differences in the State’s assessment of the acceptability of least expensive brands. For example, negative participant reactions to least expensive brand restrictions on peanut butter led Oklahoma and Texas to drop these restrictions. Concern about participation satisfaction was a major reason that officials in California and Ohio cited for not adopting these restrictions.

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<sup>17</sup> An important administrative factor in California was the challenge of educating a linguistically diverse population.

<sup>18</sup> The “dried beans/peas” category includes dry beans, peas, lentils and other legumes.

California had a policy of requiring the least expensive brand of milk from 1999 to 2000, adopted when milk prices were rising. Both participants and cashiers were often confused by the policy, so the State switched to using monthly data to set maximum prices for milk and dairy food instruments as a way to control costs while responding to changes in the market.

When these States require a participant to select the least expensive brand of a WIC food, the participant always has the choice of the type or flavor, as long as it is included in the WIC food prescription. For example, participants can generally choose among whole, reduced-fat, and low-fat fluid milk. The participant may also have a choice of form or package size, such as gallons versus half-gallons of milk. Within the participant's choice of authorized types and package sizes or forms, she must then choose the item that represents the least expensive brand (such as the brand with the least expensive gallon of whole milk). This distinction sometimes causes confusion for participants or store cashiers who may think that the participant must choose the least expensive type offered. (Such confusion was a factor in California's decision to drop its least expensive brand policy for milk.)<sup>19</sup>

Texas authorized both store brands and national brands in numerous categories of juice. The participant chose the type and form of juice (for example, frozen orange juice) and then had to select the item that represented the least expensive authorized brand. This might be a store brand or national brand, depending on the brands authorized by the State and offered by the vendor.

The rules for identifying the least expensive brand varied somewhat among the States. Most often, this was a store-brand or private-label product (unless the vendor carried only national brands). Many of the States' food lists equated "least expensive" with "store brand." Nevertheless, most of the States technically defined the least expensive brand as the one that cost least at the time of purchase, taking into account sale prices, coupons, and availability. Thus, the participant might have had to check prices to determine the least expensive brand, although the cashier was ultimately responsible for making sure the item was allowable. A national brand might have been the least expensive brand if it was on sale, if the participant had a manufacturer's coupon, or if it was the only brand available. For example, a manufacturer's coupon might have made Kraft American cheese less expensive than the store brand of this product, allowing a participant to choose the national brand while meeting the State's requirement.

In Texas, each vendor declared the "traditionally least expensive brand" for each type of WIC food subject to this requirement as part of the application process. This brand was the one that was normally least expensive, but it could have occasionally cost more than another brand that was on sale. To facilitate WIC shopping, the vendor marked the designated brand as "WIC authorized" on the shelf. If the designated brand was out of stock, the vendor was supposed to identify the least expensive brand that was in stock.

### **Private-Label or Store-Brand Restrictions**

"Private-label" or "store" brands are marketed exclusively by specific retailers or wholesalers.<sup>20</sup> They are usually offered as a less expensive alternative to a similar "national" brand, that is, a product

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<sup>19</sup> An unbranded generic food might be the least expensive "brand," but none of the States identified such generic foods on their WIC food lists.

<sup>20</sup> Another term for these products is "controlled brands."

branded by the manufacturer and marketed nationally in a variety of competing outlets. In contrast, the availability of private-label or store-brand products depends on the locations served by the retailer or wholesaler. Within a State, a retailer may operate in only selected areas, so the retailer's store-brand products may not be available statewide. State WIC agencies may require a brand to be available statewide to keep the number of authorized products manageable.

The proliferation of store-brand and private-label products provides both an opportunity and a challenge in compiling food lists. On the one hand, these products often provide significant cost savings over national-brand products. On the other hand, in considering a store-brand version of a product (such as toasted oat circles), the State needs to review all store-brand or private-label products offered, to assure equity among the many vendors. The State must determine that each brand of these products meets WIC nutritional standards, which is not always true even if the equivalent national-brand product is WIC-approved. The State also needs to be sure that the product is widely available, to avoid participant confusion and to keep the food list manageable. For these reasons, Ohio chose not to authorize store-brand or private-label cereals, but the State did authorize some store-brand and private-label juices. Only Oklahoma and North Carolina had extensive lists of authorized store-brand or private-label cereals.

Oklahoma had the broadest policy of restricting WIC food purchases to store-brand or private-label foods, with nearly all cereals and most adult juices subject to this policy. (Oklahoma did allow some national brands of frozen or shelf-stable concentrated juices, and also some full-strength canned juice blends.)<sup>21</sup> There were instances of this type of restriction, however, in two of the other States. California and Texas allowed only store-brand or private-label crispy rice cereals. (The discussion that follows uses the term "store brand" to include both store brands that are exclusive to a single retailing firm and private-label brands owned by a wholesaler that may supply them to several retailing firms.)

In practice, the least expensive brand is often the store brand, particularly in the supermarkets where most WIC participants shop. Therefore, the least expensive brand policy is similar in outcome to the store brand policy, but there is an important difference between the two. In States with the least expensive brand policy, the State authorizes national as well as store brands. Vendors can count the national brands towards the WIC food inventory requirements, and participants can choose national brands if they are the least expensive in that store. When the State authorizes only store brands, vendors must carry them as a condition of authorization, and participants can never purchase a national brand.

Texas removed national brands of cereals from its WIC food list in 1990, but began adding them back in 1995. The balance of store and national brands gradually shifted in later years, so that the 2001 food list had 17 national brands and 14 store brands. According to State officials, the original decision to drop the national brands was intended to reduce food package costs at a time when they were rising and the State was trying to stretch its food grant farther. The State began adding back national brands when it became clear that participants were dissatisfied with receiving only the store brands, although the State also found that nutritional formulations were better in the national brands (for instance, with folic acid added). To hold down the cost of adding the national brands, the State set

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<sup>21</sup> At the time of the study, Oklahoma had authorized two national brands of cereal, one for hot cereal and one that was a less popular competitor to the dominant national brand in its category. In July 2001, Oklahoma added four national brands to its list of authorized cereals. One reason for this decision was declining WIC participation, which the State thought might be influenced by the lack of national brand cereals.

minimum package sizes to take advantage of discounts on large packages, while still seeking to leave the participant flexibility in filling this part of the food prescription. Each year, the State evaluates its list of cereals for nutritional content, cost per ounce, and participant acceptance (the latter based on surveys). Thus, the list continues to evolve as the State tracks changes in available cereals and monitors participant satisfaction and costs.

### **Package-Size Restrictions**

The six States varied in their use of package-size restrictions to hold down the unit costs of WIC foods. The most notable variations were in the minimum package sizes for fluid cow's milk, cheese, and eggs. Three States—North Carolina, Ohio, and Texas—required at least half-gallon containers of fluid cow's milk, and two States—California and Oklahoma—required gallon containers.<sup>22</sup> California, North Carolina, and Texas had minimum package sizes for cheese.

The six States had similar minimum package sizes for juice, dried beans/peas, and infant cereal, with some exceptions. Texas restricted single-strength fluid juice purchases to 46-ounce cans (excluding the more expensive plastic bottles), and California restricted single-strength juice purchases to 64-ounce bottles (as discussed in the preceding text). Four States (all except Ohio and Oklahoma) had an 18-ounce minimum package size for peanut butter.

California, Connecticut and North Carolina had standardized minimum package sizes for all brands of cereal, while Ohio and Oklahoma did not have minimum package sizes for cereal. Texas set different minimum package sizes for cereal, depending on the type and brand, so that the minimum package sizes were larger for the more expensive types or brands.

### **Summary of Food-Item Restrictions**

Table 2-3 summarizes the food-item restrictions used by each State. As the table shows, the most common restrictions were minimum package sizes (used in all six States), least expensive brand requirements (used in four States), and limits on allowed types (used in four States). Store-brand restrictions were used in three States. Texas used all four types of food-item restrictions, whereas Ohio used only one type. Chapter 3 provides detailed information on the restrictions for each WIC food group.

### **Communicating and Enforcing Food-Item Restrictions**

The list of allowed WIC foods is the primary medium for documenting and communicating food-item restrictions to participants and vendors. Each State distributes a list of authorized foods to all participants and vendors when they enter the WIC program. In addition, current participants and vendors receive updated lists when changes are made. Producing and distributing the food list is an important and resource-intensive activity, particularly when major changes are being made.

The food lists provide information on authorized food categories, food types, and package types or sizes. When the State has a policy limiting food choices to least expensive or store brands, this is specified on the food list. For ease of recognition by participants and vendors, several of the States

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<sup>22</sup> Different minimum package sizes applied to less commonly prescribed forms of milk, such as nonfat dry milk and lactose-reduced milk.

place photographs of authorized foods on their food lists, or at least the logos of the manufacturers of authorized brands. This approach is particularly helpful for States with substantial non-English-speaking populations, even when translations into Spanish or other common languages are available. It adds to the cost and complexity of producing the list, because the State needs to incorporate photographs of the items from manufacturers or suppliers.

**Table 2-3—Summary of food-item restrictions, spring 2001**

Restriction	CA	CT	NC	OH	OK	TX
Limits on allowed types of foods	Cheese, juice, adult cereal, no XL eggs	No XL eggs			No XL or L eggs <sup>b</sup>	Juice, no XL eggs
Least expensive brand requirements		Milk, eggs, cheese, citrus juice, peanut butter	Milk		Milk, eggs, cheese, beans	Milk, juice
Private-label or store-brand restrictions	Crispy rice cereals				Adult cereal, non-concentrated juice	Crispy rice cereals
Package-size restrictions on fluid cow's milk, cereal and cheese <sup>a</sup>	Milk (g); cereal (12 oz.); cheese (12 oz.)	Milk (q); cereal (10 oz.)	Milk (h); cheese (8 oz.); cereal (12 oz.)	Milk (h)	Milk (g)	Milk (h); cereal (see note); cheese (10 oz.)

a For juice, infant cereal, and beans, all States had package size restrictions with little variation. Texas set different minimum package sizes for different types or brands of cereal based on cost. California had a 64-oz minimum size for nonconcentrated juice; all other States had a 46-oz. minimum, with Texas permitting only cans. All States except Ohio and Oklahoma had an 18-oz. minimum package size for peanut butter. All States allowed eggs in only 1-dozen cartons.

b Oklahoma allowed large eggs if medium eggs were not available.

(g) = gallon; (h) = half gallon; (q) = quart; L = large eggs; XL = extra-large eggs.

Participants receive training on how to shop with WIC benefits when they are certified and recertified. Local WIC staff members provide this training on an individual or group basis. The training includes discussion of the WIC food list and how to locate authorized foods in the store. Connecticut, and Texas cited the least expensive brand policy as one of the main sources of participant confusion about authorized WIC foods, because this policy requires the participant to determine which is the authorized brand. In response to this challenge, Texas developed its requirement for vendors to mark the least expensive brand on the shelf. On the other hand, Oklahoma did not view this policy or its store-brand-only restrictions as a significant source of confusion. Other training topics are how to select cereals so that they fit within the minimum package-size restrictions and how to use as much of the 36-ounce WIC prescription as possible.<sup>23</sup> Participants can call their local WIC office or a toll-free State WIC hotline if they have questions about which foods they can buy with their WIC benefits.

<sup>23</sup> The range of package sizes can make it difficult for participants to select a combination of packages representing exactly 36 ounces of cereal, particularly when the minimum size is 12 ounces or more.

All of the States provide in-person training on WIC program rules and procedures to new vendors, and periodically to current vendors. This training typically includes discussion of the WIC food categories and careful review of the food list. The training may be one-on-one or in a group setting, depending on the number of vendors to be trained and the available staff. The States notify vendors whenever the WIC food list or a food package is changed.

Like the participants, vendor personnel appear to have more difficulty understanding least expensive brand policies than other cost-containment restrictions. Checkout clerks tend to assume that the store brand is always the authorized brand, but some of the States with this policy allow participants to select a national brand if it is priced lower than the store brand or if the participant has a coupon to achieve this result. In Texas, the “traditionally least expensive brand” policy avoids this problem, and the declaration of least-expensive brands helps to draw out any questions when the vendor first enters the program. In general, the States do not view food-item restrictions as difficult to communicate to vendors, although the States with fewer restrictions reported fewer problems. Vendors can get information by calling WIC vendor management staff at the State level or, in North Carolina, at the local level.

Routinely available information does not exist to help the States enforce food-item restrictions. Vendors do not provide information on the brands or types of foods selected by participants, and only Texas obtains the prices of individual items. Unless a WIC representative observes a violation of food-item restrictions or receives a complaint, there is no way for the State to know that a violation has occurred.

The States rely on preventive vendor-management practices, including training and monitoring visits, to promote compliance with food-item restrictions. None of the six States devotes substantial resources to enforcing participant and vendor compliance with food-item restrictions. They will investigate complaints and apply sanctions when violations are reported, but their compliance enforcement efforts focus on trafficking, overcharging, and other more serious violations. When they attempt purchases of unauthorized items during undercover compliance investigations, they usually choose blatantly ineligible items such as sugar-coated cereals or sodas. Some States have found that administrative hearing officers are reluctant to uphold vendor sanctions based on more technical requirements, such as specified brands. Investigators sometimes test compliance with package size limits, which are viewed as easy to understand. The States, however, do remind vendors periodically of the potential penalties if they are found to have sold unauthorized items. Texas indicated that it hopes to begin testing for compliance with item restrictions after other enforcement priorities have been met.

## **Manufacturer Rebates**

Three of the six States—California, Connecticut, and Texas—had contracts to secure rebates from Gerber Foods, a manufacturer of infant cereal. As a condition of these contracts, the States exclusively prescribed this brand of infant cereal. The Gerber brand was specified on the States’ WIC food lists, and vendors were required to carry it. These contracts were established in the early 1990s, and the States have repeated the contracting cycle several times since then.

California had rebate contracts with several juice manufacturers in FY1998 through FY2000. Under these contracts, the State limited participant choice to the contract brand for each type of juice, and



the manufacturers paid rebates that reflected WIC's impact on their sales. (California issues separate WIC checks for juice, so the total volume of WIC juice sales was known, but additional market data were used to determine the rebate under each contract.) These contracts yielded a total of \$40,554,426 in rebates over 3 years, but the State determined they were not cost-effective and did not seek a second round of bids. Despite the magnitude of the rebates, these contracts did not yield net savings in the unit cost of juice, while imposing burdens on both participants and agency administrative staff. The 46-ounce container size specified in the WIC contracts was not popular among non-WIC consumers, who were buying 64-ounce containers. As a result, the cost per ounce of the 46-ounce containers after the rebate was higher than the market price per ounce of the more popular 64-ounce containers. Thus, the State determined that it could reduce juice costs by prescribing multiples of 64-ounce containers (for participants preferring shelf-stable juice to frozen juice) and requiring a minimum package size of 64 ounces.<sup>24</sup>

The States that did not have rebates for infant cereal or other foods did not believe that the yield from the rebates would justify the effort to establish them and obtain reimbursement. In North Carolina and Ohio, State officials indicated that food costs, particularly for infant cereal, did not pose a serious problem. Oklahoma's choice not to pursue rebates was based in part on the State's assessment that an infant cereal manufacturer would not find it worthwhile to contract with a small State for this purpose. These arguments highlight the tradeoff between the food cost savings to be realized by cost-containment practices and the WIC staff effort to administer these practices. In the case of infant cereal, three of the six States found that the scales were tipped by the potential administrative costs and the opportunity cost of not spending staff time on higher priorities.

The infant cereal rebate contracts are modeled on the States' contracts for infant formula rebates, and the procurement process is similar. Every 2 to 3 years, the State issues a request for proposals to qualified manufacturers of infant cereals. Interested manufacturers submit bids with specified rebates, and the State follows its procurement rules to select the winning bidder. Since these contracts were first established in the early 1990s, these States have often had only one bid. Texas had no infant cereal rebate contract for one year because it received no bids.

As specified in the rebate contracts, the States bill the selected manufacturer for rebates on a monthly basis. The State issues a separate food instrument for infant cereal and uses redemption data to determine the quantity purchased. Using the established formula for computing the rebate, the State generates an invoice and sends it to the manufacturer with supporting documentation. The manufacturer sends back the payment, which the State reviews and records in its financial records.

In addition to these exclusive rebate contracts, some of the States in the study had nonexclusive agreements to obtain rebates or reimbursements from manufacturers or suppliers. Ohio received a grant from a national juice manufacturer equal to \$1 for each 46-ounce can of the manufacturer's juice sold in the State. The manufacturer computed the grant amount and sent it without any billing by the State.

Connecticut received a reimbursement from milk producers under the terms of the Northeast Dairy Compact. This payment was designed to offset the impact of the Compact on wholesale milk prices, so that the WIC program's net cost for milk was the same as it would be without the compact.

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<sup>24</sup> California's practices regarding juice prescriptions and package sizes are discussed further in Chapter 4.

Connecticut WIC staff used redemption data and a complicated formula to compute the reimbursement amount. The other State WIC agencies and participating school food authorities in the Compact States also received a similar reimbursement. Unlike the rebates and grants arranged between the States and manufacturers, the Northeast Dairy Compact reimbursements are mandated by regulations. State WIC agencies outside the Northeast region are not subject to the terms of the Compact.

Table 2-4 provides the infant cereal rebate amounts, in total and per participant, for FY1998 through FY2000.<sup>25</sup> Connecticut's dairy compact reimbursements are also included, even though the compact is not considered a WIC cost-containment practice.

**Table 2-4—Dollar value of manufacturer rebates (nonformula)**

	FY1998	FY1999	FY2000
Infant cereal totals			
California	\$4,082,192	\$4,678,021	\$4,815,594
Connecticut	211,292	226,654	227,987
Texas	2,039,840	2,221,320	2,375,403
Connecticut Dairy Compact reimbursement	\$151,573	\$154,663	\$273,660
Infant cereal rebate per participant <sup>a</sup>			
California	\$3.36	\$3.80	\$3.95
Connecticut	3.51	3.89	4.48
Texas	2.95	3.14	3.22
Connecticut Dairy Compact reimbursement per participant	\$2.52	\$2.65	\$5.38

a Participant count is total, but rebate is earned only on cereal prescribed for infants.

## Administrative Costs of Cost-Containment Practices

Detailed data were collected on staff time for each cost-containment practice, as described in Appendix F. None of the States had previously measured or estimated the costs or level of effort for these practices. Instead, the State staff developed their best estimates of the time required, based on their recent experience. For some activities, the States estimated the total time and the proportion of time attributable to the cost-containment practice. (For example, the time spent on the use of price information to select foods for WIC authorization was difficult to estimate, so the States provided estimates of the total time on the food list selection process and the proportion attributable to the cost-containment practice.) Staff time estimates were combined with information on salaries, fringe

<sup>25</sup> These figures were reported by the California, Connecticut, and Texas WIC agencies for this study. FY2000 data may not be identical to information on FNS financial reports finalized after the data collection in the summer of 2001. FY2001 data were not available at the time of the data collection.

benefit costs, and indirect costs to estimate the administrative costs of the cost-containment practices.<sup>26</sup>

The approach was potentially subject to a substantial amount of error or bias, because of the reliance on the judgment of the State staff. Also, fluctuations in administrative priorities and procedures could have made the estimates high or low relative to long-run average costs. Therefore, the following summary information is presented with considerable caution. It is primarily useful to illustrate the relatively small scale of the administrative costs for the cost-containment practices discussed in this chapter.

As table 2-5 shows, the cross-State average estimated cost of cost-containment practices was \$0.58 per participant year (PPY). The range of estimates across the States was from \$0.14 to \$1.03 PPY. Despite these extreme values, four of the States had cost estimates in a much narrower range, from \$0.46 to \$0.79 PPY. (See appendix F for State-by-State estimates.)

**Table 2-5—Administrative costs of cost-containment in the study States (all dollar figures are per participant year)**

<b>Practice</b>	<b>Minimum<sup>a</sup></b>	<b>Average<sup>a</sup></b>	<b>Maximum<sup>a</sup></b>
Use of price data in vendor selection	\$0.01	\$0.06	\$0.10
Use of price data in selecting allowable brands, varieties and packages	<\$0.01	\$0.19	\$0.71
Communicating price-based restrictions on allowable foods to participants	\$0.44	\$0.52	\$0.67
Communicating price-based restrictions on allowable foods to vendors and monitoring compliance	\$0.02	\$0.07	\$0.16
Establishing and reviewing nonformula rebate contracts	<\$0.01	\$0.03	\$0.05
Tracking and claiming manufacturer rebates (nonformula)	<\$0.01	\$0.01	\$0.03
Total for all cost-containment practices <sup>b</sup>	\$0.14	\$0.58	\$1.03
Total as percent of FY2001 NSA cost	0.1%	0.4%	0.6%

a Minimum, average, and maximum are for States with non-zero estimates.

b Totals are based on State totals for estimated costs. Some costs were missing or not applicable for some States. Thus, averages for individual practices do not sum to overall average.

The process of communicating information to participants on price-based item restrictions had the largest average cost, \$0.52 PPY, among the States for which estimates were obtained. Unlike the other practices, this one involves direct contacts at local agencies with participants. The use of price data in selecting allowable foods had the second-highest average cost, \$0.19 PPY. The average costs for the other practices were less than \$0.10 PPY.

<sup>26</sup> Some States (e.g. Connecticut) do not charge indirect costs against their WIC NSA grants. Indirect costs are included in the administrative cost estimates for all States so that the estimates are complete and comparable.

In the context of the overall costs of program administration, the cost-containment practices implemented by the case study States were inexpensive to operate. The estimated total administrative costs ranged from \$0.01 per participant per month (PPM) in Oklahoma to \$0.09 PPM in Connecticut. These estimates may under- or overstate actual costs because the States could not always provide information needed to estimate costs for specific functions. Even allowing for a considerable margin of error, however, costs related to cost-containment were small. The estimated costs represented, on average, about 0.4 percent of the States' FY2001 NSA costs, with range from 0.1 to 0.6 percent of NSA costs.

# Chapter 3

## Approved Foods and Food Selection

The food-item restrictions described in the preceding chapter result in a list of approved WIC foods that is unique for each State in the study. The variations in approved foods may lead to differences in average food package costs, availability of items in the store, participant satisfaction with and consumption of available foods, and redemption of food instruments—topics discussed in subsequent chapters. This chapter presents details about the State lists of approved foods that will contribute to understanding the empirical results presented later. The chapter also gives information about the food items that participants purchase in each State.

### WIC-Approved Foods

Chapter 2 described the types of food-item restrictions that the six States in the study used in 2001 to reduce food package costs: requiring participants to purchase the least expensive brand available for certain prescribed foods; limiting foods to specified types and brands; and restricting packaging or package sizes. Table 3-1 provides a detailed listing of the foods allowed in each State in January 2001, at the start of the study's data collection period. The information was gathered through a review of each State's list of allowed foods. These lists are usually printed in a format that can be used by WIC participants as a guide when they do their WIC shopping.

Table 3-1 is divided first by food category, with separate sections for milk, cheese, eggs, infant cereal, juice, dried beans or peas, peanut butter, and breakfast cereal. Within each section, information is provided on allowed brands, types (or flavors), and package sizes or forms. Several sections also list types and package forms that are not allowed. State lists of approved WIC foods frequently identify foods that are often mistakenly believed (or desired) to be approved, but are not.

State lists of approved foods must conform to Federal regulations, which specify maximum quantities of prescribed food for seven standard food packages: two for infants that are age-dependent (food packages I and II); one for children or women with special dietary needs (package III); one for children aged one to five years (IV); one for pregnant and breastfeeding women (V); one for nonbreastfeeding postpartum women (VI); and an enhanced package for breastfeeding women (VII). Appendix H presents the regulation governing WIC food packages (7 CFR 246.10).

Of special note in table 3-1 is the allowed package size/form for juice in California and Connecticut. These are the only two States in the study that allow purchase of 64-ounce containers of juice; in California, these are the only allowed containers for shelf-stable, single-strength adult juice. In the regulations, however, the maximum allowable quantity for juice is not divisible by 64 (for example, 92 fluid ounces for infants aged 4 through 12 months, 276 ounces for children and pregnant/breastfeeding women, and 184 ounces for nonbreastfeeding postpartum women). These maximum quantities are divisible by 46, which is an allowed container size for shelf-stable juice in Connecticut and the other States. Thus, one effect of the California restriction on package size for juice is that maximum allowable quantities cannot be prescribed for participants who select shelf-stable juice.<sup>1</sup> In Connecticut, participants can purchase the maximum quantity allowed if they select 46-ounce

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<sup>1</sup> Participants in California wishing the maximum allowable amount of juice may select frozen juice.

**Table 3-1—WIC-approved foods as of January 2001**

	California	Connecticut	North Carolina	Ohio	Oklahoma	Texas
<b>Milk</b>						
<b>Fluid milk</b>						
Brand .....	Any brand	Store brand or least expensive	Least expensive	Any brand	Least expensive	Least expensive
Type / flavor .....	Nonfat, 1%, 2%, whole, acidophilus	Nonfat, 1%, 2%, whole, buttermilk	Nonfat, 1%, 2%, whole, acidophilus	Nonfat, 1%, 2%, whole	Any % fat and acidophilus	Nonfat, 1%, 2%, whole, buttermilk
Package size / form ..	Gallon except on 1-1/2 gallon check; 1/2 gallon acidophilus	Quart or larger	Size on voucher; quarts not allowed	Gallon	Gallon for cow milk; 1/2 gallon for acidophilus	Half-gallon or gallon
Not allowed .....	Flavored milk, buttermilk, goat milk, UHT	Flavored or protein-enriched milk	Flavored milk	Flavored milk	—	Flavored milk
<b>Lactose reduced/free</b>						
Brand .....	Lactaid, private label	[per check]	Least expensive	[per voucher]	Least expensive	Lactaid or Dairy Ease
Package size / form ..	Half gallon	Qt. or 1/2 gallon	Size on voucher	—	Qt. or 1/2 gallon	Qt. or 1/2 gallon
<b>Evaporated milk</b>						
Brand .....	Least expensive	[per check]	Least expensive	—	Least expensive	Least expensive
Package size / form ..	12-oz can	—	Size on voucher	—	12-oz can	12-oz can
<b>Dry milk</b>						
Brand .....	Least expensive	[per check]	Least expensive	Any brand	Least expensive	Least expensive
Package size / form ..	9.6 to 25.6 oz	—	Size on voucher	9.6 or 25.6 oz	—	9.6, 25.6, or 64 oz
<b>Cheese</b>						
Brand .....	Any brand	Least expensive	Any brand	Any brand	Least expensive	Any brand
Type / flavor .....	American Cheddar Monterey jack Mozzarella	American Cheddar Monterey jack Mozzarella Colby Muenster Provolone Swiss	American Cheddar Monterey jack Mozzarella Colby Swiss	American Cheddar Monterey jack Mozzarella Colby Swiss	American Cheddar Monterey jack Mozzarella Colby	American Cheddar Monterey jack Mozzarella Colby Colby-jack
Package size / form ..	12 oz or larger block, round, or sliced at deli; reduced fat, low sodium, Kosher are OK	— Block or slices, deli or dairy; lowfat/low cholesterol only when printed on check	8 or 16 oz prepacked block or slices, wrapped or unwrapped; lowfat, low cholesterol, low sodium OK	Up to 16 oz block or slices; low fat, deli are OK	— Block and sliced American	10 oz or larger block or slices, incl. deli sliced
Not allowed .....	Prepackaged slices, shredded, string	Indiv-wrapped slices, shredded, string	Shredded, deli	Indiv-wrapped slices, shredded, string, low sodium	Indiv-wrapped slices, deli, shredded	Indiv-wrapped slices, shredded
<b>Eggs</b>						
Brand .....	Any brand	Store brand or least expensive	Any brand	Any brand	Least expensive	Any brand
Type / flavor .....	White only, grade AA	White only	White or brown, grade A	White	White	White, grade A or AA
Package size / form ..	Small, medium, large	Large	Large, x-large	Any size	Medium (large if med. not avail.)	Small, medium, large
Not allowed .....	Low cholesterol, brown, vitamin enriched, specialty	Brown, Egglands Best, egg substitutes	Low cholesterol or specialty	Low cholesterol or egg substitutes	Brown or low cholesterol	Packs of 6 or 18, fertile or free range, ungraded

— Not specified on food list.

(Continued)

**Table 3-1—WIC-approved foods as of January 2001 (continued)**

	California	Connecticut	North Carolina	Ohio	Oklahoma	Texas
<b>Infant cereal</b>						
Brand .....	Gerber	Gerber	Beechnut, Gerber, Heinz	Beechnut, Gerber, Heinz	Gerber, Heinz	Gerber
Type / flavor .....	Rice, oatmeal, barley, mixed	Rice, oatmeal, barley, mixed	Rice, oatmeal, barley, mixed, Hi-Protein	Rice, oatmeal, barley, mixed, Hi-Protein	Rice, oatmeal, barley, mixed	Rice, oatmeal, barley, mixed
Package size / form ..	8 oz	8 or 16 oz	8 oz	8 oz	8 or 16 oz	8 or 16 oz
Not allowed .....	Cereal with fruit	Cereal with fruit or formula	Cereal with fruit	Cereal with fruit	Cereal with fruit or yogurt	Cereal with fruit
<b>Juice<sup>1</sup></b>						
Brand .....	Store brand only for 64-oz pineapple  Allowable brands for other flavors: Campbells, Dole, Minute Maid, Seneca, Tree Top, Welch's, private label, store brands	Least expensive brand for orange and grapefruit  Allowable brands for other flavors: Dole, Juicy Juice, Seneca, Welch's	Any brand of orange, grapefruit, and pineapple  Allowable brands for other flavors: Campbells, DelMonte, Dole, Juicy Juice, Northland, Seneca, Welch's, two store brands	Any brand of orange and grapefruit  Allowable brands for other flavors: Campbells, Dole, DelMonte, Juicy Juice, Northland, Old Orchard, Seneca, Welch's, private labels, one store brand	Allowable brands include private labels, store brands, Dole, Juicy Juice, and Welch's (frozen and liquid conc. only)	Least expensive from list of specified store brands, private labels, Seneca, Tree Top, Welch's
Type / flavor .....	Apple Grape Orange Pineapple White grape  Vegetable	Apple Grape Orange Pineapple White grape  Grapefruit Wh. grape blends Dole juice blends All Juicy Juice varieties	Apple Grape Orange Pineapple White grape  Cranberry Grapefruit Tomato Vegetable Wh. grape blends Juice blends All Juicy Juice varieties	Apple Grape Orange Pineapple White grape  Cranberry Grapefruit Tomato Vegetable Wh. grape blends Other blends All Juicy Juice varieties in liq. conc.	Apple Grape Orange Pineapple White grape  Tomato Vegetable Wh. grape blends Dole juice blends All Juicy Juice varieties	Apple Grape Orange Pineapple White grape  Grapefruit Orange-pineapple Vegetable
Package size / form ..	11.5/12-oz frozen, 64-oz plastic	11.5/12-oz frozen, 46-oz can, 64- or 128-oz refrigerated carton of orange juice	11.5/12-oz frozen, 46-oz can, 46-oz plastic, 11.5-oz liq. conc.	11.5/12-oz frozen 46-oz can 46-oz plastic 11.5-oz liq. conc.	12-oz frozen, 46-oz can, 11.5-oz liq. conc.	11.5/12-oz frozen, 46-oz can
<b>Dried beans/peas</b>						
Brand .....	Any brand	Any brand	Any brand	Any brand	Least expensive	Any brand
Type / flavor .....	Any variety of uncooked dried beans, peas, lentils	Any variety of uncooked dried beans, peas, lentils	Any variety of uncooked dried beans, peas, lentils	Any variety of uncooked dried beans, peas, lentils	Any variety of uncooked dried beans, peas, lentils	Any variety of uncooked dried beans, peas, lentils
Package size / form ..	—	1 lb.	1 lb.	—	1 lb.	1 lb.
Not allowed .....	Canned beans (unless specified on voucher)	Canned beans (unless specified on voucher)	—	Canned, prewashed, or seasoned beans	—	Canned beans, flavored or seasoned beans

(Continued)

— Not specified on food list.  
<sup>1</sup> For infants, Ohio approves Beechnut, Gerber, and Heinz 32-oz jars; Oklahoma approves Gerber and Heinz 32-oz jars; other States provide single-strength adult juices for infants.

**Table 3-1—WIC-approved foods as of January 2001 (continued)**

	California	Connecticut	North Carolina	Ohio	Oklahoma	Texas
<b>Peanut butter</b>						
Brand .....	Any brand	Least expensive	Any brand	Any brand	Any brand	Any brand
Type / flavor .....	Plain, creamy, chunky, honey nut roasted; low sodium and low sugar are OK	Unflavored, smooth or chunky	Plain, smooth, crunchy, or whipped; low sodium and low sugar are OK	Smooth or chunky	—	Smooth or crunchy
Package size / form ..	16 or 18 oz	18 oz	18 oz	—	—	18 oz
Not allowed .....	With fruit, jams, or preserves; low fat or reduced fat	With jelly, honey, marshmallow, or choc.; spreads	With jelly, honey, marshmallow	With jelly, honey, marshmallow; whipped; reduced fat	With jelly, honey, marshmallow	With jelly, honey, marshmallow; reduced fat; spreads
<b>Breakfast cereal</b>						
Package size / form ..	12 oz or larger	10 oz or larger	12 oz or larger	—	—	Allowable sizes are product specific
Allowed products						
General Mills .....	Cheerios Chex, Wheat Kix	Cheerios Cheerios, Multigrain Chex, Corn Chex, Rice Kix Total, whole grain	Cheerios Cheerios, Multigrain Chex, Multi-bran Chex, Rice Chex, Wheat Country Corn Flakes Wheaties	Cheerios Chex, Corn Chex, Multi-bran Chex, Rice Chex, Wheat Kix Wheaties Total, corn flakes Total, whole grain	—	Cheerios Chex, Wheat Country Corn Flakes Kix Para Su Familia Cinnamon Corn Stars & Raisin Bran Total, whole grain
Kellogg's .....	Corn flakes	Complete oat bran flakes Complete wheat bran flakes Mini-Wheats, raisin Special K	Complete wheat bran flakes Corn flakes Frosted Mini-Wheats Mini-Wheats, raisin Mini-Wheats, strawberry	Complete wheat bran flakes Corn flakes Frosted Mini-Wheats Mini-Wheats, raisin Product 19 Special K	—	Corn flakes Frosted Mini-Wheats
Malt-O-Meal .....	—	—	—	Puffed Rice Toasty O's	—	Toasty O's
Nabisco .....	—	100% bran	—	—	—	—
Post .....	Bran flakes	Grape Nut Flakes Natural bran flakes	Banana Nut Crunch Grape Nuts Grape Nut Flakes Honey Bunches of Oats	Banana Nut Crunch Bran flakes Grape Nuts Grape Nut Flakes Honey Bunches of Oats	—	Bran flakes Grape Nuts
Quaker .....	Crunchy Corn Bran Life	Oat Bran	King Vitaman Life Oat Bran Oatmeal Squares	King Vitaman Life Oatmeal Squares	—	King Vitaman Life
Store brand/ private label ....	Crispy rice Rice squares	Toasted oats	Bran flakes Corn biscuits Corn flakes Crispy corn puffs Crispy rice Nutty nuggetts Rice squares Shredded wheat Toasted oats	—	Bran flakes Corn biscuits Corn flakes Crispy corn puffs Crispy rice Nutty nuggetts Rice squares Shredded wheat Toasted oats	Crispy rice
Hot cereal .....	Nabisco Cream of Wheat, Quaker Sun Country Oats	Maltex, Maypo Vermont Style, Nabisco Cream of Wheat	Jim Dandy quick grits, Nabisco Cream of Wheat, Quaker instant grits	CoCo Wheats, Nabisco Cream of Wheat, Quaker instant grits, Quaker instant oatmeal	Malt-O-Meal quick & chocolate, Nabisco Cream of Wheat, Quaker instant grits, Quaker Sun Country Oats	Malt-O-Meal quick & chocolate, Quaker instant grits, Quaker Sun Country Oats

— Not specified on food list.

Source: State lists of approved foods.



containers of juice, but they restrict the amount they can purchase if they select 64- or 128-ounce containers.

The information in table 3-1 is the basis of much of the analyses reported in following chapters. For instance, the Survey of WIC Participants asked respondents which nonapproved food items they would buy with their WIC benefits if allowed. The State lists were then used to determine which of these preferred items were actually approved.

## **Actual Food Selections**

This study uses information about the actual food selections of WIC participants from two different sources: the Survey of WIC Participants, and scanner data on WIC transactions collected from supermarket chains in five of the six case study States. As discussed below, these data sources provide two different perspectives on WIC food purchases.

### **Survey Data on Purchases**

The Survey of WIC Participants provides information on the percentage of respondents in each State who purchased different food items using their WIC food instruments. The survey first asked, for different categories of WIC foods, whether the food was prescribed for the respondent or her child. If it was, detailed information was collected about the items purchased, for example, the types of cheese (e.g., American, Cheddar, Colby, and Monterey jack) and their brands. For each item, the survey asked how it was packaged (e.g., blocked, sliced and prepackaged, sliced and individually wrapped, sliced and not individually wrapped). These data give a very detailed picture of what WIC participants in each study State were buying with their WIC benefits. Table 3-2 presents the survey-based information on WIC-purchased foods.

Table 3-2 is organized into sections for different food categories. Within each category, survey respondents' purchases are broken out by type or flavor, brand (summarized primarily as national, private label, or store brand), and package size. The percentages within each column section total to more than 100 percent when respondents reported buying more than one type of food within a category. For instance, 86.0 percent of Connecticut respondents said they purchased whole milk with their WIC instrument, and 19.9 percent said they bought 2% reduced-fat milk, implying that at least 5.9 percent of respondents purchased both milk types.

The information in table 3-2 provides several interesting facts about the WIC buying habits of participants in the six States. One is that the survey respondents occasionally reported buying food items that were not approved for WIC purchase in their State. An example is milk in quart containers, which is approved only in Connecticut. For the most part, however, few respondents reported purchases of nonapproved items, and later evidence on actual purchases suggests some reporting error among the respondents.

The data in table 3-2 can also be used to examine the extent to which survey respondents in States without restrictions purchase food items restricted in other States. As an example, Ohio and Oklahoma restrict milk purchases to gallon containers. By contrast, in States where participants can choose between half-gallon and gallon containers, sizeable proportions of survey respondents said they purchased half-gallons (70.1 percent in Connecticut and 78.5 percent in Texas). Variations across States in consumer demand, WIC prescriptions, and market supply mean the State-level percentages in table 3-2 are not directly comparable, but it does appear that a sizeable percentage of WIC participants in Ohio and Oklahoma might prefer to buy milk in half-gallon containers if allowed. Other notable examples where participant choice may be affected by food-item restrictions include the following:

- Large percentages of respondents in Ohio and Oklahoma (19.4 and 18.7 percent, respectively) reported buying Colby cheese, which is not approved for purchase in California.
- North Carolina is the only State within the group that allows purchase of individually wrapped, sliced cheese. Its popularity within the State is apparent, with 45.2 percent of survey respondents with cheese in their WIC prescription saying they purchased the wrapped singles.
- North Carolina and Oklahoma were the only States in the study that included significant numbers of store-brand or private-label cereals on their lists of approved foods. Unlike Oklahoma, North Carolina also allowed national cereal brands. When given the choice, survey respondents in North Carolina overwhelmingly preferred the national brands of cereal, suggesting that Oklahoma's policy may have affected participant choice there.

Of course, the fact that a restricted item in one State is purchased frequently in another does not necessarily mean that WIC participants in the State with restrictions are dissatisfied with their array of approved food items. There may not be a strong demand for the restricted item, or close substitutes may be available. For example, relatively few respondents in Connecticut, North Carolina, and Texas said they purchased Colby cheese, even though it was approved in all three States. The topics of satisfaction with approved foods and preferences for restricted foods are examined in chapter 6.

**Table 3-2—Distribution of WIC family purchases, by food category**

	California	Connecticut	North Carolina	Ohio	Oklahoma	Texas
<i>Percent of WIC families</i>						
<b>Milk</b>						
<i>Type/flavor</i>						
Whole milk .....	79.7	86.0	84.1	55.7	77.7	82.3
2% Reduced fat .....	19.9	19.9	19.1	56.8	32.7	19.9
1% Lowfat .....	4.8	9.1	3.5	9.3	4.4	4.4
Skim or nonfat .....	2.3	3.1	3.1	3.3	4.1	1.1
Lactose-reduced .....	—	0.8	1.1	0.3	1.9	—
Buttermilk .....	—	—	—	—	—	0.5
Evaporated .....	4.9	0.1	0.4	—	—	0.8
Dry milk .....	7.2	2.6	5.7	3.2	1.4	1.8
Don't know/ missing .....	1.1	—	2.9	0.7	1.4	1.7
<i>Brand</i>						
Store brand .....	41.5	71.2	87.0	77.6	84.2	76.9
Other .....	43.4	34.8	12.1	28.2	12.0	24.3
Don't know/ missing .....	21.2	2.4	3.8	5.1	8.2	7.9
<i>Package size</i>						
Quart .....	0.0	4.8	1.1	1.3	1.5	1.9
Half-gallon .....	25.5	70.1	11.0	2.9	1.1	78.5
Gallon .....	72.8	95.1	94.4	93.4	88.7	87.2
12-oz can evaporated .....	0.6	0.1	1.9	0.5	0.7	—
Other .....	0.0	0.4	—	—	—	1.2
Don't know/ missing .....	23.5	2.4	3.8	5.7	8.2	9.2
<i>Sample size</i> .....	168	183	182	183	154	153
<b>Cheese</b>						
<i>Type/flavor</i>						
American .....	12.7	89.3	64.5	69.4	42.3	37.8
Cheddar .....	17.3	14.0	22.9	28.9	52.5	32.2
Colby .....	—	0.9	4.4	19.4	18.7	4.4
Colby-jack .....	—	—	—	1.8	—	4.4
Monterey jack .....	54.1	0.9	2.2	8.1	17.0	33.8
Mozzarella .....	41.6	5.1	15.8	19.5	25.7	25.4
Muenster .....	—	1.6	—	0.4	—	—
Provolone .....	—	4.0	—	—	—	—
Swiss .....	—	2.2	0.4	11.1	—	1.5
Other .....	—	—	0.8	—	—	—
Don't know/ missing .....	—	4.9	9.3	2.4	1.2	2.8
<i>Brand</i>						
National brand .....	38.1	33.1	74.4	79.1	3.6	11.3
Private label .....	2.3	3.4	1.7	2.4	38.1	34.1
Store brand .....	11.2	43.4	7.4	7.0	26.6	27.4
Deli .....	—	1.2	—	3.7	—	0.6
Other .....	13.3	9.2	1.9	3.4	18.4	10.0
Don't know/ missing .....	37.3	16.5	16.5	10.1	14.4	18.1
<i>Package size</i>						
Block .....	29.7	2.9	33.6	33.3	1.9	7.0
Sliced, from deli .....	2.2	15.2	—	0.9	1.1	0.8
Sliced, individually wrapped .....	—	—	45.2	0.4	—	0.2
Sliced, not individually wrapped .....	—	15.4	12.5	53.4	2.0	6.0
Don't know/ missing .....	69.2	69.6	26.6	23.5	95.0	88.2
<i>Sample size</i> .....	164	184	174	181	148	148

— No purchases of item.

(Continued)

**Table 3-2—Distribution of WIC family purchases, by food category (continued)**

	California	Connecticut	North Carolina	Ohio	Oklahoma	Texas
<i>Percent of WIC families</i>						
<b>Infant cereal</b>						
<i>Type/Flavor</i>						
Barley .....	24.9	23.9	–	10.4	12.9	9.5
Mixed .....	55.6	40.8	28.2	33.7	30.7	30.9
Oatmeal .....	49.8	77.0	64.2	53.3	49.6	43.2
Rice .....	67.8	82.0	83.3	66.5	67.0	64.6
Hi-Protein .....	–	–	–	2.6	–	–
Don't know/ missing .....	–	0.3	8.2	2.9	6.0	–
<i>Brand</i>						
National brand .....	89.5	99.7	84.8	93.4	91.6	86.7
Don't know/ missing .....	10.5	0.3	15.2	6.6	8.4	13.3
<i>Package size</i>						
8-oz .....	69.4	96.5	76.9	65.6	62.7	55.9
16-oz .....	20.1	5.1	5.3	15.8	41.4	33.9
Don't know/ missing .....	10.5	0.3	21.1	19.0	9.9	13.3
<i>Sample size</i> .....	41	53	29	40	34	54
<b>Juice</b>						
<i>Type/Flavor</i>						
Apple .....	80.7	60.0	76.7	58.6	65.3	78.6
Berry .....	–	4.0	3.4	7.0	5.0	–
Cherry .....	–	15.1	23.6	35.0	14.3	–
Cranberry blend .....	–	1.1	1.9	6.6	0.7	–
Cranberry .....	–	2.9	1.1	5.1	1.1	1.4
Grape .....	47.6	45.6	50.1	40.1	46.8	13.5
Grapefruit .....	–	–	2.1	5.3	1.8	4.9
Orange .....	53.7	53.7	33.7	29.8	37.0	75.1
Pear .....	–	–	–	4.5	3.9	–
Pineapple .....	20.7	7.9	5.1	4.0	10.7	20.7
Punch .....	–	29.3	30.2	32.4	34.2	0.2
Strawberry .....	–	9.4	12.9	11.9	10.0	–
Tomato .....	0.7	–	0.4	1.4	3.5	–
Vegetable .....	3.2	–	0.7	0.7	–	3.5
White grape .....	12.5	12.9	11.6	9.5	16.1	7.6
White grape blend .....	–	1.7	4.0	2.6	10.3	1.3
Other .....	–	–	–	–	0.7	–
Don't know/ missing .....	0.1	0.7	0.4	0.3	2.3	–
<i>Brand</i>						
National brand .....	82.8	85.4	94.4	96.3	80.2	25.3
Private label .....	4.3	1.2	–	1.3	3.9	42.5
Store brand .....	12.3	21.2	7.9	8.0	18.2	28.7
Other .....	1.1	2.2	1.5	–	–	8.4
Don't know/ missing .....	9.2	5.4	2.8	2.7	12.1	9.0
<i>Package size</i>						
Frozen (11.5/12-oz) .....	12.8	28.5	14.0	17.0	21.9	22.6
Liquid concentrate (11.5-oz) .....	–	0.1	7.2	12.2	25.0	–
46-oz can .....	2.2	63.4	40.8	25.8	38.5	24.1
46-oz plastic .....	–	0.5	57.5	59.0	2.7	–
64-oz plastic .....	78.9	0.9	0.5	0.3	–	2.3
Refrigerated carton .....	–	17.5	–	–	–	–
Other .....	–	0.5	0.4	3.2	–	–
Don't know/ missing .....	11.1	7.1	6.8	3.0	14.9	54.9
<i>Sample size</i> .....	172	193	191	180	162	165

(Continued)

– No purchases of item.

**Table 3-2—Distribution of WIC family purchases, by food category (continued)**

	California	Connecticut	North Carolina	Ohio	Oklahoma	Texas
<i>Percent of WIC families</i>						
<b>Breakfast cereal</b>						
General Mills						
Cheerios .....	40.7	57.8	36.3	49.7	—	40.4
Cheerios, Multigrain .....	—	12.5	15.8	—	—	—
Chex, Corn .....	—	15.2	1.0	15.7	1.1	—
Chex, Multi-bran .....	—	—	1.6	0.4	—	—
Chex, Rice .....	1.2	8.2	9.1	16.8	0.5	—
Chex, Wheat .....	3.6	0.1	1.0	2.4	1.2	1.6
Country Corn Flakes .....	—	—	7.7	—	0.5	10.7
Kix .....	49.4	56.9	1.0	34.2	1.5	30.0
Para Su Familia Cinnamon Corn Stars .....	—	—	—	—	—	4.4
Para Su Familia Raisin Bran .....	—	—	—	—	—	6.5
Total, corn flakes .....	—	2.1	—	6.0	—	—
Total, whole grain .....	0.7	14.2	—	3.9	—	0.5
Wheaties .....	—	0.3	2.6	3.6	0.3	0.6
Kelloggs						
Complete oat bran flakes .....	—	0.1	—	—	—	—
Complete wheat bran flakes .....	—	2.3	0.6	1.1	—	—
Corn flakes .....	42.8	6.4	46.8	16.6	1.4	31.2
Frosted Mini-Wheats, bite size .....	—	0.1	13.9	25.5	0.4	6.7
Mini-Wheat Squares, strawberry .....	—	—	1.2	—	—	—
Mini-Wheat Squares, raisin .....	—	3.7	—	1.8	—	—
Product 19 .....	—	—	—	0.3	—	—
Special K .....	—	19.8	0.6	4.7	—	—
Post						
Banana Nut Crunch .....	—	—	6.8	5.4	—	—
Grape Nuts .....	—	—	0.6	1.4	—	0.6
Grape Nut Flakes .....	—	3.7	1.5	2.0	0.4	—
Honey Bunches of Oats .....	—	—	18.1	11.3	—	—
Natural bran flakes .....	5.0	0.1	—	1.5	—	4.8
Quaker						
Crunchy Corn Bran .....	7.1	—	—	—	—	—
King Vitaman .....	—	—	9.7	7.5	—	6.6
Life .....	10.4	1.3	1.0	9.5	0.8	4.2
Oat Bran .....	—	1.5	0.6	—	—	—
Oatmeal Squares .....	—	—	1.8	4.1	—	—
Store brand / private label						
Bran flakes .....	—	—	0.9	—	5.1	—
Corn flakes .....	—	1.6	1.1	—	33.8	3.0
Crispy rice .....	15.0	—	3.6	—	26.3	6.2
Frosted shredded wheat .....	—	—	0.7	—	24.7	—
Toasted oats /tasteos .....	—	1.3	1.8	—	23.4	5.5
Wheat & barley cereals .....	—	—	0.4	—	3.8	—
Other rice cereals .....	3.4	—	0.8	—	14.9	—
Other corn cereals .....	—	—	1.0	—	25.1	3.6
Hot cereal						
Coco Wheats .....	—	—	—	8.7	—	—
Malt-O-Meal hot cereal .....	—	—	—	—	18.4	4.0
Maypo Vermont Style .....	—	3.5	—	—	—	—
Nabisco Cream of Wheat .....	6.9	6.5	4.1	10.2	10.4	—
Quaker grits .....	—	—	11.0	7.2	2.5	7.6
Quaker instant oats .....	—	2.8	2.2	15.8	1.5	—
Quaker Sun Country Oats .....	2.0	—	—	—	2.8	11.0
Other .....	0.5	2.9	0.9	0.3	0.7	0.2
Don't know/ missing .....	6.9	3.3	5.0	4.2	6.4	7.0
<b>Sample size</b> .....	<b>166</b>	<b>187</b>	<b>183</b>	<b>182</b>	<b>153</b>	<b>153</b>

— No purchases of item.

(Continued)

**Table 3-2—Distribution of WIC family purchases, by food category (continued)**

	California	Connecticut	North Carolina	Ohio	Oklahoma	Texas
<i>Percent of WIC families</i>						
<b>Dried beans/peas</b>						
<i>Type/flavor</i>						
Black beans .....	26.5	7.3	8.7	3.0	9.5	17.0
Dried peas .....	2.4	30.4	14.1	50.1	20.3	9.3
Great northern beans .....	—	0.3	—	8.2	3.1	—
Kidney beans .....	2.9	20.0	3.8	6.2	7.5	0.8
Lentils .....	8.1	4.8	1.0	1.2	7.5	5.3
Lima beans .....	0.1	9.6	8.3	23.2	7.3	2.4
Navy beans .....	2.7	0.6	5.3	21.3	1.4	1.1
Pinto beans .....	60.8	29.5	67.1	41.9	68.0	81.4
Small red beans .....	2.2	37.7	3.7	—	8.2	—
Small white beans .....	3.0	3.1	4.2	—	3.0	1.0
Other beans .....	0.9	14.9	3.5	1.1	—	2.4
Other .....	—	0.6	4.8	4.9	1.1	—
Don't know/ missing .....	1.3	1.4	4.8	—	—	1.1
<b>Sample size</b> .....	86	60	85	37	77	108
<b>Peanut butter</b>						
<i>Type/flavor</i>						
Jif .....	37.6	6.2	39.6	74.4	24.2	26.2
Peter Pan .....	0.3	5.4	38.0	11.0	42.1	18.9
Reese's .....	4.0	—	4.1	1.7	5.1	3.2
Skippy .....	42.1	21.4	3.0	3.6	1.5	1.7
Other .....	6.8	61.6	12.6	8.3	23.6	41.5
Don't know/ missing .....	9.2	5.4	2.6	1.2	3.5	8.4
<b>Sample size</b> .....	102	139	126	152	110	57

— No purchases of item.

Note: Distribution of purchases by WIC families may not sum to 100 percent due to multiple food type purchases within food category. High percentages of *Don't know/missing* responses sometimes reflect problems with the computer assisted survey program whereby unintentional skips led to missing responses.

Sample size varies by food category because the sample contains families who were prescribed the food category and who purchased all or some of their WIC prescription in the month prior to the survey.

Source: Survey of WIC Participants.

## WIC Transaction Data

Although the survey data described above provide information about the percentage of WIC families buying specific food items, the survey does not indicate how much of the item was being purchased. Such **quantity** information is available from the scanner data collected from supermarkets in all States except Oklahoma. Nearly 600 supermarkets, representing six supermarket chains in the five States, provided WIC transaction data for the study. Data were collected on over half a million transactions during a six-week period in February and March 2001.

Table 3-3 presents the percentage distribution of dollars spent on WIC food items for the five States with scanner data, by major food category. The top portion of the table includes infant formula and foods prescribed for breastfeeding mothers (carrots and tuna). These food items are not explored further in this report, so the bottom portion of the table excludes them from the distributions.<sup>2</sup> An

<sup>2</sup> Per the authorizing legislation for this study, cost-containment practices involving rebates on infant formula are not part of the scope for the study. Carrots and tuna have been excluded because they are prescribed for only a small percentage of WIC participants, breastfeeding mothers.

examination of the top portion shows that, in these supermarkets, infant formula represented between 34.1 and 54.5 percent of all WIC sales.

The bottom portion of table 3-3 shows that—after infant formula, carrots, and tuna are excluded—on a dollar-cost basis, fluid milk was the predominant WIC food item purchased in the supermarkets participating in the study. The second most common item was juice. Cheese and cold cereals followed, with approximately equal amounts spent on each.

**Table 3-3—Expenditure distribution of scanned WIC purchases, by major food category**

	California	Connecticut	North Carolina	Ohio	Texas
<i>Percent of expenditures on all items</i>					
Milk					
Fluid milk .....	19.4	17.2	16.5	13.8	13.9
Evaporated milk .....	0.4	0.1	0.0	—	0.1
Dry milk .....	0.0	—	0.0	0.0	0.0
Cheese .....	11.5	8.2	6.9	8.6	7.5
Eggs .....	4.3	2.7	3.1	1.9	2.8
Juice .....	16.4	11.4	15.2	11.4	11.2
Infant juice .....	—	—	—	1.3	—
Infant cereal .....	0.7	1.1	1.0	1.0	0.9
Breakfast cereal					
Cold cereal .....	10.7	7.0	6.9	8.4	7.7
Hot cereal .....	0.2	0.3	0.1	0.6	0.2
Dried beans/peas .....	0.7	0.2	0.3	0.1	0.5
Peanut butter .....	1.5	0.5	1.1	1.9	0.7
Breastfeeding foods					
Carrots .....	0.0	0.0	0.1	0.0	0.0
Tuna .....	0.1	0.0	0.1	0.1	0.0
Formula .....	34.1	51.3	48.8	50.9	54.5
<b>Total .....</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<i>Percent of expenditures on items excluding carrots, tuna, formula</i>					
Milk					
Fluid milk .....	29.5	35.3	32.2	28.1	30.7
Evaporated milk .....	0.5	0.2	0.0	—	0.1
Dry milk .....	0.0	—	0.0	0.0	0.0
Cheese .....	17.5	16.7	13.5	17.6	16.4
Eggs .....	6.6	5.6	6.0	3.9	6.1
Juice .....	24.9	23.4	29.7	23.3	24.7
Infant juice .....	—	—	—	2.6	—
Infant cereal .....	1.1	2.3	1.9	2.0	2.0
Breakfast cereal					
Cold cereal .....	16.2	14.3	13.5	17.1	17.0
Hot cereal .....	0.3	0.6	0.3	1.3	0.4
Dried beans/peas .....	1.1	0.4	0.6	0.3	1.1
Peanut butter .....	2.2	1.1	2.2	3.9	1.5
<b>Total .....</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

— No purchases in food category.

Source: Supermarket scanner data. Scanner data were collected from one supermarket chain in each State during a 5- to 6-week period. Data may not be representative of statewide WIC purchases.

Greater detail on these WIC transactions is presented in table 3-4, which shows the distribution of the quantity of food items purchased with WIC checks and vouchers. The format for table 3-4 is similar to that of table 3-2, which presented data from the participant survey. Although the format and content of the two tables are similar, important differences exist. First, table 3-4 focuses on quantities of items purchased within each category, whereas table 3-2 presented the percentage of WIC families purchasing specific items. For this reason, each set of columns in table 3-4 sums to 100 percent (with the exception of rounding error)—a characteristic not present in table 3-2. Second, the survey data in table 3-2 are generalizable to each State, but only with the acknowledgement that infant-only WIC families are not represented in the data. In contrast, the scanner-based data in table 3-4 are not representative of all WIC transactions in each State.<sup>3</sup> They are presented here because they form the only source of detailed data available on the quantity of food items purchased with WIC food instruments in the study States. The following chapter uses these data to form a basis for estimating counterfactuals—what WIC participants in States with food-item restrictions might buy in the absence of those restrictions. This information is needed to estimate food package costs with and without item restrictions.

Despite the differences between the survey and scanner data presented in tables 3-2 and 3-4, the information in the two tables is relatively consistent. In general, entries that have high percentage values in one table have high percentages in both. Similarly, items that survey respondents seldom identified as being purchased often show small percentage values in the WIC transaction data in table 3-4.

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<sup>3</sup> The scanner data are not representative for three reasons. First, not all WIC vendors use scanning systems. Second, among those vendors who do use scanning systems, many are unable to identify WIC transactions from information captured on the transaction log. Third, not all WIC vendors who are able to identify WIC transactions were willing to provide their scanner data for this study. The net effect of these three factors on possible bias in the results cannot be estimated with available data.



**Table 3-4—Quantity distribution of scanned WIC purchases, by food category**

	California	Connecticut	North Carolina	Ohio	Texas
<i>Percent of purchases</i>					
<b>Milk</b>					
<i>Type / flavor</i>					
Whole milk .....	76.8	75.1	78.9	45.2	91.0
2% Reduced fat .....	19.0	12.7	14.9	47.6	6.7
1% Lowfat .....	1.8	8.6	2.8	2.6	1.4
Skim or nonfat .....	0.8	2.4	2.5	4.0	0.2
Lactose-reduced .....	0.1	0.8	0.8	0.5	0.3
Buttermilk .....	—	—	—	—	0.1
Evaporated .....	1.4	0.4	0.1	—	0.3
Dry milk .....	0.1	—	>0	>0	>0
<i>Brand</i>					
National brand .....	1.4	0.2	>0	0.0	>0
Private label/store brand .....	98.6	99.8	100.0	100.0	100.0
<i>Package size / form</i>					
Quart .....	—	>0	>0	0.2	0.1
Half-gallon .....	7.2	10.7	2.4	0.2	30.7
Gallon .....	91.4	88.9	97.5	99.5	68.9
12-oz can evaporated .....	1.4	0.4	0.1	—	0.3
9.6-25.6 oz dry milk .....	0.1	—	>0	>0	>0
<b>Cheese</b>					
<i>Type / flavor</i>					
American .....	—	69.3	49.8	49.8	13.6
Cheddar .....	7.4	14.6	33.0	19.1	22.1
Colby .....	—	1.0	1.5	11.3	2.4
Colby-jack .....	—	0.1	>0	2.3	6.2
Monterey jack .....	22.4	1.8	6.1	1.8	29.4
Mozzarella .....	70.2	5.3	9.2	11.6	26.3
Muenster .....	—	1.8	—	—	—
Provolone .....	—	1.7	—	—	—
Swiss .....	>0	1.4	0.2	3.9	—
Not specified .....	—	3.1	0.2	0.2	0.0
<i>Brand</i>					
National brand .....	73.2	63.0	89.3	72.4	6.2
Private label/store brand .....	26.6	23.8	8.6	18.6	92.8
Not specified .....	0.2	13.2	2.1	9.0	1.0
<i>Package size / form</i>					
Block .....	100.0	20.4	49.2	44.5	86.4
Sliced, individually wrapped .....	—	—	32.5	—	—
Sliced, not individually wrapped .....	—	9.9	18.3	52.0	12.6
Variable weight block or sliced .....	—	69.7	—	3.4	1.0
<b>Eggs</b>					
<i>Type / flavor</i>					
White .....	100.0	97.2	92.9	100.0	100.0
Brown .....	—	2.8	7.1	—	0.0
<i>Brand</i>					
Private label/store brand .....	100.0	100.0	100.0	100.0	100.0
<i>Package size / form</i>					
Medium .....	18.6	—	—	2.1	5.2
Large .....	81.4	100.0	42.1	70.9	94.8
Extra large .....	—	—	57.9	6.2	—
Jumbo .....	—	—	—	20.8	—

— No purchases of item.  
 >0 Value too small to display.

(Continued)

**Table 3-4—Quantity distribution of scanned WIC purchases, by food category (continued)**

	California	Connecticut	North Carolina	Ohio	Texas
<i>Percent of purchases</i>					
<b>Infant cereal</b>					
<i>Type / flavor</i>					
Barley .....	13.6	12.0	0.2	7.4	—
Mixed .....	24.3	17.9	31.7	23.9	15.1
Oatmeal .....	25.3	34.6	31.2	33.7	35.8
Rice .....	36.9	35.5	36.9	35.0	49.1
<b>Brand</b>					
National brand .....	100.0	100.0	100.0	100.0	100.0
<b>Package size / form</b>					
8 oz .....	100.0	100.0	100.0	100.0	55.3
16 oz .....	—	—	—	—	44.7
<b>Infant juice</b>					
<i>Type / flavor</i>					
Mixed .....	—	—	—	22.1	—
Apple .....	—	—	—	34.3	—
Pear .....	—	—	—	18.1	—
White grape .....	—	—	—	25.4	—
<b>Brand</b>					
National brand .....	—	—	—	100.0	—
<b>Package size / form</b>					
32 oz .....	—	—	—	100.0	—
<b>Juice</b>					
<i>Type / flavor</i>					
Apple .....	51.5	13.4	17.7	15.3	38.9
Apple/grape .....	—	5.4	1.3	—	—
Berry .....	—	9.3	7.7	9.7	—
Cherry .....	—	4.7	6.7	9.9	—
Cranberry blend .....	—	—	>0	1.2	—
Cranberry .....	—	—	1.6	3.3	—
Grape .....	18.4	18.6	19.7	20.6	6.0
Grapefruit .....	—	>0	0.7	0.4	2.0
Orange .....	19.8	19.0	8.7	10.3	22.8
Pineapple .....	9.7	2.8	3.9	5.0	28.6
Punch .....	—	13.8	12.4	12.0	—
Strawberry .....	—	5.9	8.8	3.8	—
Tomato .....	—	—	0.0	—	—
Tropical .....	—	3.7	1.8	—	—
Vegetable .....	0.5	—	1.2	1.4	1.7
White grape blend .....	—	3.4	7.7	7.1	—
<b>Brand</b>					
National brand .....	87.7	81.4	95.4	97.3	2.4
Private label/store brand .....	12.3	18.6	4.6	2.7	97.6
<b>Package size / form</b>					
Frozen (11.5/12 oz) .....	17.6	25.2	15.9	21.4	22.4
46-oz can .....	—	64.7	19.4	3.0	77.6
46-oz plastic .....	—	—	61.2	67.4	—
64-oz plastic .....	82.4	—	—	—	—
Liquid concentrate (11.5 oz) .....	—	—	3.6	8.3	—
Refrigerated carton .....	—	10.1	—	—	—

— No purchases of item.  
 >0 Value too small to display.

(Continued)

**Table 3-4—Quantity distribution of scanned WIC purchases, by food category (continued)**

	California	Connecticut	North Carolina	Ohio	Texas
<i>Percent of purchases</i>					
<b>Breakfast cereal</b>					
<i>Type / flavor</i>					
General Mills					
Cheerios .....	14.2	24.1	14.5	16.1	17.0
Cheerios, Multigrain .....	—	6.1	5.8	—	—
Chex, Corn .....	—	8.3	—	3.4	—
Chex, Multi-bran .....	—	—	>0	0.5	—
Chex, Rice .....	—	8.5	3.9	4.0	—
Chex, Wheat .....	1.6	—	0.6	0.5	0.7
Country Corn Flakes .....	—	—	—	—	12.2
Kix .....	27.4	24.7	—	8.7	13.7
Para Su Familia Cinnamon Corn Stars .....	—	—	—	—	7.6
Para Su Familia Raisin Bran .....	—	—	—	—	6.8
Total, corn flakes .....	—	—	—	0.6	—
Total, whole grain .....	—	4.8	—	1.2	1.6
Wheaties .....	—	—	1.2	2.1	—
Kelloggs					
Complete wheat bran flakes .....	—	0.1	0.7	0.2	—
Complete oat bran flakes .....	—	0.2	—	—	—
Corn flakes .....	38.8	—	22.0	7.8	19.5
Frosted Mini-Wheats .....	—	—	1.8	5.1	2.9
Frosted Mini-Wheats, bite size .....	—	—	6.0	9.5	—
Mini-Wheat Squares, strawberry .....	—	—	2.0	—	—
Mini-Wheat Squares, raisin .....	—	2.9	0.6	1.7	—
Product 19 .....	—	—	—	0.5	—
Special K .....	—	10.4	—	2.2	—
Malt-O-Meal					
Puffed Rice .....	—	—	—	>0	—
Toasty O'S .....	—	—	—	—	0.6
Post					
Banana Nut Crunch .....	—	—	6.5	5.3	—
Grape Nuts .....	—	—	0.6	1.2	0.5
Grape Nut Flakes .....	—	1.8	0.8	0.5	—
Honey Bunches of Oats .....	—	—	15.8	10.2	—
Natural bran flakes .....	1.2	—	—	0.2	0.4
Quaker					
Crunchy Corn Bran .....	5.9	—	—	—	—
Life .....	8.1	—	2.0	7.6	4.0
King Vitaman .....	—	—	3.3	2.2	5.6
Oat Bran .....	—	0.1	0.1	—	—
Oatmeal Squares .....	—	—	0.8	1.0	—
Store brands and private labels .....	—	0.7	8.2	—	3.5
Hot cereal					
CoCo Wheats .....	—	—	—	1.4	—
Malt-O-Meal hot cereal .....	—	—	—	—	2.2
Maypo Vermont Style .....	—	1.1	—	—	—
Nabisco Cream of Wheat .....	2.1	6.3	1.1	2.4	—
Quaker grits .....	—	—	2.2	1.8	1.2
Quaker instant oats .....	—	—	—	2.2	—
Quaker Sun Country Oats .....	0.7	—	—	—	—
<b>Brand</b>					
National brand .....	100.0	99.3	91.8	100.0	96.5
Private label/store brand .....	—	0.7	8.2	—	3.5

(Continued)

— No purchases of item.  
>0 Value too small to display.

**Table 3-4—Quantity distribution of scanned WIC purchases, by food category (continued)**

	California	Connecticut	North Carolina	Ohio	Texas
<i>Percent of purchases</i>					
<b>Breakfast cereal (cont.)</b>					
<b>Package size / form</b>					
9-12 oz .....	9.9	47.5	13.7	30.8	19.0
13-16 oz .....	16.9	30.9	48.0	38.4	15.6
17-20 oz .....	59.8	15.4	26.1	17.8	33.2
21-36 oz .....	13.4	6.2	12.2	13.0	32.2
<b>Dried beans/peas</b>					
<b>Type / flavor</b>					
Black beans .....	17.1	4.4	6.6	1.1	3.6
Cranberry beans .....	—	—	7.0	1.4	—
Dried peas .....	2.6	13.1	11.0	24.6	3.1
Great northern beans .....	2.4	5.0	4.4	12.2	1.5
Kidney beans .....	3.7	35.0	3.7	12.2	2.0
Lentils .....	6.6	6.9	2.5	5.1	5.1
Lima beans .....	1.1	5.0	11.4	12.2	0.8
Mayacoba beans .....	15.3	—	—	—	—
Navy beans .....	—	1.2	2.8	9.7	>0
Pinto beans .....	44.2	13.8	42.3	20.3	82.1
Small red beans .....	4.6	5.6	0.6	0.2	0.3
Small white beans .....	1.2	0.6	0.2	0.6	1.5
Other beans .....	1.3	9.4	6.4	0.5	—
Not specified .....	—	—	1.2	—	—
<b>Brand</b>					
National brand .....	6.6	61.9	10.7	17.7	4.3
Private label/store brand .....	93.4	38.1	89.3	82.3	95.7
<b>Package size / form</b>					
16 oz .....	100.0	100.0	100.0	100.0	100.0
<b>Peanut butter</b>					
<b>Type / flavor</b>					
Jif .....	43.1	7.8	40.8	69.4	33.5
Peter Pan .....	3.7	3.1	35.9	15.0	28.5
Reese's .....	2.0	—	11.8	—	4.4
Skippy .....	43.3	42.7	8.3	11.7	4.9
Private label/store brand .....	7.9	46.4	3.3	3.9	28.6
<b>Brand</b>					
National brand .....	92.1	53.6	96.7	96.1	71.4
Private label/store brand .....	7.9	46.4	3.3	3.9	28.6
<b>Package size / form</b>					
18-oz jar .....	100.0	100.0	100.0	100.0	100.0

— No purchases of item.  
 >0 Value too small to display.

Source: Supermarket scanner data. Table shows percent of volume purchased within food category.

# Chapter 4

## Food Costs and Food Cost Savings

The primary purpose of imposing restrictions on allowed WIC foods is to lower costs while maintaining nutrient benefits set by Federal standards. Little is known, however, about the magnitude of food cost savings resulting from cost-containment practices. Program officials in the six States in this study had very limited financial information on the savings from the food-item restrictions they had implemented. (Many of these restrictions have been in effect for some years, so information on food costs before their implementation is no longer available.) Nevertheless, the estimates provided by the program officials are included in this chapter, both to provide context for the systematic analyses conducted for this study and to fill in a few gaps in available data.

Food-item restrictions limit, to varying degrees, the types, brands, or package forms of food items that WIC participants may purchase with their food instruments. The savings from food-item restrictions are equal to the difference between food costs that would be incurred in the absence of restrictions and the actual food costs incurred with restrictions. The food costs that would be incurred without restrictions (the counterfactual), however, cannot be observed directly.

To illustrate the problem, consider the Connecticut practice requiring purchase of the least expensive brand of orange and grapefruit juice. WIC participants purchasing orange or grapefruit juice must select the least cost brand in the store where they shop; for other types of juice (apple, grape, pineapple, juice blends) they select from the national brands listed on the WIC food list. For any given WIC participant, the savings from this restriction depends on four factors. Does their WIC prescription include juice (and, if so, how much is prescribed)? Do they purchase orange or grapefruit juice? What brand of orange juice would they purchase if unrestrained? What is the price difference between the preferred brand and the least cost brand in the store where they shop?

Three of these four factors are observable: food prescriptions, current juice selections, and prices. State WIC agency administrative data contain information about food package prescriptions for each WIC participant. Supermarket scanner data collected for this study indicate the percent of WIC juice selections that were orange or grapefruit juice, and the Survey of Food Prices and Item Availability conducted for this study collected prices of all juice brands stocked by a sample of WIC-authorized vendors in each of the six States.<sup>1</sup>

One cannot, however, observe the juice preferences of Connecticut WIC participants in a world in which they are not constrained by the State's least expensive restriction on orange and grapefruit juice. This restriction affects the brands of orange and grapefruit juice purchased with WIC food instruments, and also the types of juice purchased. Presence of a restriction on orange juice does not shift all orange juice purchases to the least cost orange juice; it may shift some orange juice purchases to national-brand apple juice and other types of juice.<sup>2</sup>

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<sup>1</sup> The final sample includes 17 to 18 WIC-authorized vendors in each State, including supermarkets and smaller grocery stores. In each State, prices were collected for all juice brands approved for WIC purchase in any of the six States (as well as prices for other WIC foods).

<sup>2</sup> For example, a person may rank their preferred juices as: national-brand orange (#1), national-brand apple (#2), store-brand orange (#3).

Estimation of the food cost savings from food-item restrictions on juice requires some assumptions about the counterfactual distribution of juices that would be purchased if there were no restrictions. This study used information about juice selections by WIC participants in study States that did not impose restrictions on juice (North Carolina and Ohio) as a proxy for the counterfactual distribution of purchases (and likewise for all other food categories). Admittedly, use of out-of-State data on food preferences poses problems that may introduce error in the estimates of food cost savings. First, if preferences vary significantly across States because of differences in demographics or food markets, the proxy distribution may not adequately represent what participants in the restricted State would have purchased in the absence of restrictions. Second, compared to foods allowed under Federal regulations, even “nonrestricted” States limit the number of food items allowed (to reduce the management task of periodically confirming that allowed foods meet nutrient standards). Thus, the counterfactual may not represent the full array of allowed foods in the absence of restrictions.

The study compensates for both problems by using as many of the study States as possible when constructing the counterfactual, thereby broadening the base of participants (and States) whose preferences (food lists) are used. Nevertheless, these two problems are likely to introduce some error in the study’s estimates of food cost savings. The size and direction of any possible error are unknown, and they are likely to vary by food category because different States form the nonrestricted group for each food category.

It is important to recognize that potential errors in estimating food cost savings cannot be avoided without conducting an experiment that relaxes current restrictions in a State and observes the resulting changes in food item selection. Otherwise, it is not possible to know what foods and quantities participants would buy in the absence of food-item restrictions. It was not possible to conduct an experiment as part of this study, so using data on actual WIC purchases from nonrestricted States provided the best available approach to developing the needed counterfactual distribution of food purchases.

The next section of this chapter presents the research approach in detail. The final section presents analysis results.

## Research Approach

### Overview

Food-item restrictions yield food cost savings equal to the difference in food costs incurred **without** those item restrictions (the counterfactual) and food costs incurred **with** those restrictions. As discussed in previous chapters, the States in this study implemented different numbers and combinations of restrictions across food categories. Table 3-1 in chapter 3 summarized the item restrictions.

For a given food category, the total monthly savings from item restrictions can be expressed as:

$$TotalSaving_F = N_F \bar{Q}_F \left[ \sum_{i=1}^{I+R} \alpha'_i \bar{P}_i - \sum_{i=1}^I \alpha_i \bar{P}_i \right] \quad (1)$$

where: F = food category,

N<sub>F</sub> = number of WIC participants prescribed food in category F

$Q_F$  = average monthly quantity prescribed for food category F

I = number of food items on the State WIC-approved food list in category F

R = number of restricted food items (Federally approved items not on food list) in category F

$\alpha'_i$  = percent of food selections in category F of item i, when unrestricted (unobservable)

$\alpha_i$  = percent of food selections in category F of item i, when restricted (observable)

$\bar{P}_i$  = average price of item i

The first component in the square brackets is the average price of all items within a food category, including items on the State food list (I) and restricted items (R)—this term is the counterfactual, and it represents all Federal (unrestricted) WIC food items within a food category. The second component in the brackets is the average price of items on the State food list (I). Thus, the quantity within the brackets is the average price differential resulting from food-item restrictions within a food category. In States with no restrictions  $R = 0$ , and the price differential from restrictions is zero. The savings estimated by equation (1) are monthly savings because the quantity term  $Q_F$  is expressed as the monthly quantity prescribed for category F.

Total savings from food-item restrictions within a State are equal to the sum of savings in all food categories. The food categories examined are milk, eggs, cheese, breakfast cereal, infant cereal, single-strength juice, infant juice, and legumes (peanut butter and dried beans or peas). As specified in the study's authorizing legislation, savings from infant formula rebates are not examined. In addition, none of the case study States imposed food-item restrictions on tuna or carrots, so these food categories are not included in the analysis.

Equation (1) is a simplified form of the estimation equation, because there is no accounting for the weighting necessary to calculate average food prices and average food quantities. Nonetheless, it is useful for discussing the data sources used in this analysis:

- **WIC administrative data** provide information on the number of WIC participants prescribed each food category ( $N_F$ ), and the quantity of food of each food category prescribed to each participant ( $Q_F$ ). Administrative data reflect WIC caseloads in November 2000.
- **The Survey of Food Prices and Item Availability** provides food price data ( $P_i$ ). Food prices were collected from a sample of 106 WIC vendors (17 or 18 stores in each of six states) during a single store visit in March or April 2001. Prices were collected for the same list of WIC food items in each State, with the list containing items approved by WIC in any of the six States. As a result, price data from each State include both items on the State's WIC food list and not on the list, but Federally approved (restricted items).
- **Supermarket scanner data** provide information on WIC participants' preferences over food items within each food category, conditional on the list of WIC-approved foods in their State ( $\alpha_i$ ). Scanner data were collected from six supermarket chains in five States

over a 6-week period in late February through mid-March 2001.<sup>3</sup> The scanner data provide the percentage distribution of food item selections (the  $\alpha_i$  vector) for five of the six States; this distribution of items was presented in chapter 3 (table 3-4).<sup>4</sup>

- The **Survey of WIC Participants** provides information on WIC participants' preferences over food items within each food category, conditional on the list of WIC-approved foods in their State ( $\alpha_i$ ). In Oklahoma, where scanner data were not available, survey data are used to construct the percentage distribution of item selections (table 3-2).<sup>5</sup>

The one element of equation (1) that is not observable from existing data is  $\alpha'_i$ —the preferences of WIC participants over an unconstrained list of WIC-approved food items. For example, the study does not know the number (or percent) of Connecticut WIC participants who would have purchased other brands of orange juice if the State's least expensive policy did not exist.

The study therefore assumes that the  $\alpha'_i$  vector for each food category, although not directly observed within each State, can be approximated by the  $\alpha_i$  vector from States without restrictions on the food category. For example, North Carolina and Ohio do not have item restrictions on juice—both States allow a large number of juice types and a wide array of brands, with no least expensive policies. The  $\alpha_i$  vector from these two States provides the counterfactual  $\alpha'_i$  vector for juice in Connecticut (and other States with juice restrictions).

Additional assumptions are made in estimating food cost savings. First, the estimated costs for this study exclude the costs of infant formula, tuna, and carrots. Formula was specifically excluded from the study by the authorizing legislation; tuna and carrots are not subject to cost-containment item restrictions in any State and do not contribute to food cost savings.

Second, the estimated costs assume that all food instruments are redeemed. As discussed later in chapter 8, an average of about 16 percent of all food instruments issued for November 2000 in the six States were never redeemed, and this acts to lower actual average food package costs.

Third, the estimated costs assume full redemption of each food instrument. Survey data and anecdotal evidence suggest that participants sometimes purchase only some of the items listed on a food instrument, but empirically based estimates of the frequency of partial redemptions or their impact on food package costs are not available. As with the assumption that all food instruments were redeemed, this assumption of full redemption of each instrument results in estimated food package costs that exceed actual food package costs.

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<sup>3</sup> The number of WIC transactions in the collected scanner data range from 4,700 in Connecticut to over 225,000 in both North Carolina and Texas. The total number of selected food items observed in the scanner data range from 18,300 in Connecticut to over 400,000 in Texas and over 900,000 in North Carolina. No scanner data were available for Oklahoma.

<sup>4</sup> Table 3-4 presents the percentage distribution of item selections aggregated into subcategories. The unaggregated distribution was used for the analyses in this chapter.

<sup>5</sup> The Survey of WIC Participants asked respondents to recall the brand, type, and package size of items purchased "last month" with WIC food instruments. The number of respondents per State varied from 203 (Texas) to 231 (Connecticut). The survey data have the limitation, however, of indicating only the items that were purchased, not the quantities. The analysis therefore used only a respondent's first reported item in each food category when building the distribution of items purchased.



This chapter presents estimates of food costs and the savings from food-item restrictions for each food category and overall, for each of the six States in the study. Total savings are not estimated separately by type of item restriction when multiple restrictions affect the same food category because multiple item restrictions do not have independent impacts on the distribution of items selected within a food category ( $\alpha_i$ ).

An example of a food category with multiple item restrictions is juice in Connecticut. Connecticut has a least expensive policy for orange and grapefruit juice, as discussed above. Connecticut also limits the types of juice that may be purchased: three types of juice are not permitted in Connecticut (cranberry, tomato, vegetable), although these juices meet Federal WIC regulations and are allowed in other States. Only the combined impact of both restrictions is estimated because the restrictions are not independent. The least expensive restriction on orange juice has two effects relative to unconstrained item selections: (1) a shift in selections of orange and grapefruit juice from high-cost national brands to low-cost store brands and private labels, and (2) a shift in juice selections from orange and grapefruit to other juice types. The shift toward other juice types, however, may be dampened by the restriction on juice types: participants who like cranberry juice cannot choose cranberry juice instead of low-cost orange juice. The actual overall distribution of juice purchases is determined by all restrictions on the food category.

### **Standardized and Nonstandardized Estimates**

The goal in analyzing WIC food costs (and food cost savings) is to obtain estimates of average food costs that vary across States due only to variation in food prices, allowable foods, and participant preferences among allowable foods. To allow comparison of food costs and savings across States, estimates in this chapter are **standardized** to remove cross-State differences in costs unrelated to prices, preferences, or food-item restrictions. Specifically, as described below, the estimates are standardized to remove three sources of cross-State variation: caseload size, differences in the distribution of WIC participants across certification category and food package, and differences in the amount of food package tailoring used by the State.

1. All estimates in this chapter are presented as food costs and food cost savings per participant per month (PPM), using the entire caseload as the denominator. This may seem strange when looking at restrictions on infant cereal, because the savings per infant are “diluted” when spread over all participants. This standardization, however, allows meaningful comparison (and summation) of food costs and savings among food categories. It also facilitates comparison across States with different numbers of WIC participants.
2. Estimates of food costs are calculated for a standard distribution of WIC participants in each State, with the standard distribution equal to the average distribution of participants across certification categories in all six States. This removes cross-State differences in food costs due to different distributions of WIC participants across certification category.
3. Estimates of food costs are calculated based on the standard food packages prescribed by Federal WIC regulations for participants in each certification category. This removes cross-State differences in food costs due to different amounts of food package tailoring.

Standardization #2 is applied because prescribed food quantities depend on the distribution of WIC participants across certification categories. Federal WIC regulations specify seven food packages:

two for infants that are age-dependent (Food Packages I and II); one for children or women with special dietary needs (package III); one for children aged 1 to 5 years (IV); one for pregnant and breastfeeding women (V); one for nonbreastfeeding postpartum women (VI); and an enhanced package for breastfeeding women (VII).<sup>6</sup> Six of the seven food packages correspond closely to certification category, with food package III prescribed to a very small fraction of women and children.

Standardization # 3 is applied because State and local WIC agencies sometimes tailor food packages to meet the nutritional needs of individual WIC clients. Tailoring may reduce the amounts or types of food prescribed, and can thereby affect food package costs.

Application of these standardizations in the estimation procedure is discussed in the next section.

### Estimation Procedure

According to equation (1), food cost savings in each food category are calculated as the difference between unconstrained (counterfactual) food costs and actual food costs. Equation (1) is a simplified form of the estimation equation, because there is no accounting for the weighting necessary to calculate average food prices and average food quantities. Price data are obtained from a weighted sample of 17 to 18 WIC retailers in each State; average food quantities are obtained by weighting the food quantities prescribed in each food package by the distribution of WIC participants across food packages.

A full representation of the estimation of average food costs per participant month is shown in equation (2). This representation includes appropriate weights.

$$AvgFoodCosts_F = \sum_{c=1}^5 \delta_c \sum_{s=1}^S \omega_s \sum_{fp=1}^{FP} [ \gamma_{fp,c} Q_{fp} \cdot ( \sum_{i=1}^I \alpha_i P_{si} ) ] \quad (2)$$

- where: F = food category,  
c = 1 to 5, denotes certification category<sup>7</sup>  
 $\delta_c$  = percent of WIC participants in certification category *c*  
S = number of stores sampled in the State for the Survey of Food Prices and Item Availability  
 $\omega_s$  = sampling weight for store *s*  
FP = number of different food packages  
 $\gamma_{fp,c}$  = percent of WIC participants in certification category *c*, prescribed food package *fp*  
 $Q_{fp}$  = prescribed monthly quantity of food category F in food package *fp*  
I = number of food items in category F on the State WIC food list (approved items)

<sup>6</sup> The content of the seven food packages is shown in appendix H.

<sup>7</sup> Infants aged 0 to 3 months are excluded from the analysis because their prescriptions contain only infant formula.

$\alpha_i$  = percent of food selections in category F of item i (observable)

$P_{si}$  = unit price of food item  $i$  in store  $s$

$\sum_{i=1}^I \alpha_i P_{si}$  = average price per unit of food in food category F, at store  $s$

Equation (2) yields the average food costs per participant month (PPM) given the State's list of approved WIC foods. Estimated counterfactual food costs, assuming no item restrictions, are obtained by equation (2'). Equation (2') is obtained by substituting  $\alpha'_i$  for  $\alpha_i$  in equation (2), and calculating the average unit price of food over  $I + R$  items, where  $R$  is the number of restricted items not appearing on the State food list.

$$AvgFoodCosts'_F = \sum_{c=1}^5 \delta_c \sum_{s=1}^S \omega_s \sum_{fp=1}^{FP} [ \gamma_{fp,c} Q_{fp} \cdot ( \sum_{i=1}^{I+R} \alpha'_i P_{si} ) ] \quad (2')$$

Food cost savings per participant month are equal to the difference between equations (2') and (2).<sup>8</sup>

The two terms within the square brackets are average quantity of food in the food category and average unit price. The average quantity is an average of food prescriptions, weighted by the distribution of WIC participants across food packages (this information is in WIC administrative data). The average price is an average unit price of all food items within the food category, stocked by store  $s$ , and weighted by the distribution of food item selections observed in the scanner data for the State.<sup>9</sup>

Three assumptions were made in applying the distribution of item selections to prices to obtain average prices. First, it is assumed that item preferences do not vary by certification category. It was not possible to measure item preferences ( $\alpha_i$ ) separately by certification category (note there is no subscript  $c$  on this term), because item preferences taken from scanner data could not be matched to the identity of individual WIC participants. This assumption does not affect the overall estimates of food costs for a State.

Second, the distribution of food selections ( $\alpha_i$ ) within a food category was adjusted to sum to 100 percent at each store so that average prices could be calculated regardless of the number of items stocked by the store. For example, suppose the scanner data indicated the following percentage distribution of cereal purchases in unrestricted States: Cheerios (25), Kellogg's Corn Flakes (30), Kix (25), Rice Chex (10), and Quaker Oat Bran (10). If a store in a restricted State did not stock Quaker Oat Bran, the percentages for all other cereals would be increased by 100/90, or 11.1 percent. This adjustment implicitly assumes that the relative ranking of item preferences is independent of

<sup>8</sup> Equations (2) and (2') show a summation over certification categories and food packages. The summation by certification category would allow presentation of food costs by certification category, but otherwise is not needed (the  $c$  subscript would then be taken off  $\gamma_{fp,c}$ ).

<sup>9</sup> The price of each item in the Survey of Food Prices and Item availability was converted to a unit price, where the units were gallon of milk, pound of cheese, 18-ounce jar of peanut butter, ounce of adult cereal, 8-ounce box of infant cereal, and 46-fluid ounce equivalent of infant and single-strength juice.

Federal regulations (CFR 246.10) specify juice amounts in units of adult single-strength juice, with all amounts divisible by 46 ounces, which is the standard container size (see appendix H).

alternatives. The assumption provides for comparisons of average prices in smaller grocery stores that lack a full range of products.

Third, it was assumed that item preferences for cheese and juice are hierarchical; in other words, when separately applying the restricted item distribution ( $\alpha_i$ ) and the unrestricted item distribution ( $\alpha'_i$ ) to store prices, an individual's preference for type (Cheddar vs. Colby vs. Swiss) took precedence over the preference for brand. This assumption was applied to cheese and juice because of the large variety of specific brands in these categories. Cheese and juice are available in a large number of national and regional brands, but any single store typically stocks a limited number of brands. As a result, the items observed in the scanner data (the  $\alpha_i$  vector) do not coincide perfectly with the items observed on the food price survey for individual stores. In order to provide weights to the items stocked in stores, the item distribution observed in the scanner data was allocated in a hierarchical fashion.<sup>10</sup>

Finally, it should be noted that the impact of a cost-containment item restriction on food costs could not be evaluated if the restriction was present in all six case study States. For example, all States prohibited purchase of cheese in shredded, cubed, and string forms. This restriction could not be evaluated because a counterfactual distribution of item selections ( $\alpha'_i$ ) including these package forms did not exist among the six States.

The estimated cost of all food packages (total term in the square brackets) was determined for each store, and the average cost across stores was weighted by the sampling weights from the Survey of Food Prices and Item Availability ( $\omega_s$ ).

Equations (2) and (2') were each calculated twice for each food category in each State to obtain:

- Standardized average food costs—using standard food package contents and standard distribution of participants across certification categories
- Nonstandardized average food costs—using actual food package contents and actual distribution of participants across certification categories ( $\delta_c$ )

Differences across States in standardized average food costs reflect prices, allowable foods, and preferences over allowable foods. Differences across States in nonstandardized average food costs reflect prices, allowable foods, preferences over allowable foods, differences in the distribution of participants across certification category, and differences across States in food package tailoring.

When calculating standardized food costs, the standard distribution of participants across certification categories ( $\delta_c$ ) is the average distribution among the six case study States, as shown in table 4-1.<sup>11</sup> The standard food package contents are taken from Federal regulations (see appendix H). For both standardized and nonstandardized food costs, estimated food costs are based on all WIC foods except

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<sup>10</sup> For example, suppose the scanner data showed that 25 percent of juice purchases in Connecticut were apple juice. Further, among apple juice purchases, 25 percent were store brand, 25 percent were Minute Maid, 15 percent were Seneca, and 35 percent were Juicy Juice. If a Connecticut store in the survey did not stock Minute Maid apple juice, the weight of Minute Maid apple juice was reallocated to all other apple juices, not all other juices of any type.

<sup>11</sup> Components of the average distribution shown in table 4-1 were rounded to the nearest whole number when standardizing estimates.

infant formula, tuna, and carrots. The exclusion of formula, tuna, and carrots from estimation of actual and counterfactual food costs reduces estimated costs relative to true food costs, but estimates of food cost savings are not affected by these exclusions.

**Table 4-1—Distribution of WIC participants in the six case study States**

<b>Certification category</b>	<b>CA</b>	<b>CT</b>	<b>NC</b>	<b>OH</b>	<b>OK</b>	<b>TX</b>	<b>Average</b>
				<i>Percent</i>			
Pregnant	10.2	10.6	11.2	10.8	12.9	10.4	11.0
Breastfeeding	7.6	3.2	4.9	3.6	4.3	6.5	5.0
Postpartum	7.0	5.0	9.2	8.3	7.3	8.4	7.5
Infants	21.5	28.6	28.5	30.5	27.9	26.8	27.3
Children	53.7	52.6	46.2	46.7	47.6	47.9	49.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Totals may not sum to 100 percent due to rounding.

Source: State administrative files, November 2000.

For both standardized and nonstandardized food costs, food package I does not enter the analyses because it contains only infant formula. Food package II contains infant formula, infant cereal, and juice; only infant cereal and juice are included in estimated average food costs. Food package VII contains tuna and carrots, in addition to milk, cheese, eggs, cereal, juice, and legumes; all items except tuna and carrots are included in estimated average food costs. For standardized food costs, it was assumed that half of breastfeeding women received food package V and half received food package VII.

Food package III is prescribed for women and children with special dietary needs and it includes formula, cereal, and juice. This food package is prescribed to a very small fraction of the caseload in the six case study States; the percent of women and children receiving special food packages was identified by a formula prescription and ranged from 0.27 to 1.55 percent in the six States. Food package III is included in estimation of nonstandardized average food costs (excluding formula costs), but due to the small fraction of participants receiving this food package, it was excluded from standardized food costs.

## Analysis Results

Using the approach described above, table 4-2 presents estimated average standardized food costs by category for each State in the study. Total estimated costs varied from a low of \$26.01 PPM in Oklahoma to a high of \$36.39 PPM in California. These estimates reflect the food-item restrictions imposed by the States, as well as within-State food prices and preferences (conditional on the restrictions). The distribution of participants across certification categories and food packages is the same for each State.

For comparison purposes, estimates of total nonstandardized costs in the six States are \$35.72 PPM in California, \$35.04 PPM in Connecticut, \$26.72 PPM in North Carolina, \$27.93 PPM in Ohio, \$24.26

PPM in Oklahoma, and \$26.97 PPM in Texas.<sup>12</sup> Except for Texas, the estimates of nonstandardized costs are lower than for standardized costs. This is largely due to the effects of tailoring; although States are not allowed to tailor food packages for the purpose of reducing costs, tailoring will lower food package costs when prescribed quantities of food are reduced.

Among the six States, milk represented about 31 percent of total estimated nonstandardized costs. In descending order, the percentage of food package costs represented by the other categories were juice (22 percent), cereal (18 percent), cheese (16 percent), eggs (6 percent), legumes (3 percent), infant juice (2 percent), and infant cereal (2 percent). The percentage distribution of standardized food category costs in table 4-2, averaged over the six States, is very nearly the same.

**Table 4-2—Average standardized food category costs per participant month (PPM)**

Food category	CA	CT	NC	OH	OK	TX
	<i>Dollars</i>					
Milk	11.94	10.41	10.38	8.96	8.79	9.19
Eggs	2.19	2.10	1.72	1.49	1.32	1.56
Cheese	5.20	5.17	5.57	5.62	4.29	5.80
Cereal	5.56	8.03	5.12	6.61	3.10	4.23
Infant cereal <sup>a</sup>	0.48	0.49	0.80	0.82	0.72	0.45
Juice	9.36	7.67	8.57	7.49	6.34	4.33
Infant juice	0.56	0.61	0.69	0.75	0.63	0.35
Legumes	1.10	1.00	0.90	1.05	0.83	0.82
Total	36.39	35.48	33.76	32.80	26.01	26.72

a Infant cereal costs include effects of manufacturer's rebate in California, Connecticut, and Texas.

Average food category costs may not sum to total due to rounding.

Sources: Survey of Food Prices and Item Availability, WIC transaction data from supermarkets, and State administrative data from November 2000.

Table 4-3 presents estimates of cost savings from the six States' implementation of food-item restrictions, based on use of standardized food packages (that is, no tailoring) and a standard distribution of participants across certification categories. That is, the estimated savings have been standardized to better facilitate comparison of savings across States. Variations in costs and cost savings due to State differences in certification category and food package contents have been removed.

In table 4-3, a blank cell represents a State that was used to estimate the counterfactual distribution of purchases in the absence of food-item restrictions. Thus, for example, table 4-3 shows estimated milk savings for Ohio and Oklahoma, which limited most milk purchases to gallon containers. Participant purchase patterns in the four States with no cell entry for milk (California, Connecticut, North Carolina, and Texas) were used to develop the counterfactual distribution.<sup>13</sup>

<sup>12</sup> The estimates for both standardized food costs and nonstandardized costs exclude the cost of infant formula, tuna, and carrots.

<sup>13</sup> The counterfactual distribution was calculated as the average of the four State-specific distributions.

The estimated savings in each food category in table 4-3 are discussed separately below. Overall, however, total savings per participant per month varied from  $-\$0.08$  PPM in North Carolina to  $\$6.14$  in OK and  $\$6.82$  PPM in Texas (the negative savings in North Carolina are explained below). In terms of the size of the savings among different food categories, food-item restrictions on cheese, breakfast cereal, and juice generated the largest savings in these States. The estimated savings in table 4-3 for restrictions on milk and eggs are conservative because savings from least expensive brand policies could not be estimated for these two food categories.<sup>14</sup>

**Table 4-3—Estimated food cost savings per participant month, based on standardized food packages and a standard distribution of participants among certification categories**

Food category	CA	CT	NC	OH	OK	TX
	<i>Dollars</i>					
Milk <sup>a</sup>				0.10	0.32	
Eggs <sup>b</sup>	0.15	0.08			0.13	0.10
Cheese	0.11	1.07			1.16	
Cereal	0.87				2.82	1.99
Infant cereal <sup>c</sup>	0.32	0.37				0.27
Juice	0.83 <sup>d</sup>	1.76			1.68	4.19
Infant juice	0.20	-0.26	-0.08			0.28
Legumes		0.08			0.03	
Total	2.48	3.09	-0.08	0.10	6.14	6.82

a Savings from least expensive brand policies in Connecticut, North Carolina, Oklahoma, and Texas could not be estimated. See text for discussion of California’s cost-containment practices for milk and the State’s estimates of savings.

b Savings from least expensive brand policies in Connecticut and Oklahoma could not be estimated.

c Savings estimates include effects of manufacturer’s rebates in California, Connecticut, and Texas.

d Estimated as a “reverse counterfactual” because sampled stores from California did not stock a 46-ounce plastic container of juice, which was a commonly purchased container in the unrestricted States of North Carolina and Ohio.

Blank cells in the table represent States whose participant preferences were used to estimate savings in States with restrictions.

Savings by food category may not sum to total because of rounding.

## Milk

Ohio and Oklahoma limited most milk purchases to gallon containers. This restriction yielded savings of  $\$0.10$  PPM in Ohio and  $\$0.32$  PPM in Oklahoma. The estimated savings are greater in Oklahoma because the average price difference between one gallon of milk and two half-gallons was larger in Oklahoma than in Ohio.

Connecticut, North Carolina, Oklahoma, and Texas required WIC participants to purchase the least expensive brand of milk available in the store. Savings from this policy are not estimated because the

<sup>14</sup> In categories with less branding, however, savings are likely to be small.

Survey of Food Prices and Item Availability collected price data only for the least expensive brand of milk in the store. Thus, the estimated savings for food-item restrictions on milk are conservative estimates. That is, the savings in Oklahoma are probably greater than \$0.32 PPM, and positive savings probably exist in Connecticut, North Carolina, and Texas.<sup>15</sup>

California is treated in this analysis as having no restrictions on milk purchases because some participants were allowed to purchase milk in half-gallon containers. The State, however, had two policies intended to contain milk costs. First, the food package formulation and associated redemption rules were designed to minimize purchases of half-gallon and smaller containers. Most commonly, milk was included in a “dairy combo” food instrument in a two-gallon quantity. Participants were required to purchase the milk in gallon sizes and encouraged to buy two-gallon “economy packs.” If a food instrument was issued with a one-and-one-half gallon quantity of milk, the participant could buy one gallon and one half-gallon.<sup>16</sup> Second, the State updated maximum values for food instruments containing milk on a monthly basis, using a formula linked to the farm price of milk. For FY2000, the State estimated that it saved \$5.5 million because of the “dairy combo” food instrument and \$9.0 million because of its maximum value system for food instruments containing milk. These savings equate to \$0.38 PPM and \$0.63 PPM, respectively.<sup>17</sup> California also had a least cost restriction for milk in FY2000, with estimated savings of \$6.0 million, but the State ended this restriction early in FY2001 because of vendor and participant confusion.

## Eggs

California, Connecticut, Oklahoma, and Texas prohibited purchase of extra-large or jumbo eggs, which are the most expensive types. Oklahoma required the purchase of medium eggs, allowing large eggs only if medium were not available. These restrictions led to estimated savings of \$0.15 PPM in California, \$0.08 PPM in Connecticut, \$0.13 PPM in Oklahoma, and \$0.10 PPM in Texas.

Connecticut and Oklahoma also required purchase of the least expensive brand of eggs. As with the least expensive brand policies for milk, cost savings due to this restriction are not evaluated here because of data limitations. The estimated savings in table 4-3 for Connecticut and Oklahoma for egg restrictions are therefore conservative estimates.<sup>18</sup>

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<sup>15</sup> Oklahoma estimates that it saves about \$600,000 per year (or \$0.57 PPM) because of its least expensive brand milk policy. This estimate reflects the actual distribution of participants and purchases, so it is not directly comparable to the evaluation’s estimate. The State did not have an estimate of the savings from requiring purchase in gallon containers.

<sup>16</sup> Scanner data from California supermarkets indicate that 7.2 percent of all milk containers were half gallons (table 3-4 in chapter 3)

<sup>17</sup> These estimates reflect the actual distribution of participants and purchases, so they are not directly comparable to the evaluation’s estimates. Furthermore, supporting data for the State’s estimate were not available to verify their accuracy.

<sup>18</sup> Oklahoma estimates that it saved about \$200,000 per year (or \$0.19 PPM) because of its least expensive brand egg policy. This estimate may also reflect the State’s limit on egg size. This estimate reflects the actual distribution of participants and purchases, so it is not directly comparable to the evaluation’s estimate.



## Cheese

Connecticut and Oklahoma are the only two States in the group to require purchase of the least expensive brand of cheese in the store. Because a large share of cheese is nationally branded, the Survey of Food Prices and Item Availability collected price data on different brands of allowed cheese in each State, including store-brand and private-label items. Estimated savings from the least expensive brand policy on cheese were \$1.05 PPM in Connecticut and \$1.24 PPM in Oklahoma.<sup>19</sup>

Compared to the other States, California limited the number of allowed cheeses (table 3-1). This limitation led to estimated savings of \$0.11 PPM.<sup>20</sup>

## Legumes

Peanut butter and dried beans/peas both satisfy the food package prescription for legumes, as specified in Federal regulations (food packages with legumes include 18 ounces of peanut butter or 1 pound of dried beans or peas). States generally prescribe either peanut butter or dried beans/peas to participants according to participant preferences.<sup>21</sup> Because the food actually prescribed results from participant preferences, peanut butter and dried beans/peas are analyzed together in the legume category.<sup>22</sup> In analyzing standard food package contents (as specified in the regulations), it is assumed that half of legume prescriptions are peanut butter and half are dried beans/peas.

With regard to food-item restrictions for legumes, Connecticut required purchase of the least expensive brand of peanut butter and Oklahoma required purchase of the least expensive brand of dried beans/peas. Basing the counterfactual distributions of purchases on the 50/50 split noted above, the estimated savings were \$0.08 PPM in Connecticut and \$0.03 PPM in Oklahoma.

## Cereal

Three of the six case study States—California, Oklahoma, and Texas—imposed relatively stringent restrictions on breakfast cereals, but each State took a different approach. Table 3-1 in chapter 3 shows that, with the exception of a few hot cereals, the Oklahoma WIC program allowed purchase of only store-brand or private-label cereals. California allowed nationally branded cereals, but the number of different cereals allowed was smaller than in the other four States. Finally, Texas allowed a large number of cereal types and brands, but its specified minimum package sizes for cereals were

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<sup>19</sup> Oklahoma estimates that it saved about \$1 per pound of cheese because of its least expensive brand cheese policy. The State did not provide an annual estimate of savings.

<sup>20</sup> The chapter noted earlier that, when multiple restrictions were present, separate estimates of savings from each restriction could not be presented. Here, separate estimates for savings from least expensive brand policies and limits on allowed cheeses are possible because the restrictions are in different States. It is only when multiple restrictions act together (in the same State) that their separate effects cannot be estimated.

<sup>21</sup> Although States sometimes prescribe peanut butter and dried beans/peas in alternate months as a cost-cutting measure, none of the six States in this study alternated prescriptions of peanut butter and dried beans/peas.

<sup>22</sup> For all States except California, food package codes correspond to either peanut butter or dried beans/peas (that is, participant preferences are determined prior to assigning a food package code). California food package codes correspond to “peanut butter or dried beans/peas,” and the choice is made when the food instruments are printed.

generally larger than in the other States. The intent was to achieve savings by buying cereal in larger sizes, which generally cost less per ounce.<sup>23</sup>

The analysis indicates that all three approaches led to cost savings. The savings presented in table 4-3 are \$0.87 PPM in California, \$2.82 PPM in Oklahoma, and \$1.99 PPM in Texas.<sup>24</sup>

### **Infant Cereal**

California, Connecticut, and Texas limited purchase of infant cereal to one brand. Each State received a rebate from the manufacturer for every box of Gerber infant cereal purchased with WIC food instruments. Chapter 2 presented an analysis of the size of the rebates; in FY2000, the average rebates for infant cereal were \$3.95 per participant per year in California, \$4.48 in Connecticut, and \$3.22 in Texas. On a per participant per month basis, these rebates equaled \$0.33 PPM in California, \$0.37 PPM in Connecticut, and \$0.27 PPM in Texas.<sup>25</sup>

Using the analysis approach developed for all food categories, the study found virtually no direct cost savings from the brand restrictions on infant cereal (prices in different States varied little by brand). Thus, the rebates represent the estimated cost savings of \$0.32 PPM in California, \$0.37 PPM in Connecticut, and \$0.27 PPM in Texas.<sup>26</sup> Recall that, as with the analyses of all food categories in this chapter, the savings are averaged over all participants, not just those for whom the food item was prescribed.

### **Juice**

Four of the six States (California, Connecticut, Oklahoma, and Texas) imposed restrictions on juice purchases, by type, brand, or container type (see table 3-1).

With respect to brand restrictions, Oklahoma required purchase of store- or private-label brands for most allowed juice. Connecticut and Texas required purchase of the least expensive available brand of some or all juice types.

All six States allowed purchase of five basic juice types: apple, grape, orange, pineapple, and white grape. California allowed only one additional type (vegetable), and Texas allowed two additional types (grapefruit and vegetable). The other four States allowed many more types, including blends of flavors.

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<sup>23</sup> Table 3-4 in chapter 3 shows that WIC participants in both Texas and California generally bought larger packages of cereal than participants in the other States.

<sup>24</sup> Oklahoma estimates that it saves \$1.8 million to \$2.1 million per year because of its cereal restrictions, or about \$1.86 PPM. California estimates that its cereal restrictions saved \$0.25 PPM in FY2000. Supporting data for these estimates were not provided, and they are not standardized by participant category distribution and food prescription.

<sup>25</sup> Note that these estimates are savings per participant month (PPM), not per box of infant cereal purchased. Averaged over just infants, the estimated savings would be \$1.22 per month in California, \$1.37 in Connecticut, and \$1.00 in Texas.

<sup>26</sup> The restriction on infant cereal in California led to extra costs equal to \$0.01 PPM, with Gerber cereal costing just a little more in California than the other brands. With the rebate of \$0.33 PPM in California, estimated net savings were \$0.32 PPM.

With respect to package size and form, all States allowed purchase of both frozen and shelf-stable juices. North Carolina, Ohio, and Oklahoma also allowed shelf-stable liquid concentrate. All States except California required most shelf-stable, regular-strength juice to be purchased in 46-ounce containers,<sup>27</sup> whereas California limited purchases of shelf-stable juices to 64-ounce containers. North Carolina and Ohio were the only two States to allow purchase of shelf-stable juice in either cans or plastic bottles. Oklahoma and Texas limited purchases of shelf-stable juices to cans; California required purchase of 64-ounce bottles, and Connecticut required cans for all juices except orange juice, which had to be purchased in carton form.

For Connecticut and Oklahoma, the restrictions yielded similar savings: \$1.76 PPM in Connecticut and \$1.68 in Oklahoma. The estimated savings in Texas were considerably higher at \$4.19 PPM. These large savings were the result of the State using several types of restrictions on juice in combination: a least expensive brand policy; limits on the types of juice that could be purchased; and a prohibition on the purchase of 46-ounce plastic bottles, which are more expensive than cans.

The savings from juice restrictions in California are estimated as \$0.83 PPM. A different estimation approach, however, had to be used in California. North Carolina and Ohio (the unrestricted States) allowed purchase of either 46-ounce cans or 46-ounce plastic containers of juice, and scanner data revealed a strong preference in these States for plastic containers. Few of the sampled stores in California carried 46-ounce plastic containers of juice, so the counterfactual purchase could not be priced in California stores. Instead, the savings in California are based on a “reverse counterfactual” estimation approach. This approach estimated costs for juice in North Carolina and Ohio by imposing California juice restrictions on allowed types and packaging. These costs were then subtracted from estimated actual costs in the two States to estimate savings related to these restrictions (that is, the savings that would accrue in North Carolina and Ohio if they adopted California’s restrictions on juice). These estimated savings averaged \$0.83 PPM, and they serve as the estimated savings for California.

### **Infant Juice**

Ohio and Oklahoma were the only two States in the study that prescribed infant juice. The other States prescribed single-strength adult juices to save money. Substitution of single-strength for infant juice yielded estimated savings in California and Texas of \$0.20 PPM and \$0.28 PPM, respectively. In Connecticut and North Carolina, however, juice costs **increased** by \$0.26 PPM and \$0.08 PPM, respectively. By requiring 46-ounce adult juice containers instead of 32-ounce infant juice containers, these two States paid slightly higher costs, but they distributed more juice. Variations across markets in the relative costs of single-strength and infant juices, and in allowable containers for single-strength juice, account for the differences in estimated savings for the four States.

### **Estimates of State Savings**

By design, the estimates of food cost savings presented above and in table 4-3 do not account for variation among the States in food package tailoring and the distribution of participants across WIC certification categories. For those who desire State-level estimates that are closer to the actual savings arising from food-item restrictions (but less comparable among States), table 4-4 presents

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<sup>27</sup> Federal regulations specify juice prescriptions in multiples of 46 ounces.

estimated food cost savings based on actual distributions of food packages and certification categories in each State.

The figures in table 4-4 also incorporate State estimates of savings discussed in earlier sections, but not incorporated in table 4-3 because they were not based on a standardized distribution of food packages. Specifically, table 4-4 includes California’s estimate of savings from milk package restrictions of \$0.38 PPM and Oklahoma’s estimate of savings from its least expensive brand policy for milk of \$0.57 PPM (which is added to a savings estimate of \$0.05 PPM for its restrictions on container size). Because Connecticut and Texas also had least expensive brand policies for milk for which savings could not be estimated, the Oklahoma estimate of milk savings of \$0.57 PPM is used for Connecticut and Texas as well.

**Table 4-4—Estimated food cost savings per participant month, based on actual food packages prescribed and actual distribution of participants among certification categories**

	CA	CT	NC	OH	OK	TX
	<i>Dollars</i>					
Milk <sup>a</sup>	0.38	0.57	0.57	0.05	0.62	0.57
Eggs <sup>b</sup>	0.16	0.26			0.31	0.10
Cheese	0.12	1.04			1.14	
Cereal	0.95				2.72	2.00
Infant cereal <sup>c</sup>	0.32	0.37				0.27
Juice	0.63 <sup>d</sup>	1.69			1.60	4.16
Infant juice	0.10	-0.39	-0.06			0.22
Legumes		0.10			0.03	
Total	2.66	3.65	0.51	0.05	6.43	7.33

a Total savings for milk in Connecticut, North Carolina, Oklahoma, and Texas include an estimate of savings by Oklahoma officials of \$0.57 PPM for their least expensive brand policy. The California saving of \$0.38 PPM is based on information provided by State officials.

b Total savings for eggs in Connecticut and Oklahoma include an estimate of savings by Oklahoma officials of \$0.19 PPM for their least expensive brand policy.

c Savings estimates include effects of manufacturer’s rebates in California, Connecticut, and Texas.

d Estimated as a “reverse counterfactual” because sampled stores from California did not stock 46-ounce plastic containers of juice, which was a commonly purchased container in the unrestricted States of North Carolina and Ohio.

Blank cells in the table represent States whose participant preferences were used to estimate savings in States with restrictions.

Savings by food category may not sum to total because of rounding.

In addition, Oklahoma officials estimated savings equal to \$0.19 PPM from their least expensive brand policy for eggs. This saving has been added to estimated savings of \$0.12 PPM from the State’s restrictions on allowed egg size, yielding a total saving of \$0.31 PPM for eggs. Lacking any other empirical estimate of savings from Connecticut’s least expensive brand policy for eggs, the table entry of \$0.26 for eggs in Connecticut includes the Oklahoma estimate of \$0.19 PPM. The remaining \$0.07 PPM is the evaluation’s estimate for savings attributable to Connecticut’s size restrictions on eggs.

Therefore, the estimated savings in table 4-4 for milk and eggs (and for total savings) represent a mixture of evaluation and State official's estimates of savings from food-item restrictions. Although the estimates provided by State officials could not be verified, they provide information that the evaluation could not provide because of data limitations.<sup>28</sup>

With the combination of State and evaluation estimates of savings in table 4-4, total savings from food-item restrictions ranged from a low of \$0.05 PPM in Ohio to a high of \$7.33 PPM in Texas. In both tables 4-3 and 4-4, Ohio had small estimates of total savings, and North Carolina had either a small loss or a modest saving. The finding of small effects in these two States is not surprising. North Carolina and Ohio were selected to represent States with few food-item restrictions, so cost savings due to such restrictions were not expected.

Of the four States with large estimated savings from their food-item restrictions, Texas had the largest—\$6.82 PPM in table 4-3 and \$7.33 PPM in table 4-4. The largest contributors to these savings were the State's large minimum package size requirements for cereal and its combined juice policies of least expensive brand and limited types and containers.

With estimated savings of \$6.14 PPM (table 4-3) and \$6.43 PPM (table 4-4), Oklahoma had the second highest estimated savings within the six States. One of the reasons for selecting Oklahoma was to examine the consequences of its requirement that only store-brand or private-label cereals could be purchased with WIC food instruments. This restriction led to estimated savings of \$2.82 PPM (table 4-3) and \$2.72 PPM (table 4-4). Other major contributors to Oklahoma's total savings were its least expensive brand policy for cheese and its requirement that juice purchases be limited to store or private-label brands.

Total food package cost savings in Connecticut are estimated as \$3.09 PPM (table 4-3) and \$3.65 PPM (table 4-4). The largest contributions to these savings came from the State's least expensive brand restrictions on cheese and juice. Finally, the estimated savings for California (\$2.48 PPM in table 4-3 and \$2.66 PPM in table 4-4) arose largely from its restrictions on the number and types of cereal that may be purchased and on its package size restrictions on juice.

The estimated savings per participant per month in table 4-4 represent substantial reductions in average food package costs, both in percentage terms and as annualized savings. Table 4-5 presents the estimated reductions. On a percentage basis, Oklahoma and Texas experienced the largest estimated reductions in food package costs: 21.0 and 21.4 percent, respectively. California and Texas had the greatest annualized savings, \$39.7 and \$66.0 million, respectively, due to the combination of their large WIC caseloads and large savings per participant per month.

The **annualized** savings presented in table 4-5 are not the same as **annual** savings; the estimates in the table are based on WIC price and transaction data collected at a point in time, not over the course of a full year.

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<sup>28</sup> California officials' estimate of \$0.63 PPM in savings due to use of maximum price restrictions on milk are not included because savings from maximum value restrictions on food instruments in the other States are not available.

**Table 4-5—Estimates of food package savings**

	CA	CT	NC	OH	OK	TX
Savings PPM	\$2.66	\$3.65	\$0.51	\$0.05	\$6.43	\$7.33
Savings (percent)	6.9	9.4	1.9	0.2	21.0	21.4
Caseload (000s)	1,243	49	200	247	87	750
Savings (millions)	\$39.7	\$2.2	\$1.2	\$0.1	\$6.7	\$66.0

In estimating food package savings on a percentage basis, estimated savings were divided by the sum of estimated savings plus estimated actual food package costs.

Finally, in reviewing these estimates of food package savings, it is important to remember that the savings estimates are based on a number of simplifying assumptions. Furthermore, they are not representative of the effects of food-item restrictions nationally. The six States do not represent a random sample. Instead, they were selected to represent a mixture of vendor and food-item restrictions designed to reduce food package costs. Therefore, the focus of the analysis has been relating specific food-item restrictions to their associated effects on food costs. From the analysis, it is clear that all three major types of food-item restrictions (least expensive brands, limited choice of types, and package-size restrictions), as well as manufacturer rebates, were able to achieve cost savings.

# Chapter 5

## Access to WIC Vendors and Availability of Prescribed Foods

State use of a competitive pricing policy at vendor application may restrict WIC participants' access to authorized vendors. Competitive pricing policies and food-item restrictions may both impact the availability of prescribed foods in authorized WIC stores. This chapter examines the effects of these policies and restrictions on participant access to vendors and food availability in the six case study States.

Competitive pricing policies are designed to limit the average cost of prescribed WIC food packages, either by keeping high-price stores out of the program or by causing them to reduce the prices they charge to WIC. Such policies, however, may restrict WIC participants' access to vendors if the policy reduces their number. As discussed in chapter 2, Connecticut, Oklahoma, and Texas had explicit price standards for vendor applications. All three States used a fixed threshold for evaluating prices of a standard package of WIC foods (which varied by State). If a store's price for the package of foods exceeded the threshold, the store had to lower its prices or not be authorized.<sup>1</sup> In the other three case study States, program analysts had greater flexibility in judging whether store prices were appropriate. The study therefore treats Connecticut, Oklahoma, and Texas as having "restrictive" vendor selection policies for purposes of comparing participant access and availability of food.

Chapter 2 also noted that very few retailer applications had been denied as a result of competitive pricing policies in any of the States. It is possible, however, that these policies may have dissuaded high-price retailers from applying for authorization, thereby reducing the number of stores participating and, potentially, participants' access to stores that were authorized.

Cost-containment practices may also reduce the availability of prescribed WIC foods. First, if competitive pricing restrictions have the unintended consequence of limiting the availability of well-stocked stores, then WIC participants may have difficulty finding prescribed foods at remaining WIC vendors. Second, when State cost-containment practices limit the number of different food items that may be purchased with the WIC food instrument, there may be a greater likelihood that an approved item will not be available when the WIC participant shops.

### Research Approach

The first portion of this chapter examines whether measures of participant access to WIC vendors differ between the three States with the most restrictive price standards (Connecticut, Oklahoma, and Texas) and the remaining less restrictive States. Measures of access include distance, travel time, and out-of-pocket costs incurred when traveling to the store in which a participant does most of her WIC shopping, especially in comparison to the store in which most regular (non-WIC) shopping is done.

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<sup>1</sup> Thresholds were determined as a percentage premium over average package price, as determined by store type and area. Connecticut required that an applicant's total price be within 7.5 percent of the average price. The thresholds in Oklahoma and Texas were 5.0 and 8.0 percent, respectively. Because the States used different approaches to calculate average prices, one cannot infer that Oklahoma necessarily had the most stringent policy of the three States.

The second portion of the chapter looks at the availability of prescribed foods using two different data sources. The Survey of Food Prices and Item Availability captured information on which State-prescribed food items were available in a sample of WIC vendors in each State. In addition, for respondents to the Survey of WIC Participants who said they did not buy all the WIC food items prescribed for them, the survey asked for the main reason they did not buy all of each item. One of the response codes to these questions was that the store ran out of the item, and the chapter examines whether the frequency of this response is related to the presence of food-item restrictions.

## Participant Access to WIC Vendors

Survey respondents' access to WIC vendors was examined both in absolute terms and in relation to access to their regular food stores. In the vast majority of cases (87 percent), however, respondents did their WIC shopping at the same store where they did their regular food shopping.

Table 5-1 presents information on participant access to WIC vendors, based on data from the study's Survey of WIC Participants. The survey asked respondents about the store where they usually used their WIC food instruments. The table shows average distance to the WIC store (in miles), average travel time to the store (minutes), the percentage of respondents who incurred travel expenses when going to the WIC store, and the average out-of-pocket expenses incurred.

The average distance traveled to the respondent's usual WIC store was 3.9 miles.<sup>2</sup> Participants in California traveled the shortest average distance (2.6 miles), whereas Oklahoma participants traveled the longest average distance to shop (5.2 miles). Average travel time for the six States was 11.0 minutes (one way), with Connecticut and California participants spending, respectively, the least and most time to travel (9.5 and 12.7 minutes).

A cross-State average of only 5.1 percent of respondents said that they incurred out-of-pocket expenses for the trip to the store. These expenses included bus or taxi fares, tolls, and parking fees. Averaged over the entire sample of respondents, not just those who said they incurred costs, the average cost was \$0.14 for a one-way trip. With an average of \$0.45 per one-way trip, California respondents paid by far the highest out-of-pocket costs, largely because they were most likely (18.3 percent) to incur any out-of-pocket costs.<sup>3</sup>

When the averages in States without vendor restrictions are compared to averages in the three restrictive States of Connecticut, Oklahoma, and Texas, only two of the group differences in table 5-1 are statistically significant. Absolute travel time to the respondent's WIC store was, on average, 1.7 minutes shorter in the States with restrictions than without (significant at the 0.01 level), and respondents in the nonrestrictive States were significantly more likely to incur travel expenses (significant at the 0.01 level). These findings are opposite what one would expect if State cost-containment

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<sup>2</sup> Group averages reported in this and following chapters give equal weight to data from each State, regardless of the size of the State's WIC caseload. If averages for groups of States (for instance, all restrictive or nonrestrictive States) were weighted by caseload, all results would be dominated by the experience of WIC participants in California and Texas, which have the largest WIC caseloads in the study.

<sup>3</sup> The high travel times and out-of-pocket expenses in California appear to be related to how respondents traveled to their shopping destination. Respondents in California were the most likely to travel by bus or taxi, thereby incurring costs. They were also relatively likely to walk to the store, contributing to the higher travel times in California.



**Table 5-1—Participant access to store where they usually used their WIC food instruments**

Access measure	Individual States						State groups			
	CA	CT	NC	OH	OK	TX	All States	No restrictions	Restriction	Group difference
Distance (miles)	2.6	2.7	5.6	4.2	5.2	3.0	3.9	4.2	3.6	-0.5
Travel time (minutes)	12.7	9.5	11.5	11.2	10.1	10.7	11.0	11.8	10.1	-1.7**
Out-of-pocket costs incurred (percent)	18.3	0.9	3.3	0.5	2.4	5.4	5.1	7.4	2.9	-4.5**
Out-of-pocket costs	\$0.45	\$0.04	\$0.11	\$0.01	\$0.08	\$0.15	\$0.14	\$0.19	\$0.09	-\$0.10
<i>Sample size (number)</i>	<i>178</i>	<i>198</i>	<i>196</i>	<i>191</i>	<i>168</i>	<i>171</i>	<i>1,102</i>	<i>585</i>	<i>537</i>	<i>1,102</i>

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Sample size varies across measures due to item non-response. Sample sizes shown is the maximum for measures included in the table. Item non-response is below 2 percent for all measures.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Out-of-pocket expenses are for one-way travel.

Connecticut, Oklahoma, and Texas had the most restrictive policies regarding use of competitive pricing at vendor application.

Source: Survey of WIC Participants.

practices reduced participant access. Thus, this cross-State comparison provides no evidence that State use of competitive pricing policies at application reduced participant access to WIC vendors.

Interstate variations in road networks, public transportation, and food store location decisions could obscure the possible effects of restrictive vendor authorization practices on participant access. Lacking site-level data on these factors, the study used several proxy measures in a multivariate analysis to determine whether cost-containment practices in Connecticut, Oklahoma, and Texas may have affected access. These measures were population density (persons per square mile), the ratio of population to stores, the percentage of the population living below the Federal poverty guidelines, and the percentage of the population participating in WIC.<sup>4</sup> After controlling for these factors, residence in a State with restrictive practices either had no correlation with the WIC access measure (for out-of-pocket expenses) or a negative and significant correlation (for travel distance and time). Again, the evidence indicates that restrictive vendor authorization practices in these three States did not reduce WIC participants' access to vendors.

A second and better approach for controlling for State-by-State variations in factors affecting access is to examine the **extra** distance, time, and travel costs that WIC participants spent going to their usual WIC stores, compared to the distance, time, and out-of-pocket expenses incurred going to their regular food stores. This approach is better because, by using access to regular food stores as a base, it controls for State variation in non-WIC factors affecting access, like transportation system. Table 5-2 shows that in three of the six States (California, Connecticut, and Ohio), the average distance to WIC stores was less than the average distance to the respondent's regular food store, whereas the opposite was true in Oklahoma. Extra distance was virtually zero in North Carolina and Texas. A similar pattern holds for travel time. Finally, except for California, differences in out-of-pocket expenses for trips to WIC and regular stores were small: less than or equal to \$0.05 per one-way trip. In California, average trip costs to WIC stores were \$0.18 less than average costs to regular stores.

If States' vendor restrictions decreased WIC participants' access to WIC stores, one would expect to see significantly larger extra travel distances, times, and out-of-pocket expenses in table 5-2 for the restrictive States. The absence of significant findings means there is no evidence that State vendor restrictions affected participant access to WIC-authorized vendors in these States. A similar lack of significant differences was seen when access was examined separately for urban, suburban, and rural areas.<sup>5</sup>

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<sup>4</sup> All model variables were measured at the county level.

<sup>5</sup> The sampling scheme for the Survey of WIC Participants used three strata: urban (central city portion of "metropolitan" counties, as defined by the Office of Management and Budget), suburban (noncentral city portion of metropolitan counties), and rural (nonmetropolitan counties).

**Table 5-2—Comparison of access to regular and WIC stores**

Access measure	Individual States						State groups			
	CA	CT	NC	OH	OK	TX	All States	No restrictions	Restriction	Group difference
Extra distance to WIC store (miles)	-0.3	-0.4	<0	-0.6	0.2	>0	-0.2	-0.3	-0.1	0.2
Extra time to WIC store (minutes)	-0.5	-1.7	<0	-1.0	0.1	0.2	-0.5	-0.5	-0.5	>0
Extra cost to travel to WIC store	-\$0.18	-\$0.05	\$0.00	-\$0.04	\$0.00	\$0.00	-\$0.05	-\$0.07	-\$0.02	\$0.06
<i>Sample size (number)</i>	<i>178</i>	<i>198</i>	<i>196</i>	<i>191</i>	<i>168</i>	<i>171</i>	<i>1,102</i>	<i>585</i>	<i>537</i>	<i>1,102</i>

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Sample size varies across measures due to item non-response. Sample size shown is the maximum for measures included in the table. Item non-response is below 2 percent for all measures.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Out-of-pocket expenses are for one-way travel.

Connecticut, Oklahoma, and Texas had the most restrictive policies regarding use of competitive pricing at vendor application.

<0 Negative value too near zero to display.

>0 Positive value too near zero to display.

Source: Survey of WIC Participants.

The small, and often negative, measures of extra distance, time, and costs related to WIC shopping were largely due to most WIC participants using the same store for both their usual WIC and non-WIC shopping. Table 5-3 shows that a cross-State average of only 13.0 percent of survey respondents said that their usual store for WIC shopping was different than the store where they did most of their shopping, although the percentage nearly doubled (to 24.2 percent) in California because of the relatively large number of WIC-only food stores in that State.<sup>6</sup> There was no significant difference in this measure between the restrictive and nonrestrictive States. As shown in the table, WIC stores were sometimes closer than the respondent's regular food store, and sometimes farther away.

By itself, the fact that most WIC participants in these six States (87.0 percent) did their regular and WIC shopping at the same store is strong evidence that WIC's competitive pricing policies did not limit access to WIC vendors. If stores were not being authorized because of high prices, then fewer participants would have been doing their WIC shopping at their regular food stores. The absence of any statistically significant differences in table 5-3 bolsters the finding of no effect.<sup>7</sup>

## Availability of Prescribed Foods

If States limit the number of approved items within a given food category, there may be a greater chance that an approved item will not be available when WIC participants shop. This can be a particular hardship for participants because, when multiple food items are listed on the same WIC instrument, all the items must be purchased at the same time. If an approved item is not available, the participant must either forego buying the item with WIC benefits or postpone buying all of the items until a later trip. Chapter 8 (Food Instrument Redemption) provides a discussion of how the case study States aggregate multiple food items on single instruments.

Food-item restrictions can affect item availability in several ways. If States limit the brands allowed, then the possibility increases that the allowed brand(s) will not be on the shelf during the participant's shopping trip. For instance, California, Connecticut, and Texas limit infant cereal to Gerber brand because they have negotiated rebates with Gerber Foods. If a participant in these States finds a store out of Gerber cereal, her infant's prescribed cereal is unavailable. In North Carolina and Ohio, a WIC participant facing a similar situation could purchase Beechnut or Heinz infant cereal instead. (Participants in Oklahoma can buy Heinz or Gerber cereals, but not Beechnut.) One might therefore expect infant cereal availability to be more of a problem in the States with brand restrictions than elsewhere, even though WIC-authorized vendors are supposed to maintain ample inventories of a variety of food items within each food category (as discussed in more detail below).

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<sup>6</sup> Among the California survey respondents who said that they did their regular and WIC shopping at different stores, 80.7 percent said they did their WIC shopping at a WIC-only store.

<sup>7</sup> One might argue that any evidence that participants did their WIC shopping at different stores implies an extra burden from additional trips. This is not necessarily the case; the survey did not ask whether any regular shopping was done at the same store as the WIC shopping. It is quite possible that WIC shopping trips act as substitutes for regular shopping trips rather than as additional trips. Furthermore, even if going to a different store for WIC shopping does indicate extra burden, that burden was not more prevalent in the States with restrictions.

**Table 5-3—Same versus different stores for regular and WIC shopping**

Access measure	Individual States						State groups			
	CA	CT	NC	OH	OK	TX	All States	No restrictions	Restriction	Group difference
						<i>Percent</i>				
Different store for regular and WIC shopping	24.2	15.8	5.9	14.2	12.7	5.4	13.0	14.8	11.3	-3.5
WIC store farther away	9.1	1.0	2.1	1.3	5.9	3.8	3.9	4.2	3.6	-0.6
Regular and WIC stores same distance away	4.8	6.1	1.6	6.4	4.2	1.6	4.1	4.3	3.9	-0.4
WIC store closer	10.3	8.7	2.2	6.5	2.6	0.0	4.2	4.6	3.8	-0.8
						<i>Number</i>				
<i>Sample size</i>	<i>178</i>	<i>198</i>	<i>196</i>	<i>191</i>	<i>168</i>	<i>171</i>	<i>1,102</i>	<i>585</i>	<i>537</i>	<i>1,102</i>

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Sample size varies across measures due to item non-response. Sample size shown is the maximum for measures included in the table. Item non-response is below 2 percent for all measures.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Out-of-pocket expenses are for one-way travel.

Connecticut, Oklahoma, and Texas had the most restrictive policies regarding use of competitive pricing at vendor application.

Source: Survey of WIC Participants.

Similarly, package-size restrictions can also affect the availability of prescribed foods. As an example, Ohio required that all fluid milk be purchased in gallon containers, whereas Texas allowed purchase of both gallon and half-gallons. Depending on stores' ability to keep gallon containers of milk on the shelf, a WIC participant in Texas might have been more likely to find an allowed container of milk in the store than a participant in Ohio.

Restrictions on food type may also affect the availability of prescribed foods. When fewer types within a food category are allowed, opportunities for substitution when a preferred type is missing are diminished. For instance, California included only four types of cheese on its list of approved foods: American, Cheddar, Monterey jack, and mozzarella. Oklahoma allowed these four plus Colby. If a participant viewed Colby cheese as an acceptable substitute for Cheddar, then cheese availability should have been higher in Oklahoma than California, other factors (like store-stocking policies) held constant.

Finally, it is possible for vendor restrictions—as well as food-item restrictions—to affect the availability of prescribed foods. If higher priced stores, on average, carry more types of food and larger inventories than lower priced stores, then program restrictions on higher priced stores could increase the possibility of not finding prescribed food items. This assumption has not been tested, and indeed, higher priced stores may have fewer food item choices than low-priced stores (for instance, high-priced corner grocery stores compared with large supermarkets). Given the earlier findings in this chapter that vendor restrictions appear to have had no impact on store accessibility, there is no expectation that vendor restrictions could affect food-item availability in this sample of six States.

One food-item restriction that has not been mentioned is the requirement to purchase the least expensive brand of a food item. In the six case study States this means that participants must purchase the lowest-cost brand **available** within the store. By definition, this cost-containment practice cannot limit item availability.

In the analyses that follow, no attempt has been made to assess the availability of every single food item approved by the six States. Instead, individual food items approved for WIC in each State were combined with close substitutes (also WIC approved) to form food **groups**. The chapter then presents the percentage of WIC stores in each State that had at least one item from a food group available.

Three types of grouping were performed. The first was to ignore package size as long as it met State regulations. Thus, the study looked only at whether reduced-fat milk in an approved size was available, not at whether it was available in both half-gallon and gallon containers. Second, for single-strength juices, the analysis grouped together different package forms (frozen concentrate, liquid concentrate, refrigerated, and shelf-stable cans and bottles) within each type, as long as the different forms were State-approved. Finally, for breakfast cereals, all State-approved cold breakfast cereals were grouped by their predominant grain type (bran, corn, oats, rice, wheat, multi-grain), and hot cereals were treated as a separate group of breakfast cereal.

Even with this grouping, the issue of substitutions remains. If a store carries no oat-based cereals, some participants may view wheat-based cereals as an acceptable substitute, whereas others may not. The study examines the issue of personal preferences and substitutions at the end of this chapter by looking at the extent to which respondents to the Survey of WIC Participants did not buy a prescribed

food item because “the store ran out.” For these participants, it is clear that the store did not have an acceptable substitute available.

The issue of availability and substitutability is also examined by investigating whether each sampled WIC store met program standards: all WIC-authorized stores are required to meet minimum requirements for both the variety and quantity of stocked items within each food category, established by each State. The Survey of Food Prices and Item Availability was not designed to determine quantities of food items stocked, but it can be used to determine whether stores met minimum variety standards. Table 5-4 shows each State’s minimum requirements for each food category.

**Table 5-4—Minimum variety requirements for WIC inventory<sup>a</sup>**

	CA	CT	NC	OH	OK	TX
Milk	1	1	3 (whole, low-fat or non-fat, non-fat dry)	1	3 (whole, low-fat, non-fat)	1
Evaporated milk	1	1	1	Not authorized	No minimum	1
Cheese	1	2	2	2 (American plus 1 other)	5	1
Eggs	1	1	Grade A, large or extra large, white or brown	1 (Grade A large)	1 (medium)	1
Infant cereal	1	2	2 (rice plus 1 other)	1	2 (each single grain)	1
Juice	1	3	2 (orange plus 1 other)	3 (orange plus 2 others)	All allowed types	2
Infant juice	Not authorized	Not authorized	No minimum	1	2 (frozen apple plus 1 other)	No minimum
Dried beans/peas	1	2	2	1	2	1
Peanut butter	1	1	1	1	No minimum	1
Cold cereal	1	3	4	3 (Cheerios plus 2 others)	Every type allowed	5
Hot cereal	1	1	No minimum	No minimum	2	No minimum

<sup>a</sup> The number in each cell represents the number of different types or varieties of a food category required by the State to be available for purchase. “No minimum” means that the State did not specify a minimum variety requirement for that food. Cell entries also indicate further requirements specified by the States.

Source: State program manuals.

## Availability of Different Types or Varieties of WIC Foods

The availability of approved WIC foods is shown in tables 5-5 through 5-11, with each table representing a different WIC food category. The respective tables are for milk, cheese, eggs, infant cereal, single-strength juices, dried beans or peas, and breakfast cereals. In each table, a blank cell indicates that the food item was not approved in that State. For each food category except dried beans/peas, the States have been classified as restrictive or not, based on food-item restrictions that could potentially affect availability. None of the six States imposed restrictions for dried beans or peas that could affect availability.

Availability is defined as an item normally being carried by the store. In many instances, data collectors checked store shelves to see if an item was present. When stores used scanning systems at the checkout, however, store managers or cashiers scanned a set of over 200 Universal Product Codes (UPCs) for Federally approved WIC foods, and data collectors used the resulting printed receipts to ascertain item availability and price.<sup>8</sup> For items that generally do not have UPCs, like milk, eggs, and deli cheese, store shelves were always checked for item availability.

One of the 18 WIC stores sampled in Connecticut was found to carry a very low inventory of WIC items. This was a small store, so its chance of being sampled was small. Accordingly, its sampling weight was large, and this single store skewed the food availability results for Connecticut dramatically. For this reason, the store was dropped from the analysis sample.<sup>9</sup>

### *Milk*

Table 5-5 shows the percentage of WIC stores in each State in which different types of milk were available. Many types of milk were carried by nearly all of the WIC stores, with low-fat and non-fat fluid cow's milk being somewhat less available, on average, than whole or reduced-fat milk. Evaporated milk was carried by all sampled WIC stores in the five States that allowed this item. A cross-State average of 80.3 percent of stores carried lactose-reduced milk.

California, Ohio, and Oklahoma generally limited purchases of cow's milk to gallon containers, so one might expect approved containers of milk to have been less available in these three States than in Connecticut, North Carolina, or Texas. The group difference column in table 5-5 shows no significant differences in the availability of milk in the States with and without restrictions, so the hypothesis that food-item restrictions might affect item availability is not supported for milk in this sample of States.

In all States but North Carolina, all sampled stores met the State's minimum variety requirements for availability of milk. In North Carolina, 90.2 percent of the stores met the minimum requirements. As was shown in table 5-4, North Carolina and Oklahoma both required approved stores to carry at least three varieties of cow's milk, whereas the other States required only one variety. When States with and without restrictions on milk are compared, however, the 3.3 percentage point difference in stores carrying minimum requirements is not statistically significant.

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<sup>8</sup> If the store did not stock an item, the printed receipt would not show a line for the item.

<sup>9</sup> In July 2001, shortly after the end of the study's data collection period, this store lost program authorization when store ownership changed.





### ***Cheese***

The availability of different types of State-approved cheese is presented in table 5-6. California and Oklahoma were the most restrictive States with respect to approved types and packaging of cheese. California allowed purchase of only four types (American, cheddar, Monterey jack, and mozzarella), and Oklahoma allowed only five (the previous four plus Colby). Furthermore, Oklahoma prohibited purchase of most sliced cheese. Where significant group differences exist in the table, however, the States with restrictions were more, rather than less, likely to carry approved cheeses than were stores in the States with fewer restrictions. Thus, the hypothesis that food-item restrictions for cheese might reduce the availability of approved cheese items in stores is not supported.

All stores in the two States with restrictions met minimum variety requirements for cheese, compared with a cross-State average of 96.2 percent of stores in the other four States. The 3.8 percentage point difference is not statistically significant.

### ***Eggs***

Connecticut had the most restrictive policy for eggs in the six case study States—only large white eggs could be purchased with the WIC food instrument. As shown in table 5-7, all stores in Connecticut had large white eggs in stock. All the sampled stores in the other States also meet minimum variety requirements. No relationship exists between the presence of food-item restrictions on eggs and the availability of eggs in the sampled stores.

### ***Infant Cereal***

California, Connecticut, and Texas limited approved infant cereals to Gerber brand. All four types of infant cereal (barley, oatmeal, rice, and mixed) were approved for purchase in each State, but only the availability of barley cereal differed between States with and without restrictions (table 5-8). Only 4.4 percent of sampled stores in North Carolina carried barley infant cereal, and this low availability created a large (44.7 percentage points) and statistically significant difference in availability between the States with and without restrictions.<sup>10</sup> North Carolina did not restrict approved infant cereals to just one brand, however, so the evidence does not support a hypothesis that food-item restrictions created problems with availability. All the sampled stores in each State met the minimum variety requirements for infant cereal.

### ***Juices***

For single-strength juices, California imposed the greatest restrictions of the six States on types allowed, with only apple, grape, orange, pineapple, and tomato being approved for WIC purchase. California also limited allowed brands and packaging for juices. Oklahoma also limited allowed brands, and Texas required purchase of least expensive brands. These three States form the group of restricted States in table 5-9.

Orange juice was the most available juice in the six States, with a cross-State average of 99.4 percent of WIC-authorized stores carrying at least one of the allowed brands/types/package forms of the product. Allowed versions of apple, grape, grapefruit, and pineapple juice were also carried by over 90 percent of stores. In the two States that allowed tomato juice, an average of 74.1 percent of stores stocked an allowed version. A cross-State average of 64.7 percent of stores stocked vegetable juice in

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<sup>10</sup> The tables in chapter 3 show that none of the North Carolina respondents to the Survey of WIC Participants said they purchased barley, and the scanner data from North Carolina show only 0.2 percent of infant cereal purchases were for barley. The demand in North Carolina for barley cereal appears to be quite low.









the five States (all but Connecticut) where it was allowed for WIC purchase, and an average of 59.7 percent of stores carried cranberry juice in the two States (North Carolina and Ohio) where it was WIC approved.

Stores in States with juice restrictions were less likely to carry tomato and vegetable juice than were stores in the other States, and the differences were large: 38.9 percentage points for tomato and 15.0 percentage points for vegetable juice. The large differences are not statistically significant, however, because the sample sizes for these juices were smaller than indicated in the table (not all States allowed these juices). For all other juices, vendors in the restrictive States were more, not less, likely to stock the individual juices, so there is no consistent evidence that the restrictions on juice types, brands, and package forms were associated with availability problems.

As shown in table 5-9, most stores met State minimum variety requirements for approved juices. The stringent requirement in Oklahoma that vendors carry all allowed types, however, resulted in only 72.4 percent of sampled vendors in that State meeting the minimum requirement.

### ***Peanut Butter***

Connecticut limited WIC purchases of peanut butter to the least expensive brand available—a restriction that cannot affect availability. All sampled stores in each State carried peanut butter, and they all met minimum variety requirements. Given the uniformity of the findings, no table of results is presented for peanut butter.

### ***Dried Beans or Peas***

There were no restrictions among the six States in the brands or types of Federally approved dried beans or peas that could be purchased with WIC food instruments, so table 5-10 does not compute group differences for the availability of different types of dried beans/peas. With the exception of mayacoba beans, most stores in each State carried most of the types shown in the table.

### ***Breakfast Cereals***

Table 5-11 divides breakfast cereals into types based on predominant grain, with a separate category for hot cereals. California and Oklahoma form the group of States with restrictions; both States approved a relatively narrow choice of breakfast cereals, and Oklahoma allowed purchase only of store or private-label brands of cereal.<sup>11</sup>

With the two exceptions of oat- and wheat-based cereals, WIC stores in California and Oklahoma were equally or more likely to carry approved cereals than were stores in the other four States. Even for the two exceptions, the differences in availability, 8.4 and 16.0 percent respectively, were not statistically different from zero. For hot cereals, the California and Oklahoma stores were significantly more likely, at the 0.05 level, to carry approved brands, by a margin of 12.2 percentage points. Thus, restrictions on allowed types and brands of cereal did not reduce the availability of allowed items.

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<sup>11</sup> In early 2001, when these data were collected, the only national brands allowed in Oklahoma were hot Quaker and Nabisco cereals. In July 2001, Oklahoma added four national-brand cold cereals to its list of approved foods.

Table 5-10—Availability of approved dried beans or peas in WIC stores

Food type	Individual States						State groups			
	CA	CT	NC	OH	OK	TX	All States	No restrictions	Restriction	Group difference
						<i>Percent</i>				
Black beans	100.0	93.5	100.0	43.7	67.4	100.0	84.1			
Black-eyed peas	70.6	72.1	100.0	85.2	100.0	100.0	88.0			
Lentils	100.0	88.9	93.5	72.6	100.0	100.0	92.5			
Mayacoba	45.6	0.0	0.0	0.0	2.2	0.0	8.0			
Pinto beans	100.0	97.3	100.0	97.3	100.0	100.0	99.1			
Red kidney beans	100.0	91.6	93.5	83.7	78.4	100.0	91.2			
Small red beans	94.1	85.1	93.5	41.4	84.8	100.0	83.2			
Store carries minimum variety	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0
						<i>Number</i>				
<i>Sample size</i>	<i>18</i>	<i>17</i>	<i>18</i>	<i>18</i>	<i>18</i>	<i>17</i>	<i>106</i>	<i>88</i>	<i>18</i>	<i>106</i>

Weighted estimates for States were obtained with SUDAAN software.

There were no differences among the six States in food-item restrictions that could potentially affect availability.

Source: Survey of Food Prices and Item Availability.



**Table 5-11—Availability of approved breakfast cereals in WIC stores**

Food type	Individual States						State groups			
	CA	CT	NC	OH	OK	TX	All States	No restrictions	Restriction	Group difference
						<i>Percent</i>				
Bran-based	95.8	54.4	93.5	82.5	86.5	100.0	85.4	82.6	91.1	8.6
Corn-based	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0
Hot cereals	100.0	82.8	93.5	74.9	100.0	100.0	91.9	87.8	100.0	12.2*
Multi-grain		70.1	93.5	75.3			79.6	79.6		–
Oat-based	100.0	100.0	100.0	100.0	83.1	100.0	97.2	100.0	91.6	–8.4
Rice-based	93.7	91.6	100.0	82.5	100.0	74.4	90.4	87.1	96.8	9.7
Wheat-based	70.2	100.0	100.0	100.0	97.8	100.0	94.7	100.0	84.0	–16.0
Store carries minimum variety cold cereal	100.0	100.0	100.0	100.0	100.0	74.4	95.7	93.6	100.0	6.4
Store carries minimum variety hot cereal	100.0	100.0			100.0		100.0	100.0	100.0	0.0
						<i>Number</i>				
<i>Sample size</i>	<i>18</i>	<i>17</i>	<i>18</i>	<i>18</i>	<i>18</i>	<i>17</i>	<i>106</i>	<i>70</i>	<i>36</i>	<i>106</i>

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Blank cell indicates item not approved in that State or group. Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

– Difference not defined because no States in one group allowed food item.

California and Oklahoma approved a relatively narrow choice of breakfast cereals; Oklahoma allowed only private label and store brands.

Source: Survey of Food Prices and Item Availability.

In five of the six States, 100 percent of sampled stores met their State's minimum variety requirements for cold cereals; only 74.4 percent of stores in Texas did so because some stores did not carry any rice-based cereals. In the three States with minimum variety requirements for hot cereal, all sampled stores met the requirements.

### ***Summary of Availability***

Based on the six case study States, there is no evidence that the presence of food-item restrictions adversely affected the availability of foods at WIC stores. Indeed, with most of the significant differences in tables 5-5 through 5-11 being positive (meaning that stores in States with food-item restrictions were more likely to carry the prescribed food item than stores in States without restrictions), there is some evidence that approved items were more available at WIC-approved stores when the States imposed food-item restrictions. This could reflect grocers' greater efforts or ability to maintain inventory of WIC-approved foods when the number of approved items is reduced. It may also reflect greater State enforcement of minimum inventory requirements when food-item restrictions are in place, or simply variation among the States in enforcement that mirrors the presence of food-item restrictions. Available data are not sufficient to explain this pattern, but it is clear that the data do not support a hypothesis that food-item restrictions decrease item availability.

### **Nonpurchase of WIC Items Due to Their Being Out of Stock**

As mentioned earlier, for survey respondents who did not buy all of a prescribed food item within a particular food category, the Survey of WIC Participants asked for the main reason they did not. A relatively small number said the store had run out (of an item normally carried). Rather than coming back another time, or going to a different store to buy all the items on their WIC food instrument, these respondents decided simply to forego purchase of this WIC-prescribed food item.

Table 5-12 displays the percentage of survey respondents in each State who said they did not buy all of a purchased item because the store ran out. The survey did not ask whether the respondent meant only her preferred item or all allowed items within the food category. Most likely, because non-selected items cannot be picked up at a later time, respondents meant that neither their preferred item nor an acceptable (to them) alternative was available.

For most of the food items in most States, no respondents said that an out-of-stock item was the main reason they did not buy all of their prescribed food. In only four instances did more than 1.0 percent of survey respondents indicate a problem with item availability. In descending order of magnitude:

- 4.6 percent of respondents in North Carolina said their store ran out of their choice of infant cereal;
- 2.5 percent of respondents in North Carolina said their store ran out of their choice of breakfast cereal;
- 2.0 percent of respondents in Ohio said their store ran out of their choice of dried beans or peas; and
- 1.5 percent of respondents in Oklahoma said their store ran out of their choice of breakfast cereal.

The results in table 5-12 are not correlated with the presence of food-item restrictions that could potentially affect availability, as identified in tables 5-5 through 5-11. With so few respondents citing item availability as an issue, the results from the earlier tables are bolstered. There is no evidence that food-item restrictions or vendor restrictions in the six case study States had a significant impact on the availability of WIC-prescribed foods.

**Table 5-12—Respondents giving “store ran out” as the main reason for not buying a food item**

	CA	CT	NC	OH	OK	TX	Total
				<i>Percent</i>			
Milk	0.7	0.0	0.0	0.0	0.0	0.0	0.1
Cheese	0.0	0.0	0.0	0.0	0.0	0.9	0.1
Eggs	0.0	0.0	0.0	0.0	0.8	0.0	0.1
Infant cereal	0.0	0.4	4.6	0.0	0.0	0.0	0.8
Juice	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dried beans/ peas	0.0	0.0	0.0	2.0	0.0	0.0	0.3
Peanut butter	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Breakfast cereal	0.0	0.0	2.5	0.4	1.5	0.0	0.7
				<i>Number</i>			
<i>Sample size</i>	<i>174</i>	<i>193</i>	<i>192</i>	<i>181</i>	<i>162</i>	<i>168</i>	<i>1,070</i>

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group.

Sample size varies across measures due to differences in food prescription rates and item nonresponse. Sample size shown is the maximum for measures included in the table. Item nonresponse is below 2 percent for all measures.

Source: Survey of WIC Participants.



## Chapter 6

# Participant Satisfaction With and Use of Prescribed Foods

State practices to reduce food package costs—by restricting brands, types, or packaging of allowed foods—limit WIC participants’ food choices. One of the concerns with food-item restrictions is the possibility that choice limitation may reduce WIC participants’ satisfaction with the WIC food package, their likelihood of purchasing WIC foods, or their likelihood of consuming all the prescribed foods they have selected. If such adverse effects exist, then this cost-containment practice may have an undesired impact on the WIC program’s ability to improve the nutritional status of participants.

This chapter is divided into five sections. Following a discussion of research approach, the chapter presents findings about participant food preferences and the extent to which those preferences are constrained by State-imposed restrictions on foods, relative to foods allowed under Federal WIC regulations. These constraints are examined for cheese, infant cereal, juice, and cereals. The third and fourth sections provide a detailed examination of rates of satisfaction with, and purchase and consumption of, WIC-prescribed cheese and cereal, respectively; these are two food categories for which food-item restrictions appear to have had some effect on satisfaction or food use. The fifth section contains a summary of the estimated effects of food-item restrictions on satisfaction with and use of foods in all eight categories examined by this study: cheese, cereal, milk, eggs, infant cereal, single-strength adult juice, peanut butter, and dried beans or peas. Detailed findings for the latter six food categories are presented in appendix I.

### Research Approach

WIC participants’ satisfaction with and consumption of prescribed foods is examined, using data collected during the Survey of WIC Participants. Most of the respondents to the survey (85.8 percent) were asked the following series of questions about foods provided by WIC.<sup>1</sup> Did their WIC prescription include items from a specific food category (such as milk, cheese, eggs, infant cereal)? How much of the prescribed food was bought (all, some, or none)? How much of the purchased food was consumed (all, some, or none)? What was the main reason for not buying or consuming the prescribed item? For each food category, the survey also asked the type and brand of foods purchased and the types or brands respondents would have liked to buy, but could not because they were not on the State’s list of approved WIC foods.

Every State imposes some restrictions on allowed foods, often to limit the number of allowed foods to a manageable size. Food-item restrictions designed primarily to reduce food package costs have been described in previous chapters. These restrictions include requirements that participants buy the least expensive brand available, limits on the allowed brands or types of food within a category (including brands for which the State receives a manufacturer’s rebate), and limits on package size or form. The cost-containment restrictions vary by State and food category, as shown in table 6-1.

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<sup>1</sup> The remaining respondents had experience with WIC food instruments, but they had not used them during the survey reference month—the month prior to the interview. The survey did not ask these respondents questions about their purchase or consumption of WIC foods because of concerns about recall error.

**Table 6-1—Major food-item restrictions imposed, by State and food category**

	CA	CT	NC	OH	OK	TX
Milk	Packaging	Least expensive	Least expensive	Packaging	Least expensive, packaging	Least expensive
Eggs	Type	Least expensive, type			Least expensive, type	Type
Cheese	Type	Least expensive			Least expensive, type	
Cereal	Type				Brand, type	Packaging
Infant cereal	Rebate	Rebate				Rebate
Juice	Packaging, type	Least expensive			Brand	Brand, least expensive, packaging, type
Infant juice	Type	Type	Type			Type
Peanut butter		Least expensive				
Dried beans/peas					Least expensive	

Blank cells indicate nonrestrictive States with respect to use of food-item restrictions.

Source: Survey of WIC Participants.

For each food category, the six case study States are identified as being either restrictive or not restrictive with respect to food-item choices, based on their WIC-approved food lists. Blank cells in table 6-1 indicate those States considered by the study to be nonrestrictive for each food category. In this chapter, patterns of satisfaction, purchase, and consumption are compared for groups of respondents in restrictive vs. nonrestrictive States. When presenting empirical results, equal weight is given to each State because the number of participants varies among States. Thus, for instance, the statement, “83.6 percent of survey respondents were ‘very satisfied’ with the allowed brand(s) of cheese,” means the arithmetic average of the percentages in the six States was 83.6 percent.<sup>2</sup> To remind readers that this is not the same as saying that 83.6 percent of **all** survey respondents said they were very satisfied, the chapter often refers to a “cross-State average” where each State is weighted equally.

Responses to most of the survey questions on how much of a food item was purchased or consumed have three possible responses—all, some, or none. For responses to these questions, a chi-squared test was conducted to determine whether the average distribution within States with food-item restrictions was statistically different from the average distribution within the remaining States. In a few instances, the average percentage of survey respondents answering “all” was compared for the two

<sup>2</sup> If equal weight is not given to the experiences in each of the six States, then overall findings will be dominated by California and Texas, the two States in the study with the greatest number of participants.

groups of States, and a *z*-test of statistical significance of the difference in means was conducted. The *z*-test was done when the survey responses did not include “some” as an allowable response (for purchase of peanut butter and dried beans/peas) and when so few respondents answered “none” to a question that a valid chi-squared test of independence could not be performed.<sup>3</sup> Similarly, response categories to questions about why respondents did not purchase or consume all of a prescribed food item were collapsed, when needed, to ensure the validity of the chi-squared test of independence.<sup>4</sup>

When examining the relationship between food-item restrictions and participants’ satisfaction with and use of prescribed foods, it is important to realize that the restrictions are not necessarily “binding” on all participants. For instance, three of the case study States restricted infant cereal purchases to Gerber brand. For mothers who preferred Gerber infant cereal over other brands, this was not a binding constraint. For four of the food categories (cheese, infant cereal, juice, and cereal), the survey asked respondents whether there were any types or brands of food that they would like to buy with their WIC vouchers that were not on the State’s food list.<sup>5</sup> If a respondent specified a type or brand of the food item that met the Federal guidelines for approved WIC foods but was not on the State’s approved food list, then the State’s food-item restriction was considered binding for that particular respondent.

## Participant Preferences and Binding Constraints

In order to determine the extent to which WIC food-item restrictions are binding on participants, the Survey of WIC Participants asked an open-ended question designed to elicit respondents’ preferences. For four of the food categories (cheese, infant cereal, juice, and cereal), survey respondents were asked, “Are there any [food items in a food category] that you would like to buy with your WIC vouchers that are not on [State’s] WIC food list?” If respondents said yes, they were asked to specify their preferences. Within each of the four food categories, the participant’s preferred food item was then compared to Federal regulations regarding allowed foods. If the preferred item met Federal regulations but was not on the State’s list of allowed foods, then that participant faced a “binding constraint” on purchases within that food category.<sup>6</sup>

Table 6-2 shows the percentage of survey respondents who faced binding constraints on food choice, together with an indicator for the States treated as restrictive in this study. As displayed in that table, a cross-State average of 8.8 percent of respondents preferred a federally approved type or brand of cheese not included on their State’s list of allowable WIC foods. Virtually nobody faced a binding constraint on infant cereal. A cross-State average of 6.9 percent of respondents faced a binding constraint on juice, and 10.0 percent faced a binding constraint on cereal. To the extent that respondents did not provide enough information to identify their preferred food item as not allowed in their

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<sup>3</sup> In general, no chi-squared test was conducted if the expected count of observations in any cell of the table was less than 2.0. The “expected count” is calculated as the sample size times the marginal row and column percentages associated with that cell.

<sup>4</sup> For instance, chapter 5 discussed the frequency with which survey respondents said that their WIC store ran out of an item as a reason for not buying all of a prescribed food item. Few respondents gave this as a reason, and it has been combined with other infrequently cited reasons into a response category marked “other.”

<sup>5</sup> Similar information was not sought for the other food categories, either because brands are not well-differentiated (e.g., milk, eggs, dried beans/peas), or because the food item is prescribed for a limited number of WIC participants (e.g., infant juice).

<sup>6</sup> Though “binding” often means obligatory, it is used here in its sense of being confining or limiting.

State, the percentages in table 6-2 are lower-bound estimates of the prevalence of binding constraints.<sup>7</sup>

**Table 6-2—WIC families facing binding constraints on food choices**

	CA	CT	NC	OH	OK	TX	All States
				<i>Percent</i>			
Cheese	5.4 <sup>a</sup>	8.8 <sup>a</sup>	1.1	12.6	15.7 <sup>a</sup>	9.3	8.8
Infant cereal	0.0 <sup>a</sup>	2.1 <sup>a</sup>	0.0	0.0	0.0	0.7 <sup>a</sup>	0.5
Juice	13.3 <sup>a</sup>	7.2 <sup>a</sup>	1.0	4.7	3.1 <sup>a</sup>	12.1 <sup>a</sup>	6.9
Cereal	5.4 <sup>a</sup>	15.1	12.7	5.6	19.4 <sup>a</sup>	1.7	10.0
				<i>Number</i>			
<i>Sample size</i>	<i>173</i>	<i>193</i>	<i>192</i>	<i>182</i>	<i>159</i>	<i>168</i>	<i>1,064</i>

a Study treats State as “restrictive” with regard to food choice within this food category.

Group estimates give equal weight to each State in the group.

Source: Survey of WIC Participants.

There is considerable State-to-State variation in table 6-2, and the reasons for some of the variation seem readily apparent. For instance, at 19.4 percent, the rate of binding constraints for cereal was highest in Oklahoma—the only State in the study to exclude most nationally branded cereals from its food list.<sup>8</sup> Oklahoma also had the highest rate of binding restrictions on cheese (15.7 percent), for which it both limited allowed types and had a least cost brand policy.

Other rates, however, are more difficult to interpret. At 12.6 percent, Ohio participants had the second highest rate of binding restrictions on cheese, but Ohio had as many or more food choices among cheeses than the other States. In addition, the relatively high rates for breakfast cereals in Connecticut (15.1 percent) and North Carolina (12.7 percent) seem difficult to explain, because their food lists contained a variety of both national- and store-brand cereals. The next section of the chapter and Appendix I provide further detail about these binding constraints and their relationship to participant satisfaction, and to the purchase and consumption of prescribed foods.

## Cheese

Connecticut and Oklahoma required WIC participants to buy the least expensive brand of cheese available. As described in previous chapters, variation also existed among States in the types of cheese WIC participants could purchase (refer to table 3-1 in chapter 3 for a complete description of

<sup>7</sup> Some respondents specified a food item that, as stated, was actually included in their State’s list of approved foods (for instance, mozzarella cheese). It is possible that these respondents were mistaken in their understanding of which foods were allowed. It is also possible that they did not provide the interviewers enough information to assess why the foods they specified were not allowed. For instance, some respondents might have been thinking shredded mozzarella cheese, which is not allowed in any of the six States.

<sup>8</sup> In early 2001, when the survey data were collected, the only national cereal brands allowed in Oklahoma were Quaker and Nabisco, for hot cereals only. In July 2001, Oklahoma added four nationally branded cold cereals to its list of approved foods.



WIC-approved cheese in each State). California allowed the fewest types (four), whereas Connecticut allowed the most (eight). This study treats California, Connecticut, and Oklahoma as the restrictive group of States when examining brand satisfaction, purchase, and consumption of cheese.

All survey respondents were asked whether they were satisfied with brands of food and package sizes allowed for several different food categories, including cheese. If the food item was not currently in their food package prescription, they were asked whether they were satisfied with the item in the past.<sup>9</sup> The top two sections of table 6-3 present responses for satisfaction with cheese brands and package sizes, respectively. For the entire sample of States, a cross-State average of 83.6 percent of survey respondents said they were very satisfied with allowed brands of cheese,<sup>10</sup> and 85.2 percent said they were very satisfied with allowed package sizes.

The top panel of table 6-3 shows that restrictions on cheese were associated with lower brand satisfaction. When the average distribution of responses within States with restrictions is compared to the average distribution in States without restrictions (the “Restriction” and “No restriction” columns in the table), a chi-squared test on the difference in distributions is statistically significant at the 0.01 level; a cross-State average of 81.2 percent of respondents in California, Connecticut, and Oklahoma said they were very satisfied with allowed brands of cheese, compared to a cross-State average of 85.9 percent in States without restrictions.

No chi-squared test is performed on satisfaction with package sizes because the six States had few differences in package-size restrictions on cheese.

The central panel of table 6-3 shows that cheese was prescribed for a cross-State average of 91.5 percent of the sampled WIC families. The difference in average prescription rates between States with and without restrictions on cheese, 1.0 percent, is not statistically significant.

All respondents with prescribed cheese were asked whether they purchased “all,” “some,” or “none” of the cheese in the month prior to the interview. As shown in the fourth, or “Amount purchased,” panel of table 6-3, a cross-State average of 95.4 percent of respondents said they purchased all of the cheese prescribed, 4.0 percent said some, and less than 1 percent said none.<sup>11</sup> A chi-squared test on the difference in distributions indicates no significant difference. So few participants answered “none,” however, that the distribution of responses is nearly binomial (“all” versus “some”). A significance test was therefore performed for the percentage of respondents who said they purchased all the prescribed cheese; the difference between the two groups (1.3 percentage points) is not statistically significant.<sup>12</sup>

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<sup>9</sup> If the food item had never been prescribed, a response of “not applicable” was recorded.

<sup>10</sup> For comparison, in a nationally representative survey of people being certified for WIC, 87.5 percent of those with prior WIC experience said they were very satisfied with available brands of prescribed cheese. See Nancy Cole *et al.*, *National Survey of WIC Participants: Final Report*, Nutrition Assistance Program Report Series, Food and Nutrition Service, USDA, October 2001, Exhibit 3-66.

<sup>11</sup> Nationally, 98.7 percent of WIC participants say they usually purchase all their prescribed cheese (*National Survey of WIC Participants: Final Report*, Exhibit 3-69).

<sup>12</sup> Significance tests were not conducted for differences in the average percentage of respondents saying they purchased “some” or “none” of the prescribed cheese. Because such tests would not be independent (of each other or the test on “all”), stricter conditions for evaluating statistical significance would have to be used. The report instead uses the usual criteria for evaluating the statistical significance of differences in the “all” category. This approach is used throughout the rest of the chapter.

Table 6-3—Satisfaction with, purchase, and consumption of cheese

	Individual States						State groups			Group difference
	CA	CT	NC	OH	OK	TX	All States	No restrictions	Restriction	
	<i>Percent</i>									
Satisfaction with brands <sup>a</sup>										
Very satisfied	88.6	78.2	86.6	85.5	78.9	85.6	83.6	85.9	81.2	-4.7
Somewhat satisfied	13.4	15.8	12.8	13.1	18.5	13.5	14.5	13.2	15.9	
Not satisfied	0.0	6.0	0.6	1.4	2.7	0.9	1.9	1.0	2.9	
Sample size (number)	204	225	220	213	198	195	1,255	628	627	
Satisfaction with package sizes										
Very satisfied	90.5	83.6	86.5	88.9	79.5	82.3	85.2			
Somewhat satisfied	9.4	13.4	11.8	9.0	18.9	13.8	12.7			
Not satisfied	0.0	3.1	1.6	2.0	1.7	3.9	2.1			
Sample size (number)	204	225	220	212	201	195	1,257			
Percent with prescription	91.8	93.4	89.8	96.3	90.6	86.9	91.5	91.0	92.0	1.0
Sample size (number)	178	198	195	191	168	171	1,101	557	544	
Amount purchased <sup>b</sup>										
All	99.4	94.5	92.3	97.1	94.5	94.8	95.4	94.8	96.1	-1.3
Some	0.6	5.5	7.4	2.9	3.9	3.4	4.0	4.6	3.3	
None	0.0	0.0	0.3	0.0	1.6	1.8	0.6	0.7	0.5	
Sample size (number)	164	184	175	181	150	150	1,004	406	498	
Amount consumed <sup>a</sup>										
All	87.8	71.0	78.2	79.5	72.3	84.1	78.8	80.6	77.1	-3.5
Some	11.3	27.0	21.5	19.8	26.8	15.9	20.4	19.1	21.7	
None	0.9	2.0	0.3	0.7	0.9	0.0	0.8	0.3	1.2	
Sample size (number)	164	184	175	181	148	148	1,000	504	496	

a A chi-square test on the difference in distribution between States with and without restrictions was statistically significant at the 0.01 level.

b A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Connecticut and Oklahoma required purchase of least expensive brand of cheese. California limited allowed types of cheese.

Source: Survey of WIC Participants.

All respondents who purchased at least some of the prescribed cheese were asked whether the WIC participants in the family ate “all,” “some,” or “none” of the cheese they purchased; responses are shown at the bottom of table 6-3. Respondents in States without restrictions were more likely to eat all the cheese purchased (80.6 percent) than respondents in States with restrictions (77.1 percent). The two distributions are significantly different at the 0.01 level.<sup>13</sup>

The direction of the difference in amount consumed is consistent with a hypothesis that food-item restrictions would reduce consumption of WIC-prescribed foods. Examination of respondents’ reasons for not consuming all their purchased cheese, however, suggests that the difference in consumption was not related to the presence or absence of food-item restrictions. Table 6-4 shows the percentage of respondents giving different reasons for not purchasing or consuming all of their prescribed cheese. With only 49 respondents saying they did not purchase all of their prescribed cheese, sample sizes are too small to present State-specific results. The two group distributions in the table, however, are not significantly different from one another. The most common reason given for not purchasing cheese was that too much cheese was prescribed (64.2 percent in the restrictive States and 31.4 percent in the nonrestrictive group). Very few respondents said they did not like the prescribed cheese, and the 3.3 percentage-point difference in this response between the two groups of States (6.0 percent vs. 9.3 percent) is not statistically significant.

Recall from table 6-2 that, among all six States, an average of 8.8 percent of respondents said they preferred a federally approved type or brand of cheese that was not on their State’s list of approved foods. The highest rates of binding constraints were in Oklahoma (15.7 percent) and Ohio (12.6 percent). Although the high rate in Oklahoma is consistent with that State’s requirement that participants buy the least cost brand of cheese, only 5 of the 26 survey respondents in Oklahoma with a binding constraint said that they preferred a brand not on the State’s list of approved cheeses. Twelve respondents in Oklahoma said they preferred a nonallowed type of cheese (especially Colby-jack), and seven indicated a preference for sliced cheese or individually wrapped cheese.

Indeed, a preference for wrapped slices of cheese was indicated by respondents with binding constraints in all States except North Carolina—the only State in the group to allow purchase of prewrapped slices. Of the 71 respondents in the six States facing a binding constraint, 23 said they wanted to buy wrapped cheese and 11 wanted to buy sliced cheese. An additional 22 preferred cheese types that were not allowed in their State, with Colby-jack being the most commonly preferred type. Only 12 respondents preferred a brand that was not allowed or not least cost. Thus, it was not the least expensive brand policies in Connecticut and Oklahoma that created binding constraints, but rather packaging restrictions and limits on the types of cheese that could be purchased.

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<sup>13</sup> Note that these responses are conditional on at least some of the prescribed cheese being purchased. If one wanted to know the percentage of all respondents who said they both purchased and ate all their prescribed cheese, the “all” percentages in the panel on “amount consumed” would need to be multiplied by the “all” percentages in the panel on “amount purchased”. In California, for example, 87.3 percent of respondents ate all the cheese that was prescribed (that is, 87.8 percent of the 99.4 percent who bought all their prescribed cheese).

**Table 6-4—Reasons for not purchasing or consuming prescribed cheese**

	All States <sup>a</sup>	No restrictions	Restriction	Group difference
	<i>Percent</i>			
Reasons for not purchasing some or all of prescribed item <sup>b</sup>				
Don't like	7.6	9.3	6.0	-3.3
Voucher expired or lost	13.6	9.0	18.2	
Too much	48.1	32.0	64.2	
Can't get to store	16.8	31.4	2.3	
Other	13.8	18.4	9.2	
<i>Sample size (number)</i>	<i>49</i>	<i>27</i>	<i>22</i>	
Reasons for not eating some or all of prescribed item <sup>b</sup>				
Don't like	20.2	22.5	17.9	-4.6
Too much	41.4	41.1	41.6	
Don't normally eat	5.9	10.8	0.9	
Consumed by others	20.9	12.9	29.0	
Other	11.7	12.7	10.6	
<i>Sample size (number)</i>	<i>197</i>	<i>97</i>	<i>100</i>	

a Results presented for the six States in the study. Due to small sample sizes, State-specific results are not reported.

b A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Connecticut and Oklahoma required purchase of least expensive brand of cheese. California limited allowed types of cheese.

Source: Survey of WIC Participants.

Do respondents facing binding constraints behave differently in their purchase or consumption of prescribed cheese? Table 6-5 shows the relationships between binding constraints, brand satisfaction, and the amount of cheese purchased and consumed. Compared to survey respondents who did not indicate a preferred type or brand of cheese that was restricted by the State, respondents with a binding constraint were significantly less likely to purchase their prescribed cheese. Based on the group distributions shown in the table, they also may have been less satisfied with brand choice and less likely to eat the cheese that was purchased, but the relatively small number of respondents with binding constraints causes these distributions to be not significantly different from one another.

**Table 6-5—Binding constraints and participant satisfaction with and use of prescribed cheese**

	Binding	Not binding
	<i>Percent</i>	
Satisfaction with allowed brands or types		
Very satisfied	77.1	85.7
Somewhat satisfied	15.9	12.9
Not satisfied	7.0	1.4
<i>Sample size (number)</i>	<i>71</i>	<i>931</i>
Amount purchased <sup>a</sup>		
All	88.6	96.3
Some	11.4	3.1
None	0.0	0.7
<i>Sample size (number)</i>	<i>71</i>	<i>933</i>
Amount consumed		
All	65.4	80.3
Some	31.8	19.2
None	2.7	0.5
<i>Sample size (number)</i>	<i>71</i>	<i>929</i>

a A chi-squared test on the difference in distribution between respondents with and without a binding constraint was statistically significant at the 0.05 level.

Weighted estimates were obtained with SUDAAN software. Group estimates give equal weight to each State in the group.

Totals may not sum to 100 due to rounding.

Source: Survey of WIC Participants.

## Cereal

The six States in this study differed substantially in the restrictions they placed on breakfast cereals. Table 3-1 in chapter 3 shows the brands and the number of different types of cereal (for instance, Cheerios, Kix, corn flakes) that each State allowed. Both California and Oklahoma allowed fewer types of hot and cold cereal (10 to 13) than the other four States (19 to 32), and Oklahoma prohibited purchase of most nationally branded cereals.<sup>14</sup> In the tables that follow, California and Oklahoma form the group of States with cereal restrictions.

When asked about satisfaction with allowed brands of cereal, a cross-State average of 52.9 percent of survey respondents said they were very satisfied.<sup>15</sup> The average distributions of responses for States with and without restrictions are not statistically different (top panel of table 6-6). Two aspects of the table, however, are striking. First, in all six States, the level of satisfaction with allowed cereal brands

<sup>14</sup> In early 2001, when these data were collected, the only national cereal brands allowed in Oklahoma were Quaker and Nabisco, for hot cereals only. In July 2001, Oklahoma added four nationally branded cold cereals to its list of approved foods.

<sup>15</sup> Nationally, 62.3 percent of WIC participants say they are very satisfied with available cereal brands (*National Survey of WIC Participants: Final Report*, Exhibit 3-66).

was relatively low. For example, a cross-State average of only 52.9 percent of respondents were “very satisfied” with allowed brands of cereal, compared to 83.6 percent being “very satisfied” with allowed brands of cheese.<sup>16</sup> Second, the percentage of respondents in Oklahoma who were “very satisfied” with allowed brands was much lower (34.5 percent) than in any other State. When this percentage is compared to the average of the other five States (56.6 percent, not shown in the table), the 22.1 percentage-point difference is statistically significant at the 0.01 level.

The group of respondents who were not very satisfied with allowed brands of cereal includes the cross-State average of 10.0 percent of respondents who faced a binding constraint on cereal purchases (table 6-2).<sup>17</sup> Oklahoma had the highest percentage of respondents facing a binding constraint on cereal due to cost containment (19.4 percent), followed by Connecticut (15.1 percent) and North Carolina (12.7 percent). Only 5.4 percent of California respondents faced a binding constraint, suggesting that California WIC officials were effective in identifying a limited number of cereal types that satisfied the preferences of most of their WIC participants.

Among the six States, the most common binding constraint is the group of hot cereals—oatmeal, grits, and Cream of Wheat.<sup>18</sup> Of the 108 respondents with a binding constraint, 37 mentioned one or more of these three cereals. This preference, in fact, explains the relatively high rate of binding constraints in North Carolina. The next most common preferences, in descending order, were Kix (mentioned by 14 respondents), rice or wheat Chex (8 respondents), raisin bran (7),<sup>19</sup> “national brands” (7, all from Oklahoma), Total (6), Cheerios (5), and corn flakes (4). There were also a number of unique responses for specific cereals (e.g., Frosted Mini-Wheats, high-iron cereal, farina, Special K, Grapenuts).

Table 6-6 also shows levels of satisfaction with allowed package sizes. Texas specified minimum package sizes for cereal that were generally larger than in the other five States, so Texas is treated as the restrictive State with respect to packaging. These restrictions, however, are associated with higher—not lower—levels of satisfaction with package sizes in Texas than elsewhere.

About 95 percent of all respondents had cereal as part of their prescribed food package. As shown in the fourth panel of table 6-6, a cross-State average of 91.6 percent said they purchased all of their prescribed cereal, and the average distribution of amount purchased in California and Oklahoma is not significantly different from the average distribution for the other four States.<sup>20</sup> There is also no statistical difference between the States with and without restrictions in the amount of purchased cereal consumed (bottom panel of table 6-6).

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<sup>16</sup> As presented in appendix I, the cross-State percentages of respondents who were “very satisfied” with allowed brands of other foods were: 89.3 percent for milk, 79.4 percent for infant cereal, and 78.7 percent for juice. Respondents were not asked about brand satisfaction for eggs, peanut butter, or dried beans/peas.

<sup>17</sup> For respondents not facing a binding constraint, many expressed preferences for cereals with high sugar content, and these cereals are not federally approved for WIC.

<sup>18</sup> Most oatmeal does not have sufficient iron to meet Federal regulations for WIC-approved cereals. Instant oatmeal has enough iron, but it costs more than regular oatmeal. Of the six States, only Ohio allowed instant oatmeal. California and Connecticut did not allow grits, and Texas did not allow Nabisco Cream of Wheat.

<sup>19</sup> Most, but not all, brands of raisin bran include too much sugar to meet Federal regulations.

<sup>20</sup> Nationally, 96.8 percent of WIC participants say they usually purchase all the breakfast cereal prescribed for them (*National Survey of WIC Participants: Final Report*, Exhibit 3-69).

**Table 6-6—Satisfaction with, purchase, and consumption of cereal**

	Individual States						State groups			Group difference
	CA	CT	NC	OH	OK	TX	All States	No restrictions	Restriction	
	<i>Percent</i>									
Satisfaction with brands <sup>a</sup>										
Very satisfied	65.7	51.4	52.6	51.4	34.5	62.0	52.9	54.3	50.1	-4.2
Somewhat satisfied	28.4	38.7	37.3	37.3	39.8	30.0	35.2	35.8	34.1	
Not satisfied	5.9	9.9	10.2	11.4	25.7	7.9	11.8	9.8	15.8	
Sample size (number)	206	230	222	213	203	197	1,271	862	409	
Satisfaction with package sizes <sup>b</sup>										
Very satisfied	68.5	66.8	72.6	70.1	58.7	77.2	69.0	67.3	77.2	9.9*
Somewhat satisfied	22.8	25.4	22.6	22.8	32.7	16.7	23.8	25.3	16.7	
Not satisfied	8.7	7.8	4.8	7.0	8.6	6.0	7.2	7.4	6.0	
Sample size (number)	206	229	220	212	203	190	1,260	1,070	190	
Percent with prescription	94.8	97.5	96.1	97.2	95.4	89.7	95.1	95.1	95.1	-0.0
Sample size (number)	178	198	196	191	167	171	1,101	756	345	
Amount purchased <sup>a</sup>										
All	92.7	92.3	87.4	95.0	85.5	96.9	91.6	92.9	89.1	-3.8
Some	6.1	7.5	10.4	4.6	9.9	1.7	6.7	6.1	8.0	
None	1.1	0.2	2.2	0.4	4.6	1.4	1.7	1.0	2.9	
Sample size (number)	167	189	189	183	158	155	1,041	716	325	
Amount consumed <sup>a</sup>										
All	76.4	68.8	68.1	75.8	62.8	82.1	72.4	73.7	69.6	-4.1
Some	23.6	29.4	31.9	23.6	35.1	16.0	26.6	25.2	29.3	
None	0.0	1.8	0.0	0.6	2.2	1.8	1.1	1.1	1.1	
Sample size (number)	164	187	183	181	153	153	1,021	704	317	

a A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

b A chi-square test on the difference in distribution between States with and without restrictions was statistically significant at the 0.05 level.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

California and Oklahoma approved a relatively narrow choice of breakfast cereals; Oklahoma allowed only private-label and store brands. Texas required purchase of relatively large package sizes of cereal.

Source: Survey of WIC Participants.

As with attitudes about brand satisfaction, cereal use by respondents in Oklahoma differed from that in California, the other State with restrictions. Of the six States, Oklahoma had the lowest percentages of respondents buying all their prescribed cereal (85.5 percent) and eating all their purchased cereal (62.8 percent). When these values are compared to the averages for the other five States (92.9 percent for purchase and 74.3 percent for consumption, not shown in the table), the differences equal 7.4 and 11.5 percentage points, respectively. Both of these differences are statistically significant at the 0.05 level.

Among those respondents who did not purchase all the prescribed cereal, the most common reason given (a six-State average of 40.5 percent) was that “too much” was prescribed (top panel of table 6-7). The distributions of reasons for not buying all the cereal are not statistically different for the two groups of States, nor is the average percentage of respondents saying that taste was the reason for not buying the cereal. There is also no statistical difference in the distributions of reasons given for not eating all of the cereal purchased (bottom panel of table 6-7).

**Table 6-7—Reasons for not purchasing or consuming prescribed cereal**

	All States <sup>a</sup>	No restrictions	Restriction	Group difference
	<i>Percent</i>			
Reasons for not purchasing some or all of prescribed item <sup>b</sup>				
Don't like	24.0	25.4	21.2	-4.2
Voucher expired or lost	11.7	9.1	16.8	
Too much	40.5	45.0	31.5	
Other	23.8	20.4	30.6	
<i>Sample size (number)</i>	<i>91</i>	<i>63</i>	<i>28</i>	
Reasons for not eating some or all of prescribed item <sup>b</sup>				
Don't like	24.4	23.7	25.8	2.2
Too much	2.6	2.5	3.0	
Don't normally eat	8.9	9.8	7.0	
Consumed by others	41.9	40.4	44.8	
Other	22.2	23.6	19.3	
<i>Sample size (number)</i>	<i>284</i>	<i>199</i>	<i>85</i>	

a Results presented for the six States in the study. Due to small sample sizes, State-specific results are not reported.

b A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

California and Oklahoma approved a relatively narrow choice of cereals; Oklahoma allowed only private-label and store brands.

Source: Survey of WIC Participants.



When one compares respondents with and without a binding constraint for cereal, as in table 6-8, respondents with a binding constraint were less satisfied with allowed brands than other respondents, but this reduced satisfaction did not carry over into purchase or consumption behavior. Chi-squared tests on the bottom two sets of distributions in the table indicate no statistically significant differences.

**Table 6-8—Binding constraints and participant satisfaction with and use of prescribed cereal**

	Binding	Not binding
	<i>Percent</i>	
Satisfaction with allowed brands or types <sup>a</sup>		
Very satisfied	39.0	54.4
Somewhat satisfied	52.1	35.2
Not satisfied	8.9	10.5
<i>Sample size (number)</i>	<i>108</i>	<i>929</i>
Amount purchased		
All	84.2	92.4
Some	11.8	6.0
None	4.0	1.6
<i>Sample size (number)</i>	<i>108</i>	<i>933</i>
Amount consumed		
All	76.2	72.2
Some	17.8	26.8
None	5.9	1.0
<i>Sample size (number)</i>	<i>105</i>	<i>916</i>

a A chi-square test on the difference in distribution was statistically significant at the 0.05 level..

Weighted estimates were obtained with SUDAAN software. Group estimates give equal weight to each State in the group.

Totals may not sum to 100 due to rounding.

Source: Survey of WIC Participants.

## Summary of Findings

For the six States included in this study, food-item restrictions designed to reduce WIC food package costs did not have much effect on WIC participants' satisfaction with prescribed foods, or on their purchase and consumption of these foods. Nevertheless, as presented in this chapter and appendix I, there are several exceptions to this general finding. Oklahoma's restriction against purchase of national brands of breakfast cereal reduced satisfaction with allowed brands in the State, and respondents in Oklahoma purchased and consumed less of their prescribed cereal than respondents in the other States. The State's use of a least cost policy for dried beans/peas also appears to have reduced consumption. Finally, restrictions that were binding on respondents affected their satisfaction with allowed brands of cheese and cereal, but the impacts on purchase and consumption decisions were mixed.

When asked why they did not purchase all of the WIC food prescribed for them, or eat or drink all the food they purchased, survey respondents provided a variety of reasons. Not liking the food item was mentioned by some respondents, but other reasons were given more frequently. This suggests that cost-containment practices limiting types and brands of allowed foods were usually not the main reason survey respondents did not buy or consume all of their prescribed food.

Among the other reasons given for not buying or consuming all the prescribed food, common responses were that too much was prescribed or that some of the purchased food was consumed by non-WIC members of the family. This may suggest that, for some WIC participants, the program is overprescribing certain foods—an issue of concern to some WIC officials.<sup>21</sup> Given that this research was not designed to examine the appropriateness of prescription amounts, however, one should treat the evidence as suggestive rather than conclusive.

A list follows of the primary findings with respect to each of the food categories examined.

### **Cheese**

- Connecticut and Oklahoma imposed least cost restrictions on cheese, and California limited the number of allowed types of cheese.
- The presence of restrictions on cheese was not related to brand satisfaction or amount purchased.
- Consumption of purchased cheese was lower in the restricted than in the nonrestricted States, but the evidence suggests that factors unrelated to restrictions account for the difference in consumption. Factors cited most frequently were that the WIC food instrument was lost (or had expired) and that “too much” cheese had been prescribed.
- State restrictions on brand, type, and packaging of cheese were binding on a State average of 8.8 percent of survey respondents, with the highest rates in Oklahoma (15.7 percent) and Ohio (12.6 percent). Respondents with a binding restriction were, on average, less satisfied than others with allowed brands of cheese, less likely to buy their prescribed cheese, and less likely to eat the cheese they bought

### **Cereal**

- California and Oklahoma imposed relatively stringent restrictions on the brands or types of cereal that could be purchased. California limited the number of allowed types of cereal, and Oklahoma limited most cereals to store-brand or private label.
- When the average distribution of respondent satisfaction in California and Oklahoma is compared to the average distribution in the other four States, there is no significant difference in the two distributions.
- There is no significant difference in the distributions of amount of cereal purchased between States with and without restrictions on cereal types and brands.

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<sup>21</sup> The National Association of WIC Directors (NAWD) has issued a position paper, “NAWD WIC Food Prescription Recommendations” that calls for a reduction in the maximum quantity of milk and protein-rich foods prescribed for children (undated).

- Similarly, the presence of cereal restrictions was not related to the amount of cereal consumed.
- If Oklahoma is defined as the only State with cereal restrictions, then satisfaction with allowed brands was significantly lower in Oklahoma than elsewhere, as was purchase and consumption of cereal. In July 2001, after data for this study were collected, Oklahoma added four nationally branded cereals to its list of approved foods.
- State restrictions on cereal were binding on a State average of 10.0 percent of survey respondents, with the highest rates in Oklahoma (19.4 percent), Connecticut (15.1 percent), and North Carolina (12.7 percent). Respondents with a binding restriction were, on average, less satisfied than others with allowed brands of cereal and somewhat less likely to buy their prescribed cereal. They were not, however, less likely to eat the cereal they purchased.

### **Dried Beans or Peas**

- Oklahoma was the only State in the study that imposed a least cost restriction on the purchase of dried beans or peas.
- The restriction has no impact on the amount of dried beans/peas purchased.
- The restriction appears to have reduced the amount of purchased dried beans/peas that was eaten.

### **Milk**

- Connecticut, North Carolina, Oklahoma, and Texas imposed least cost restrictions on milk.
- The presence of restrictions was not related to brand satisfaction.
- The percentage of respondents purchasing all their prescribed milk was not related to the presence of least cost restrictions.
- The percentage of respondents drinking all their purchased milk was lower in the States with restrictions than in the nonrestrictive States, but the evidence suggests that factors other than brand dissatisfaction accounted for this difference. The factor cited most often by respondents was that “too much” milk was prescribed.

### **Eggs**

- Connecticut and Oklahoma imposed least cost restrictions on the purchase of eggs.
- The restrictions had no impact on amount purchased.
- There was less consumption of purchased eggs in the restricted States, but apparently not because of the imposed restrictions. The most commonly cited factor for not eating all the purchased eggs was that too much was prescribed.

### **Infant Cereal**

- Three States—California, Connecticut, and Texas—restricted purchases of infant cereal to a single brand.

- This brand restriction was binding on almost no WIC participants in these three States.
- The brand restriction was not related to levels of brand satisfaction or amount of prescribed infant cereal that was purchased.
- The brand restriction did not reduce the amount of infant cereal consumed.

### **Juice**

- Four States—California, Connecticut, Oklahoma, and Texas—imposed restrictions on either the brand or type of juice that could be purchased.
- The State restrictions had no impact on expressed levels of satisfaction with approved brands, nor did they reduce the amount of prescribed juice that was purchased.
- The presence of restrictions on juice was not related to the amount of purchased juice that was consumed.
- State restrictions were binding on a State average of 6.9 percent of survey respondents, with the highest rates in California (13.3 percent) and Texas (12.1 percent). These binding restrictions, however, did not affect satisfaction with allowed brands or the purchase or consumption of prescribed juice.

### **Peanut Butter**

- Connecticut imposed a least cost restriction on the purchase of peanut butter.
- The restriction had no impact on the amount of peanut butter purchased.
- The restriction had no impact on the amount of purchased peanut butter that was consumed.

Overall, the food-item restrictions imposed in these six States created some binding constraints and lowered participant satisfaction with allowed brands in some instances. In general, however, satisfaction with allowed brands and packaging was high, and purchase and consumption of prescribed foods were not affected by the restrictions.

# Chapter 7

## WIC Participants with Special Diets or Food Allergies

One objective of this study is to determine whether WIC cost-containment practices have differential impacts on participants with special diets or food allergies, compared with other WIC participants. Those with special diets or food allergies have dietary restrictions that limit the foods they can eat. Often, they must verify food product ingredients to ensure that the product is safe and appropriate.

To address this objective, the study examined several types of special diets and food allergies, based on responses to the Survey of WIC Participants. The study identified those households with special diets in which at least one WIC member:

- modified their diet for a health-related reason,
- followed a diet restricted by religious practice, or
- followed a vegetarian diet.

The study also identified those households having food allergies in which at least one WIC member:

- had a food allergy diagnosed by a physician, or
- had experienced a severe allergic reaction within an hour after eating.

Survey respondents from households with special diets or food allergies were asked whether their dietary restriction posed problems with finding appropriate foods when shopping for WIC items. In addition, the study examines whether respondents with dietary restrictions in States with food-item restrictions had different views about brand satisfaction, or exhibited different behaviors with respect to purchase and consumption of prescribed foods, than respondents with dietary restrictions in States without food-item restrictions.

### Possible Effects of Cost-Containment Practices

Food-item restrictions on product size or packaging will not create additional problems for participants with special diets or food allergies. They can still purchase food brands and types known to be appropriate for them. When State WIC agencies restrict which food brands or types may be purchased with WIC food instruments, however, they may inadvertently eliminate food items that participants know to be appropriate. Such restrictions can occur whenever federally approved WIC food items are not included in the State agency's list of approved foods.

It is also possible for vendor restrictions to affect participants with special diets or food allergies. If WIC participants have to shop at a different store as a result of State agency requirements that WIC vendors have competitive prices, they may find that the new store does not stock the food items they know to be safe and appropriate. When that happens, the participants must make sure that an alternative allowed food brand is appropriate. For instance, those with food allergies may need to check cereal labels to ensure that offending ingredients are not included in an allowed brand. Because food labels do not always list all ingredients, participants may further need to contact manufacturers to

check on actual ingredients. They could also decide to simply do without a prescribed food item rather than risk eating an offending ingredient.

Food-item restrictions, however, should not affect WIC participants' ability to find WIC-approved foods when either (1) most WIC food items already meet the dietary restriction, or (2) substitute foods are available on the WIC food list. For example, participants on a low-fat diet may choose skim or 1-percent milk rather than whole milk. In addition, food package tailoring at the WIC clinic can accommodate certain allergies (for instance, substitution of dried beans or peas for peanut butter for participants with a peanut allergy). Finally, given the availability of food substitutes, vendor restrictions on higher price stores are also unlikely to affect participants on most special diets, even if higher price stores carry a larger selection of approved WIC foods than authorized stores.

Of course, participants may not be as satisfied with the taste or texture of a substitute food item as with an item restricted due to cost-containment, even though the item can still meet their dietary restrictions.<sup>1</sup>

## Research Approach

The study originally planned to over-sample families with WIC members on special diets or with food allergies to provide a sufficient sample for examining whether cost-containment practices had a disproportionate effect on them. Review of available data from the WIC certification files of the six case study States, however, indicated that consistent data identifying participants special diets or food allergies were not available. WIC families were therefore randomly selected within each sampling stratum, and the Survey of WIC Participants included a series of questions asking about the presence of special diets and food allergies.<sup>2</sup> A sufficient number of families on special diets or with food allergies were sampled ( $n = 528$ ) to address whether cost-containment practices had a disproportionate effect on them.

Most of the chapter presents tabular analyses of the survey data. The last analysis section describes a set of multivariate models used to assess whether families on special diets or with food allergies had different responses to cost-containment practices than other WIC families.

## Special Diets

The Survey of WIC Participants asked respondents about three types of special diets: diets modified for health reasons (such as low-calorie for weight loss, low-sodium, and low- or high-fiber); vegetarian diets; and religious diets, specifically Kosher, Muslim, and Seventh-Day Adventist diets. Table 7-1 presents the percentage of survey respondents in each State reporting that they or a WIC family member were on a special diet.

Depending on the State, from 28.5 to 48.5 percent of survey respondents reported that they were on a special diet for health-related reasons (though not necessarily prescribed by their physician). North Carolina had the highest percentage, and Texas the lowest. There is no single type of special diet that

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<sup>1</sup> Participant satisfaction with prescribed foods was described in chapter 6.

<sup>2</sup> These questions are contained in section F of the survey questionnaire. A copy of the survey questionnaire and a description of the survey's sample design are contained in appendix A.

explains the variation among States. For instance, for almost all of the health-related special diets listed in table 7-1, WIC participants in North Carolina were more likely than their counterparts in the other States to be on such a diet.

**Table 7-1—WIC families with special diets**

	CA	CT	NC	OH	OK	TX	All States
	<i>Percent</i>						
Health-related special diet							
High-fiber	18.3	16.5	24.9	14.7	30.3	18.5	20.5
Sugar-free or low-sugar	18.2	17.3	23.1	12.6	21.7	17.8	18.4
Low-fat or low-cholesterol	13.2	13.8	20.9	13.1	15.8	10.8	14.6
Low-sodium	11.5	12.6	19.6	14.8	16.5	12.6	14.6
High-calorie or high-protein	6.7	14.0	15.4	14.0	11.9	8.3	11.8
Low-calorie	11.4	12.4	16.3	10.4	9.1	4.8	10.8
Low-fiber	4.3	6.7	9.2	6.9	4.6	2.0	5.6
Other (health related)	0.9	1.8	1.6	0.6	2.6	1.1	1.4
Any health-related special diet	30.6	36.8	48.5	35.2	46.5	28.5	37.7
Religious	0.0	3.8	2.6	4.8	2.0	1.1	2.4
Vegetarian	2.8	2.6	1.7	2.2	1.6	0.2	1.8
Any special diet	31.6	40.8	49.0	38.4	46.8	29.4	39.3
<i>Sample size (number)</i>	<i>222</i>	<i>222</i>	<i>222</i>	<i>215</i>	<i>206</i>	<i>203</i>	<i>1,285</i>

Weighted estimates for States were obtained with SUDAAN software. Group estimates gave equal weight to each State in the group. Component percentages may not sum to within-State totals because of rounding or indication of more than one dietary restriction.

Source: Survey of WIC Participants.

A cross-State average of 37.7 percent of respondents reported the presence of one or more health-related special diets. The most common diet was a high-fiber diet (20.5 percent of respondents), followed by a sugar-free or low-sugar diet (18.4 percent). The next most common restrictions, at 14.6 percent each, were low-sodium and low-fat or low-cholesterol diets. A small number of respondents (an average of 1.8 percent among the six States) said they or their WIC child were on a vegetarian diet, and 2.4 percent said they followed a Kosher, Muslim, or Seventh-Day Adventist diet. When all dietary restrictions are considered, an average of nearly 40 percent of the WIC families said they had at least one of the identified special diets. The range varied from 29.4 percent in Texas to 49.0 percent in North Carolina.

For reasons described below, cost-containment practices that restrict food choice are unlikely to have a disproportionate adverse impact on most WIC participants on special diets.

### Health-Related Special Diets

As noted earlier, food-item restrictions should not affect WIC participants' ability to find WIC-approved foods when either (1) most WIC food items already meet the dietary restriction, or (2)

substitute foods are available on the WIC food list. With regard to the special diets listed in table 7-1, the following WIC food substitutes or accommodations are available:

- A cross-State average of 20.5 percent of survey respondents said they or their sampled children were on high-fiber diets. WIC foods that provide fiber include dried beans/peas and many cereals, especially bran and other whole grain cereals. Changing brands for these food items would not materially affect fiber content, and State agencies take care to make sure that their food-item restrictions do not eliminate major cereal grain categories.
- An average of 18.4 percent of surveyed families reported that a WIC member was on a sugar-free or low-sugar diet. Most WIC food items are already low in added sugar, so food-item restrictions should not materially affect participants on low-sugar diets. Cereals, in particular, are restricted to types with no more than 21.2 grams of sucrose or other sugars per 100 grams of dry cereal. Although it is possible that allowable brands or types of cereal might have somewhat higher sugar content than restricted brands or types, the differences are likely to be small.
- In addition to infant formula, WIC foods high in fat or cholesterol are milk (whole and 2-percent), eggs, cheese, and peanut butter. None of the case study States precluded purchase of skim or 1-percent milk. In addition, WIC clinics can tailor food packages to reduce amounts of prescribed cheese, eggs, and peanut butter, and increase amounts of milk and dried beans/peas. Clinics can also prescribe low-fat or low-cholesterol cheese. Thus, food restrictions imposed by State WIC agencies should not affect the 14.6 percent of WIC families who said they were on low-fat or low-cholesterol diets.
- A cross-State average of 14.6 percent of survey respondents said they or a WIC family member were on a low-sodium diet. Except for some cereals (for example, puffed wheat and rice, shredded wheat), most WIC foods are not low in sodium. Thus, to avoid causing problems for WIC participants on low-sodium diets, State WIC agencies might want to include low-sodium cereals on their lists of approved foods.
- WIC participants needing high-calorie or high-protein foods can buy cheese, peanut butter, dried beans/peas, or whole milk with their WIC food instruments. Food-item restrictions do not eliminate these high-protein and generally calorie-rich choices, so they should not affect the nearly 12 percent of WIC participants with these special diets.
- An average of 10.8 percent of survey respondents said they were on a low-calorie diet for weight loss. As with participants on low-fat or low-cholesterol diets, and for the same reasons, State WIC food restrictions should not affect the ability of participants to select and purchase lower calorie types of prescribed foods, such as skim or reduced-fat milk.
- Between 5 and 6 percent of respondents said they were on a low-fiber diet; they would need to avoid buying high-fiber foods like bran or whole-grain cereals. State agencies try to ensure that their food-item restrictions do not eliminate major cereal grain categories, so these restrictions should not limit participants' ability to choose low-fiber alternatives.

### **Religious and Vegetarian Diets**

Cost-containment practices may, under some circumstances, make it more difficult for participants with special diets to observe those diets. For example:



- A cross-State average of 2.4 percent of survey respondents said they or a WIC family member adhered to a religious diet. Food-item restrictions may impact those on Kosher or Muslim diets by eliminating brands that have been certified as meeting the dietary specifications. Similarly, restrictions on higher price vendors may reduce the availability of WIC stores that stock foods meeting Kosher or Muslim diet needs.
- Fewer than 2 percent of survey respondents said they or a WIC family member were on a vegetarian diet. State food-item restrictions should not affect the food choices of these participants because WIC does not prescribe meats (except tuna fish for breastfeeding mothers) or foods that may contain meat ingredients. It is not known if any of these WIC participants were strict vegan vegetarians, but if these participants choose not to consume dairy products, fish, or eggs, they may require tailored food packages. Again, however, the food-item restrictions imposed for cost-containment purposes would not change their ability to follow a vegetarian diet.

## Food Allergies

The survey asked WIC participants whether a doctor had ever told them that they (or another WIC member of the family) had a food allergy, celiac disease or sprue, lactose or milk intolerance, or sulfite sensitivity. It also asked whether, within an hour after eating something, the respondent or her WIC child or infant had ever had a severe reaction, such as itching all over, trouble breathing, flushing, hives, or swelling of the face or hands or feet. This chapter treats all respondents who replied “yes” to either the food allergy or severe reaction question as having a food allergy.

Table 7-2 presents the percentages of WIC respondents indicating a food allergy or other condition causing food sensitivity. The percentages of respondent families with a food allergy varied from 4.6 percent in Texas to 13.4 percent in North Carolina. The cross-State average was 9.4 percent.<sup>3</sup> Lactose intolerance or milk intolerance was reported by an average of 10.8 percent of the respondents, with a particularly high percentage of them in Oklahoma (21.7 percent). Cost-containment practices should not affect participants with lactose or milk intolerance because their food packages can be tailored to avoid cow’s milk. Furthermore, there were very few reported instances of celiac disease or sulfite sensitivity in any State. The rest of this section therefore focuses on participants with food allergies.

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<sup>3</sup> This percentage is high compared to national figures. For example, in the *National Survey of WIC Participants: Final Report*, nutritional risk data indicate that 1.8 percent of participants have a food allergy (a weighted average of category-specific rates in exhibits 3-31 through 3-35). The presence of a food allergy was not always assessed by the WIC clinic, however, so the 1.8 percent figure may be an underestimate. The percentages in table 7-2 refer to any WIC member of the family. The average number of WIC members per family was 1.65, so the 9.4 percent figure in table 7-2 corresponds to 5.7 percent of **participants** having a food allergy, which is still substantially higher than indicated by the nutritional risk data.

**Table 7-2—WIC families with food allergies or intolerances**

	CA	CT	NC	OH	OK	TX	All States
				<i>Percent</i>			
Any food allergy or intolerance	9.6	15.1	21.2	13.8	25.2	10.8	16.0
Food allergy <sup>a</sup>	8.3	12.5	13.4	7.9	9.8	4.6	9.4
Lactose or milk intolerance	4.3	8.3	12.3	10.3	21.7	7.9	10.8
Sulfite sensitivity	0.0	0.4	0.9	0.3	0.6	0.0	0.4
Celiac disease, or sprue	0.0	0.1	0.0	0.0	0.0	0.0	0.0
<i>Sample size (number)</i>	<i>208</i>	<i>231</i>	<i>222</i>	<i>215</i>	<i>206</i>	<i>203</i>	<i>1,285</i>

a Respondents with food allergies include those for whom a doctor said they or their child had an allergy.

Weighted estimates for States were obtained with SUDAAN software. Group estimates gave equal weight to each State in the group. Component percentages may not sum to within-State totals because of rounding or indication of more than one food allergy or intolerance.

Source: Survey of WIC Participants.

About 71 percent of the respondents in table 7-2 with a food allergy said that a doctor had indicated that they or their child had the allergy. (The remaining 29 percent are in the table because they indicated a severe reaction after eating.) Respondents who had been told by a doctor that they or their children had an allergy were asked to identify the allergenic food or foods. Table 7-3 presents their responses. The food most commonly cited was cow’s milk, with 3.2 percent of all respondents indicating the allergy. Very few respondents indicated any other specific food allergy, although just over 3 percent reported a food allergy that was recorded as “other.” Most of these other food allergies were to chocolate, certain fruits (peaches, strawberries, lemons, bananas, tomatoes), or certain vegetables (mushrooms, lettuce, peppers).<sup>4</sup>

Participants with food allergies may be able to find other WIC foods that do not cause problems, or they may be able to have their food packages tailored, substituting foods that are not generally WIC approved for regular WIC food items they should not eat. Such food-package tailoring requires a doctor’s note confirming the presence of the food allergy. Specific food alternatives include the following:

- The few respondents who reported egg allergies (0.3 percent) can rely on cheese from their regular WIC prescription as a source of protein. WIC regulations, however, do not permit cheese to be **substituted** for eggs, so these participants cannot receive extra cheese as a result of their egg allergy.
- Wheat and corn are found in some cereals, but only about 0.1 percent of survey respondents said they were allergic to wheat or corn. Neither food-item nor vendor restrictions should prevent these participants from purchasing safe or appropriate cereals from among WIC-approved cereals, but they may still need to check labels or contact manufacturers to confirm the absence of wheat or corn. When restricting cereal brands or types, State WIC agencies try not to delete entire grain groups.

<sup>4</sup> Most of these specified “other allergies” may be food intolerances rather than true food allergies.

**Table 7-3—WIC families with food allergies**

	CA	CT	NC	OH	OK	TX	All States
	<i>Percent</i>						
Any food allergy <sup>a</sup>	5.0	10.2	8.2	6.2	7.2	3.3	6.7
Cow's milk	3.6	5.2	3.0	3.8	3.3	0.2	3.2
Eggs	0.0	1.5	0.0	0.0	0.0	0.2	0.3
Wheat	0.0	0.2	0.0	0.0	0.0	0.2	0.1
Peanuts	0.0	1.2	0.0	0.0	0.0	0.5	0.3
Soy	0.8	1.6	0.4	0.0	0.0	0.0	0.5
Corn	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Other nuts	0.0	1.1	0.7	0.0	0.0	0.0	0.3
Fish	0.5	0.4	0.0	0.5	0.0	0.0	0.2
Shellfish	0.5	0.4	0.0	0.0	0.0	0.0	0.2
Other	0.8	3.0	4.5	2.4	5.7	2.4	3.2
<i>Sample size (number)</i>	<i>222</i>	<i>222</i>	<i>222</i>	<i>215</i>	<i>206</i>	<i>203</i>	<i>1,285</i>

a Respondents with food allergies include those for whom a doctor said they or their child had an allergy.

Weighted estimates for States were obtained with SUDAAN software. Group estimates gave equal weight to each State in the group. Component percentages may not sum to within-State totals because of rounding or indication of more than one food allergy.

Source: Survey of WIC Participants.

- About 0.3 percent of WIC families in the six States had a WIC member allergic to peanuts, so these participants cannot eat peanut butter. Instead, they can purchase dried beans or peas as an alternative protein source.
- Nuts other than peanuts (for example, almonds) are sometimes found in WIC-approved cereals. Because there are many other approved cereals that do not contain nuts, cost-containment practices should not affect food choices for the 0.3 percent of respondents who said they were allergic to other nuts. These participants, however, may still need to check food labels or contact manufacturers to determine whether specific cereals contain nuts.
- The few survey respondents with a soy allergy (0.5 percent) may have some difficulties finding an appropriate cereal to buy when State agencies restrict cereal brands. It is sometimes difficult to determine if soy is used as an ingredient in store-brand or private-label cereals.
- About 0.3 percent of respondents indicated an allergy to fish. This would affect only breastfeeding participants, whose food package usually includes tuna. If a breastfeeding mother were allergic to tuna, it would be dropped from her food package. Cost-containment practices would not affect her food choices.
- Food products containing shellfish are not WIC approved, so the 0.2 percent of WIC families with this allergy would not be affected by WIC cost-containment practices.
- Finally, the 3.2 percent of WIC families with a reported allergy to cow's milk do not have a ready substitute in the WIC prescription, because WIC clinics may not prescribe soy-

based beverages.<sup>5</sup> Furthermore, these participants may also be allergic to milk protein, an ingredient found in such foods as cheese, cereal, and peanut butter. Such participants need to avoid foods containing milk protein, so State restrictions on allowed brands and types of food may impose extra burden on them to check food labels of allowed cheese, cereal, and peanut butter.

Thus, for the reasons described above, most WIC participants with food allergies should not be affected by cost-containment practices that limit food choice or remove higher priced stores from approved vendor lists. WIC participants, however, may need to check food labels or contact manufacturers to determine whether products include dairy protein, eggs, wheat, corn, soy, or nuts.

## Problems Finding Appropriate Food Items

The expectation that cost-containment practices will not have a disproportionate adverse effect on most WIC participants with special diets or food allergies is borne out by survey evidence. For all survey respondents who indicated that they had a dietary restriction, the survey asked whether their special diet posed problems with finding appropriate food items when shopping for WIC foods. Table 7-4 displays the results. Of the 528 WIC families in which at least one WIC participant had a dietary restriction, a cross-State average of only 2.5 percent reported that their special diet posed “problems” with finding appropriate food items among WIC foods. When asked a follow-up question about the nature of the problem, 7 of the 16 respondents said they either could not find out what ingredients were in a food item or did not know whether approved brands were safe to eat.

**Table 7-4—WIC families with dietary restrictions who report problems finding appropriate foods when shopping for WIC<sup>a</sup>**

	CA	CT	NC	OH	OK	TX	All States
Percent of total caseload	4.2	2.4	2.5	0.8	4.9	0.0	2.5
<i>Sample size (number)</i>	63	108	119	87	92	59	528

a Excludes respondents whose only dietary restriction was a food intolerance.

Weighted estimates for States were obtained with SUDAAN software. Group estimates gave equal weight to each State in the group.

Source: Survey of WIC Participants.

On a percentage basis, most of the shopping problems were centered on families who followed religious or vegetarian diets. Small sample sizes preclude presenting State-level estimates for the different categories. For the 29 WIC families in the overall sample following religious diets, however, 12.8 percent said they had problems finding appropriate food items when shopping for WIC foods, and 9.7 percent of the 22 families following a vegetarian diet reported problems. In contrast,

<sup>5</sup> If the milk “allergy” is actually an intolerance to lactose, however, the WIC clinic may prescribe lactose-free milk as a substitute for cow’s milk.

6.0 percent of families with food allergies and 2.3 percent of families with health-related special diets said they had problems shopping for WIC foods.

As displayed in table 7-4, Oklahoma had the highest rate (4.9 percent) of survey respondents who said they had problems finding appropriate food items. This high rate is somewhat surprising because Oklahoma had a relatively low percentage of WIC families who were on a religious (2.0 percent) or vegetarian (1.6 percent) diet. As reported in table 7-2, however, Oklahoma did have the highest percentage of families (21.7 percent) with food allergies, and this may help explain the relatively high rate of shopping problems within the State. It is also the case that of the seven WIC families in Oklahoma who reported difficulty in shopping, three said the problem was in not knowing how to find out about ingredients in store-brand food items. With the small sample, it is not possible to conclude that these problems were related to Oklahoma's previous exclusion of national-brand cereals in its WIC food packages.

## Satisfaction With and Use of Prescribed Foods

To examine whether WIC participants with special diets or food allergies were less satisfied with allowed brands of food, or less likely to purchase or consume all their WIC food, the study specified and estimated a series of logit models. Each model had the following general form:

$$Y = \beta_0 + \beta_1 * \text{RESTRICT} + \beta_2 * \text{RACE} + \beta_3 * \text{GRAD} + \beta_4 * \text{NUMBER} + \beta_5 * \text{DIET} + \beta_6 * (\text{DIET} * \text{RESTRICT}),$$

where Y is one of three outcome measures, RESTRICT indicates whether the survey respondent resided in a State with restrictions for the food category being examined, RACE is a vector of racial/ethnic categories, GRAD indicates whether the survey respondent is a high school graduate, NUMBER is the number of WIC participants in the family,<sup>6</sup> and DIET is a vector indicating whether the respondent had a special diet or food allergy. The interactive terms DIET\*RESTRICT are included in the model as well. The  $\beta$ s are the estimated coefficients of the model.<sup>7</sup>

The specific variables representing each vector in the models are:

- RACE (African-American, Hispanic)
- DIET (vegetarian diet or special diet for health or religious reasons, food allergy).

Too few respondents indicated that they followed a vegetarian or religious diet to include these diets as separate variables in the models.

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<sup>6</sup> The number of WIC members in the family is included to test the hypothesis that, as the number of WIC family members increases, the total amount of prescribed food may exceed the family's demand for WIC foods. If so, the estimated coefficient should be zero (that is, insignificant) in the models of brand satisfaction, but negative in the models of food purchase and food consumption.

<sup>7</sup> Variables indicating location (urban, suburban, rural) and whether any of the WIC members were pregnant, an infant, or a child were included in alternative model specifications. Estimated coefficients for the location variables were never statistically significant, and these variables were dropped from model specification. The variables indicating certification category were dropped because of collinearity between these variables and presence of special diets and food allergies.

The excluded category in each model is White participants living in a State without food restrictions (for the food category examined) who do not have a high school education and special diet or food allergy.

Separate models were fit to the survey data for three outcome measures: whether or not the respondent was “very satisfied” with allowed brands of a WIC food item, whether the respondent purchased “all” of the prescribed WIC item, and whether WIC members of the family consumed “all” of the item that was purchased. The two models on purchase and consumption behavior were specified for each of the eight food categories discussed in chapter 6 and appendix I:

- milk
- eggs
- cheese
- juice
- cereal
- infant cereal
- peanut butter
- dried beans or peas

The model on brand satisfaction was specified for all food categories except eggs, peanut butter, and dried beans/peas. For these three categories, the survey did not ask about satisfaction with allowed brands.

If survey respondents with special diets or food allergies were less satisfied with allowed brands than other survey respondents, the estimated coefficients on the DIET variables will be negative and statistically significant. Similarly, the estimated coefficients will be negative in the respective models if survey respondents with dietary restrictions were less likely to purchase all the prescribed food in a category or to consume all the food purchased.

A significant negative estimated coefficient on a variable indicating a special diet or food allergy, however, does not mean that food-item restrictions are related to the decreased satisfaction or purchase or consumption behavior. One must also consider the estimated coefficients for the interactive terms in each model. If the estimated coefficients on any interactive terms are negative and statistically significant, this evidence would support a hypothesis that food-item restrictions have a disproportionate impact on WIC participants with special diets or food allergies.

Appendix J presents the estimated coefficients for the 24 models specified. Two separate sets of models are specified for breakfast cereals. The first set includes both California and Oklahoma as States with food-item restrictions; the second set includes only Oklahoma in the restricted group. This repetition acknowledges the very different types of restrictions used in the two States: limiting types of allowed cereals in California versus allowing only store and private-label brands in Oklahoma.

Using the 0.05 confidence level as the threshold for assessing statistical significance, only one of the estimated coefficients for an interaction term is statistically significant, and its sign is positive rather than negative. Survey respondents in California and Oklahoma with special diets were more likely to eat all the prescribed cereal they purchased than respondents with special diets in the other States

(table j-46 in the appendix). Thus, there is no evidence that food-item restrictions in the six case study States had a disproportionate adverse effect on WIC participants with special diets or food allergies. This finding is consistent with the evidence that very few respondents with special diets or food allergies (a cross-State average of 2.5 percent) experienced problems finding appropriate food items when shopping for WIC foods.

The above models were re-specified with their interaction terms omitted in order to estimate the overall relationship between having a special diet or food allergy and satisfaction with allowed brands, amount purchased, and amount consumed. In only two of the new models were the estimated coefficients of the special diet variable statistically significant: respondents on special diets were less likely than others to buy all their prescribed cheese and to eat all the peanut butter they purchased. None of the estimated coefficients for the food allergy variable were significant in the re-estimated models.

Based on these analyses, there is no evidence that States' efforts to control food package costs through food-item restrictions created special problems for WIC respondents with food allergies or special diets. This is not to say that a few WIC participants with food allergies or special diets may not have been adversely affected by food-item restrictions. If an effect existed, however, it likely affected only a small percentage of participants.

## Summary

Averaged over the six case study States, 37.7 percent of survey respondents said they or their WIC child followed a special diet for specified health reasons. In addition, an average of 9.4 percent reported a food allergy. Finally, 2.4 percent of the surveyed respondents followed a religious diet, and 1.8 percent of the sample followed a vegetarian diet.

In its legislation authorizing this study, Congress identified WIC participants with special diets or food allergies as a group of special concern with regard to the possible impacts of WIC cost-containment practices. This chapter's discussion of dietary restrictions, WIC foods, and substitute foods suggests that cost-containment practices are not likely to have disproportionately greater impacts on participants with dietary restrictions than other participants, and survey evidence supports this discussion; only 2.5 percent of WIC families with dietary restrictions said their special diets posed problems with finding appropriate WIC food items. The incidence of reported shopping problems was considerably higher, however (12.8 and 9.7 percent, respectively), for the relatively few WIC families adhering to religious or vegetarian diets.





# Chapter 8

## Food Instrument Redemption

This chapter examines food instrument redemption in the six case study States and the relationship between redemption rates and food-item restrictions. The key research question is whether food-item restrictions lead to decreased redemption rates.

### Research Approach

State WIC administrative data on food instrument issuance and redemption are used to examine rates of redemption. Each issuance record indicates the food categories and amounts included on the instrument, the month for which the food instrument was valid, and whether or not the instrument was redeemed.

Two different measures of redemption are examined using the administrative data:

1. Percentage of certified participants who pick up their food instruments
2. Percentage of issued food instruments that are redeemed

A third measure is “partial redemption,” where only some of the prescribed foods on a single instrument are selected. The administrative data cannot be used to examine this measure because the data do not indicate which of the foods listed on the instrument were selected, and in what amount, only whether the instrument was redeemed. Instead, the analysis uses survey data on the percentage of respondents who said they did not buy all of their prescribed food. This is not an exact measure of partial redemption, because it may include respondents who did not redeem an instrument at all. Nevertheless, the survey data are able to provide information on the likely magnitude of partial redemptions.

Some of the following analyses exclude data from North Carolina or indicate that the North Carolina data are not representative of the entire State. The problem is one of incomplete coverage of the State; food instrument issuance and redemption data are largely missing for several counties. This data limitation, however, is not expected to bias the results of the analyses.<sup>1</sup>

This chapter examines all three measures of food instrument redemption: the rates of pickup, redemption, and partial redemption. As explained in the chapter, a multivariate analysis of instrument redemption rates was conducted, but results were extremely sensitive to model specification. Conclusions about the effects of food-item restrictions on instrument redemption, therefore, rely on the tabulations presented in the chapter due to the absence of consistent model results.

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<sup>1</sup> According to State officials, food instruments are either manually prepared or printed online. Of the 100 counties in the State, 95 printed their food instruments online at the time of the study, and the issuance information was automatically logged onto the State’s computer system. The remaining counties prepared their instruments manually. Even in the online counties, some instruments were manually prepared. Although the manual data were later logged into the State’s online issuance system, analysis of the issuance file received from the State suggests that some records were missing. Specifically, the percentage of certified WIC participants who picked up their food instruments appeared to be artificially low.

## Issuance and Redemption Process

When a WIC applicant is certified as eligible, a nutritionist or competent professional authority (CPA) assesses his or her dietary needs and selects an appropriate food prescription. The food prescription may be one of the food packages specified in program regulations, or it may be tailored to meet the specific nutritional needs of individual participants or categories of participants. When the prescription is determined, the local office issues a set of food instruments to the participant. California, Connecticut, and Oklahoma issue WIC checks. Ohio and Texas issue WIC vouchers, and North Carolina issues WIC drafts. These are all referred to as “food instruments,” and they are used by participants to obtain prescribed food at authorized outlets.

To reduce burden on both office staff and participants, food instruments are often issued for 2 or 3 months at a time, saving participants extra trips to the WIC office or clinic. All food instruments, however, are valid only during the specific month printed on the instrument.

The six States varied in the number of food instruments issued per participant per month. Typically, multiple food instruments were issued for a given month, with each instrument listing a portion of the participant’s total monthly prescription. Table 8-1 indicates the average number of food instruments issued per WIC participant in each of the six case study States. California, Connecticut, and Ohio issued an average of over 4 instruments per month, whereas the other States issued, on average, about 2.5 instruments. Infants usually received fewer instruments than women or children, in part because breastfed infants received no instruments. Issuing multiple instruments for a given month enabled participants to buy their WIC foods over the course of the month, reducing problems of spoilage and storage.

**Table 8-1—Average number of food instruments issued per participant per month**

	CA	CT	NC <sup>a</sup>	OH	OK	TX
	<i>Number</i>					
All participants	4.6	4.4	2.5	4.1	2.5	2.4
All women	5.8	4.5	2.7	4.1	2.6	2.8
Infants <sup>b</sup>	1.2	3.4	1.8	4.2	1.0	1.0
Children	5.1	4.9	2.8	4.1	2.8	2.7

a The North Carolina data represent about 80 percent of all WIC participants within the State.

b Base includes infants who were breastfed and received no food instruments for the month.

Sources: State food instrument issuance and redemption data for November 2000.

With multiple instruments issued to each participant each month, and with most food prescriptions including foods from multiple categories, States have flexibility in how to structure each food instrument. In California and Texas, most instruments were for a single food category (for instance, just milk or infant formula). In the other four States, most food instruments contained prescriptions for multiple food categories. To illustrate, table 8-2 displays the most commonly issued food instruments in the six States, identified by the food categories listed on the instrument. Each table entry indicates the percentage of that State’s instruments issued for a specific food category or group of categories. Thus, for example, 27.8 percent of all California food instruments issued for November 2000 were for

**Table 8-2—Distribution of most common food instruments in each State**

Food categories	CA	CT	NC <sup>a</sup>	OH	OK	TX
	<i>Percent</i>					
Single-category instruments						
Milk	27.8	2.1		4.6		61.4
Eggs	0.0	0.0		0.1		
Peanut butter or dried beans/peas	8.2	0.0				0.0
Cheese	0.0			0.0		0.0
Juice	17.4	0.1	0.0	0.2		
Cereal	17.2	11.7	0.0	0.0		
Infant formula	0.6	17.4	13.2	18.9	6.5	6.1
Tuna	0.0					
Carrots	0.0					
Subtotal, single category	71.2	31.3	13.2	23.8	6.5	67.5
Multiple-category instruments						
Milk, peanut butter or dried beans/peas		10.1				
Milk, juice		5.0	0.0	29.5	0.1	
Milk, cheese		5.7	0.2	0.2		0.0
Juice, cheese		8.4	0.0	0.0		
Peanut butter or dried beans/peas, juice	7.9		0.0		0.0	
Milk, eggs, juice		14.2	23.3	7.9	2.5	
Milk, eggs, cheese	17.2	7.5	1.1	0.0		
Milk, peanut butter or dried beans/peas, juice			0.0	24.7	24.7	
Milk, juice, cheese		2.8	0.1	7.7	1.2	
Infant formula, juice, infant cereal			0.3	6.2	0.3	
Milk, eggs, peanut butter or dried beans/peas, juice		0.3	16.7	0.0	0.0	
Milk, eggs, peanut butter or dried beans/peas, cheese		4.4		0.0		
Milk, eggs, juice, cheese		0.2	3.2	1.7	27.7	
Milk, juice, cheese, cereal			26.6	0.0	0.2	
Milk, eggs, peanut butter or dried beans/peas, juice, cheese		0.0	7.6	0.0		
Milk, eggs, juice, cheese, cereal				3.8	28.6	3.3
Milk, eggs, peanut butter or dried beans/peas, juice, cheese, cereal				14.1	0.0	27.4
Other <sup>b</sup>	3.7	10.1	7.7	5.1	8.2	1.8
Subtotal, multiple categories	28.8	68.7	86.8	76.2	93.5	32.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

a The North Carolina data represent about 80 percent of all WIC participants within the State.

b “Other” includes all food instruments with food category combinations that did not represent at least 4 percent of all instruments redeemed in at least one State.

Sources: State food instrument issuance and redemption data for November 2000.

milk only, 17.4 percent were for juice only, and 0.6 percent were for infant formula only<sup>2</sup>. In Texas, 61.4 percent of all issued instruments contained only milk. The most common instrument in Ohio was for milk and juice (29.5 percent).

## Rate of Food Instrument Pickup

The first measure of food instrument redemption is the “rate of food instrument pickup”, calculated as the percentage of certified participants who pick up their food instruments for a given month. The following analysis uses November 2000 as the reference month because accurate counts of certified participants are available from the November administrative data provided by each State.

Food instrument “issuance” occurs when participants pick up their instruments at the local WIC office. Note that, because some food instruments are issued in advance of the month for which they are valid, this first measure of redemption does not mean that participants actually picked up the instruments during November 2000.

One would expect that rates of food instrument pickup would be higher in the early months of a certification period than in the later months, for several reasons. Most important, for most participants, food instruments for the first 1 to 3 months of the certification period are issued at time of certification; pickup rates should be nearly 100 percent because most participants are already in the office.<sup>3</sup> After the initial instruments are issued, pickup rates might decline for two main reasons. First, some certified participants might not be able to get to the office for their scheduled appointment to pick up their instruments. They might be out of town, in the hospital, or simply unable to make it to the office on time. If a new appointment could not be scheduled before the end of the month, they might not be able to pick up their food instruments for the month. Second, some participants might effectively drop out of the program by simply not showing up for their instruments. This could be related to dissatisfaction with the State’s list of allowed WIC foods, or it could be the result of factors entirely unrelated to food-item restrictions (for instance, difficulty getting to the local WIC office, dissatisfaction with office operations or staff, relocation out of the WIC clinic’s service area, or perceived ineligibility due to changed circumstances).

Table 8-3 presents rates of food instrument pickup over the first 6 months of a participant’s certification period. The rates are calculated as the number of instrument packages issued divided by the number of certified WIC participants, excluding infants.<sup>4,5</sup> The data confirm the expected decline in

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<sup>2</sup> The percentage of food instruments for infant formula in California was low, relative to the other States, because California issued so many single-category instruments. This raises the total number of instruments issued in California and reduced the share for infant formula.

<sup>3</sup> Some infants are certified for WIC while still in the hospital. Their mothers would need to go to the office to pick up their first food instruments.

<sup>4</sup> Information on participants’ certification dates was appended to the analysis file to enable identification of month of certification period.

<sup>5</sup> Infants who are being entirely breastfed do not receive a WIC food prescription. The study could identify such infants for November 2000, using the food package code from the State’s certification file, but not for the months for which certification data were not collected. Because infants initially breast-fed may start to receive prescriptions for formula at any time (and they may receive prescriptions for infant cereal or juice at the age of 4 months), table 8-3 excludes all infants and infant food packages from the calculated rates to avoid presenting misleadingly low food instrument pickup rates.

the rate of food instrument pickup over the first months of a participant's certification period. Pickup rates in the first month of certification were nearly 100 percent. They declined thereafter, with the largest declines occurring in month 4 for all States except California. The decline in month 4 may correspond to the States' having issued 3 months of food instruments during the initial pickup.

**Table 8-3—Rate of food instrument pickup by month of certification period**

Certification month	CA	CT	OH	OK	TX
			<i>Percent</i>		
1	98.5	99.4	99.6	99.9	99.9
2	92.7	96.9	99.2	95.8	98.3
3	89.8	95.2	98.9	93.7	95.7
4	88.2	89.2	87.3	79.1	84.7
5	87.1	87.7	87.7	77.0	85.9
6	80.3	84.1	83.9	73.2	83.9

Data limitations preclude including North Carolina in the analysis of food instrument pickup rates. Table excludes all infants.

Sources: State food instrument issuance and redemption data for November 2000 to February 2001.

Table 8-4 presents the same data on food instrument pickup rates, but broken out by certification category and averaged over all months of a certification period. For all participants, pickup rates varied from a low of 88.8 percent in Oklahoma to a high of 94.2 percent in Ohio. The rates exclude infants who were breastfed and received no food package in November 2000.

**Table 8-4—Rate of food instrument pickup by certification category**

Certification category	CA	CT	OH	OK	TX
			<i>Percent</i>		
All participants	90.0	93.8	94.2	88.8	90.0
All women	90.9	93.7	93.7	89.5	91.0
Infants	88.8	94.8	95.3	91.5	87.8
Children	90.2	93.3	93.9	87.0	90.8

Data limitations preclude including North Carolina in the analysis of food instrument pickup rates. Table excludes only infants who were breastfed and received no food package.

Sources: State food instrument issuance and redemption data for November 2000.

Within each State, pickup rates generally did not vary much by certification category; they were always within 3 percentage points of each other. Infants had the lowest pickup rates in California and Texas, but the highest rates in Connecticut, Ohio, and Oklahoma. This may be due to different rates among States in the extent to which infants were certified for WIC while still at the hospital. In such

cases a separate trip to the WIC office would be needed to pick up the infant’s initial food instruments.<sup>6</sup>

The rates of food instrument pickup presented above cannot be meaningfully related to the presence or absence of food-item restrictions because participants must pick up **all** their instruments for the month at the same time. They are not allowed to choose which instruments they plan to use. Food-item restrictions may cause some participants to drop out of the program (that is, to stop picking up their instruments), but the administrative data examined here on food instrument issuance cannot isolate the possible impacts of food-item restrictions.<sup>7</sup>

## Rate of Food Instrument Redemption

The rate of food instrument redemption is defined as the percentage of food instruments issued (that is, picked up) that are redeemed, in whole or in part, excluding instruments that have been voided. Table 8-5 presents these rates for all participants in the six States and by certification category. California had the highest rate among the six States—of all food instruments issued in California for November 2000, 90.7 percent were redeemed. Ohio had the lowest rate at 80.6 percent. Redemption rates were generally highest for children, especially in California and Texas.

Certification category	CA	CT	NC <sup>a</sup>	OH	OK	TX
	<i>Percent</i>					
All participants	90.7	87.9	85.7	80.6	85.7	85.2
All women	89.7	86.4	82.8	77.5	83.2	80.2
Infants	89.8	87.6	86.5	81.6	86.2	84.4
Children	97.8	89.6	88.1	81.1	88.0	95.9

a The North Carolina data represent about 80 percent of all WIC participants within the State.

Sources: State food instrument issuance and redemption data for November 2000.

Conceptually, it is possible to relate food instrument redemption rates to the presence or absence of food-item restrictions. A modeling approach is suggested, however, because States include more than one food category on individual instruments. The next section describes the study’s analysis of the effects of restrictions on food instrument redemption.

## Effects of Food-Item Restrictions on Redemption

The purpose of this section is to determine if there is a statistically significant relationship between food-item restrictions and rates of food instrument redemption. That is, do item restrictions lower the

<sup>6</sup> Despite efforts to control for infants receiving no food packages, the variation in pickup rates for infants may still reflect some differences across States in the percentages of infants who were breastfed. As was shown in table 4-1 of chapter 4, California and Texas had the highest percentages of breastfeeding women among their participants.

<sup>7</sup> Chapter 9 examines dropout rates and food-item restrictions.

perceived value of a prescribed food to the extent that instruments listing that food category are less likely to be used?

If all food instruments included just one category of food, it would be relatively easy to test the above hypothesis; redemption rates for instruments listing one category could be compared between groups of States with and without restrictions on that category. The presence of multiple food categories on single instruments, as documented in table 8-2, makes it more difficult to determine the effect of individual food-item restrictions. The difficulty is both theoretical (for instance, do restrictions on one food-item affect the perceived value of other items on the food instrument?) and practical (in terms of data requirements and limitations).

## Theory

The probability that a food instrument will be redeemed is based on the simple theory that demand for a food instrument is a function of the food categories included on the instrument, the quantity specified for each food category, the number of food categories included, and the restrictions on those categories. Each WIC participant might rank the food categories differently, but the probability of redeeming the instrument should be highly correlated with the demand for the prescribed foods.

Generally, one would expect demand to increase with the quantity and variety of food categories on the instrument; and to decrease when restrictions are placed on food items. The probability of redeeming an instrument with a highly valued item and a little-valued item should be no less than the probability of redeeming the instrument with just a highly valued item. That is, the food instrument can be partially redeemed (or undesired food given away), so the consumer can ignore any food category that she does not want.<sup>8</sup> Similarly, consider two food instruments with the same food category and quantity, but with one from a State with a restriction on that category: the demand for the food instrument with the restriction should be the same as for the unrestricted food instrument if the restriction is not binding on the consumer's choices. For example, the consumer may consider the store-brand cereal to be comparable to a national brand. In that case, a restriction that the instrument be used to buy only the store-brand (or private-label) cereal should have no effect on the participant's selection because the restriction does not eliminate any items that are more preferred. If the restriction does eliminate some preferred brands, or otherwise limit the participant's choices, however, one would expect it to reduce the perceived value of that food instrument, thereby reducing its likelihood of being redeemed.

Beyond this simple basis of preference ordering, there are other factors that could affect redemption. The demand for the food categories could be defeated by the logistics of getting to the store in the right month with the correct instruments. Something as simple as losing the instrument may have little relation to the preference ordering of the consumer. Moreover, it is unclear whether food instruments with two food items on the same instrument are more likely to be redeemed than separate instruments with a single food item each. The study does not test the effect of these differences on redemption probabilities because they vary by State and are often indistinguishable from patterns of State-level restrictions.

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<sup>8</sup> Program regulations, of course, require that all food items be selected and consumed by the participant.

## Data

The primary source of data used in the analysis is the 4.2 million food instrument records issued by the six study States for November 2000 (excluding instruments that were returned or voided). These data were supplemented with participant demographic information from the States' certification files.

The food instruments included 32 food specifications, aggregated to 11 food categories; the aggregation involved removing package size indicators. For instance, milk gallons and half-gallons were combined into the milk category. Information was not lost, however, as the total quantity of each food category prescribed was retained on the records. Aggregation also included combining "similar" foods, such as cow's milk, powdered milk, evaporated milk, buttermilk, and acidophilus milk.

As shown in table 8-6, States in the study imposed food-item restrictions on 8 of the 11 food categories. The restrictions on milk, eggs, peanut butter, and dried beans or peas included purchase of the least expensive brand, as did the cheese restrictions in Connecticut and Oklahoma and the juice restrictions in Connecticut and Texas. California limited allowed types of cheese, breakfast cereal, and juice. Oklahoma prohibited purchase of most national brands of cereal and juice, and Texas required that cereal be bought in large packages. California, Connecticut, and Texas limited infant cereal selection to one brand. Previous chapters provide more complete descriptions of the restrictions.

**Table 8-6—Food category restrictions by State**

	CA	CT	NC	OH	OK	TX
Milk	Π			Π	Π	
Lactaid						
Eggs	Π	Π			Π	Π
Cheese	Π	Π			Π	
Breakfast cereal	Π				Π	Π
Infant cereal	Π	Π				Π
Juice	Π	Π			Π	Π
Legumes		Π			Π	
Tuna						
Carrots						
Infant formula						

The legumes food category is an aggregation of peanut butter and dried beans/peas, necessitated by the fact that North Carolina food instruments allowed the bearer to choose either at the time of purchase. Information on selected items is not available. Therefore, to include North Carolina instruments in the analysis, peanut butter and dried beans/peas were combined into the "legumes" category, though separate food-item restrictions were maintained in the model specification.

Only one State, North Carolina, had no food-item restrictions. At the other extreme, Oklahoma had six restrictions (though no single instrument in Oklahoma was subject to more than five). Most food instruments had one restriction or none, and the modal value was one restriction. Table 8-7 combines data from all six States and breaks out food instrument redemption rates by the number of food category restrictions affecting use of the instrument. Redemption rates were consistently **higher** for



instruments containing restricted food categories than for the 25 percent of food instruments not subject to any restrictions. The pattern of redemption rates in the table fails to support the hypothesis that restrictions reduce redemption rates. The average redemption rate for instruments with any restriction was 89.1 percent, which is significantly higher than the redemption rate of 82.3 percent for instruments not subject to restrictions. From this initial evidence, food-item restrictions do not appear to depress redemption rates.

**Table 8-7—Redemption rates by number of restrictions**

	0	1	2	3	4	5
	<i>Percent</i>					
Redemption rates	82.3	87.4	94.0	94.2	84.1	88.9
Distribution of food instruments	25.0	54.0	3.0	17.0	1.0	<1.0

Sources: State food instrument issuance and redemption data for November 2000.

The redemption rates in table 8-7 do not distinguish among instruments containing different food categories. A strong effect of restrictions on redemption rates for one category could be diluted by the absence of effects for other categories. (Note that one would not expect to see “offsetting” effects. There is no hypothesis that would lead one to expect food-item restrictions to cause higher redemption rates.<sup>9</sup>)

Table 8-8 presents redemption rates by food category, overall and separately for restricted and non-restricted States. In reviewing these rates, it is important to remember that, for the most part, these are not single-category instruments. Thus, for example, the 86.8 percent redemption rate for milk could be affected by demand for other food categories listed on the instruments containing milk.

For each food category in table 8-8 subject to food-item restrictions, the table presents the pooled redemption rates within States with and without restrictions, as noted in table 8-6. The difference in redemption rates between the two groups of States is also given. If food-item restrictions reduce redemption rates, one would expect to see negative differences in the table. Negative differences are seen only for peanut butter and dried beans/peas (and the aggregated legumes category), and the magnitudes of these differences are small. Again, subject to the caveat that other factors may have affected these redemption rates, the results suggest that food-item restrictions did not have an adverse impact on redemption rates.

One of the “other factors” expected to affect redemption rates is the quantity of food prescribed on the instruments for each food category. States with and without restrictions did not always prescribe equal average amounts per instrument. Thus, quantity effects could be complicating the comparisons in table 8-8. When the analysis compared redemption rates while holding quantities constant,

<sup>9</sup> Selection bias could lead to higher redemption rates for food instruments with restrictions if the presence of food-item restrictions was correlated with participants who really needed or wanted their food and were more likely to pick up their instruments. As noted in the previous section, the relationship between food-item restrictions and pickup rates cannot be examined with available data.

however, the results remained inconsistent. Redemption rates were sometimes higher in the States with restrictions and sometimes lower.

**Table 8-8—Redemption rates by food category**

	Total	Restricted	Non-restricted	Group difference
			<i>Percent</i>	
Milk	86.8	88.6	83.5	5.2
Lactaid	73.7			
Eggs	90.9	93.8	82.0	11.8
Cheese	91.3	94.8	86.7	8.1
Breakfast cereal	87.6	88.3	84.0	4.3
Infant cereal	93.2	96.3	84.0	12.3
Juice	87.6	90.5	81.1	9.3
Peanut butter	87.2	85.9	87.2	-1.3
Dried beans/peas	86.8	84.4	86.9	-2.5
Legumes	86.7	85.0	86.7	-1.7
Tuna	83.5			
Carrots	85.9			
Formula	89.4			

North Carolina's food instruments are in the "not restricted" group for each food category. The North Carolina data represent about 80 percent of all WIC participants within the State.

Sources: State food instrument issuance and redemption data for November 2000.

Based on the raw redemption data, that is, not controlling for any factors other than food category and quantity prescribed, there were few categories for which the restricted redemption rates were lower than the nonrestricted redemption rates. This was true only for peanut butter and dried beans/peas. The results were mixed for milk, depending on quantity prescribed. For the other food categories, the redemption rates for restricted instruments were larger than the nonrestricted instruments. This suggests that, with the possible exception of restrictions on peanut butter and dried beans/peas, the food-item restrictions in these case study States had no impact on food instrument redemption rates, and the effects on peanut butter and dried beans/peas were small—a reduction in rates of 1.3 and 2.5 percentage points, respectively. To control for other factors and to confirm these results, however, it is necessary to model the redemption probability of food instruments.

### Model Specification

The main disadvantage of the tabular comparisons is that the differences do not control for factors other than the restriction of the particular food category. Given that many instruments have multiple food-items, it is possible that there are cross (interaction) effects between food categories and food restrictions. There may also be differences in demographics or other State factors that would affect redemption rates independent of a restriction. With the restrictions based on State rules, it is certainly possible that the food restrictions would be correlated with demographics or miscellaneous other State effects. In that case, the correlations could make the simple comparison between redemption rates misleading. There are insufficient data to control adequately for all the possibilities, but a logistic regression model was specified in which the dependent variable was based on the probability of

redemption (1 if the food instrument was redeemed, 0 otherwise). The independent variables included measures for the amount of food prescribed, indicators for food-item restrictions, and controls for demographics and miscellaneous State effects. This model was estimated using all 4.2 million food instrument records for November 2000.

The most general model had the following specification:  
where:

$$\text{Log}\left(\frac{\text{REDEEM}}{1-\text{REDEEM}}\right) = \beta_0 + \sum_{f=1}^{11} (\beta_{1f} * \text{QUANTITY}_f) + \sum_{f=1}^{11} (\beta_{2f} * \text{RESTRICTDUM}_f) + \sum (\beta_3 * \text{DEMOGRAPHICS}) + \beta_4 * \text{NUMITEMS} + \sum_{j=1}^6 (\beta_{5j} * \text{STATE}_j)$$

REDEEM = a binary variable indicating whether an issued food instrument was redeemed (1) or not (0).

QUANTITY<sub>f</sub> = the quantity listed on the food instrument for food category f, f=1 to 11.

RESTRICTDUM<sub>f</sub> = a dummy variable indicating whether food category f, f=1 to 11, was restricted in the State in which the food instrument was issued.

DEMOGRAPHICS = a vector of variables indicating the following characteristics of the WIC participant: certification category; month of certification period; gender; race or ethnicity; household size; migrant status; poverty status; location (urban, suburban, rural); and receipt of program benefits (food stamps, TANF, Medicaid).

NUMITEMS = a count of the number of different food categories included on the food instrument.

STATE<sub>j</sub> = a dummy variable indicating the State, j=1 to 6, in which the participant resided.

In specifications including STATE<sub>j</sub>, the RESTRICTDUM<sub>f</sub> vector was replaced with RESTRICTQ<sub>f</sub>—a vector of interactive terms between the QUANTITY<sub>f</sub> and RESTRICTDUM<sub>f</sub> vectors—to avoid problems of multicollinearity.

In either model specification, one would expect positive coefficients on the QUANTITY<sub>f</sub> vector: the larger the quantity of a food category prescribed, the greater the value of the instrument and the greater the likelihood of its being redeemed.

The estimated coefficients on the RESRICTDUM<sub>f</sub> vector are expected to be negative or zero, but never positive. Restrictions could lower the value of an instrument or have no effect, but they should not increase its value (compared with the same instrument in an unrestricted State). Estimated coefficients that are positive and significant would suggest a misspecified model. Likewise, the estimated coefficients on the RESTRICTQ<sub>f</sub> vector should be negative or zero, but not positive.<sup>10</sup>

<sup>10</sup> Again, the possibility of selection bias cannot be discounted. If one could model the participant's probability of picking up the food instruments using different explanatory variables than in the model of instrument redemption, then it would be possible to control at least partially for any selection bias, if present. To lead to positive coefficients on the

## Analysis Results

The results of the modeling effort are not reported here because, in general, the different model specifications were not robust. With such large sample sizes, it was easy to get statistically significant results, but the signs of the coefficients were extremely sensitive to the model specification. More problematic, there was no consistent support for the theory that food quantities have positive coefficients and food restrictions have zero or negative coefficients.

The results from the pooled data were further tested by estimating separate logistic regressions on the subset of instruments for each food category. For most food categories, the model specification included the full set of food quantities and restrictions because there were instruments with nearly every combination of food-items. Again, the signs of the coefficients were sensitive to the specification. It was not uncommon for the sign on the restriction coefficient to change depending on whether the single restriction was included or the full set of restrictions.

Despite extensive specification searching and regression experimentation, the study was unable to find evidence of a consistent negative effect from the food restrictions on instrument redemption. The problem of inconsistent findings is largely a data problem. It is difficult to control for State-level effects when food-item restrictions are applied statewide. There is also a likely omitted-variables problem in the specification—a variable that decreases redemption rates that has different values in the unrestricted States than in the restricted States.

## Partial Redemption of Food Instruments

The last component of the redemption analysis addresses whether participants purchase items from all food categories listed on the food instrument. For single-category instruments, partial redemption would mean that only part of the total quantity listed on the instrument was obtained. For multiple-category instruments, partial redemption could mean either that some foods were not selected at all, or that the full quantities of one or more listed foods were not purchased.<sup>11</sup>

The food instrument data do not indicate whether food items for all listed categories were selected. The only data available to examine possible partial redemptions are responses to survey questions that asked respondents whether they purchased all the items prescribed for them or their WIC children within each food category. These data, originally presented in chapter 6 in a different format, are presented again in table 8-9. Table entries provide the percentage of respondents who did not purchase all the food, by category, prescribed for their family for a month.

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RESTRICTDUM<sub>r</sub> or RESTRICTQ<sub>r</sub> vectors, however, the probability of picking up food instruments would have to be positively related with the presence of restrictions, an unlikely behavioral response.

<sup>11</sup> Focus group participants in several States, however, said that store personnel insisted that all foods and quantities listed on a food instrument be selected before ringing up the WIC items.

**Table 8-9—Partial redemptions of WIC food instruments by food category (not buying “all” items)**

	Individual States						State groups				
	CA	CT	NC	OH	OK	TX	Total	Res- triction	No res tric- tion	Group differ- ence	
	<i>Percent</i>										
Milk	7.2	6.0	10.1	11.4	6.7	11.6	8.8	8.6	9.3	-0.7	
Eggs	1.9	2.4	6.5	3.1	8.8	4.3	4.5	5.6	4.0	1.6	
Cheese	0.6	5.5	7.7	2.9	5.5	5.2	4.6	5.5	4.1	1.4	
Breakfast cereal	7.3	7.7	12.6	5.0	14.5	3.1	8.4	10.9	7.1	3.8	
Infant cereal	5.6	9.6	12.3	22.4	12.4	3.0	10.9	6.0	15.7	-9.6	
Juice	0.2	1.3	4.8	6.6	5.0	2.0	3.3	2.1	5.7	-3.6*	
Peanut butter	2.2	4.6	23.6	2.6	3.6	6.9	7.2	4.6	7.8	-3.2	
Dried beans/ peas	8.8	5.6	33.5	15.2	15.2	0.6	13.1	15.2	12.7	2.4	

Weight estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group.

States with restrictions and sample size vary by food category. See tables in chapter 6 and appendix I for sample sizes for each food category.

Significant differences in means and proportions between State groups are noted by \* (0.05 level) and \*\* (0.01 level).

Source: Survey of WIC Participants.

Over all six States, the percentage of survey respondents who said they did not buy all their prescribed food varied from a low of 3.3 percent for juice to a high of 13.1 percent for dried beans or peas. Within States with restrictions, the high was 15.2 percent for dried beans or peas (Oklahoma was the only State with restrictions on dried beans or peas). Looking at the group differences in the table, the only statistically significant finding is the 3.6 percentage-point difference for juice. For juice, respondents in States with restrictions (California, Connecticut, Oklahoma, and Texas) were more likely, not less, to buy all their prescribed juice than were respondents in the unrestricted States.<sup>12</sup>

If restrictions were causing partial redemptions, one would expect to see positive and significant group differences in the table. None of the positive differences are statistically significant, so these data suggest that food-item restrictions were not related to partial redemptions in the study States. The survey data are somewhat ambiguous, however, with respect to partial redemptions as defined above. If respondents said they purchased only some of their prescribed food, this could reflect either partial redemption of one or more food instruments or a failure to redeem one or more instruments at all. The survey data cannot distinguish between the two possibilities. Nevertheless, regardless of the interpretation, there is no evidence that the restrictions were reducing purchase of prescribed food.

<sup>12</sup> The 9.6 percentage-point difference for infant cereal is not statistically significant because the survey included relatively few infants. Furthermore, the direction of the effect is toward higher redemption rates for infant cereal in the States that limited infant cereal to one brand, opposite to the hypothesized effect.

## Conclusions

Given the inconsistency of both the tabular and modeling results, there is no convincing evidence that State restrictions on food-items reduced rates of food instrument redemption. The tabular results show that redemption rates were often higher in States with restrictions than those without, and the modeling effort failed to resolve this discrepancy. The positive and significant model coefficients observed for some restrictions suggest that factors not captured in the models, but correlated with the presence of restrictions, explain the likelihood that a food instrument will be redeemed.

If food-item restrictions did reduce the likelihood of a food instrument's being redeemed, the model results suggest that the effect must have been small; otherwise, the results would have been more consistent. This finding is corroborated by the information collected by the Survey of WIC Participants and presented in chapter 6—very few survey respondents, when faced with restrictions, said they did not purchase all of their prescribed food because they did not like the item.

# **Chapter 9**

## **Program Participation**

Cost-containment practices can negatively affect WIC participation levels in several ways. First, if a State's use of competitive pricing criteria at application reduces the number of authorized vendors and makes it difficult or inconvenient for participants to travel to a WIC-authorized outlet, some of them may become dissatisfied with the program and either stop participating (by not picking up or redeeming their food instruments) or not seek recertification at the end of their certification period. Second, food-item restrictions may have similar effects if participants are dissatisfied with the choices on their State's list of approved foods. Third, through word of mouth, participant dissatisfaction with a reduced availability of vendors or foods associated with cost-containment practices might keep otherwise-eligible individuals from applying for program benefits.

### **Research Approach**

This chapter examines the possible effects of vendor and food-item restrictions on WIC program participation by examining the incidence of participants in the six case study States who “dropped out” of WIC. Focus groups with participants who stopped picking up their food instruments then probed the extent to which different cost-containment practices may have influenced the decision to stop participating.

It is beyond the scope of this study to estimate the degree to which cost-containment practices may have kept otherwise-eligible individuals from applying to WIC. Based on the findings presented in earlier chapters, however, and especially the survey results on participant satisfaction found in chapter 6, there is little evidence that cost-containment practices had any measurable adverse impact on program application rates in the case study States.

### **WIC Program Dropouts**

The study defined and identified WIC program “dropouts” as WIC participants who failed to pick up their WIC food instruments for two consecutive months during the six months prior to November 2000. That is, they missed a scheduled food instrument issuance and did not pick up the instruments within 60 days, regardless of whether they were supposed to pick up a one-, two-, or three-month supply at the time. This definition does not preclude identifying as dropouts participants who later returned to the program. For instance, a participant could have failed to pick up her food instruments in September and October 2000, but then picked up new instruments in November.

Food instrument issuance data are recorded at WIC service sites and maintained in the State's information system. Given the variations in the information maintained on each State's system, the study could not use the same definition for dropouts in California as in the other States. Dropouts in California could only be identified as those participants who failed to pick up their most recent issuance.

Table 9-1 presents the calculated dropout rates for the six States. California had the highest rate, 4.2 percent, perhaps due to the different definition of dropout used there.<sup>1</sup> The remaining dropout rates were 3.3 percent (Connecticut and Ohio), 3.1 percent (Oklahoma and Texas), and 2.1 percent (North Carolina). The rates were generally low and consistent. Based on the States' issuance data, there does not seem to have been a problem with participants failing to pick up their food instruments.

**Table 9-1—Program dropout rates**

	CA	CT	NC	OH	OK	TX
	<i>Percent</i>					
Dropout rate	4.2	3.3	2.5	3.3	3.1	3.1

The dropout rate in California measures the percentage of WIC participants who failed to pick up their most recent set of food instruments prior to November 2000. In the other States, the dropout rate measures the percentage of WIC participants who failed to pick up their food instruments for 2 consecutive months in the 6 months prior to November 2000.

Source: State issuance data from November 2000.

The dropout rates in table 9-1 represent WIC participants who failed to pick up their food instruments for 2 months in a row (or just the most recent month, in the case of California) for any reason. A subset of these participants may have dropped out as a result of dissatisfaction with available WIC-authorized outlets or approved foods. Other factors could explain participants' dropout behavior, however, including problems getting to the clinic, poor service or language problems at the clinic, perceived stigma, difficulty using the food instruments, thinking they were no longer eligible for the program, or moving out of the area.

To determine if and why vendor or food-item restrictions might cause some participants to drop out of the WIC program, the study conducted focus groups in April 2001 with dropouts in five cities. Focus groups were used rather than a survey because focus groups are better suited for learning about how specific factors of interest (here, cost-containment practices) fit into an overall pattern of reasons for dropping out of WIC.

To better understand the role of cost-containment practices in explaining dropouts, it was necessary to invite to the focus groups only dropouts for whom cost-containment practices were a contributing cause. A screener survey therefore asked dropouts why they stopped picking up their WIC food instruments. If the respondents said they believed they or their children were no longer eligible for WIC, they were not recruited for the focus group.<sup>2</sup> If any reason related to not liking WIC stores or foods was given, the respondents were invited. If the respondents did not indicate dissatisfaction with WIC stores or foods as a reason for dropping out, they were asked explicitly whether either factor contributed to their decision. If they said "yes" to either question, they were invited to the focus group.

<sup>1</sup> Whether the different definition used for California would cause measures of dropout rates to increase or decrease is not known. Although 1-month dropouts would occur more frequently than two-month dropouts, the two-month dropouts could have occurred at any point in a six-month period. In contrast, the California dropout rate was measured only for the most recent issuance.

<sup>2</sup> These respondents were not invited to a focus group because the project team believed that a respondent's perception of no longer being eligible would dominate any other possible reasons for not picking up her food instruments. Thus, little would be learned about the possible role of food-item and vendor restrictions.



The plan was to have 8 to 9 WIC dropouts in each State attend a focus group session. For reasons described below, it was not possible to conduct a focus group in Hartford, CT, so two focus groups were held in Los Angeles, CA. Other focus group sites were Charlotte, NC; Houston, TX; Oklahoma City, OK; and Cleveland, OH. It was not always possible to find enough WIC participants in a single city in each State who met the screening criteria (which included speaking English), despite selection of the city in each State with the largest number of identified dropouts. A total of 34 respondents participated in the six sessions.<sup>3</sup>

Out of 268 identified dropouts in Hartford, none met the screening criteria. Recruiting efforts were difficult in the other sites as well, suggesting that most dropouts stopped picking up their food instruments for reasons unrelated to cost-containment practices.<sup>4</sup> Following common practice in focus group selection of a certain number of people meeting specified criteria, the screening interviews did not follow the same procedures as an evaluation survey (for example, callbacks to increase response rates or a full follow-through on all released sample). For this reason, one cannot use the results of the screening interviews to estimate the percentage of dropouts who gave specific reasons for their decision.

Given the recruiting difficulties and the relatively small percentage of participants who dropped out, it is likely that only a small fraction of WIC participants in the six States left the program for reasons related to cost-containment practices. This assessment is reinforced by what was learned at the six focus groups, as described below.

Each focus group began with a discussion about attitudes toward the WIC program. Focus group participants were generally positive about the program, and indeed many had resumed picking up their food instruments. The free food supplements and health referral services were the favorite components of the program, with many respondents saying the supplements helped them meet the nutritional needs of their children. Mothers with infants relied on the program to obtain expensive infant formula. Likewise, the mothers said the WIC program was a valuable source of information on child health care. Many respondents said they sought health information from WIC on child immunizations. These positive attitudes and resumed participation are evidence that the focus group participants did not have strong complaints about the WIC program. Rather, as discussed later, they continually weighed the advantages and disadvantages of continued participation and, with changing circumstances, made different decisions at different times.

Using a card-sort technique, participants were then invited to rank the relative importance of six different reasons for not picking up their food instruments:

1. I don't like the experience in the clinic.
2. I can't shop at my usual store.
3. It is too confusing to find the allowed item on the WIC vouchers.

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<sup>3</sup> The number of participants at each focus group was Cleveland (5), Charlotte (7), Oklahoma City (2), Houston (4), and Los Angeles (8 and 8).

<sup>4</sup> Pre-coded responses to the question included (1) transportation or child care problems getting to the clinic; (2) poor service at the clinic, long waiting lines, or crowded waiting areas; (3) clinic staff not speaking your primary language; (4) feeling like participation in the program labeled you as "poor"; (5) not liking the kinds of food you could get from WIC; (6) trouble using the food instruments; (7) not liking the stores where WIC instruments can be used or the stores not being convenient; (8) not being able to get infant formula anymore; and (9) thinking you were (or your child was) no longer eligible for WIC.

4. I don't like the experience at the checkout.
5. I don't like the WIC food-item selections.
6. Overall, I don't think the benefits are worth the extra hassles.

Results from the card sort exercise are not available for the Cleveland focus group.<sup>5</sup> Among the remaining five groups, only three out of 27 respondents said that not liking the WIC food-item selections was their main reason for not picking up their food instruments, with another six respondents giving food-item selections as their second most important reason. Not being able to shop at their regular store was consistently at the bottom of the list (only three respondents gave this a first or second ranking). These findings about the relative importance of factors other than food-item and vendor restrictions are especially striking when one recalls that the screening criteria used to select focus group participants were related only to possible effects of food-item and vendor restrictions.

"I don't like the experience in the clinic" was the most commonly cited reason for not picking up food instruments, with 13 of 27 respondents giving this as their first or second most important reason. Eight respondents said their first or second reason was that the WIC benefits were not worth the extra hassle of obtaining them.

With regard to food selection, many respondents voiced preferences for food items not federally approved for WIC (like sweetened cereals). Some complaints, however, were related to food restrictions imposed by the States. Examples, by item, included the following.

### **Milk**

"We used to get any kind of milk you want and now you have to get the store brand milk. And I don't understand what's the difference and why can't you get Pet milk." (Charlotte, NC)

"I mean the [store-brand] WIC milk doesn't taste very good...It tastes spoiled...old...watery." (Oklahoma City, OK)

### **Eggs**

"You can only get [one] brand of eggs and they [the store] won't let you substitute because WIC won't pay for the substitution." (Oklahoma City, OK)

### **Cereal**

"When it comes to the selection of cereal, there is no selection. You can only get about five different cereals. There are 30 brands of cereal that are healthy that they could put on there." (Charlotte, NC)

"I think they need to broaden their [cereal] selections." (Los Angeles, CA)

"I don't like corn flakes or Kix cereals." (Cleveland, OH)

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<sup>5</sup> The cards for the Cleveland focus group were lost in transit. Review of the transcript from the Cleveland session indicates that problems at the clinic were the main reason respondents gave for not picking up their food instruments.

“There’s not enough selection on the cereal.” (Houston, TX)

“My kids won’t eat Kix. They won’t eat those Cheerios.” (Los Angeles, CA)

“Kids don’t want that [cereal]. You have to get the store brands and that’s a no-no.” (Los Angeles, CA)

“I don’t like WIC food items, but that is only for the cereal though.” (Oklahoma City, OK)

“Don’t like getting the off-brand because they are not end up tasting right.” (Oklahoma City, OK)

### **Juice**

“This one lady told me you can’t get mixed juice. You can only get one, all grape, all apple, or something like that.” (Los Angeles, CA)

“You can get orange juice, but the orange doesn’t taste like orange.” (Los Angeles, CA)

“Generic beans don’t really make a difference because beans is beans, but generic juice is nasty, generic cereal is nasty!” (Los Angeles, CA)

“I’d prefer a national brand [of juice]...I don’t like generic stuff” (Los Angeles, CA)

### **Cheese**

“I just feel they should add sliced cheese in there because if you’re making kids grilled cheese or making the kids sandwiches or something like that the slices are better.” (Los Angeles, CA)

“And they don’t allow you to get individually wrapped cheese. You have to get the cheese that is thrown together in the pack. It gets hard and you can’t use it.” (Cleveland, OH)

“It’s not Kraft and it’s not milk cheese. It’s that oil-based cheese, and if you try to melt it all of a sudden it just turns oily, constantly, like processed cheese.” (Los Angeles, CA)

“You can’t get high-quality cheese.” (Los Angeles, CA)

A few comments were also heard about access to WIC stores:

“I don’t like how you can’t go to any store and use WIC.” (Oklahoma City, OK)

“I can’t shop at my usual store. Because the store, by being so cheap ... they don’t accept WIC.” (Cleveland, OH)

“I live on the west side and we have four stores close by me. None of these corner stores accepted WIC until last year.” (Cleveland, OH)

Respondents were also asked to rate their satisfaction with the types, quantities, and brands of selected WIC foods. Key findings related to satisfaction with **allowed types** were:

- Respondents liked having different types of juice to choose from.
- Most respondents disliked the selection of cereals on their food instruments. They understood that unsweetened cereals were more nutritious than sweetened cereals, but they said they had to add sugar to the unsweetened cereals to get their children to eat them. Several respondents remarked about having to give their WIC cereals away or find a place to store them because nobody at home would eat them.

Key findings related to satisfaction with **allowed brands** were:

- Most respondents were very satisfied with milk, and they generally did not perceive a difference in taste from one store brand to another.
- A few respondents were unhappy that they could not buy national brands of cheese.
- Some respondents complained about not being able to purchase national brands of juice.

Key findings related to satisfaction with **allowed packaging** were:

- Some respondents did not like having to buy milk in gallon containers, preferring smaller containers.
- Most respondents enjoyed the option of purchasing adult juice in either a plastic bottle or can.
- Most respondents were very satisfied with prescribed cheese, but they did not like having to select it in blocks, which they found hard to store and keep fresh.

A number of respondents also said that quantities of prescribed food were inadequate, especially for milk, eggs, and juice.<sup>6</sup> Cost-containment practices, however, do not change quantities of prescribed food.

A common theme running through the food-item discussions was that, whether due to State cost-containment practices or Federal restrictions on approved foods, the decision to not pick up one's food instruments reflected a balance between benefits and costs. These groups of participants weighed the benefits of the prescribed food against the difficulties and inconvenience of going to the WIC clinic to pick up their food instruments and using them at the store. Food-item restrictions on types, brands, and packaging of approved foods clearly bothered some of the focus group respondents, but the problems of picking up the instruments at the clinic and using them at store checkout counters bothered them more. Even among this select group of participants, however, the balance between perceived benefits and costs varied over time. Although the focus groups did not include income levels or income changes as a scheduled topic for discussion, respondents sometimes mentioned that they were more likely to pick up and use their food instruments when money was

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<sup>6</sup> Remarks in the focus groups that not enough food is prescribed contrasts with survey findings reported in chapter 6 and appendix I. Survey respondents sometimes said that they did not buy or consume all their WIC food because too much was prescribed. The two findings are not inconsistent, but merely reflect the two ends of an overall distribution of participant beliefs about the adequacy of prescribed quantities of food.

scarce. This is why some of the respondents had resumed picking up their food instruments by the time the focus groups were held in April 2001.<sup>7</sup>

## Conclusions

Based on these findings, there is little evidence that cost-containment practices had a negative impact on program participation in any of the study States. Five factors justify this conclusion. First, the study identified relatively few participants in each State as dropouts; the vast majority (generally over 90 percent, according to chapter 8) of WIC participants picked up their food instruments each month. Second, only a subset of all dropouts said that restrictions on authorized vendors or foods contributed to their decision to drop out. Third, even among this subset of dropouts, the food-item and vendor restrictions usually were not the major reasons for failing to pick up food instruments; instead, unpleasant experiences with clinic staff and inconvenience were cited more often as the reason. Fourth, a number of the focus group respondents said they had already resumed picking up their food instruments. Finally, the overall levels of satisfaction with and use of WIC foods (reported in chapter 6) make it unlikely that very many otherwise-eligible individuals did not apply for program benefits because they heard complaints from participants about restrictions on authorized stores or allowed foods. Together, these five factors indicate that cost-containment practices had little or no impact on program participation.

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<sup>7</sup> Recall that the dropout “event” occurred during the 6 months preceding November 2000.



# Chapter 10

## Health Outcomes

Positive health outcomes are the ultimate goal of the WIC program. WIC enrolls individuals who are at nutritional risk and provides nutrient-dense foods, nutrition education, and health-service referrals aimed at improving health and nutrition status. One of the congressionally mandated research objectives of this study is to examine the impact of WIC cost-containment practices on achievement of positive health outcomes.

WIC cost-containment practices do not directly affect the health outcomes of WIC participants, but there is potential for an indirect effect. Cost-containment practices limit food choices. If limits on food choice result in reduced food instrument redemption or food use, then WIC's goal of improving health and nutrition status through provision of nutrient-dense foods is compromised. Thus the potential link between cost-containment practices and health outcomes consists of two behaviorally separate components:

- Relationship between cost-containment practices and food instrument redemption or food use.
- Relationship between food instrument redemption or food use and health outcomes.

It is beyond the scope of the current study to model the complex processes that relate WIC cost-containment practices to health outcomes. Nonetheless, this study examines each component relationship separately.

The first relationship—between cost-containment practices and food instrument redemption or food use—was examined in prior chapters. Within the six case study states, there is no consistent evidence that cost-containment practices reduced food instrument redemption rates. There is also little evidence that cost-containment practices reduced food use. Participants facing a binding constraint on cheese were less likely to purchase and consume their prescribed cheese (a cross-State average of 8.8 percent of participants faced a binding constraint). In addition, Oklahoma's food-item restrictions on cereal and dried beans/peas were related to reduced purchase and consumption of these items, but the State had since added more allowed brands of cereal brands.

The second relationship—between food instrument redemption and health outcomes—is examined in this chapter. The analysis is focused on whether there is a statistically significant relationship between WIC food instrument redemption rates and health outcomes, regardless of causality.<sup>1</sup> Data limitations prevent a full analysis of the causal relationship between food instrument redemption and health outcomes and, therefore, the results presented here are interpreted carefully and used primarily as indicators that future research is needed.

The analysis of health outcomes presented in this chapter is limited by three factors. First, it was beyond the scope of this study to model fully the complex processes determining health status.

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<sup>1</sup> It is possible that food instrument redemption is related to health outcomes even if no causal relationship exists. For example, an illness that requires hospitalization may be associated with failure to redeem instruments and poor health status.

Nutrition is only one of many factors that affect health, and WIC foods are only a component of total dietary intake (WIC foods are intended to supplement the diet and not provide for all dietary needs). The study does not have data on other determinants of health status, such as non-WIC foods or use of health care services. If these unobserved determinants of health status are correlated with WIC food instrument redemption, estimates of the relationship between food instrument redemption and health status will be overstated.

The second limitation for the analysis of health outcomes is measurement error. The relationship of interest is between consumption of WIC foods and health outcomes, but consumption of WIC foods is not observable. Food instrument redemption is used as a proxy for food consumption.<sup>2</sup> The proxy (food instrument redemption) contains measurement error relative to the true value (food consumption) because some foods obtained with WIC food instruments may not be consumed by WIC participants. (For example, WIC foods may be eaten by other family members.) A second source of measurement error derives from the fact that food instrument redemption is observed as a binary outcome in WIC administrative data—a food instrument is redeemed or not. Food instruments may be partially redeemed, however, for a subset of foods listed on the food instrument.

Measurement error in the proxy for WIC food consumption results in estimates of the relationship between food instrument redemption and health status that are understated. This is because both sources of measurement error result in a measure of food instrument redemption that systematically overstates the true value of interest (on average, food instrument redemption overstates food consumption and observed redemption overstates actual redemption). As a result of this systematic upward bias, the estimated relationship between food instrument redemption and health outcomes is understated.

The third limitation for the analysis of health outcomes is the possibility of selection bias. Health outcomes are observed only for WIC participants who recertify in the program after the certification period in which food instrument use is observed. The direction of bias is unknown and may go either way. For example, if participants are not satisfied with the program and do not redeem their instruments, they are less likely to recertify; on the other hand, persons with improved health status may be unable to recertify if they no longer meet nutritional risk criteria.

The first section of this chapter presents the research approach, including a description of the data, sample definitions, outcome measures, and estimation approach. The second section presents analysis results.

## **Research Approach**

### **Overview**

The analysis in this chapter employs a very simple model relating health outcomes to WIC participant demographics and rates of food instrument redemption (the proxy for food use).

The model is specified as:

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<sup>2</sup> The Survey of WIC Participants asked about food consumption but the sample is too small for analyses of health outcomes; administrative data are used for the analyses in this chapter.



$$H_i = \beta_1 X_i + \beta_2 V_i + v_i \quad (1)$$

Equation (1) specifies that health outcomes (H) depend on demographic and household characteristics (X) and food instrument redemption (V);  $v$  is an error term. The subscript  $i$  indicates that the model employs individual-level data. The difficulty with this simple model, however, is that food instrument redemption and health outcomes are determined simultaneously. It is likely that a WIC participant who is motivated to improve health status (by engaging in healthy behaviors) will also be motivated to redeem WIC food instruments and consume WIC foods. This simultaneity problem is one reason one cannot attribute causality from this analysis.<sup>3</sup>

The relationship between food instrument redemption and health outcomes is analyzed using statewide WIC administrative data from the six case study States. Two types of administrative data were collected: WIC food instrument records and WIC certification records.

WIC food instrument records consist of one record for each issued food instrument, with a participant identifier that links the food instrument record to the certification file. Each food instrument record contains a food package code and sequence or item number to indicate the food items listed for purchase on the food instrument. The record also contains an indicator of whether the food instrument was redeemed, and total amount of payment to the vendor on the redeemed food instrument. Four months of food instrument data were collected from each State, covering two-thirds of a typical 6-month certification period.

WIC certification records contain demographic information and measures of health and nutrition status. Demographic variables include age, race, sex, household size, household income, and receipt of public assistance (food stamps, TANF, and Medicaid). Health and nutrition status include anthropometric measurements (height and weight), blood iron measures (hemoglobin or hematocrit), and indicators of nutrition risk. These measures of health and nutrition status are recorded on certification records because nutrition risk is a criterion for WIC enrollment. Certification records were collected from each State at two points in time—November 2000 and April 2001. These two certification records provide two observations of health status for all WIC participants recertified between November and April.

### **Outcome Measures**

Four health outcomes are examined in this chapter for samples of WIC participants observed in the November 2000 caseload and recertified by April 2001.

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<sup>3</sup> This simultaneity problem is not easily resolved because the root of the problem is that unobserved variables are correlated with both food instrument redemption and health outcomes. Theoretically, a structural simultaneous equations model can be specified with one equation for food instrument redemption and another for health outcomes. The structural model requires data on determinants of food instrument redemption that are not correlated with health outcomes (or vice versa) for estimation and identification. The current study lacks the required data.

Outcome measure	Sample
Birthweight of infant	Pregnant women
Growth in stature (measured by change in height-for-age)	All children
Probability of “exiting” anemic status	Anemic children
Probability of “exiting” underweight status	Underweight children

These outcomes are collected across all WIC agencies. Federal regulations require height, weight and blood measures be taken for all WIC participants at certification, with a few exceptions. In addition, WIC agencies record the birthweight of infants to comply with USDA reporting requirements for the biennial WIC Participant and Program Characteristics studies.<sup>4</sup> Weight and blood measures are not examined as outcomes for WIC women because these measures of status are confounded with changes that occur naturally during pregnancy.

WIC administrative data contain other health and nutrition measures that are not examined in this chapter—nutritional risks. Nutritional risk information collected at certification identifies medical conditions and nutritional factors that put WIC participants at risk for nutrient deficiencies. Nutritional risks are not examined as health outcomes because, for the most part, WIC foods are expected to improved nutrient intake but not act directly on the underlying risk condition.<sup>5</sup>

Health outcomes are not examined for postpartum nonbreastfeeding women because they are not eligible for recertification after an initial 6-month certification period (there is no follow-up measure of health status). Breastfeeding women are excluded because blood tests are not performed when they are recertified after an initial 6-month certification period. Infants are excluded because, in four of the six States, infants are certified for periods up to their first birthday and, as a result, a recertification record is not found in the April files. In addition, hematological tests are not required for infants less than 9 months of age (7 CFR 246.7) and other measures of nutrition risk are not recorded systematically for infants less than 6 months of age because WIC regulations allow infants to be certified on the basis of their mother’s nutritional risk.<sup>6</sup>

### Relationship Between Outcome Measures and Definitions of Analysis Sample

Birthweight is examined for infants of mothers enrolled in WIC prenatally, and birthweight is related to food instrument redemption during the prenatal period. The sample for analysis (described in the next section) is defined as pregnant women in the November caseload who certified their infant for

<sup>4</sup> Birthweight is the most important indicator of infant health and a significant predictor of infant mortality and morbidity.

<sup>5</sup> Nutritional risks include biochemical and medical conditions (e.g., failure to thrive, gastrointestinal disorders, cancer, chronic or recurrent infections), potentially toxic substances (e.g., lead poisoning, maternal smoking, maternal alcohol and drug use), predisposing conditions (e.g., homelessness, migrancy, low level of maternal education), and conditions specific to pregnancy (e.g., pregnancy at a young age, closely spaced pregnancies, lack of prenatal care). For a complete list of nutrition risks, see Bartlett *et al.*, *WIC Participant and Program Characteristics 1998*, Alexandria, VA, USDA/FNS, 2000.

<sup>6</sup> Federal regulations specify, “an infant under 6 months of age may be determined to be at nutritional risk if the infant’s mother was a Program participant during pregnancy or if medical records document that the woman was at nutritional risk during pregnancy” (7 CFR 246.7). The National Survey of WIC Participants found that 45 percent of WIC infants had no nutritional risk other than conferred risk (USDA, 2001).

WIC prior to April 2001. The measure of birthweight is obtained from the infant's certification record in the April file.<sup>7</sup> Mean birthweight in this sample is 7.36 pounds (or 117.74 ounces), with 5.1 percent of births identified as low birthweight (defined as birthweight below 5.5 pounds).

Growth in height for children is examined for all WIC children age 2 years and older, observed in the November caseload and recertified by April 2001. Growth in height is measured as the difference in height-for-age in the April file versus the November file. Height-for-age was obtained by comparing height measurements from WIC certification data, to age- and gender- specific reference curves developed by the Centers for Disease Control and Prevention (CDC).<sup>8</sup> The analysis sample contains children age 2 years and older because the CDC reference curves for height were developed for persons age 2 years and older.<sup>9</sup> For the analysis sample of children observed in November and recertified by April, the mean height-for-age percentile in November and April, respectively, were 55.66 and 56.71; the mean difference was 1.04 percentiles.<sup>10</sup> It is important to note that height-for-age may decline over time, even though height does not decrease. The height-for-age percentile is a standardized score and slow growth can cause a decrease in a child's height-for-age percentile relative to the reference curve.

The analysis of anemia in children is modeled as the probability of "exiting" anemic status. WIC files contain hematological test results (hemoglobin or hematocrit), which were compared to CDC guidelines to identify anemia in children.<sup>11</sup> The records from the November and April certification files provide two observations of anemia status. The analysis sample is limited to children with anemia in November, who were recertified by April. Of all children recertified between November and April, approximately 10 percent were measured anemic in November; of these, 40 percent were still anemic in April.<sup>12</sup>

Similar to the analysis of anemia, the analysis of underweight children is modeled as the probability of "exiting" underweight status. Underweight children are identified as children with weight-for-age below the 10<sup>th</sup> percentile. Weight-for-age was obtained by comparing weight measurements from WIC certification data, to age- and gender- specific reference curves developed by the Centers for Disease Control and Prevention. The records from the November and April certification files provide two observations of underweight status. The analysis sample is limited to children measured

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<sup>7</sup> Texas records birthweight on the mother's recertification record. For Texas, the mother's pregnant record was matched to her postpartum record and her infant's record (to obtain information on the sex of the infant).

<sup>8</sup> Kuczarski RJ, Ogden C, Grummer-Strawn LM, *et al.*, *CDC Growth Charts: United States*, Hyattsville, MD: U.S. Department of Health and Human Services, 2000. NCHS Advance Data Report No. 314.

<sup>9</sup> CDC developed stature-for-age (or height-for-age) charts for people age 2 to 20 years old and recumbent length-for-age charts for children from birth through 36 months. Limiting the sample to children age 2 years and older avoids comparison of height-for-age measures based on different growth charts.

<sup>10</sup> The percent of children with low height-for-age (at or below the 10<sup>th</sup> percentile) declined from 6.3 percent in November to 5.9 percent in April.

<sup>11</sup> CDC guidelines identify anemia in children by hemoglobin below 11 g/dl or hematocrit below 33 percent. Source: Institute of Medicine, *WIC Nutrition Risk Criteria: A Scientific Assessment*, Washington, DC: National Academy Press, 1996.

<sup>12</sup> As discussed in the next section, the study also examined the probability of "entering" anemic status: among children without anemia in November, 6 percent were anemic in April. For clarity, however, the discussion is focused on samples of children with nutritional risks at baseline.

underweight in November who were recertified by April. Of all children recertified between November and April, approximately 8 percent were measured underweight in November; of these, 55 percent were still underweight in April.

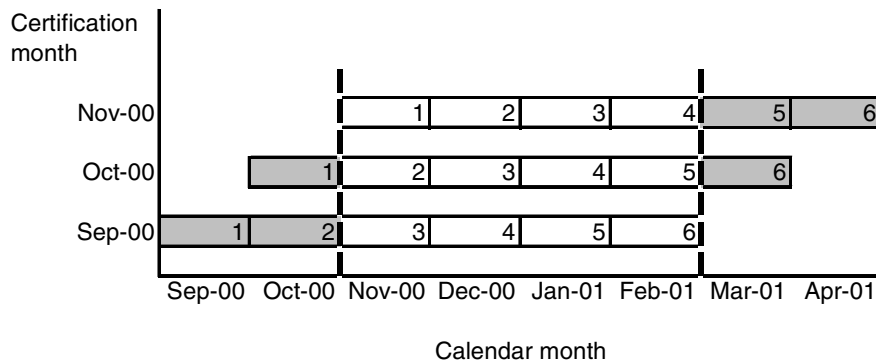
### Analysis Samples

The relationship between food instrument redemption and health outcomes is examined using state-wide WIC administrative data from the six case study States, collected at multiple points in time:

- WIC certification records for the active caseload in November 2000
- WIC certification records for the active caseload in April 2001
- WIC food instrument records for 4 months, November 2000 through February 2001

The November and April certification records provide measures of health status before and after the period over which food instrument redemption is observed. As shown in figure 10-1, a 6-month WIC certification period implies that three cohorts of WIC participants, defined by month of certification, potentially have 4 months of food instrument data and are recertified by April.

**Figure 10-1—Definition of WIC participant cohorts for health outcomes analysis**



For analysis of health outcomes in children, the definition of analysis samples is exactly as shown in the figure because children are certified in WIC for 6-month periods. The samples are initially defined by month of enrollment, and are further restricted to WIC participants observed in the April certification files (the sample is restricted to participants who reenroll) and who have 4 months of food instrument issuance data in the food instrument files. (This main sample is then restricted according to outcome measure, as discussed above: height-for-age is examined for children age 2 years and older; the probability of “exiting” anemia is examined for children identified as anemic in November; and the probability of “exiting” underweight status is examined for children identified as underweight in November.)

For analysis of birthweight, the sample contains pregnant women active in November with an infant in the April certification file. The sample for pregnant women includes women certified in the months of August through November 2000; the sample extended back to August because pregnant women may be certified for periods longer than 6 months depending on the trimester of enrollment. The sample sizes for analysis of birthweight and anemia are shown in table 10-1. The table also shows the analysis sample as a percent of the November caseload. For example, the analysis of birthweights is based on an analysis sample equal to 18.9 percent of all pregnant women certified as of November. The size of the analysis sample is determined first by the size of the cohorts (certified in August to November) relative to the entire November caseload (approximately 60 percent)—the subsample of cohorts from the caseload is random, based on certification month. Within the subsample of cohorts, the percentage of pregnant women who were recertified by April (i.e., delivered) and had 4 months of food instrument data was approximately 45 percent<sup>13</sup>—some selection bias is introduced because women with late deliveries (higher birthweights) are more likely to be excluded from the sample. Finally, the percent of the remaining sample with non-missing birthweight on an April certification record varied from less than 50 percent in North Carolina and Ohio to over 80 percent in the other States.<sup>14</sup>

Similarly, the number of children included in the analyses of anemia is about 20 percent of the entire November caseload of anemic children. The September through November cohorts represent approximately 50 percent of the November caseload; approximately 50 percent of children in these cohorts were recertified by April; and missing data on health status reduces the sample by about 5 percent. The analysis samples for change in height and for underweight status are also approximately 20 percent of the respective cases in the entire November caseload.

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<sup>13</sup> Pregnant women are certified up to 6 weeks postpartum, so a large number are not observed to be recertified within 6 months of their original certification date.

<sup>14</sup> Birthweight data may be missing on the infant's WIC record, or it may be missing due to an inability to link the mother and infant WIC records, or because the infant was not certified by April when the data extract was drawn. The latter two reasons account for most of the missing birthweight data. For example, only 1.6 percent of infant records in North Carolina are missing birthweight; but 47 percent of pregnant women from the August to November cohorts could not be matched to the record of their infants' birthweight.

**Table 10-1—Sample sizes for health outcomes analyses**

	Birthweight analysis, pregnant women		Change in anemia, children measured anemic in November	
	<i>n</i>	Percent <sup>a</sup>	<i>n</i>	Percent <sup>b</sup>
California	23,921	16.9	8,839	15.9
Connecticut	1,080	20.6	489	23.9
North Carolina	2,861	11.8	1,718	20.5
Ohio	2,719	10.2	c	
Oklahoma	2,381	20.4	551	18.8
Texas	21,745	27.0	13,153	29.0
Total	54,707	18.9	24,750	21.7

a Percent of pregnant women in the November caseload.

b Percent of anemic children in the November caseload.

c Ohio was unable to provide anthropometric and hematological measures in the April administrative data extract.

### Estimation Procedures

The procedure used to estimate the health outcome equation (equation 1, repeated below) varies by outcome measure. Ordinary least squares (OLS) regressions were estimated for birthweight and change in height-for-age; logistic regressions were estimated for the probability of exiting anemic status and the probability of exiting underweight status.

$$H_i = \beta_1 X_i + \beta_2 V_i + v_i \quad (1)$$

The health outcome measures, *H*, were discussed above. The demographics included in the models (vector *X* in equation 1) vary according to the outcome measure examined. All models include the following household characteristics: income as a percent of poverty, household size, rural or urban residence, and indicators of participation in food stamps, TANF, and Medicaid. The birthweight models include the sex of the infant and characteristics of the mother: age, age squared, height, race/ethnicity.<sup>15</sup> The models for anemia, change in height-for-age, and underweight status include characteristics of the child: age, age squared, sex, race/ethnicity, and the number of days between health outcome measurements.

To test the relationship between food instrument redemption (*V* in equation 1) and health outcomes, the 4 months of food instrument data (November 2000 through February 2001) were summarized, for each WIC participant, in four alternate measures:

<sup>15</sup> Additional covariates were included in regressions run separately by State, according to the availability of data on the State files. These variables include an indicator of whether this was the first pregnancy for the mother, whether she had prior pregnancy losses, whether the interval between this and the prior pregnancy was less than 6 months, and the trimester of enrollment in WIC. These additional variables improved the predictive power of the model but did not change the results with respect to the statistical significance of the food instrument redemption variable.

PCTINSTRU	=	percentage of issued food instruments that were redeemed
PCTCOST	=	percentage of the estimated cost of issued food instruments redeemed
PCTCEREAL	=	percentage of prescribed cereal ounces on food instruments that were redeemed

The first measure is a simple count of redeemed food instruments divided by the total food instruments issued during the period for the WIC participant. A count of instruments is a crude measure, however, because it does not account for the fact that some food instruments are single-item food instruments (gallon of milk), whereas others are multiple-item food instruments (milk, cereal, juice). In other words, the percentage of redeemed instruments does not reflect the percent of WIC foods, or nutrients, redeemed. To create a proxy for the amount of food available from each voucher, each food instrument was valued using the average prices per State constructed for the food cost analysis, and PCTCOST is the percentage of the value of WIC foods redeemed.<sup>16</sup> The final measure—PCTCEREAL—was constructed for the analysis of anemia, because iron-fortified cereal is the only WIC food that provides dietary iron. For all analysis samples, the mean values of the food instrument redemption summary measures (PCTINSTR, PCTCOST, PCTCEREAL) are between 88 and 91 percent.

## Results

The primary estimates of interest from the health outcome regressions are the estimated coefficients on the food instrument redemption variables. These estimates are shown in table 10-2 and discussed below. The complete results for each regression model are presented in appendix K.

### Birthweight

The estimated relationship between food instrument redemption and birthweight is positive and statistically significant, although very small in magnitude. Furthermore, the estimated coefficients on food instrument redemption are the same regardless of whether redemption is measured by a count of food instruments or the estimated value of food instruments. The estimates suggest that a percentage point increase in the rate of food instrument redemption is associated with increased birthweight of 0.03 ounces.

The very small magnitude of the relationship between food instrument redemption and birthweight is at least partly due to the fact that mean food instrument redemption is quite high, at 88 to 90 percent. An additional factor is that the model specifications do not include many important determinants of birthweight, due to data limitations. For example, some but not all State WIC files contained data on pregnancy histories: number of prior pregnancies, number of pregnancy losses, date most recent pregnancy ended.

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<sup>16</sup> PCTCOST is equal to the “value” of foods listed on redeemed instruments divided by the “value” of foods listed on all issued instruments. This percent is measured for each WIC participant based on food costs within their State. This measure is not a perfect proxy for percent of nutrients redeemed. Furthermore, as a proxy for nutrients, the measure varies across States if the relative costs of different food items (e.g., cost of milk relative to cereal) varies across States.

**Table 10-2—Estimated relationship between food instrument redemption and health outcomes**

Procedure:	Health outcome			
	Birthweight (ounces) OLS	Change in height-for-age OLS	Probability of “exiting” anemia Logistic	Probability of “exiting” underweight Logistic
<i>Alternate measures of food instrument redemption</i>				
			<i>Number</i>	
PCTINSTRU	0.03 (6.51)	0.02 (7.68)	-0.001 (1.58)	0.005 (25.28)
PCTCOST	0.03 (5.66)	0.02 (6.88)	-0.0008 (0.84)	0.004 (12.35)
PCTCEREAL	—	—	0.004 (30.33)	—
<i>Sample size</i>	<i>52,927</i>	<i>158,798</i>	<i>24,521</i>	<i>13,177</i>

Parentheses contain t-statistics for OLS regressions and Wald chi-square statistics for logistic regressions.

In State-by-State regressions, with the same specification as the all-state regression (i.e., same covariates), the estimated coefficient on food instrument redemption is statistically significant only for Texas. Pregnancy history variables were available for all States except Connecticut and North Carolina.<sup>17</sup> With pregnancy history variables added to the model, the estimated coefficient on food instrument redemption was positive and statistically significant in California and Texas.<sup>18</sup>

### Change in Height-for-Age

Similar to the birthweight regressions, the estimated relationship between food instrument redemption and change in height-for-age is positive, statistically significant, and small in magnitude. A percentage point increase in the rate of food instrument redemption is associated with an increased change in the height-for-age percentile of 0.02 percentile points. The mean change in height-for-age percentile for the sample is 1.04, which implies that a percentage point increase in food instrument redemption is associated with a 2 percent increase in height-for-age percentile.

Although the estimated relationship between food instrument redemption and change in height-for-age is small, it is important to remember that the health outcome measure is taken over a 6-month period for an outcome that is standardized relative to the population mean for gender and age.

<sup>17</sup> The Connecticut file contained these data items but they were missing for one-third of the sample.

<sup>18</sup> The coefficient for Texas was slightly larger in this model (.045) compared to the base model (.038).



## Anemia

Anemia in children was examined by modeling the probability that children identified as anemic at one WIC certification, would not be anemic at recertification. This model provides compelling results. The estimated relationship between food instrument redemption and change in anemia status is the wrong sign and not statistically significant when food instrument redemption is measured by PCTINSTRU or PCTCOST. The “wrong” sign suggests that an increase in food instrument redemption would decrease the likelihood of “exiting” anemia status.

In contrast, when food instrument redemption is measured by the percent of cereal ounces on redeemed food instruments, the estimated relationship is positive and statistically significant, although very small in magnitude. A 10-percentage-point increase in the percent of cereal redeemed is associated with a 0.04 percentage point increase in the probability of “exiting” anemia.<sup>19</sup>

The evidence from the anemia models is compelling. Recall that one of the difficulties with this simple model of health outcomes is that food instrument redemption and health outcomes are determined simultaneously. It is likely that a WIC participant who is motivated to improve health status (by engaging in healthy behaviors) will also be motivated to redeem WIC food instruments and consume WIC foods. Because all three measures of food instrument redemption are correlated, the evidence that food instrument redemption, measured generally, is not related to anemia, whereas cereal redemption is related to anemia, suggests that food instrument redemption is not acting as a proxy for unobserved healthy behaviors.

## Underweight

Similar to anemia, underweight in children was examined by modeling the probability that children identified as underweight at one WIC certification, would not be underweight at recertification. The estimated coefficients are nearly the same regardless of whether redemption is measured by a count of food instruments or the estimated value of food instruments. The estimates suggest that a percentage point increase in the rate of food instrument redemption is associated with a 0.005 increased likelihood of no longer being underweight.

An additional model, not shown in the table, was specified to examine the relationship between food instrument redemption and overweight status—the probability that overweight children in November are no longer overweight in April. This model provides another way to test whether the food instrument redemption measures are acting as a proxy for unobservable behaviors. If food instrument redemption is a proxy for healthy behavior, then one might expect food instrument redemption to increase the likelihood that overweight children lose weight.<sup>20</sup> On the other hand, if food instrument redemption provides a reasonable measure of WIC food consumption, one would expect food instrument redemption to be negatively related to the likelihood that overweight children lose weight. The estimated coefficient on food instrument redemption in the overweight model is negative and statisti-

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<sup>19</sup> Similar results are found when examining the probability of “entering” anemia. Six percent of children who were not anemic in November became anemic by April. The probability of “entering” anemia is positively related to PCTINSTR and PCTCOST, suggesting that consumption of WIC foods is related to anemia (wrong-signed results). The probability of “entering” anemia, however, is negatively related to PCTCEREAL and is statistically significant.

<sup>20</sup> Food instrument redemption may also increase the likelihood of “exiting” overweight status if nutrient-dense WIC foods replace higher calories foods with less nutritional value.

cally significant ( $-0.006$ ), suggesting that WIC food instrument redemption decreases the likelihood of exiting overweight status.

## Conclusions

This chapter provides evidence of the relationship between WIC food instrument redemption and health outcomes. Four health outcomes are examined: birthweight for women enrolled in WIC prenatally, change in height-for-age percentiles for children, the probability that anemic children identified at WIC certification will no longer be anemic at recertification, and the probability that underweight children identified at WIC certification will no longer be underweight at recertification.

The estimated models are simple due to data limitations, and the main determinant of interest—food instrument redemption—is an imperfect proxy for food consumption. Nonetheless, the results show a positive and statistically significant relationship between food instrument redemption and positive health outcomes.

The magnitude of the estimated relationship between food instrument redemption and health outcomes is very small for all outcomes examined. This is partly due to the fact that, in most models, health outcomes are measured as changes in status over a short time period. The estimates are also understated to the extent that measurement error in the food instrument redemption variables puts a downward bias on the estimated coefficients. Better information on the relationship between WIC benefits and health outcomes requires examination of WIC outcomes over a longer time period, with more precise measures of WIC food use.

For cost-containment practices to have an adverse effect on health outcomes, it is necessary to show (1) that cost-containment practices reduce food instrument redemption or food use, and (2) that a positive relationship exists between food instrument redemption and positive health outcomes. This chapter has demonstrated the second relationship. Previous chapters have presented evidence that some food-item restrictions affect the purchase and consumption of cheese and cereal, but the effects are targeted toward specific subgroups of the entire WIC caseload (mostly those participants for whom restrictions impose a binding constraint). Furthermore, there was no consistent evidence that food-item restrictions reduced rates of food instrument redemption. Thus, the study concludes that it is unlikely that the cost-containment practices used in the six case study States had any measurable negative effect on health outcomes.

# Chapter 11

## Summary and Conclusions

The previous chapters reported the observed relationships between WIC cost-containment practices in the six case study States and the outcome measures specified by the U.S. Congress in this study's authorizing legislation. This chapter summarizes the main findings from the study. The first section of the chapter organizes the findings according to each outcome measure. The second section reorganizes these findings according to the cost-containment practices implemented in the six States. This reorganization focuses on the individual practices, the costs and savings attributable to them, and their relationships with participant outcomes.

This study examined the following cost-containment practices. States implementing each practice are shown in parentheses.

- **Competitive pricing.** State applies competitive pricing criteria at application to ensure that stores with excessive prices are not authorized (all States except North Carolina and Ohio used competitive pricing criteria at application, but Connecticut, Oklahoma, and Texas had the most explicit and restrictive policies).
- **Requiring least expensive brand.** For specified food categories, WIC participants must purchase the least expensive brand available in the store (Connecticut, North Carolina, Oklahoma, and Texas).
- **Restricting brands or types.** For specified food categories, the State's list of approved foods restricts which brands or types (such as cheese varieties) that may be purchased (California, Oklahoma, and Texas).
- **Limiting package form.** For specified food categories, the State's list of approved foods restricts which package forms (package size or container type) may be purchased (California, North Carolina, Ohio, Oklahoma, and Texas).
- **Rebate contracts.** For infant cereal, the State's list of approved foods restricts purchase to a single brand due to a negotiated rebate contract with the manufacturer (California, Connecticut, and Texas).

A number of vendor management practices that may affect food package costs were not examined because they do not impose restrictions on WIC participants. Examples include maximum values on food instruments and limits on the number of WIC-authorized outlets within a specified area. All of the States in the study set maximum redemption values for food instruments. Ohio and Oklahoma placed limits on the number of WIC vendors in an area. Oklahoma denied authorization to six stores in FY1999 and three in FY2001 when numeric limits were reached. Numeric limits in Ohio had never been reached when data for this study were collected (primarily during the spring and summer of 2001), so the State had never denied authorization for this reason.

## Summary of Findings

There are three major findings from this study:

1. Four of the six case study States (California, Connecticut, Oklahoma, and Texas) imposed restrictions on many WIC foods in an effort to reduce food package costs. Their efforts were successful, reducing monthly food package costs by an average of nearly 15 percent.
2. Cost-containment practices were associated with few adverse outcomes for WIC participants.
3. State and local office administrative costs attributed to cost-containment practices were relatively low. In the four States with substantial food-item restrictions, administrative costs averaged less than 1.5 percent of estimated food package savings. These costs averaged about 0.4 percent of the States' annual NSA funds.

Due to the nature of case studies, these findings cannot be construed as applicable to all States. In addition, the success of cost-containment practices in these six States was the result of their ongoing efforts to find those practices that both reduced food package costs and were acceptable to participants.

## Main Findings by Outcome Measure

### Food Costs and Food Cost Savings

The study examined average WIC food costs and the savings resulting from food-item restrictions. Two sets of estimated costs and savings were obtained. The first set is based on a research approach that used a uniform distribution of standard food packages across the States to remove State-by-State variation in food package contents—an important factor affecting food package costs. This standardized measure is useful for cross-State comparisons of costs and savings. The second measure removed this standardization and includes estimates by State officials of some savings that this study did not examine. The second measure is likely to be more meaningful to program officials in the six States, and it is the appropriate one to use when comparing savings to administrative costs.

Based on the second (nonstandardized) measure, average food package costs (excluding the cost of infant formula, tuna, and carrots) varied from a low of \$24.26 per participant per month (PPM) in Oklahoma to a high of \$35.72 PPM in California.<sup>1</sup> The largest contributors to average food package costs in the six States were milk, juice, cereal, and cheese.

Again using the nonstandardized measure, cost-containment practices led to estimated savings as high as \$6.43 PPM in Oklahoma and \$7.33 PPM in Texas. The large savings in Oklahoma and Texas were due primarily to food-item restrictions on juice and cereal. In California and Texas, the States with the largest WIC caseloads, estimated annual savings from cost-containment practices were

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<sup>1</sup> Formula costs were not estimated because infant formula was specifically excluded from the study by the authorizing legislation; costs for tuna and carrots were not estimated because these foods were not subject to cost-containment restrictions in any of the six States, and thus could not contribute to food cost savings.

nearly \$40 million and \$66 million, respectively. Even in Oklahoma, a State with a relatively small WIC caseload, estimated annual savings were \$6.7 million.

The small savings in North Carolina and Ohio were expected, as these States used few cost-containment practices. The large savings in Oklahoma and Texas were due primarily to food-item restrictions on juice and cereal. Oklahoma required purchase of store- or private-label brands for most allowed juice and cereal products, and restricted many juice purchases to 46-ounce cans, a less expensive form than bottled juice. Texas allowed a large number of cereal types and brands, but its specified minimum package sizes were generally larger than in the other States. For juice, Texas limited the number of allowed types, required purchase of the least expensive brand available, and restricted most juice containers to 46-ounce cans.

### **Administrative Costs of Cost-Containment Practices**

When compared to the overall costs of program administration, the cost-containment practices implemented by the case study States were inexpensive to operate. The estimated total administrative costs ranged from \$0.01 per participant per month (PPM) in Oklahoma to \$0.10 PPM in Connecticut. These estimates may under- or overstate actual costs because the States could not always provide information needed to estimate costs for specific functions.<sup>2</sup> Even allowing for a considerable margin of error, however, costs related to cost-containment were small. The estimated costs represented, on average, about 0.4 percent of the States' FY2001 NSA costs.

The study did not estimate the cost of designing and implementing (as opposed to operating) cost-containment practices because the States implemented these practices many years ago. Program officials in other States considering the initiation of a cost-containment practice should be aware of the unknown magnitude of implementation costs.

### **Access to Vendors**

Four of the six States (all but North Carolina and Ohio) applied competitive pricing criteria at application to ensure that stores with excessive prices were not authorized.<sup>3</sup> Connecticut, Oklahoma, and Texas had the most explicit and restrictive policies, using a fixed threshold for evaluating prices of a standard package of WIC foods. Program officials in all four States, however, said that they rarely, if ever, denied vendor authorization based on prices. Instead, if prices were high, the stores agreed to reduce their prices for WIC transactions.

Although very few stores were denied WIC authorization because of high prices, it is possible that pricing criteria kept some higher priced stores from applying to WIC at all. This could lead to problems with participant access to WIC-authorized outlets if enough stores elected not to apply.

Examination of shopping patterns, as measured in the Survey of WIC Participants, shows that vendor pricing restrictions in the three most restrictive States had no impact on participant access to WIC vendors. Survey respondents in the three States with vendor restrictions, as a group, did not travel

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<sup>2</sup> In some instances, activities supporting cost-containment practices were so integrated with other administrative processes that State officials could not provide estimates of the cost-containment portion of the activity.

<sup>3</sup> Ohio's policy of competitive pricing applies only when limits on the number of authorized vendors in an area have been reached. These limits had never been reached at the time data for this study were collected.

farther or longer to do their WIC shopping, compared with their regular shopping, than participants in the remaining States, nor did they pay more in out-of-pocket expenses. A major reason for finding no relationship between price restrictions and access to vendors is that most survey respondents said they did their WIC and regular shopping at the same store. A cross-State average of only 13.0 percent of survey respondents did their WIC and non-WIC shopping at different stores.

### **Availability of Prescribed Foods**

Cost-containment practices may reduce the availability of prescribed WIC foods in two ways. First, if competitive pricing restrictions have the unintentional consequence of limiting access to well-stocked stores, then WIC participants may have difficulty finding prescribed foods at WIC vendors. Second, when State cost-containment practices limit the number of food items that may be purchased with the WIC food instrument, the likelihood of finding an approved item at an authorized store may decrease.

The study found that restrictions on the brands, types, and packaging of prescribed foods did not affect item availability in a sample of stores in each State. Indeed, there is some evidence that approved items were more available, rather than less, at WIC-authorized stores in States with food-item restrictions. This could reflect grocers' greater efforts and/or ability to maintain inventory of WIC-approved foods when the number of approved items was reduced. It may also reflect greater State enforcement of minimum inventory requirements when food-item restrictions are in place.

The study also compared the percentages of stores in States with and without restrictions that met WIC's minimum variety requirements for store inventory. Nearly all stores met the requirements for all food categories. There were no significant differences between the States with and without restrictions.

### **Participant Satisfaction With and Use of Prescribed Foods**

Among the case study States, most surveyed WIC participants indicated they were "very satisfied" with the brands of food allowed on their State's list of approved foods. Brand satisfaction was highest for milk, cheese, infant cereal, and juice, with satisfaction levels generally near or above 80 percent. About 65 percent of respondents said they were "very satisfied" with allowed brands of peanut butter, and a little more than 50 percent indicated satisfaction with allowed brands of cereal. Most importantly, when overall satisfaction levels in States with restrictions are compared with levels in the nonrestrictive States, the differences are small and usually not statistically insignificant. Only for cheese and cereal did food-item restrictions affect levels of satisfaction with allowed brands.

With regard to "use" of prescribed foods, the study examined both the purchase and consumption of WIC foods by asking survey respondents how much of their monthly prescription they purchased, and how much of the purchased food they (or other WIC members of the household) ate or drank. The findings, by food category, were:

- **Milk:** Four States (Connecticut, North Carolina, Oklahoma, and Texas) required participants to purchase the least expensive brand of milk. The percentage of respondents purchasing all their prescribed milk was not related to these least cost restrictions. Although the percentage of respondents drinking all their purchased milk was lower in the States with restrictions than in the nonrestrictive States, the evidence suggests that

factors other than brand dissatisfaction accounted for this difference. The factors cited most often by respondents were that “too much” milk was prescribed and that other (non-WIC) members of the household drank some of the milk.

- **Eggs:** Connecticut and Oklahoma required purchase of the least expensive brand of eggs available. These restrictions had no impact on the amount of eggs purchased. Consumption of purchased eggs in the two restricted States was lower than in the other States, but apparently not because of the imposed restrictions. The most commonly cited factor for not eating all the purchased eggs was that too many were prescribed.
- **Cheese:** Survey respondents in California, Connecticut, and Oklahoma were somewhat less satisfied with allowed brands of cheese than respondents elsewhere. Respondents in States with and without cheese restrictions, however, were equally likely to purchase and eat the cheese that had been prescribed for them by the local WIC office.
- **Cereal:** California and Oklahoma were the most restrictive States with regard to allowed brands or types of cereal. California limited the number of different types of cereal that could be purchased, and Oklahoma required purchase of store-brand or private-label cereals. When responses of sampled respondents in these two States were compared with those in the other States, there were no significant differences in satisfaction with allowed brands or the amount of cereal purchased or consumed. When Oklahoma is looked at separately, however, brand satisfaction and the amount of cereal that survey respondents said they purchased and consumed were lower than in the other States.
- **Infant cereal:** With rebate contracts in place, California, Connecticut, and Texas allowed only Gerber infant cereal to be purchased. The brand restriction did not reduce the amount of infant cereal purchased or eaten.
- **Juice:** Four States had restrictions on the purchase of single-strength juice. Connecticut and Texas required purchase of the least expensive brand for some or all of their approved juices, Texas and California restricted the allowed types of juice, and Oklahoma and Texas did not allow purchase of juice in plastic bottles. Oklahoma also approved only store brands or private labels for most juice types. State restrictions on allowed juice were not related to the amount of juice purchased or consumed.
- **Peanut butter:** Connecticut limited purchase of peanut butter to the least expensive brand available. This restriction had no impact on the amount of peanut butter bought or eaten.
- **Dried beans or peas:** Oklahoma was the only State to restrict dried beans or peas, requiring purchase of the least expensive brand available in the store. This restriction had no impact on the amount of dried beans/peas purchased, but it may have reduced the amount of purchased dried beans/peas that were eaten. Although the most common reason given for not eating all the food that had been purchased was that “too much” was prescribed, another common response was that the respondent did not like the beans or peas. This latter response may have indicated dissatisfaction with the taste or quality of the least expensive brand.

The above findings on satisfaction with, and purchase and consumption of, prescribed foods are based on the responses of all sampled participants in each State. There are participants, however, for whom their State’s food-item restrictions were binding—they would have bought a different federally approved food if it was included on their State’s list. Table 11-1 shows the percentage of sampled

families in each State who faced binding constraints on the purchase of cheese, infant cereal, juice, and cereal.

**Table 11-1—WIC families facing binding constraints on food choices**

	CA	CT	NC	OH	OK	TX	All States
				<i>Percent</i>			
Cheese	5.4 <sup>a</sup>	8.8 <sup>a</sup>	1.1	12.6	15.7 <sup>a</sup>	9.3	8.8
Infant cereal	0.0 <sup>a</sup>	2.1 <sup>a</sup>	0.0	0.0	0.0	0.7 <sup>a</sup>	0.5
Juice	13.3 <sup>a</sup>	7.2 <sup>a</sup>	1.0	4.7	3.1 <sup>a</sup>	12.1 <sup>a</sup>	6.9
Cereal	5.4 <sup>a</sup>	15.1	12.7	5.6	19.4 <sup>a</sup>	1.7	10.0

a Study treats State as “restrictive” with regard to food choice within this food category.

Group estimates give equal weight to each State in the group.

Source: Survey of WIC Participants.

There is considerable State-to-State variation in table 11-1, although all the rates are below 20 percent. Virtually no participants faced a binding constraint for infant cereal. For cheese, the highest rates of binding constraints were in Oklahoma (15.7 percent) and Ohio (12.6 percent). North Carolina had the lowest rate (1.1 percent). Examination of respondents’ preferences reveals that restrictions on individually wrapped cheese created many of the binding constraints. Restrictions on allowed types of cheese were also important; many of the respondents with binding constraints said they preferred to buy Colby-jack, which was allowed only in Texas. Thus, it was not the least expensive brand policies in Connecticut and Oklahoma that created most of the binding constraints, but rather packaging restrictions and limits on the types of cheese that could be purchased.

When asked about preferences for cereals not on their State’s food list, a cross-State average of 10.0 percent named cereals that met Federal regulations. Oklahoma had the highest percentage of respondents facing a binding constraint on cereal (19.4 percent), followed by Connecticut (15.1 percent) and North Carolina (12.7 percent).<sup>4</sup> Only 5.4 percent of California respondents faced a binding constraint, suggesting that California WIC officials were effective in identifying a limited number of cereal types that satisfied the preferences of most of their WIC participants.

Survey respondents facing a binding constraint on cheese purchased less cheese, on average, than those not facing a binding constraint. The presence of a binding constraint on cereal was associated with reduced brand satisfaction, but not with reduced purchase or consumption of cereal. Finally, binding constraints on juice did not affect either expressed satisfaction with allowed juice brands or the purchase or consumption of juice.

<sup>4</sup> The high percentages in Connecticut and North Carolina seem puzzling because these States imposed few food-item restrictions. Upon inspection of the stated preferences of respondents, the high percentages were found to be due mostly to instant oatmeal (both States) and Kix (North Carolina) not being on their State’s list of approved foods.



## **Impacts on Participants with Special Diets or Food Allergies**

A large number of survey respondents said they (or another WIC member in the household) modified their diets for various health-related reasons; the modifications included high-fiber diets, sugar-free or low-sugar diets, and low-fat or low-cholesterol diets. The percentage of respondents on special diets varied from a low of 28.5 percent in Texas to a high of 48.5 percent in North Carolina. In addition, depending on State, from zero to 4.8 percent of respondents said they followed religious diets, and from 0.2 to 2.8 percent said they followed vegetarian diets.

A cross-State average of 9.4 percent of survey respondents reported either that a doctor told them they (or another WIC member) had a food allergy, or they or the other individual had suffered a severe reaction after eating a meal. The percentage of WIC families with food allergies varied from 4.6 percent in Texas to 13.4 percent in North Carolina. Allergies to cow's milk were most prevalent.

Respondents on special diets or with food allergies were asked whether their dietary restriction posed problems finding appropriate foods in their WIC shopping. Only 2.5 percent said yes. When asked a follow-up question about the nature of their shopping problem, the most common responses were that they could not find out what ingredients were in a food item or did not know whether approved brands were safe or appropriate to eat. The small numbers of respondents involved, however, suggest that food-item restrictions were not creating many problems for most WIC participants.

For each food category, patterns of brand satisfaction, purchase, and consumption of prescribed foods were compared for respondents with and without special diets or allergies, using multivariate analysis. There was no evidence that food-item restrictions had any disproportionate effects on these respondents. Participants on special diets or with food allergies were occasionally less satisfied with brands, or purchased or consumed less food than those without dietary restrictions, but the differences were no greater in States with food-item restrictions than those with none.

## **Food Instrument Redemption**

Participant dissatisfaction with vendor or food-item restrictions used to reduce costs could lead to reduced use of food instruments, defeating the program goal of supplementing participants' diets with nutritious foods. Three types of behavior could reduce food instrument use:

1. Participants could fail to pick up their food instruments at the local WIC office or clinic.
2. They could fail to redeem some or all of their food instruments.
3. For instruments containing multiple food categories, participants could purchase foods from some categories but not all ("partial redemption").

As shown in table 11-2, rates of food instrument issuance/pickup were high in the five States in which they could be calculated, varying from a low of 88.8 percent in Oklahoma to a high of 94.2 percent in Ohio.<sup>5</sup> Rates of food instrument redemption varied from a low of 80.6 percent in Ohio to a high of 90.7 percent in California.

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<sup>5</sup> A food instrument pickup rate could not be determined for North Carolina because the State could not provide complete data on food instrument issuances.

**Table 11-2—Use of WIC food instruments**

	CA	CT	NC	OH	OK	TX
	<i>Percent</i>					
Pickup rate <sup>a</sup>	90.0	93.8	(b)	94.2	88.8	90.0
Redemption rate	90.7	87.9	85.7	80.6	85.7	85.2

a Excludes infants who were breastfed and received no food packages.

b The North Carolina data could not be used to calculate rates of food instrument pickup among certified participants. For estimating the rate of food instrument redemption, the North Carolina data represent about 80 percent of all WIC participants within the State.

Sources: Food instrument issuance and redemption data for November 2000.

With regard to food instrument issuance/pickup rates, the effect of various food-item restrictions on issuance rates cannot be determined because participants must pick up all their instruments for the month at the same time. For example, if a participant did not want to buy cheese because the State did not include her (federally approved) favorite cheese on its list of approved foods, she could not pick up just those food instruments for the remaining foods in her prescription. Thus, administrative data on food instrument issuance cannot isolate the possible impacts of different food-item restrictions.

The impacts of food-item restrictions on redemption rates could be examined because participants can redeem instruments containing desired foods, while not using those containing foods whose appeal was reduced by the restrictions. The presence of multiple food categories on many food instruments made this a challenging analysis, however, because some categories were subject to restrictions whereas others were not. Attempts to model the likelihood of food instrument use as a function of prescribed foods, food restrictions, and other variables were unsuccessful; model results were inconsistent and extremely sensitive to model specification. Examination of redemption rates, by State, for all instruments containing particular food categories found that redemption rates were often higher, rather than lower, in States with restrictions, suggesting that unmeasured State-level effects were obscuring any possible effects of the restrictions. Thus, if food-item restrictions did reduce rates of food instrument redemption in these States, the effects were too small to detect with available data.

The Survey of WIC Participants did ask about purchase behavior. The survey results do not unambiguously identify partial redemption, because respondents who said they did not buy “all” of a prescribed food could have either partially redeemed an instrument or not redeemed it at all. Nevertheless, the survey results provide an upper bound for rates of partial redemption.

The WIC food category most often redeemed in full was cheese in California, where only 0.6 percent of respondents said they did not purchase all. The highest rate for not buying all was 33.5 percent for dried beans/peas in North Carolina. Averaged over all six States, the highest rates for not buying all prescribed food were 13.1 percent for dried beans/peas and 10.9 percent for infant cereal. Only one rate difference between restricted and unrestricted States was statistically significant (a 3.6 percentage-point difference for juice), but the direction was opposite to what one would expect from food-item restrictions. Thus, the survey results indicate that food-item restrictions were not related to rates of partial redemption.

## **Program Participation**

One concern with the use of cost-containment practices is that they may reduce participants' satisfaction with the WIC program, leading to reduced participation, and hence, reduced distribution of health and nutrition benefits to eligible individuals. The study addressed this possibility by examining program "dropout" rates and conducting focus groups with WIC dropouts to determine whether State restrictions on vendors or food choice contributed to their decision to leave the program.

The study defined program dropouts as participants who failed to pick up their food instruments for 2 consecutive months in the 6-month period prior to November 2000 (except in California, where data limitations caused dropouts to be defined as participants who failed to pick up their most recent set of food instruments prior to November 2000).

The WIC dropout rate varied from a low of 2.5 percent in North Carolina to a high of 4.2 percent in California. All the rates were relatively low, and factors unrelated to cost containment (for instance, problems getting to the clinic for an appointment, difficulty using the food instruments, the belief that one was no longer eligible for WIC) explained some of the dropouts.

Focus group sessions were held with dropouts who said, during a screening interview, that vendor or food-item restrictions contributed to their dropping out. Finding enough dropouts who met the screening criteria proved difficult, suggesting that most dropouts failed to pick up their instruments for reasons unrelated to cost-containment practices. Indeed, even among the focus group respondents, the major reasons for dropping out were unpleasant experiences at WIC clinics and the "hassle" of picking up one's food instruments. Only about one-third of all focus group respondents said that food-item restrictions were their major or second most important reason for dropping out. Vendor restrictions were seldom mentioned. Thus, although cost-containment practices may have contributed to the decision of some participants to stop participating in WIC, the evidence suggests that any effects were small.

## **Health Outcomes**

WIC cost-containment practices do not directly affect the health outcomes of WIC participants, but there is potential for an indirect effect. If limits on food choice result in reduced food instrument redemption or food use, then WIC's goal of improving health and nutrition status by providing nutrient-dense foods could be compromised. Similarly, if cost-containment practices cause participants to drop out of the program, they would not have access to the program's nutrition education and health referral services.

Based on study results, there is little evidence that the six States' cost-containment practices affected food instrument redemption, food use, or participation rates. Thus, the study concludes that these cost-containment practices did not have adverse effects on health outcomes of participants.

Despite the conclusion that cost-containment practices could not have affected health outcomes because they did not affect food instrument redemption or food use, the study did examine the relationship between food instrument redemption rates and changes in four health measures, based on WIC participants observed in the November 2000 caseload and recertified by April 2001. The four health measures, and the groups of participants to which they were applied, are shown in table 11-3.

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**Table 11-3—Health outcomes**

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<b>Outcome measure</b>	<b>Sample</b>
Birth weight of infant	Pregnant women
Growth in stature (measured by change in height-for-age) <sup>a</sup>	All children
Probability of “exiting” anemic status <sup>b</sup>	Anemic children
Probability of “exiting” underweight status <sup>c</sup>	Underweight children

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a Height-for-age was obtained by comparing height measurements from WIC certification data to age- and gender-specific reference curves developed by the Centers for Disease Control and Prevention (CDC) in 2000.

b CDC guidelines identify anemia in children by hemoglobin below 11 g/dl or hematocrit below 33 percent.

c Underweight children identified as those with weight-for-age below the 10th percentile, using age- and gender-specific reference curves developed by the CDC.

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The analysis results were consistent for all four health outcomes. Using participant-level data from all six States, participants with higher rates of food instrument redemption had improved health outcomes.<sup>6</sup> The magnitudes of the improvements were all small, but still statistically significant. One cannot infer, however, that a causal relationship necessarily exists between food instrument redemption rates and positive health outcomes. Even if adequate baseline information on the participant’s health status in November 2000 were available, the analysis could not control for many intervening variables, such as actual consumption of WIC foods between November 2000 and April 2001. Nevertheless, the results provide evidence that when the food package is consumed, it has a positive effect on health status.

## **Main Findings by Cost-Containment Practice**

One of the stated goals of the study was to link various cost-containment practices used in the case study States to their outcomes, in order to better understand their consequences for both WIC participants and program administration. This section presents each major cost-containment practice and its associated outcomes. When multiple cost-containment practices affected the same outcome (for instance, the average price of juice when the State restricted both allowed types and packaging of juice), this section presents the combined impact of the practices.

### **Competitive Pricing at Application**

Four of the six States (all but North Carolina and Ohio) used competitive price criteria when selecting stores to authorize as WIC vendors. The study found no evidence that use of price criteria at application had an adverse effect on participants’ access to vendor locations, availability of food items, or continuing participation. This was not surprising, because State officials said they rarely denied vendor authorization based on prices.

In order to receive authorization, stores with high prices reduced their pricing for WIC purchases. The study did not examine whether this vendor restriction had an impact on average food package costs. An effect, if one existed, could have gone either way. By keeping out high-price stores,

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<sup>6</sup> Food instrument redemption rates were measured over the 4-month period November 2000 to February 2001.

average food package costs could have been reduced. By allowing high-price stores to reduce prices to meet price criteria, however, such policies could have raised average costs by authorizing more stores at the high end of the price distribution. If so, this is a tradeoff that State officials seemed willing to make in order to improve access.

The use of competitive pricing at application was not expected to have an impact on the other outcome measures under investigation—satisfaction with and use of prescribed foods, disproportionate effects on participants on special diets or with food allergies, redemption of food instruments, or achievement of positive health outcomes.

### **Requiring Purchase of Least Expensive Brands**

The most common food-item restriction in the six States was the requirement that participants purchase the least expensive brand of a food category available in the store. Connecticut had this policy for milk, eggs, cheese, citrus juice, and peanut butter. North Carolina, which was selected for this study because it used very few cost-containment practices, required purchase of the least expensive brand of milk. Oklahoma had a least expensive brand policy for milk, eggs, cheese, and dried beans/peas, and Texas required purchase of the least expensive brand of milk and juice.

Table 11-4 shows that requiring purchase of the least expensive brand of cheese saved Connecticut an estimated \$1.04 PPM, and it contributed to savings of \$1.14 PPM in Oklahoma (which also limited the number of approved types of cheese). Least expensive brand policies saved \$0.10 PPM on peanut butter in Connecticut and \$0.03 PPM on dried beans or peas in Oklahoma. Texas' least expensive brand policy for juice, one of several restrictions in effect for juice in that State, contributed to the very large estimated savings of \$4.16 PPM. This study did not estimate savings arising from least expensive brand policies on eggs and milk, but program officials in Oklahoma estimated egg savings equal to \$0.19 PPM and milk savings equal to \$0.57 PPM. These estimates are applied to the other States that used the same policies.

Where States imposed multiple restrictions on individual food categories, it was not possible to estimate the individual effects of each restriction, so the table says that savings were “part of” the total estimated savings for that food category.

A comparison of the responses of sampled participants in the case study States with and without least expensive brand policies revealed that the practice was not associated with reduced purchase of foods subject to the restrictions. The policies were correlated with reduced levels of consumption of milk, cheese, eggs, and dried beans/peas, but not peanut butter or juice. In all cases except dried beans/peas, however, respondents who did not eat all the purchased food cited factors unrelated to food-item restrictions as the main reason (for instance, that too much food had been prescribed). Thus, whether least expensive brand policies reduced consumption is unclear. If so, the magnitude of the effect was too small to detect.

**Table 11-4—Estimated savings per participant per month from requiring purchase of least expensive brands**

	CA	CT	NC	OH	OK	TX
			<i>Dollars PPM</i>			
Milk		0.57 <sup>a</sup>	0.57 <sup>a</sup>		0.57 <sup>a</sup>	0.57 <sup>a</sup>
Eggs		0.19 <sup>a</sup>			0.19 <sup>a</sup>	
Cheese		1.04			Part of 1.14 <sup>b</sup>	
Juice		Part of 1.69 <sup>b</sup>				Part of 4.16 <sup>b</sup>
Peanut butter		0.10			0.03	

Blank cell indicates that State did not impose a least expensive brand policy for that food category.

a Savings estimate based on information provided by State WIC officials in Oklahoma; this information is the only available evidence on savings due to least expensive policies for milk and eggs.

b State applied multiple restrictions to this food category.

Sources: Survey of Food Prices and Item Availability, State administrative data on food packages, and interviews with State officials.

There is no evidence that the use of least expensive brand policies affected the study’s other outcome measures, or that they had disproportionate effects on participants on special diets or with food allergies.

### Limiting Approved Brands

Oklahoma was the only State that required purchase of private-label or store-brand items for cereals and juices. Texas also placed limits on brands of juice, allowing selected national brands.

Oklahoma’s restrictions against national brands of cereal saved an estimated \$2.72 PPM. The restrictions, however, were associated with lower levels of participant satisfaction with allowed brands of cereal, reduced levels of cereal purchase, and reduced levels of consumption. In response to participant preferences, Oklahoma added some national-brand cereals to its list of approved foods after data for this study were collected.

With respect to brand restrictions on juice, they had no impact on expressed levels of satisfaction with approved brands. In addition, they did not reduce either the amount of juice purchased or consumed.

Finally, there is no evidence that limiting the number of approved juice and cereal brands affected rates of either food instrument pickup (based on focus group respondents’ reasons for dropping out of WIC), instrument redemption, achievement of positive health outcomes, or the availability of allowed juice or cereal in these States.

### Limiting Approved Types of Foods

As shown in table 11-5, all States except Ohio limited the types of certain foods on their approved lists. California approved a relatively small number of cheeses, juices, and cereals, and it prohibited purchase of extra-large or jumbo eggs and infant juice (substituting single-strength juice instead). Connecticut limited egg selection to large white eggs only, and it prohibited purchase of infant juice. North Carolina also prescribed single-strength juice instead of infant juice. Oklahoma prohibited

purchase of extra-large or jumbo eggs, and its list of approved foods included relatively few types of cheese and cereal. Texas also prohibited purchase of extra-large or jumbo eggs and infant juice, and it approved a limited number of different types of single-strength juice. The table shows estimated savings from these restrictions.

**Table 11-5—Estimated savings per participant per month from restrictions on allowed types of food**

	CA	CT	NC	OH	OK	TX
	<i>Dollars PPM</i>					
Eggs	0.16	0.07			0.12	0.10
Cheese	0.12				Part of 1.14 <sup>a</sup>	
Cereal	0.95				Part of 1.72 <sup>a</sup>	
Juice	Part of 0.63 <sup>a</sup>					Part of 4.16 <sup>a</sup>
Infant juice	0.10	-0.39	-0.06			0.22

Blank cell indicates that State did not restrict allowed types of food for that category.

a State applied multiple restrictions to this food category.

Sources: Survey of Food Prices and Item Availability and State administrative data on food packages.

The largest savings from restrictions on food type were for cereal and juice. The small savings for infant juice in California and Texas, and the negative “savings” in Connecticut and North Carolina, appear because these States, by prescribing single-strength juice instead of infant juice, prescribed extra amounts of juice.

One concern with limiting food types is that participants may have difficulty finding the approved foods at WIC-authorized stores. The study’s survey of WIC-authorized stores in each State found no relationship between these restrictions and the availability of approved foods within the stores.

There was no significant difference in the amount of cereal purchased or consumed between States with and without restrictions on cereal type.

There was also no evidence that limiting the number of approved types of food negatively affected rates of either food instrument pickup (based on focus group respondents’ reasons for dropping out of WIC), instrument redemption, or achievement of positive health outcomes.

### Limiting the Allowed Packaging of Foods

All six States set minimum package sizes for at least one WIC food group. California, Oklahoma, and Texas had the most package-size restrictions.

Ohio and Oklahoma generally prohibited purchase of milk in half-gallon or quart containers. These restrictions saved the States an estimated \$0.05 PPM in both Ohio and Oklahoma. State officials in California estimated that their efforts to have participants buy milk in 2-gallon “value packs” saved an amount equal to \$0.38 PPM.

Restrictions on egg sizes saved an estimated \$0.16 PPM in California, \$0.07 PPM in Connecticut, \$0.12 PPM in Oklahoma, and \$0.10 PPM in Texas.

Texas imposed larger package-size requirements on cereal purchases to take advantage of lower per-ounce costs. The estimated savings from this policy were \$2.00 PPM. The State's restrictions on shelf-stable juice containers (46-ounce cans only) contributed to juice savings of \$4.16 PPM.

There is no evidence that limiting the package forms of food negatively affected either rates of food instrument pickup (based on focus group respondents' reasons for dropping out of WIC), instrument redemption, consumption of prescribed foods, the achievement of positive health outcomes, or program participation.

### **Manufacturer Rebates**

California, Connecticut, and Texas received rebates on sales of infant cereal through contracts that specified a single allowed brand. These rebates saved an estimated \$0.32 PPM in California, \$0.37 PPM in Connecticut, and \$0.27 PPM in Texas.

The infant cereal rebates did not affect the availability of allowed brands in the three States. They were binding on almost no WIC participants, and the brand restrictions were not related to levels of brand satisfaction, amount purchased, or amount consumed. There is also no evidence that the infant cereal rebates affected rates of food instrument redemption, program participation, or the achievement of positive health outcomes.

### **Multiple Food-Item Restrictions**

The States in the study imposed multiple food-item restrictions for some foods, and it was not possible for the study to estimate the singular effect of the individual restrictions. This section summarizes the total effects of these multiple restrictions.

For cheese, least expensive brand policies and restrictions on type and packaging created binding constraints on a cross-State average of 8.8 percent of survey respondents, with the lowest rate in North Carolina (1.1 percent) and the highest rates in Oklahoma (15.7 percent) and Ohio (12.6 percent).

Restrictions on brand, type, and packaging of breakfast cereal were binding on a cross-State average of 10.0 percent of survey respondents, with the highest rates in Oklahoma (19.4 percent), Connecticut (15.1 percent), and North Carolina (12.7 percent). Texas had the lowest rate (1.7 percent).

Least expensive brand policies and restrictions on brand, type, and packaging of juice were binding on a cross-State average of 6.9 percent of survey respondents, with the highest rates in California (13.3 percent) and Texas (12.1 percent). The lowest rate was in North Carolina (1.0 percent).

Finally, there is no evidence that any food-item restrictions had a differential impact on WIC participants with food allergies or those on special diets.



## Implications of the Findings for Other States

The cost-containment practices implemented by the six case study States were relatively inexpensive to manage and operate, reduced food package costs, and had few adverse impacts on WIC participants. It is therefore tempting to conclude that all States should implement similar practices.<sup>7</sup>

For cost-containment practices to work, they need to be well managed by State officials. The success of cost containment in the case study States was the result of ongoing efforts by these States to find those restrictions that both reduced food package costs and were acceptable to participants. (For instance, all six States collected price information on a regular basis and obtained feedback from local offices on participant comments on allowed foods.) What works well in one State might not work at all in another. Similarly, an effective practice today may not work tomorrow. Selecting and managing appropriate cost-containment practices is therefore a dynamic process, requiring ongoing attention to local food markets (especially price and availability of federally approved food items) and participant preferences.

A critical factor in this process lies in the ongoing evaluation of program effectiveness. To facilitate this activity, States should not overlook the ability to systematically collect and analyze relevant data. In the process of assessing cost-containment practices for this study, considerable limitations and difficulties were encountered due to a lack of program information in readily useable form. In most States, for example, the effects of cost-containment practices on food redemptions could not be completely analyzed due to different foods being combined on individual food instruments.

This study provides evidence that cost-containment practices can reduce WIC food package costs. Estimates of cost savings in other States are beyond the scope of this study, as are estimates of the potential for additional savings if further restrictions were adopted. The potential for further cost savings would depend on States' current use of vendor and item restrictions and Federal incentives for States to adopt additional restrictions. Furthermore, not all cost-containment practices may be appropriate for all States because of differences in item prices, availability, and participant preferences. States therefore need the flexibility to find the right balance between food cost reductions and limits on participant choice and use.

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<sup>7</sup> Many other States, of course, already use cost-containment practices. The six States in this study were selected only to represent different combinations of these practices.



# Appendix A

## Survey of WIC Participants

This appendix discusses the sample design for the Survey of WIC Participants and presents information on sampling weights and survey response rates. As part of the discussion of the sample design, the appendix lists geographic areas included in the survey and the local WIC offices serving those areas. Officials in these local WIC offices were interviewed as part of the study's examination of how cost-containment practices are implemented and their administrative costs. The appendix includes a copy of the survey instrument.

### Survey Purpose and Structure of Instrument

The Survey of WIC Participants collected information related to almost all of the outcome measures examined by this study. The survey instrument included sections on:

- A. Item Satisfaction
- B. Voucher Pickup
- C. Item Selection
- CX. Item Preferences of Nonparticipants
- D. Access to WIC Vendors
- E. Participation
- F. Special Diets or Food Allergies
- G. Health Outcomes
- H. Demographics

The survey asked about satisfaction with WIC benefits and experiences redeeming food instruments (vouchers) during the "reference month." The reference month generally was the calendar month prior to the interview date. If the respondent indicated that none of the food instruments for the prior month had been used, the reference month was designated as two months prior to the interview date.<sup>1</sup>

### Sampling

The Survey of WIC Participants was conducted in six States. The goal was to survey 1,200 WIC families, with the respondent being the "WIC mom" (pregnant, breastfeeding, postpartum woman or mother/guardian of WIC infant or child). Assuming a minimum response rate of 72 percent, an initial sample of 1,669 families was selected. WIC families were chosen as the responding unit, rather than WIC participants, because in families with multiple WIC participants, it was believed that the respondent would have trouble distinguishing the food items purchased with each set of vouchers.

The sample was selected via three stages of sampling:

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<sup>1</sup> Food instruments expire at the end of their designated month.

**Stage 1.** The population of WIC participants was stratified by geographic location, defined by non-metropolitan, metropolitan, and urban areas.<sup>2</sup> Three survey areas (one per strata) were selected in each State, with probability proportional to size. The measure of size used was the number of families receiving WIC in November 2000. Families were identified by the “family ID” that links WIC participants in State administrative data files.<sup>3</sup>

**Stage 2.** In all States except Connecticut, a second stage of sampling selected four zip code areas within the urban area, to reduce the geographic size of the urban survey area. ZIP code areas were selected with probability proportional to size. The urban area in Connecticut was small enough to forego this second stage of sampling.

**Stage 3.** The final stage of sampling selected WIC families within each survey area. In Connecticut, an equal number of families was selected in each survey area (93 families per strata for a total of 279 families). In other States, it was necessary to increase the size of the urban sample, relative to the other strata, to offset the increased variance imposed by the second stage of sampling in the urban area. The sample size for urban areas was 103 families, and 87 or 88 families were selected in the non-metro and metro areas, for a total of 278 families per State.

### **Areas Selected**

The first stage of sampling selected 18 geographic areas—a central city, a metropolitan, and a non-metropolitan area in each of the six States (representing urban, suburban, and rural sites, respectively). Table A-1 lists the 18 areas, together with the WIC office that was included in the study of implementation procedures and administrative costs. When more than one WIC office served a geographic area, the office serving the largest number of sampled participants was selected for the study. In Oklahoma, State officials recommended replacement offices for Canadian and Payne counties with similar caseloads and operating characteristics.

### **Response Rates**

Response to the Survey of WIC Participants is shown in table A-2. The overall response rate was 77 percent; the response rate ranged from 72.8 percent in Texas to 82.8 percent in Connecticut. Nonmetropolitan areas achieved the highest response rates in four of the six States, with metropolitan areas achieving the highest response rate in North Carolina and Ohio.

Table A-2 also shows the number of respondents to "Section CX" of the survey. Section CX was designed as an alternative to Section C (food item selection) for respondents who did not pick up WIC food instruments for the reference month. Overall, 14 percent of respondents did not pick up their food instruments; these respondents include WIC participants whose certification period ended prior to the interview, and who did not seek re-certification.

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<sup>2</sup> Nonmetropolitan areas were defined as counties outside of Census-defined Metropolitan Statistical Areas (MSAs); metropolitan areas were defined as counties in MSAs, exclusive of the central city portion of the county; urban areas were defined as central cities in MSAs.

<sup>3</sup> The family ID was constructed for North Carolina.

**Table A-1—Areas sampled for participant survey**

<b>State</b>	<b>Stratum</b>	<b>Area</b>	<b>WIC office</b>	<b>Office location</b>
California	Metropolitan (suburban) <sup>a</sup>	Noncentral city portion of San Diego County	American Red Cross	San Diego
California	Nonmetropolitan (rural) <sup>a</sup>	All of Imperial County	Clinica de Salud del Pueblo	Brawley
California	Central city (urban) <sup>a</sup>	4 ZIP codes of Los Angeles	Public Health Foundation	Irwindale
Connecticut	Metropolitan (suburban) <sup>a</sup>	Noncentral city portion of New Haven County	Naugatuck Valley District	Shelton
Connecticut	Nonmetropolitan (rural) <sup>a</sup>	All of Litchfield County	Torrington Area Health District	Torrington
Connecticut	Central city (urban) <sup>a</sup>	All of Hartford	Hartford Health Department	Hartford
North Carolina	Metropolitan (suburban)	Noncentral city portion of Buncombe County	Buncombe County Health Department	Asheville
North Carolina	Nonmetropolitan (rural)	All of Cleveland County	Cleveland County Health Department	Shelby
North Carolina	Central city (urban)	4 ZIP codes of Charlotte	Mecklenburg County Health Department	Charlotte
Ohio	Metropolitan (suburban)	Noncentral city portion of Belmont County	Belmont County WIC Program	Bellaire
Ohio	Nonmetropolitan (rural)	All of Tuscarawas County	Tuascarawas County WIC Program	Dover
Ohio	Central city (urban)	4 ZIP codes of Cleveland	Cuyahoga County WIC Program	Cleveland
Oklahoma	Metropolitan (suburban)	Noncentral city portion of Canadian County	Creek County Health Department	Sepula
Oklahoma	Nonmetropolitan (rural)	All of Payne County	LeFlore County Health Department	Stillwater
Oklahoma	Central city (urban) <sup>a</sup>	4 ZIP codes of Oklahoma City	Variety Health Center	Oklahoma City
Texas	Metropolitan (suburban) <sup>a</sup>	Noncentral city portion of Fort Bend County	Fort Bend Family health Center	Richmond
Texas	Nonmetropolitan (rural) <sup>a</sup>	All of Hale County	South Plains Health Provider	Plainview
Texas	Central city (urban) <sup>a</sup>	4 ZIP codes of Houston	Houston Health and Human Services	Houston

<sup>a</sup> Signifies that more than one local WIC office served participants in the area.

**Table A-2—Survey of WIC Participants**

State	Strata	Sample size <i>n</i>	Respon- dents <i>n</i>	Response rate %	Respondents to section CX <sup>a</sup>	
					<i>n</i>	%
California	Total	277	208	75.1	30	14.4
	Non-metro	87	73	83.9	9	12.3
	Metro	87	58	66.7	7	12.1
	Central city	103	77	74.8	14	18.2
Connecticut	Total	279	231	82.8	33	14.3
	Non-metro	93	82	88.2	8	9.8
	Metro	93	75	80.6	10	13.3
	Central city	93	74	79.6	15	20.3
North Carolina	Total	278	222	79.9	26	11.7
	Non-metro	88	69	78.4	5	7.2
	Metro	87	72	82.8	8	11.1
	Central city	103	81	78.6	13	16.0
Ohio	Total	278	215	77.3	24	11.2
	Non-metro	87	67	77.0	6	9.0
	Metro	88	80	90.9	6	7.5
	Central city	103	68	66.0	12	17.6
Oklahoma	Total	278	206	74.1	38	18.4
	Non-metro	88	67	76.1	18	26.9
	Metro	87	63	72.4	6	9.5
	Central city	103	76	73.8	14	18.4
Texas	Total	279	203	72.8	32	15.8
	Non-metro	88	72	81.8	14	19.4
	Metro	88	60	68.2	12	20.0
	Central city	103	71	68.9	6	8.5
All States	Total	1669	1285	77.0	183	14.2

a Respondents skipped “Section C: Item Selection” and answered “Section CX: Item Preferences of Nonparticipants” when they reported that they had not picked up WIC vouchers for the reference month.

### Sampling Weights

For each survey respondent, the base sampling weight equals the reciprocal of the probability of selection, taking into account the three stages of sampling. Multiplicative adjustments were made to these base weights to compensate for non-response among the sampled families within cells defined by State and strata. A further adjustment, using the iterative procedure known as raking, then brought the weighted counts of WIC families into agreement with the population counts for each State (measured in November 2000). Raking was done on two variables: race and family type.<sup>4</sup>

<sup>4</sup> Race categories were collapsed for the purpose of raking.

## **Survey Instrument**

A paper copy of the survey instrument for the Survey of WIC Participants is attached at the end of this appendix. The actual survey was conducted using CATI (computer assisted telephone interview) software. Field interviewers administered the survey using laptop computers.





# Survey of WIC Participants

## The Paperwork Reduction Act—Disclosure Statement

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is XXXX-XXXX. The time required to complete this information collection is estimated to average 30 minutes per response.

## Introduction

**NOTE: WORDS AND PHRASES IN ALL CAPITAL LETTERS ARE INSTRUCTIONS TO THE INTERVIEWERS AND WILL NOT BE READ TO RESPONDENTS.<sup>1</sup>**

May I speak with (SAMPLED WIC MOTHER/MOTHER or GUARDIAN OF SAMPLE CHILD)?

WHEN CONNECTED:

Hello, my name is \_\_\_\_\_. I'm working with Abt Associates, a research firm located in Cambridge, Massachusetts. My company is conducting a study for the United States Department of Agriculture to collect information about the experiences of WIC participants when food shopping and when using WIC (checks/vouchers).

You have been selected for this study. The interview takes about 30 minutes.

Your participation in this study is completely voluntary, and the information that you provide is strictly confidential. Your answers will not be shared with WIC staff, and the information that you provide will not affect the benefits or services that you receive from WIC or any other government agency.

Do you have any questions before we begin? (ANSWER R's QUESTIONS, IF ANY.)

We really appreciate your time and help with this study.

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<sup>1</sup> EBT-specific instrument needed. Instrument should vary by state so that the questions include either "check" or "voucher," as appropriate. Some questions apply only if there is an infant WIC participant in the household. We will not sample households with only infant WIC participants.

1. I'd like to begin by confirming some information. According to our records,

You are the only member of your household receiving WIC foods (PREGNANT OR BREASTFEEDING WOMAN), or

(You and/or NAME(s) are currently receiving WIC foods (PREGNANT AND CHILD; POSTPARTUM AND INFANT/CHILDREN; INFANT/CHILDREN)

Is that correct?

YES ..... GO TO A1  
NO ..... ASK 2

2. Are you currently receiving WIC foods?

YES ..... ASK 2a  
NO ..... GO TO 3

a. Please tell me the ages of the children in your household currently receiving WIC foods.  
(IF AGE < 1 YEAR, ENTER 0.)

AGE

[NOTE TO PROGRAMMER: HOUSEHOLD IS PRECODED WITH FLAGS FOR TYPES OF WIC PARTICIPANTS—WOMAN, INFANT, CHILD. UPDATE FLAGS BASED ON ABOVE INFO. IF AGE < 1 YEAR THEN INFANT = 1. IF AGE = 1–4 YEARS THEN CHILD = 1.]

3. PROGRAMMER CHECK: IF 2 = NO AND ONLY ONE AGE IS ENTERED IN 2a AND AGE = 0, THEN STOP INTERVIEW.

According to what you have told me, the only person in your household who receives WIC foods is your infant. Is that correct?

YES ..... GO TO EXIT  
NO ..... GO BACK TO 2

**Exit**

This study is interested in learning about the experiences of women and children WIC participants, so we will not need to continue with the survey. Thank you for your time.

## A. Item Satisfaction

I'm going to begin with some questions about WIC foods.

- A1. The WIC Program provides particular **brands of foods**. I am going to read a list of food categories and I want you to tell me if you are **very satisfied, fairly satisfied, or not satisfied** with the **brands of foods** WIC provides. What about (READ CATEGORY AND CHECK ONE ANSWER IN EACH ROW)?

Food Category	Very Satisfied	Somewhat Satisfied	Not Satisfied	Not Applicable
Breakfast cereals				
Juices				
Milk				
Cheese				
Infant cereal (IF INFANT = 1)				
Infant juice (IF INFANT = 1)				

- A2. The WIC Program sometimes specifies particular **package sizes** to be bought. For example, canned or bottled juice can be bought in 46-ounce containers. Are you **very satisfied, fairly satisfied, or not satisfied** with the **package sizes** allowed for . . .? (READ CATEGORY AND CHECK ONE ANSWER IN EACH ROW)?

Food Category	Very Satisfied	Somewhat Satisfied	Not Satisfied	Not Applicable
Breakfast cereals				
Frozen juice				
Canned or bottled juice				
Milk				
Cheese				
Infant cereal (IF INFANT = 1)				
Infant juice (IF INFANT = 1)				

Now I'm going to ask you a general question about your use of WIC (checks/vouchers).

A3. Do you find it **difficult, somewhat difficult, or not difficult** to shop with WIC food (checks/vouchers)? (CIRCLE ONE.)

DIFFICULT .....	ASK A4
SOMEWHAT DIFFICULT .....	ASK A4
NOT DIFFICULT .....	SKIP TO SECTION B

A4. Which of the following causes difficulty when shopping with WIC (checks/vouchers)? (READ AND CIRCLE ALL THAT APPLY.)

Finding the foods listed on the (check/voucher) .....

Determining the least expensive brand (SKIP IF STATE = OH)

Determining which package sizes add up to your prescription .....

OTHER (SPECIFY) .....

<b>IF STATE = OHIO, SKIP TO SECTION C</b>
---

## B. Voucher Pickup

My next questions are about your use of WIC (checks/vouchers). All of the questions refer to the last calendar month, that is, the month of (MONTH).

### Voucher Pickup

B1. Did you pick up WIC food (checks/vouchers) for the month of (MONTH)?

YES .....

NO .....

ASK B3, THEN SKIP  
TO SECTION D<sup>2</sup>

B2. Did you use any of your (MONTH) WIC (checks/vouchers) to purchase food?

YES .....

NO .....

GO TO SECTION C  
ASK B4, THEN SKIP  
TO SECTION D

B3. Which of the following statements best describes why you did not pick up your (checks/vouchers) for (MONTH)? (READ AND CIRCLE ONE.)

Couldn't get to the clinic .....

ASK B3a

Didn't want or need the food .....

ASK B3b

It's too much trouble to use the (checks/vouchers) .....

ASK B3c

OTHER (SPECIFY) .....

a. Which of the following statements best describes why you couldn't get to the WIC clinic? (READ AND CIRCLE ONE.)

Didn't have transportation .....

Didn't have child care .....

The clinic is too far from home .....

OTHER (SPECIFY) .....

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2 Note: We probably need a modified Section C to get preference info on these "pseudo-dropouts."

- b. Which of the following statements best describes why you didn't want or need the food? (READ AND CIRCLE ONE.)

(You/SAMPLE CHILD) don't usually eat the foods WIC provides . . . . .  
 (You/SAMPLE CHILD) don't like the brands of WIC foods . . . . .  
 OTHER (SPECIFY) . . . . .

- c. Which of the following statements best describes why it's too much trouble to use WIC (checks/vouchers)? (READ AND CIRCLE ONE.)

You have to make extra shopping trips to get to WIC stores . . . . .  
 The WIC stores are too far away . . . . .  
 The (checks/vouchers) are confusing to use . . . . .  
 OTHER (SPECIFY) . . . . .

**SKIP TO SECTION D**

- B4. Which of the following statements best describes why you did not redeem your (checks/vouchers) for (MONTH)? (READ AND CIRCLE ONE.)

Didn't want or need the food . . . . . ASK B3a  
 It's too much trouble to use the (checks/vouchers) . . . . . ASK B3b  
 OTHER (SPECIFY) . . . . .

- a. Which of the following statements best describes why you didn't want or need the food? (READ AND CIRCLE ONE.)

(You/SAMPLE CHILD) don't usually eat the foods WIC provides . . . . .  
 (You/SAMPLE CHILD) don't like the brands of WIC foods . . . . .  
 OTHER (SPECIFY) . . . . .

- b. Which of the following statements best describes why it's too much trouble to use WIC (checks/vouchers)? (READ AND CIRCLE ONE.)

You have to make extra shopping trips to get to WIC stores . . . . .  
 The WIC stores are too far away . . . . .  
 The (checks/vouchers) are confusing to use . . . . .  
 OTHER (SPECIFY) . . . . .

**C. Item Selection**

**Milk**

C1. Did (your/your family's) WIC prescription in (MONTH) include milk?

- YES .....
- NO ..... SKIP TO C6

C2. During (MONTH), did you buy all, some, or none of the WIC milk prescribed for (you/your family)?

- ALL ..... SKIP TO C3
- SOME ..... ASK C2a
- NONE ..... ASK C2b

a. Why didn't you buy all of the WIC milk? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

- TOO MUCH—CAN'T USE IT ALL .....
- DON'T LIKE MILK .....
- CAN'T TOLERATE MILK .....
- DON'T HAVE ROOM IN REFRIGERATOR .....
- DON'T HAVE A REFRIGERATOR .....
- NO TIME TO SHOP .....
- TRANSPORTATION PROBLEMS .....
- STORE RAN OUT .....
- OTHER (SPECIFY) .....

**GO TO C3**



- b. Why didn't you buy any of the WIC milk? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

TOO MUCH—CAN'T USE IT ALL .....  
 DON'T LIKE MILK .....  
 CAN'T TOLERATE MILK .....  
 DON'T HAVE ROOM IN REFRIGERATOR .....  
 DON'T HAVE A REFRIGERATOR .....  
 NO TIME TO SHOP .....  
 TRANSPORTATION PROBLEMS .....  
 STORE RAN OUT .....  
 OTHER (SPECIFY) .....

**SKIP TO C6**

- C3. Which type of milk did you buy with your WIC (check/voucher)? Please be specific by telling me the type, brand and size. By type, I mean was it whole milk, reduced fat, lowfat, or skim milk. IF NECESSARY, INTERVIEWERS MAY READ ANSWER CATEGORIES.

THE CATI PROGRAM WILL DISPLAY THE TYPE SCREEN. AFTER THE INTERVIEWER SELECTS A TYPE, THE BRAND AND PACKAGING SCREENS WILL APPEAR.

- a. TYPE

WHOLE .....  
 REDUCED FAT OR 2% .....  
 LOWFAT OR 1% .....  
 NONFAT OR SKIM .....

- b. FOR EACH TYPE, RECORD BRAND (ALL THAT APPLY).

HOOD .....  
 GARELICK .....  
 LACTAID .....  
 DAIRY EASE .....  
 STORE BRAND .....  
 OTHER (SPECIFY) .....

c. FOR EACH BRAND, RECORD SIZE (ALL THAT APPLY).

QUART .....  
HALF GALLON .....  
GALLON .....

d. What other type of milk did you buy with your WIC prescription last month?

THE CATI PROGRAM WILL CYCLE THROUGH C3a – C3c UNTIL THE  
RESPONDENT SAYS “NO OTHER.”

1. TYPE \_\_\_\_\_ BRAND \_\_\_\_\_ SIZE \_\_\_\_\_  
2. TYPE \_\_\_\_\_ BRAND \_\_\_\_\_ SIZE \_\_\_\_\_

C4. Did you buy any specialty milks with your WIC (check/voucher), like lactose-free or lactose-reduced milk, powdered milk, evaporated milk, goat’s milk, buttermilk, acidophilus milk, or Parmalat, which is non-refrigerated milk in a box?

YES ..... ASK C4a  
NO ..... GO TO C5

a. Which type, and in what sizes?

LACTOSE-FREE OR LACTOSE-REDUCED .....  
POWDERED MILK .....  
EVAPORATED MILK .....  
GOAT’S MILK .....  
BUTTERMILK .....  
ACIDOPHILUS MILK .....  
PARMALAT (SKIP TO C4c) .....

b. FOR EACH TYPE, RECORD BRAND (ALL THAT APPLY).

STORE BRAND .....  
OTHER (SPECIFY) .....

c. FOR EACH BRAND, RECORD SIZE (ALL THAT APPLY).

QUART .....  
HALF GALLON .....  
GALLON .....  
OTHER (SPECIFY) .....

C5. Did the WIC participant(s) in your family drink some, all or none of the milk you purchased with the WIC (check/voucher)? Don't be afraid to say some or none. Your answers will in no way affect your future participation in WIC or the food items prescribed.

ALL .....	SKIP TO C6
SOME .....	ASK C5a
NONE .....	ASK C5b

a. Why didn't the WIC participant(s) drink all of the milk? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

DON'T NORMALLY DRINK IT .....

DIDN'T LIKE IT .....

FOOD WENT BAD .....

DON'T HAVE REFRIGERATOR .....

CONSUMED BY OTHER FAMILY MEMBERS . . . .

CAN'T DRINK THAT MUCH .....

OTHER (SPECIFY) .....

b. Why didn't the WIC participant(s) drink any of the milk? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

DON'T NORMALLY DRINK IT .....

DIDN'T LIKE IT .....

FOOD WENT BAD .....

DON'T HAVE REFRIGERATOR .....

CONSUMED BY OTHER FAMILY MEMBERS . . . .

OTHER (SPECIFY) .....

**Cheese**

C6. Did (your/your family's) WIC prescription in (MONTH) include cheese?

YES .....	
NO .....	SKIP TO C12

C7. During (MONTH), did you buy all, some, or none of the WIC cheese prescribed for (you/your family)?

ALL .....	SKIP TO C8
SOME .....	ASK C7a
NONE .....	ASK C7b

- a. Why didn't you buy all of the WIC cheese? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

TOO MUCH—CAN'T USE IT ALL .....  
DON'T LIKE CHEESE .....  
DON'T LIKE THE TYPES OF CHEESE WIC ALLOWS .....  
DON'T HAVE A REFRIGERATOR .....  
NO TIME TO SHOP .....  
TRANSPORTATION PROBLEMS .....  
STORE RAN OUT .....  
OTHER (SPECIFY) .....

**GO TO C8**

- b. Why didn't you buy any of the WIC cheese? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

TOO MUCH—CAN'T USE IT ALL .....  
DON'T LIKE CHEESE .....  
CAN'T TOLERATE CHEESE .....  
DON'T HAVE A REFRIGERATOR .....  
NO TIME TO SHOP .....  
TRANSPORTATION PROBLEMS .....  
STORE RAN OUT .....  
OTHER (SPECIFY) .....

**SKIP TO C12**

- C8. Which types of cheese did you buy with your WIC (check/voucher)? Please be specific by telling me the type of cheese, brand, and packaging. IF NECESSARY, INTERVIEWERS MAY READ ANSWER CATEGORIES.

THE CATI PROGRAM WILL DISPLAY THE TYPE SCREEN. AFTER THE INTERVIEWER SELECTS A TYPE, THE BRAND AND PACKAGING SCREENS WILL APPEAR.

a. TYPE

- AMERICAN .....
- CHEDDAR .....
- COLBY .....
- MONTEREY JACK .....
- MOZZARELLA .....
- SWISS .....
- MUENSTER .....
- PROVOLONE .....

b. FOR EACH TYPE, RECORD BRAND (ALL THAT APPLY).

- KRAFT .....
- BORDEN .....
- LAND O' LAKES .....
- STORE BRAND .....
- OTHER (SPECIFY) .....

c. FOR EACH BRAND, RECORD PACKAGING (ALL THAT APPLY).

- BLOCK .....
- SLICED, PREPACKAGED .....
- SLICED, FROM DELI .....
- SHREDDED OR GRATED .....

d. What other type of cheese did you buy with your WIC (checks/vouchers) last month?

THE CATI PROGRAM WILL CYCLE THROUGH C8a – C8d UNTIL THE RESPONDENT SAYS “NO OTHER.”

- 1. TYPE \_\_\_\_\_ BRAND \_\_\_\_\_ SIZE \_\_\_\_\_
- 2. TYPE \_\_\_\_\_ BRAND \_\_\_\_\_ SIZE \_\_\_\_\_

e. Was any of the cheese you bought with your WIC (check/voucher) low-fat or low-cholesterol?

- YES .....
- NO .....

f. Was any of the cheese you bought with your WIC (check/voucher) low-sodium?

- YES .....
- NO .....

C9. Are there any types of cheese that you would like to buy with your WIC (checks/vouchers) that are not on the WIC food list?

TYPE 1 \_\_\_\_\_

a. Anything else?

TYPE 2 \_\_\_\_\_

REPEAT C9a UNTIL RESPONDENT SAYS NO.

C10. Did the WIC participant(s) in your family eat some, all or none of the cheese you purchased with the WIC (check/voucher)? Don't be afraid to say some or none. Your answers will in no way affect your future participation in WIC or the food items prescribed.

ALL .....	SKIP TO C11
SOME .....	ASK C10a
NONE .....	ASK C10b

a. Why didn't the WIC participant(s) eat all of the cheese? (Open-end response with pre-specified codes for answers)

DON'T NORMALLY EAT IT .....

DIDN'T LIKE IT .....

FOOD WENT BAD .....

DON'T HAVE REFRIGERATOR .....

CONSUMED BY OTHER FAMILY MEMBERS . . . .

CAN'T EAT THAT MUCH .....

OTHER (SPECIFY) .....

b. Why didn't the WIC participant(s) eat any of the cheese? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

DON'T NORMALLY EAT IT .....

DIDN'T LIKE IT .....

FOOD WENT BAD .....

DON'T HAVE REFRIGERATOR .....

CONSUMED BY OTHER FAMILY MEMBERS . . . .

OTHER (SPECIFY) .....

C11. During the past six months, when you bought cheese with WIC vouchers or your own money, did you buy store brand cheeses, national brand cheeses, or some of both?  
 (INTERVIEWER: WE ARE ASKING ABOUT WIC AND NON-WIC PURCHASES.)

STORE BRAND .....	SKIP TO C12
NATIONAL BRAND .....	SKIP TO C12
BOTH .....	GO TO C11a

a. Which do you prefer?

STORE BRAND ALWAYS .....
NATIONAL BRANDS ALWAYS .....
DEPENDS ON THE PRODUCT .....
NO PREFERENCE .....

**Eggs**

C12. Did (your/your family's) WIC prescription in (MONTH) include eggs?

YES .....	
NO .....	SKIP TO C15

C13. During (MONTH), did you buy all, some, or none of the WIC eggs prescribed for (you/your family)?

ALL .....	SKIP TO C14
SOME .....	ASK C13a
NONE .....	ASK C13b

a. Why didn't you buy all of the WIC eggs? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

TOO MUCH/CAN'T USE IT ALL .....
DON'T LIKE EGGS .....
DON'T HAVE A REFRIGERATOR .....
NO TIME TO SHOP .....
TRANSPORTATION PROBLEMS .....
STORE RAN OUT .....
OTHER (SPECIFY) .....

**GO TO C14**

- b. Why didn't you buy any of the WIC eggs? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

TOO MUCH/CAN'T USE IT ALL .....  
 DON'T LIKE EGGS .....  
 DON'T HAVE A REFRIGERATOR .....  
 NO TIME TO SHOP .....  
 TRANSPORTATION PROBLEMS .....  
 STORE RAN OUT .....  
 OTHER (SPECIFY) .....

**SKIP TO C15**

- C14. Did the WIC participant(s) in your family eat some, all or none of the eggs you purchased with the WIC (check/voucher)? (Don't be afraid to say some or none. Your answers will in no way affect your future participation in WIC or the food items prescribed.)

ALL ..... SKIP TO C15  
 SOME ..... ASK C14a  
 NONE ..... ASK C14b

- a. Why didn't the WIC participant(s) eat all of the eggs? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

DON'T NORMALLY EAT THEM .....  
 DIDN'T LIKE THEM .....  
 FOOD WENT BAD .....  
 DON'T HAVE REFRIGERATOR .....  
 CONSUMED BY OTHER FAMILY MEMBERS ....  
 CAN'T EAT THAT MUCH .....  
 OTHER (SPECIFY) .....

- b. Why didn't the WIC participant(s) eat any of the eggs? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

DON'T NORMALLY EAT THEM .....  
 DIDN'T LIKE THEM .....  
 FOOD WENT BAD .....  
 DON'T HAVE REFRIGERATOR .....  
 CONSUMED BY OTHER FAMILY MEMBERS ....  
 OTHER (SPECIFY) .....



**Infant Cereal**

SKIP SECTION IF THERE IS NO INFANT WIC PARTICIPANT IN FAMILY.

C15. Did (INFANT NAME)'s WIC prescription in (MONTH) include infant cereal?

- YES .....
- NO ..... SKIP TO C20

C16. During (MONTH), did you buy all, some, or none of the WIC infant cereal prescribed for (INFANT NAME)?

- ALL ..... SKIP TO C17
- SOME ..... ASK C16a
- NONE ..... ASK C16b

a. Why didn't you buy all of the WIC infant cereal? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

- TOO MUCH—CAN'T USE IT ALL .....
- DON'T LIKE THE FOOD .....
- NO TIME TO SHOP .....
- TRANSPORTATION PROBLEMS .....
- STORE RAN OUT .....
- OTHER (SPECIFY) .....

**GO TO C17**

b. Why didn't you buy any of the WIC infant cereal? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

- TOO MUCH—CAN'T USE IT ALL .....
- DON'T LIKE THE FOOD .....
- NO TIME TO SHOP .....
- TRANSPORTATION PROBLEMS .....
- STORE RAN OUT .....
- OTHER (SPECIFY) .....

**SKIP TO C20**

C17. Which types of infant cereal did you buy with WIC (checks/vouchers)? Please be as specific as possible by telling me the flavor, brand, and size. IF NECESSARY, INTERVIEWERS MAY READ ANSWER CATEGORIES.

THE CATI SYSTEM WILL DISPLAY THE FLAVOR SCREEN. AFTER THE INTERVIEWER SELECTS A FLAVOR, THE BRAND AND SIZE SCREENS WILL APPEAR.

a. FLAVOR.

- RICE .....
- OATMEAL .....
- BARLEY .....
- MIXED .....

b. FOR EACH FLAVOR, RECORD BRAND (ALL THAT APPLY).

- BEECHNUT .....
- GERBER .....
- HEINZ .....

c. FOR EACH FLAVOR, RECORD SIZE.

- 8 OZ .....
- 16 OZ .....

d. What other flavor of cereal did you buy with your WIC (checks/vouchers) last month?

THE CATI PROGRAM WILL CYCLE THROUGH C17a – C17c UNTIL THE RESPONDENTS SAYS “NO OTHER.”

- 1. FLAVOR \_\_\_\_\_ BRAND \_\_\_\_\_ SIZE \_\_\_\_\_
- 2. FLAVOR \_\_\_\_\_ BRAND \_\_\_\_\_ SIZE \_\_\_\_\_

C18. Did (INFANT NAME) eat some, all or none of the infant cereal you purchased with the WIC (check/voucher)? Don't be afraid to say some or none. Your answers will in no way affect your future participation in WIC or the food items prescribed.

- ALL ..... SKIP TO C19
- SOME ..... ASK C18a
- NONE ..... ASK C18b

- a. Why didn't (INFANT NAME) eat all of the infant cereal? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

DON'T NORMALLY EAT IT .....  
 DIDN'T LIKE IT .....  
 FOOD WENT BAD .....  
 DON'T HAVE REFRIGERATOR .....  
 CONSUMED BY OTHER FAMILY MEMBERS ....  
 CAN'T EAT THAT MUCH .....  
 OTHER (SPECIFY) .....

- b. Why didn't (INFANT NAME) eat any of the infant cereal? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

DON'T NORMALLY EAT IT .....  
 DIDN'T LIKE IT .....  
 FOOD WENT BAD .....  
 DON'T HAVE REFRIGERATOR .....  
 CONSUMED BY OTHER FAMILY MEMBERS ....  
 OTHER (SPECIFY) .....

- C19. Are there any infant cereals that you would like to purchase with your WIC (checks/ vouchers) that are not on the WIC food list?

CEREAL 1 \_\_\_\_\_

- a. Anything else?

CEREAL 2 \_\_\_\_\_

REPEAT C19a UNTIL RESPONDENT SAYS NO.

**Juice**

- C20. Did (your/your family's) WIC prescription in (MONTH) include juice?

YES .....  
 NO ..... SKIP TO C26

- C21. During (MONTH), did you buy all, some, or none of the WIC juice prescribed for (you/your family)?

ALL ..... SKIP TO C22  
 SOME ..... ASK C21a  
 NONE ..... ASK C21b

- a. Why didn't you buy all of the WIC juice? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

TOO MUCH—CAN'T USE IT ALL .....  
 DON'T LIKE THE FOOD .....  
 DON'T HAVE A REFRIGERATOR .....  
 NO TIME TO SHOP .....  
 TRANSPORTATION PROBLEMS .....  
 STORE RAN OUT .....  
 OTHER (SPECIFY) .....

**GO TO C22**

- b. Why didn't you buy any of the WIC juice? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

TOO MUCH—CAN'T USE IT ALL .....  
 DON'T LIKE THE FOOD .....  
 DON'T HAVE A REFRIGERATOR .....  
 NO TIME TO SHOP .....  
 TRANSPORTATION PROBLEMS .....  
 STORE RAN OUT .....  
 OTHER (SPECIFY) .....

**SKIP TO C26**

- C22. Which types of juice did you buy with your WIC (checks/vouchers)? Please tell me the flavors, for example apple or orange, and for each flavor tell me the brand and size. IF NECESSARY, INTERVIEWERS MAY READ ANSWER CATEGORIES.

THE CATI SYSTEM WILL DISPLAY THE FLAVOR SCREEN. AFTER THE INTERVIEWER SELECTS A FLAVOR, THE BRAND AND SIZE SCREENS WILL APPEAR.

a. FLAVOR.

- APPLE .....
- CRANBERRY .....
- CRANBERRY BLEND .....
- GRAPE, PURPLE .....
- GRAPEFRUIT .....
- ORANGE .....
- ORANGE-GRAPEFRUIT .....
- ORANGE-PINEAPPLE .....
- PINEAPPLE .....
- PINEAPPLE BLEND .....
- TOMATO .....
- VEGETABLE .....
- WHITE GRAPE .....
- WHITE GRAPE BLEND .....
- OTHER BLENDS .....

b. FOR EACH FLAVOR, RECORD BRAND (ALL THAT APPLY).

- CAMPBELL'S .....
- DEL MONTE .....
- DOLE .....
- JUICY JUICE .....
- LUCKY LEAF .....
- MUSSELMAN'S .....
- NORTHLAND .....
- SENECA .....
- WELCH'S .....
- WHITE HOUSE .....
- STORE BRAND .....
- OTHER (SPECIFY) .....

c. FOR EACH FLAVOR, RECORD SIZE.

- 46 OZ CANNED .....
- 46 OZ BOTTLED .....
- 6 OZ FROZEN .....
- 12 OZ FROZEN .....
- 11.5 OR 12 OZ LIQUID CONCENTRATE .....

d. What other flavor of juice did you buy with your WIC (checks/vouchers) last month?

THE CATI PROGRAM WILL CYCLE THROUGH C22a – C22c UNTIL THE RESPONDENTS SAYS “NO OTHER.”

- 1. FLAVOR \_\_\_\_\_ BRAND \_\_\_\_\_ SIZE \_\_\_\_\_
- 2. FLAVOR \_\_\_\_\_ BRAND \_\_\_\_\_ SIZE \_\_\_\_\_

C23. Did the WIC participant(s) in your family drink some, all or none of the juice you purchased with the WIC (check/voucher)? Don't be afraid to say some or none. Your answers will in no way affect your future participation in WIC or the food items prescribed.

- ALL ..... SKIP TO C24
- SOME ..... ASK C23a
- NONE ..... ASK C23b

a. Why didn't the WIC participant(s) drink all of the juice? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

- DON'T NORMALLY DRINK IT .....
- DIDN'T LIKE IT .....
- JUICE WENT BAD .....
- DON'T HAVE REFRIGERATOR .....
- CONSUMED BY OTHER FAMILY MEMBERS ....
- CAN'T DRINK THAT MUCH .....
- OTHER (SPECIFY) .....

b. Why didn't the WIC participant(s) drink any of the juice? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

- DON'T NORMALLY DRINK IT .....
- DIDN'T LIKE IT .....
- JUICE WENT BAD .....
- DON'T HAVE REFRIGERATOR .....
- CONSUMED BY OTHER FAMILY MEMBERS ....
- OTHER (SPECIFY) .....

C24. Are there any juices that you would like to buy with your WIC (checks/vouchers) that are not on the WIC food list?

JUICE 1 \_\_\_\_\_

a. Anything else?

JUICE 2 \_\_\_\_\_

REPEAT C24a UNTIL RESPONDENTS SAYS NO.

C25. During the past six months, when buying juice with WIC vouchers or your own money, did you buy store brand juices, national brand juices, or both?

STORE BRAND .....	GO TO C26
NATIONAL BRAND .....	SKIP TO C26
BOTH .....	GO TO C25a

a. Which do you prefer?

STORE BRAND ALWAYS .....
NATIONAL BRANDS ALWAYS .....
DEPENDS ON THE PRODUCT .....
NO PREFERENCE .....

**Beans**

C26. Did (your/your family's) WIC prescription in (MONTH) include beans?

YES .....	
NO .....	SKIP TO C29

C27. During (MONTH), did you buy the WIC beans prescribed for (you/your family)?

YES .....	SKIP TO C28
NO .....	ASK C27a

- a. Why didn't you buy the WIC beans? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

TOO MUCH—CAN'T USE IT ALL .....  
 TOO MUCH TROUBLE/TAKE TOO LONG TO COOK .....  
 DON'T LIKE THEM .....  
 DON'T HAVE A REFRIGERATOR .....  
 NO TIME TO SHOP .....  
 TRANSPORTATION PROBLEMS .....  
 STORE RAN OUT .....  
 OTHER (SPECIFY) .....

**SKIP TO C29**

- C28. Did the WIC participant(s) in your family eat some, all or none of the beans you purchased with the WIC (check/voucher)? Don't be afraid to say some or none. Your answers will in no way affect your future participation in WIC or the food items prescribed.

ALL .....	SKIP TO C29
SOME .....	ASK C28a
NONE .....	ASK C28b

- a. Why didn't the WIC participant(s) eat all of the beans? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

DON'T NORMALLY EAT THEM .....  
 DIDN'T LIKE THEM .....  
 FOOD WENT BAD .....  
 DON'T HAVE REFRIGERATOR .....  
 CONSUMED BY OTHER FAMILY MEMBERS .....  
 CAN'T EAT THAT MUCH .....  
 OTHER (SPECIFY) .....

- b. Why didn't the WIC participant(s) eat any of the beans? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

DON'T NORMALLY EAT THEM .....  
 DIDN'T LIKE THEM .....  
 FOOD WENT BAD .....  
 DON'T HAVE REFRIGERATOR .....  
 CONSUMED BY OTHER FAMILY MEMBERS .....  
 OTHER (SPECIFY) .....



**Peanut Butter**

C29. Did (your/your family's) WIC prescription in (MONTH) include peanut butter?

- YES .....
- NO ..... SKIP TO C35

C30. During (MONTH), did you buy the WIC peanut butter prescribed for (you/your family)?

- YES ..... ASK C30a
- NO ..... GO TO C31

a. Why didn't you buy the WIC peanut butter? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

- TOO MUCH—CAN'T USE IT ALL .....
- DON'T LIKE THE FOOD .....
- DON'T HAVE A REFRIGERATOR .....
- NO TIME TO SHOP .....
- TRANSPORTATION PROBLEMS .....
- STORE RAN OUT .....

**SKIP TO C35**

C31. What brand of peanut butter did you buy with your WIC (check/voucher)? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

- JIF .....
- PETER PAN .....
- SKIPPY .....
- REESE'S .....
- STORE BRAND .....
- OTHER (SPECIFY) .....

C32. Was the peanut butter you bought with your WIC (check/voucher) reduced fat or low-fat?

- YES .....
- NO .....

C33. Was the peanut butter you bought with your WIC (check/voucher) low-sodium?

- YES .....
- NO .....

C34. Did the WIC participant(s) in your family eat some, all or none of the peanut butter you purchased with the WIC (check/voucher)? Don't be afraid to say some or none. Your answers will in no way affect your future participation in WIC or the food items prescribed.

ALL ..... SKIP TO C35  
SOME ..... ASK C34a  
NONE ..... ASK C34b

a. Why didn't the WIC participant(s) eat all of the peanut butter? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

DON'T NORMALLY EAT IT .....  
DIDN'T LIKE IT .....  
FOOD WENT BAD .....  
CONSUMED BY OTHER FAMILY MEMBERS .....  
CAN'T EAT THAT MUCH .....  
OTHER (SPECIFY) .....

b. Why didn't the WIC participant(s) eat any of the peanut butter? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

DON'T NORMALLY EAT IT .....  
DIDN'T LIKE IT .....  
FOOD WENT BAD .....  
CONSUMED BY OTHER FAMILY MEMBERS .....  
OTHER (SPECIFY) .....

**Breakfast Cereal**

C35. Did (your/your family's) WIC prescription in (MONTH) include breakfast cereal?

YES .....  
NO ..... SKIP TO D1

C36. During (MONTH), did you buy all, some, or none of the WIC breakfast cereal prescribed for (you/your family)?

ALL ..... SKIP TO C37  
SOME ..... ASK C36a  
NONE ..... ASK C36b

- a. Why didn't you buy all of the WIC breakfast cereal? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

TOO MUCH—CAN'T USE IT ALL .....  
 DON'T LIKE THE FOOD .....  
 NO TIME TO SHOP .....  
 TRANSPORTATION PROBLEMS .....  
 STORE RAN OUT .....  
 OTHER (SPECIFY) .....

**GO TO C37**

- b. Why didn't you buy any of the WIC breakfast cereal? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

TOO MUCH—CAN'T USE IT ALL .....  
 DON'T LIKE THE FOOD .....  
 NO TIME TO SHOP .....  
 TRANSPORTATION PROBLEMS .....  
 STORE RAN OUT .....  
 OTHER (SPECIFY) .....

**SKIP TO D1**

C37. Did you buy any hot breakfast cereals with your WIC vouchers last month?

YES .....	ASK C37a
NO .....	GO TO C38

- a. Which hot cereals did you buy last month? IF NECESSARY, INTERVIEWERS MAY READ ANSWER CATEGORIES.

COCO WHEATS .....  
 FARINA .....  
 MALTEX WHEAT CEREAL .....  
 MALT-O-MEAL (EITHER QUICK OR CHOCOLATE)  
 MAYPO OATMEAL CEREAL .....  
 NABISCO CREAM OF RICE .....  
 NABISCO CREAM OF WHEAT .....  
 PILLSBURY JIM DANDY QUICK GRITS .....  
 QUAKER INSTANT GRITS .....  
 QUAKER SUN COUNTRY OATS .....  
 QUAKER INSTANT OATMEAL .....  
 STORE BRAND OATMEAL .....  
 STORE BRAND INSTANT GRITS .....  
 STORE BRAND HOT WHEAT CEREAL .....

THE CATI SYSTEM WILL DISPLAY THE PRODUCT SCREEN. AFTER THE INTERVIEWER SELECTS A PRODUCT, THE FOLLOWING QUESTION WILL APPEAR:

- b. What other hot breakfast cereals did you buy with your WIC (checks/vouchers) last month?

THE CATI PROGRAM WILL REPEAT C37b UNTIL THE RESPONDENT SAYS "NO OTHER."

BRAND 1 \_\_\_\_\_  
 BRAND 2 \_\_\_\_\_

- C38. Did you buy any cold breakfast cereals with your WIC vouchers last month?

YES ..... ASK C38a  
 NO ..... GO TO C39

- a. Which types of cold breakfast cereal did you buy with your WIC (checks/vouchers)? Please be as specific as possible by telling me the cereal name and manufacturer. For example, if you bought corn flakes, please tell me if it was Kellogg's Corn Flakes, General Mills Country Flakes, or a store brand of corn flakes. IF NECESSARY, INTERVIEWERS MAY READ ANSWER CATEGORIES.

**GENERAL MILLS**

- CHEERIOS, PLAIN .....
- MULTI-GRAIN CHEERIOS .....
- CORN CHEX .....
- RICE CHEX .....
- MULTI-BRAN CHEX .....
- WHEAT CHEX .....
- COUNTRY CORN FLAKES .....
- KABOOM .....
- KIX, REGULAR .....
- TOTAL, CORN FLAKES .....
- TOTAL, WHOLE GRAIN .....
- WHEATIES, REGULAR .....

**POST**

- 100% BRAN .....
- BANANA NUT CRUNCH .....
- BRAN FLAKES .....
- GRAPE NUT FLAKES .....
- GRAPE NUTS .....
- HONEY BUNCHES OF OATS .....

**KELLOGGS**

- COMPLETE OAT BRAN FLAKES .....
- COMPLETE WHEAT BRAN FLAKES .....
- CORN FLAKES .....
- CRISPIX .....
- FROSTED MINI WHEATS, BITE SIZE OR REGULAR .....
- APPLE CINNAMON MINI WHEATS .....
- BLUEBERRY MINI WHEATS .....
- RAISIN MINI WHEATS .....
- STRAWBERRY MINI WHEATS .....
- PRODUCT 19 .....
- SPECIAL K .....

**MALT-O-MEAL**

- PUFFED RICE .....
- PUFFED WHEAT .....
- TOASTY-OS .....

**QUAKER**

- CRUNCHY CORN BRAN .....
- KING VITAMIN .....
- LIFE, PLAIN .....
- OAT BRAN .....
- OATMEAL SQUARES .....
- TOASTED OATS .....
- TOASTED OATMEAL .....

**STORE BRAND**

- BRAN FLAKES .....
- CORN FLAKES .....
- CORN PUFFS, CRISPY CORN PUFFS, CORN CRISPS,  
OR SILLY SPHERES .....
- CRISPY FLAKES .....
- CRISPY HEXAGONS .....
- CRISPY RICE OR CRISP RICE .....
- CRUNCHY CORN, TOASTED CORN, SQUARE-  
SHAPED CORN, OR CORN BISCUITS .....
- FROSTED SHREDDED WHEAT, REG OR BITE-SIZE
- NUTTY NUGGETS, CRUNCHY NUGGETS, OR
- KRUNCHY NUTTIES .....
- TASTEEOS, TOASTED OATS, OR TOASTY OS ...

THE CATI SYSTEM WILL DISPLAY THE PRODUCT SCREEN. AFTER THE INTERVIEWER SELECTS A PRODUCT, THE FOLLOWING QUESTION WILL APPEAR:

- b. What other cold cereals did you buy with your WIC (checks/vouchers) last month?

THE CATI PROGRAM WILL REPEAT C38b UNTIL THE RESPONDENTS SAYS "NO OTHER."

BRAND 1 \_\_\_\_\_  
 BRAND 2 \_\_\_\_\_

C39. Did the WIC participant(s) in your family eat some, all or none of the breakfast cereal you purchased with the WIC (check/voucher)? Don't be afraid to say some or none. Your answers will in no way affect your future participation in WIC or the food items prescribed.

ALL .....	SKIP TO C40
SOME .....	ASK C39a
NONE .....	ASK C39b

a. Why didn't the WIC participant(s) eat all of the breakfast cereal? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

DON'T NORMALLY EAT IT .....

DIDN'T LIKE IT .....

FOOD WENT BAD .....

CONSUMED BY OTHER FAMILY MEMBERS .....

CAN'T EAT THAT MUCH .....

OTHER (SPECIFY) .....

b. Why didn't the WIC participant(s) eat any of the breakfast cereal? (OPEN-END RESPONSE WITH PRE-SPECIFIED CODES FOR ANSWERS.)

DON'T NORMALLY EAT IT .....

DIDN'T LIKE IT .....

FOOD WENT BAD .....

CONSUMED BY OTHER FAMILY MEMBERS .....

OTHER (SPECIFY) .....

C40. Are there any breakfast cereals that you would like to buy with your WIC (checks/vouchers) that are not on the WIC food list?

BRAND 1 \_\_\_\_\_

a. Anything else?

BRAND 2 \_\_\_\_\_

REPEAT C40a UNTIL RESPONDENT SAYS NO.

C41. During the past six months, when you bought breakfast cereal with WIC vouchers or with your own money, did you buy store brand cereals, national brand cereals, or both?

STORE BRAND .....	SKIP TO D
NATIONAL BRAND .....	SKIP TO D
BOTH .....	ASK C41a

a. Which do you prefer?

- STORE BRAND ALWAYS .....
- NATIONAL BRANDS ALWAYS .....
- DEPENDS ON THE PRODUCT .....
- NO PREFERENCE .....



## D. Access to WIC Vendors

### General Food Shopping

My next set of questions are about shopping for food.

- D1. At what kind of store do you buy most of your food? (READ AND CIRCLE ONE. READ EXAMPLES IN PARENTHESES ONLY IF NECESSARY.)

Supermarket . . . . .  
Smaller grocery store such as a neighborhood grocer . . .  
Convenience store such as 7-11 or stores that sell  
groceries and gas . . . . .  
Specialty stores such as bakeries, vegetable stands,  
farmers' markets, dairy stores, meat markets, health  
food stores . . . . .  
General merchandise store such as WalMart . . . . .  
OTHER (SPECIFY) . . . . .

- D2. What is the name of the store where you buy most of your food?

\_\_\_\_\_

- D3. Where is that store located? (PROMPT FOR STREET AND CITY.)

STREET NAME \_\_\_\_\_  
CITY OR TOWN \_\_\_\_\_

- D4. How do you usually get to (STORE)? IF RESPONDENT REPORTS COMBINATION, CODE HIGHEST NUMBER.

WALK . . . . .	SKIP TO D8
BICYCLE . . . . .	SKIP TO D7
DRIVE A CAR . . . . .	GO TO D5
GET A RIDE WITH FRIENDS OR RELATIVES . . .	GO TO D5
TAKE A BUS . . . . .	SKIP TO D6
TAKE A TAXI/HACK . . . . .	SKIP TO D6
TAKE A CUSTOMER SERVICE VAN . . . . .	SKIP TO D6
OTHER (SPECIFY) . . . . .	

- D5. Do you pay any out-of-pocket costs when you drive to (STORE), such as parking or tolls?

YES . . . . .	ASK D5a
NO . . . . .	SKIP TO D7

a. How much do you usually pay in out-of-pocket costs each time you go to (STORE)?

\$ \_\_\_\_\_. \_\_\_\_ ..... SKIP TO D7

D6. Do you pay any out-of-pocket costs for this transportation to get to (STORE)?

YES ..... ASK D6a

NO ..... GO TO D7

a. How much do you usually pay in out-of-pocket costs each time you go to (STORE)?

\$ \_\_\_\_\_. \_\_\_\_

b. Is that amount for one way, or for a round trip?

ONE WAY .....

ROUND TRIP .....

D7. If you wanted to, could you walk to (STORE)?

YES .....

NO .....

D8. How far is (STORE) from your home? PROBE: How many miles or blocks is (STORE) from your home?

\_\_\_\_\_ MILES

\_\_\_\_\_ BLOCKS

D9. How long does it take you to travel to (STORE)? PROBE: By your usual means of transportation. WE WANT TRAVEL TIME ONE WAY.

\_\_\_\_\_ MINUTES

**WIC Redemption**

D10. Is the store where you do most of your food shopping the same store where you usually use your WIC (checks/vouchers)?

YES ..... SKIP TO D19

NO .....

NEVER USED (CHECKS/VOUCHERS) ..... SKIP TO SECTION E

D11. What is the name of the store where you usually use your WIC (checks/vouchers)?

\_\_\_\_\_

D12. Where is that store located? (PROMPT FOR STREET AND CITY.)

STREET \_\_\_\_\_

CITY OR TOWN \_\_\_\_\_

D13. How do you usually get to (WIC STORE)? IF RESPONDENT REPORTS COMBINATION, CODE HIGHEST NUMBER.

- |  |             |
|--|-------------|
| WALK .....                               | SKIP TO D17 |
| BICYCLE .....                            | SKIP TO D16 |
| DRIVE A CAR .....                        | ASK D14     |
| GET A RIDE WITH FRIENDS OR RELATIVES ... | ASK D14     |
| TAKE A BUS .....                         | SKIP TO D15 |
| TAKE A TAXI/HACK .....                   | SKIP TO D15 |
| TAKE A CUSTOMER SERVICE VAN .....        | SKIP TO D15 |
| OTHER (SPECIFY) .....                    |             |

D14. Do you pay any out-of-pocket costs when you drive to (WIC STORE), such as parking or tolls?

- |           |             |
|-----------|-------------|
| YES ..... | ASK D14a    |
| NO .....  | SKIP TO D16 |

a. How much do you usually pay in out-of-pocket costs each time you go to (WIC STORE)?

\$ \_\_\_\_\_. \_\_\_\_ .....

SKIP TO D16

D15. Do you pay any out-of-pocket costs for this transportation to get to (WIC STORE)?

- |           |           |
|-----------|-----------|
| YES ..... | ASK D15a  |
| NO .....  | GO TO D16 |

a. How much do you usually pay in out-of-pocket costs for this transportation?

\$ \_\_\_\_\_. \_\_\_\_

b. Is that amount for one way or for a round trip?

ONE WAY .....  
ROUND TRIP .....

D16. If you wanted to, could you walk to (WIC STORE)?

YES .....  
NO .....

D17. How far is (WIC STORE) from your home? PROBE: How many miles or blocks is (WIC STORE) from your home?

\_\_\_\_\_ MILES  
\_\_\_\_\_ BLOCKS

D18. How long does it take you to travel to (WIC STORE)? PROBE: By your usual means of transportation. WE WANT TRAVEL TIME ONE WAY.

\_\_\_\_\_ MINUTES

**Store Satisfaction**

D19. Next, I am going to read a list of factors that could be important when a person decides where to shop for food. As I read each one, please tell me if (WIC STORE) is excellent, good, fair, or poor.

a. First, having a clean, neat store. Would you rate the cleanliness and neatness of (WIC STORE) as excellent, good, fair, or poor?

EXCELLENT .....  
GOOD .....  
FAIR .....  
POOR .....

b. Having courteous, friendly employees. PROBE: Please tell me if (WIC STORE) is excellent, good, fair, or poor.

EXCELLENT .....  
GOOD .....  
FAIR .....  
POOR .....

- c. Having good, low prices. PROBE: Please tell me if (WIC STORE) is excellent, good, fair, or poor.

EXCELLENT .....  
GOOD .....  
FAIR .....  
POOR .....

- d. Having quality fruits and vegetables. PROBE: Please tell me if (WIC STORE) is excellent, good, fair, or poor.

EXCELLENT .....  
GOOD .....  
FAIR .....  
POOR .....

- e. Having good quality meat. PROBE: Please tell me if (WIC STORE) is excellent, good, fair, or poor.

EXCELLENT .....  
GOOD .....  
FAIR .....  
POOR .....

- f. Having good variety or a wide selection. PROBE: Please tell me if (WIC STORE) is excellent, good, fair, or poor.

EXCELLENT .....  
GOOD .....  
FAIR .....  
POOR .....

- g. Having private labels or store brands. PROBE: Please tell me if (WIC STORE) is excellent, good, fair, or poor.

EXCELLENT .....  
GOOD .....  
FAIR .....  
POOR .....

- h. Having items on sale or money-saving specials. PROBE: Please tell me if (WIC STORE) is excellent, good, fair, or poor.

EXCELLENT .....  
GOOD .....  
FAIR .....  
POOR .....

- i. Having a convenient location. PROBE: Please tell me if (WIC STORE) is excellent, good, fair, or poor.

EXCELLENT .....  
GOOD .....  
FAIR .....  
POOR .....

- j. In a safe area or having good security. PROBE: Please tell me if (WIC STORE) is excellent, good, fair, or poor.

EXCELLENT .....  
GOOD .....  
FAIR .....  
POOR .....

- h. Having fast checkout. PROBE: Please tell me if (WIC STORE) is excellent, good, fair, or poor.

EXCELLENT .....  
GOOD .....  
FAIR .....  
POOR .....

**E. Participation**

E1. While (you/your family) have been in the WIC program, have you picked up your WIC (checks/vouchers) for every month before they expired, or have you missed some months?

- PICKED UP ALL MONTHS ..... SKIP TO E3
- MISSED SOME MONTHS ..... ASK E2
- PICKED UP SOME AFTER THEY EXPIRED ..... ASK E2

E2. Which of the following statements best describes why you did not pick up your WIC (checks/vouchers), or didn't pick them up until they were expired? (READ LIST, CIRCLE ALL THAT APPLY.)

- The WIC clinic is too far away .....
- It takes too long at the WIC clinic .....
- The WIC stores are too far away .....
- You don't like to shop in the WIC stores .....
- (You don't/Your family doesn't) like the WIC foods ...
- (You don't/Your child doesn't) need the food .....
- OTHER (SPECIFY) .....

E3. Do you know of anyone who chose not to get WIC benefits because of restrictions on where she could shop or what brands or types of foods she could buy?

- YES .....
- NO .....

E4. ASK IF SAMPLE PERSON IS PREGNANT WOMAN, INFANT, OR CHILD LESS THAN 4.5 YEARS OF AGE.

Do you expect to seek recertification when (your/SAMPLE CHILD's) current period of eligibility ends?

- YES ..... SKIP TO SECTION F
- NO ..... ASK E5
- NOT SURE YET ..... SKIP TO SECTION F

E5. Please tell me the **main** reason you do not expect to seek recertification. Is it because . . . ?  
(READ LIST, CIRCLE ALL THAT APPLY.)

- Your income or other resources will be too high to qualify  
(You/SAMPLE CHILD) will not meet the health or  
nutritional risk requirements . . . . .
- It takes too long at the WIC clinic . . . . .
- The WIC clinic is too far away . . . . .
- The WIC stores are too far away . . . . .
- You have to make extra shopping trips to buy WIC foods
- You don't like to shop in the WIC stores . . . . .
- (You don't/Your family doesn't) like the WIC foods . . .
- OTHER (SPECIFY) . . . . .



## F. Special Diets or Food Allergies

Now I have some questions about special diets or food allergies that (you/you or your child/your child) may have. These questions will help us understand the types of foods required by WIC participants.

- F1. Has a doctor ever told you that (you have/you or your child have/your child has) . . .?  
(READ LIST AND CHECK ONE ANSWER IN EACH ROW.)

	YES	NO	DK	REF
Diabetes				
High blood pressure				
Heart disease				
High blood cholesterol				
Asthma				

- F2. I'm going to read a list of ways in which people modify their diets for various health-related reasons. Please tell me yes or no if the statement describes (your/you and your child's/your child's) diet. (READ AND CHECK ONE ANSWER IN EACH ROW.)

	YES	NO	DK	REF
Low-calorie for weight loss				
Low-fat or low-cholesterol				
Low-salt or low-sodium				
Sugar-free or low-sugar				
High-fiber				
Low-fiber				
High-calorie or high-protein for weight gain				
OTHER (SPECIFY)				

F3. Some people are on special diets for religious reasons or because they are vegetarian. I'm going to read a list of diets. Please tell me yes or no if they describe (your/you and your child's/your child's) diet. (READ AND CHECK ONE ANSWER IN EACH ROW.)

	YES	NO	DK	REF
Kosher diet				
Muslim diet				
Seventh-Day Adventist diet				
Vegetarian diet				
OTHER (SPECIFY)				

F4. Has a doctor ever told you that (you/your or your child/your child) had . . . ? (READ LIST AND CHECK ONE ANSWER IN EACH ROW.)

	YES	NO	DK	REF
A food allergy				
Celiac disease or sprue				
Lactose intolerance or milk intolerance				
Sulfite sensitivity				

IF "YES" TO "food allergy," ASK F5. IF "NO" TO ALL CONDITIONS, SKIP TO F6; OTHERWISE SKIP TO F7.

F5. What food(s) are (you/you or your child/your child) allergic to? (DO NOT READ LIST. CIRCLE ALL THAT APPLY.)

- COW'S MILK .....
- EGGS .....
- WHEAT .....
- PEANUTS .....
- SOY .....
- CORN .....
- OTHER NUTS, INCLUDING ALMONDS, WALNUTS,  
PECANS .....
- FISH .....
- SHELLFISH .....
- OTHER (SPECIFY) .....
- DON'T KNOW .....

F6. Within an hour after eating something, have (you/you and your child/your child) ever had a severe reaction, such as itching all over, trouble breathing, flushing, hives, or swelling of the face or hands or feet?

YES .....  
NO .....

F7. IF F2, F3, or F4, (ANY CONDITION), ASK:  
Does your special diet pose problems with finding appropriate food items when you shop for WIC foods?

YES ..... ASK F8  
NO ..... SKIP TO SECTION G

F8. In what way(s)? (DO NOT READ LIST. CIRCLE ALL THAT APPLY.)

- I DON'T KNOW WHETHER THE BRANDS ALLOWED ARE SAFE FOR (ME/MY CHILD) TO EAT .....
- I DON'T KNOW HOW TO FIND OUT ABOUT INGREDIENTS IN STORE BRAND FOOD ITEMS .....
- THE STORE MANAGER CAN'T TELL ME WHAT OTHER INGREDIENTS MIGHT BE IN THE STORE BRAND FOODS .....
- I CAN ONLY GET PEANUT BUTTER EVERY OTHER MONTH .....
- I CAN ONLY GET BEANS EVERY OTHER MONTH
- I CANNOT FIND CEREALS HIGH ENOUGH IN IRON OR FOLIC ACID/FOLATE .....
- I CANNOT BUY CALCIUM-FORTIFIED JUICE ...
- I CANNOT FIND LACTOSE-FREE OR LACTOSE-REDUCED MILK .....
- I CANNOT FIND THE SPECIAL KOSHER OR MUSLIM FOODS I AM REQUIRED TO EAT .....
- OTHER (SPECIFY) .....

## G. Health Outcomes

### Medical Utilization Measures

**IF WIC PARTICIPANTS IN FAMILY DO NOT  
INCLUDE AN INFANT OR CHILD, SKIP TO G4**

G1. IF NOT MEDICAID, ASK: Is (your/SAMPLE CHILD's) healthcare now covered by health insurance provided either by an employer or by an individual plan that pays part or all of a hospital, doctor's, or surgeon's bill? This does not include public assistance health care programs.

YES .....

NO .....

G2. In the past year, did you take (SAMPLE CHILD) to a doctor or clinic for a routine health checkup?

YES .....

NO .....

G3. Did (SAMPLE CHILD) have any serious health problems in the past year?

YES .....

NO .....

**Referrals**

G4. Were you referred to any of the following services when you went to the WIC clinic?  
(READ LIST. CHECK ONE ANSWER IN EACH ROW.)

IF “YES” TO ANY SERVICE, ASK: Did you receive (READ SERVICE)? (IF “YES,” CHECK BOX.)

	YES	NO	DK	REF	RECEIVED
Dental care					
Family planning					
Obstetrical or gynecological care					
Pediatric care, well-baby care, or immunizations					
Routine adult health services, such as regular checkup, immunization, or minor illness					
TANF <sup>3</sup>					
Food stamps					
Other food assistance programs					
Medicaid					
Children’s Health Insurance Program (CHIP)					
Child support enforcement					
General cash assistance					
Child care assistance					
Alcohol, tobacco, or other substance abuse counseling					
Community or migrant services					
Indian health services					
Homeless shelter					
OTHER (SPECIFY)					

---

3 Replace with state-specific program name.

## H. Demographics

### Household Composition

H1. How many adults aged 18 or over, including yourself, currently live in your household?

# OF ADULTS \_\_\_\_\_

H2. How many children are living in your household?

# OF CHILDREN \_\_\_\_\_

So, the total number of people in your household is (ANSWER TO H1 PLUS ANSWER TO H2). Is that correct? IF NOT CORRECT, RESOLVE BY RE-ASKING QUESTIONS H1 AND H2.

H3. IF NUMBER OF CHILDREN IN H2 = 0, SKIP TO H4.

What are the ages of the children living in your household? Start with the youngest. IF AGE = < 1 YEAR, RECORD ZERO.

AGE (YRS)

**Maternal Education**

H4. What is the last grade in school or college that you have completed? (CIRCLE ONE. PROBE TO DETERMINE THE HIGHEST LEVEL ATTAINED.)

- NO FORMAL SCHOOLING .....
- LESS THAN 8TH GRADE .....
- COMPLETED 8TH GRADE .....
- SOME HIGH SCHOOL .....
- COMPLETED HIGH SCHOOL OR GED .....
- SOME COLLEGE OR SCHOOL AFTER HIGH SCHOOL
- COMPLETED ASSOCIATE DEGREE, JUNIOR COLLEGE
- OR VOCATIONAL/TECHNICAL PROGRAM . . .
- COMPLETED BACHELOR'S DEGREE ADVANCED
- DEGREE (MA, MBA, JD, PHD, MD) .....
- OTHER (SPECIFY) .....

**Employment Status**

H5. What is your employment status right now—are you currently employed full time, part time, or not employed? (CIRCLE ONE.)

- EMPLOYED FULL TIME .....
- EMPLOYED PART TIME .....
- NOT EMPLOYED .....

**Automobile Ownership**

H6. Do you or anyone in your household own or lease a car, van, or truck? Do not include recreational vehicles, or motorcycles.

- YES .....
- NO .....

## CLOSING

That's all the questions I have. We want to thank you for participating in this interview. You have been a tremendous help in our study. Thank you very much. Goodbye.

DATE OF INTERVIEW: \_\_\_\_/\_\_\_\_/\_\_\_\_

INTERVIEWER NAME: \_\_\_\_\_

RECORD WHETHER INTERVIEW WAS CONDUCTED IN ENGLISH OR SPANISH:

ENGLISH .....

SPANISH .....

INTERVIEW WAS CONDUCTED:

AT ABT'S TELEPHONE RESEARCH CENTER ...

BY TELEPHONE IN THE FIELD .....

IN PERSON .....



# Appendix B

## Survey of Food Prices and Item Availability

This appendix summarizes the sampling for the Survey of Food Prices and Item Availability and presents information on response rates, sampling weights, files structure, and the average number of prices collected per store.

The Survey of Food Prices collected price data for a standard list of food items that meet the federal WIC nutrition requirements. In stores with scanners, prices for national brand items were collected by scanning a set of UPC cards and collecting the register receipt; prices for store-brand and private-label items were collected by searching the store aisles for items listed on an instrument. The latter procedure was used for all items in stores without scanners.

### Sampling

Two sample frames were constructed for this survey: a sample frame of WIC vendors, and a sample frame of non-WIC retailers authorized for the Food Stamp Program (FSP).<sup>1</sup> WIC vendors were selected in each State; non-WIC FSP retailers were selected in four States with WIC cost-containment vendor restrictions.<sup>2</sup>

The sample frames for the Survey of Food Prices contained stores located within the three survey areas selected for the Survey of WIC Participants. Thus the first stage sampling weights were identical to the first stage sampling weights for the Survey of WIC Participants. In contrast to the Survey of WIC Participants, the sample frame for the store survey was not stratified by location and the urban area did not undergo a second stage of sampling. WIC vendors in the three survey areas were pooled in a single sample frame; likewise, for four States, non-WIC vendors within the survey areas were pooled in a single sample frame.

Two types of WIC vendors were excluded from the sample frame: pharmacies and WIC-only stores. Redemption at pharmacies is primarily limited to infant formula purchases because pharmacies do not stock a full range of WIC food items. WIC-only stores were excluded from the sample because they stock only items approved for WIC purchase in their State, and as a result, they would not provide observation of unapproved items for price comparison. The sample frame of non-WIC FSP retailers was limited to supermarkets and grocery stores (as identified in the master list of FSP retailers obtained from USDA/FNS).

The target number of stores for selection was 18 WIC vendors in each of the six States and 12 non-WIC retailers in four States. Stores were selected with probability proportional to size (the measure of size for WIC vendors is average monthly WIC redemption reported in November 2000; the measure of size for non-WIC stores is average monthly FSP redemption reported in August 2000). Connecticut and Ohio did not have sufficient numbers of non-WIC stores in the sample frame to

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<sup>1</sup> Non-WIC stores were identified by matching FSP data, provided by USDA/FNS, to State lists of WIC vendors.

<sup>2</sup> Data on non-WIC stores were collected in California, Connecticut, Ohio, and Texas.

sample the target number of 12 stores. Altogether, the original sample included 108 WIC vendors and 43 non-WIC stores for a total of 151 retailers.

### Response Rates

The sample of stores is shown in table B-1. The total number of stores surveyed is 150. Four stores were replaced in the sample during the survey period: 2 stores closed and 2 stores refused to participate.<sup>3</sup> After the survey period one WIC vendor in Texas was identified as a WIC-only store and was dropped from the sample; sampling weights for Texas stores were adjusted accordingly. Similarly, one WIC vendor in Connecticut was determined to carry very few WIC items and was dropped; sampling weights were adjusted.

**Table B-1—Survey of Food Prices and Item Availability**

State	Stores	Item prices	Average	Stores with scanned data
			prices per store	
			<i>Number</i>	<i>Percent</i>
WIC vendors				
California	18	3,018	167.7	14 77.8
Connecticut	18	2,178	121.0	8 44.4
North Carolina	18	2,969	164.9	17 94.4
Ohio	18	2,503	139.1	12 66.7
Oklahoma	18	3,278	182.1	13 72.2
Texas <sup>a</sup>	17	3,004	176.7	17 100.0
All WIC vendors	107	16,950	158.4	81 75.7
Non-WIC vendors <sup>b</sup>				
California	12	471	39.3	2 16.7
Connecticut	8	407	50.9	3 37.5
Ohio	11	495	45.0	2 18.2
Texas	12	338	28.2	1 8.3
All non-WIC vendors	43	1,711	39.8	8 18.6

a One WIC-only vendor in Texas was sampled in error and subsequently dropped from the sample.

b Non-WIC vendors were surveyed in States with vendor restrictions.

Table B-1 also provides an indication of “item response.” The data collection instrument contained 412 items (in stores with scanners, 202 item UPCs were scanned and data collectors searched the aisles for 208 items).<sup>4</sup> Scanners were used to collect price data in 75.7 percent of WIC stores and 18.6 percent of non-WIC stores. On average, data collectors obtained 158 item prices in WIC stores and 40 in non-WIC stores.

<sup>3</sup> The refusals were a non-WIC store in Ohio and a WIC vendor in Texas; the closures were a WIC vendor in Oklahoma and a non-WIC store in Texas.

<sup>4</sup> Aside from national brand items, the count of items is generic in the sense that “private-label corn flakes” were counted as one item, even though the exact identity of that item varies across stores.

## Sampling Weights

Two sets of sampling weights were derived: WIC weights and FSP weights. WIC weights apply to all WIC vendors in a State; FSP weights apply to the full sample of WIC and non-WIC vendors in the four States with vendor restrictions.<sup>5</sup>

For each store in the survey, the base sampling weight equaled the reciprocal of the probability of selection, taking into account the two stages of sampling. First-stage weights are identical to the first-stage weights for the Survey of WIC Participants (these weights were derived by the probability of selecting each of the three geographic survey areas, with the measure of size for selection equal to WIC families). Second-stage WIC weights are equal to the probability of selection within the survey area—that is, the ratio of the store's average monthly WIC redemption to the total average monthly WIC redemption within the survey areas. Second-stage FSP weights were constructed for all FSP stores (WIC and non-WIC), and are equal to the ratio of the store's average monthly FSP redemption to the total average monthly FSP redemption at grocery stores and supermarkets within the survey areas.

For both sets of weights, the weights from each stage of sampling were derived with different data: participant data at stage one and store data at stage two. As a result, the base sampling weights did not sum to total redemption. A further adjustment brought the sum of the base WIC weights into agreement with total monthly WIC redemption in each State, and the sum of the FSP weights into agreement with total monthly FSP redemption (at grocery stores and supermarkets) in each State.

## Survey Instrument

Two data collection instruments were used—one each for stores with and without scanning systems. A copy of the instrument used in stores without scanners is attached. The other instrument was nearly identical; blocks for food items whose UPC codes were being scanned were crossed out to remind data collectors that these data were being collected elsewhere.

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<sup>5</sup> The two sets of weights were to be used independently for different analyses. The marginal impact of food-item restrictions on food package costs was analyzed using price data from WIC vendors. The marginal impact of vendor restrictions on food package costs was going to be analyzed using the pooled sample of WIC and non-WIC stores, but discovery that State policies had not excluded any stores removed the need for the analysis.



# Survey of Food Prices and Item Availability

(White version for use without scan cards.)

Store name: \_\_\_\_\_

Address: \_\_\_\_\_

Date and time of data collection:

Date: \_\_\_\_\_ Time at start: \_\_\_\_\_ am pm Time at end: \_\_\_\_\_ am pm

## Interviewer Instructions

This survey collects price and availability data for seven categories of foods that satisfy the federal regulations for the WIC Program. The data collection instrument is organized by food category so that most items on a page will be found within close proximity within a supermarket or grocery store. Information will be collected about three types of food products:

- **National brand products.** These products are identified by manufacturer and product name.
- **Store brand products.** These products bear the name of the supermarket or grocery store. For example, if you are in a Star Market, the store label products say “Star Market” on the package; in an IGA store, the store label will say “IGA.”  
Wherever “store label” appears on the instrument, enter the name of the store and look for products with the store label. Package sizes must be entered because they will vary by store.
- **Private label products.** Private label products are typically regional brands that appear in many different stores. Examples include “President’s Choice,” “Red & White,” and “Thrifty Maid.”  
Wherever “private label:” appears on the instrument, enter the private label brand carried by the store. Package sizes must be entered because they will vary by brand.

## Procedure

For each item on the instrument,

1. Locate item and record package size if store label or private label item.
2. Record the current price for each item. If item is on sale, record sale price.
3. Record the price even if the item is not on the shelf. Check shelf tags when space on the shelf indicates that an item is currently out of stock.
4. Mark “X” in price field if item is not in store.

**Note:** Some stores may have shelf markers identifying WIC foods. The shelf markers may help you find some of the items on the instrument. But remember that data must be collected for all items on the instrument, even if there is no WIC shelf marker for the item.

**INSTRUCTIONS: Enter price in space provided. Enter "X" if item is not available in store.**

**Milk, Eggs, and Refrigerated Orange Juice**

Instructions: Enter brand names in space provided.

<b>Fluid Dairy Milk</b>			
Store brand:	Quart Price	Half Gallon Price	Gallon Price
Whole milk			
1% Lowfat			
2% Reduced fat			
Skim or Nonfat			
Private label #1:	Quart Price	Half Gallon Price	Gallon Price
Whole milk			
1% Lowfat			
2% Reduced fat			
Skim or Nonfat			
Private label #2:	Quart Price	Half Gallon Price	Gallon Price
Whole milk			
1% Lowfat			
2% Reduced fat			
Skim or Nonfat			

<b>Specialty Milks</b>	Quart Price	Half Gallon Price
Acidophilus		
Buttermilk		
Goat's Milk		
Lactose Reduced		
Lactaid 70 (any variety)		
Lactaid 100 (any variety)		
Dairy Ease 100		
Store brand		
Other:		

<b>Dozen Eggs</b>	White Price	Brown Price
Medium		
Large		
Extra large		

<b>Refrigerated Orange Juice (carton)</b>		
	64 oz Price	128 oz Price
Store brand		

**INSTRUCTIONS: Enter price in space provided. Enter "X" if item is not available in store.**

**Cheese**

**Slices, Individually-wrapped**

American	12-oz	16-oz
	Price	Price
Borden singles		
Kraft singles		
Land O Lakes singles		
Store brand:		
Private label:		

**Slices, NOT Individually-wrapped**

American	8-oz	12-oz
	Price	Price
Borden singles		
Kraft Deli Deluxe singles		
Land O Lakes singles		
Store brand:		
Private label:		

**Prepackage blocks (8 oz or 10 oz size)**

Helluva Good	Size	Price
Cheddar		
Colby		
Monterey Jack		
Mozzarella		
Muenster		

Land O Lakes	Size	Price
Cheddar		
Colby		
Monterey Jack		
Mozzarella		
Muenster		

Kraft	Size	Price
Cheddar		
Colby		
Monterey Jack		
Mozzarella		
Muenster		

Lake to Lake	Size	Price
Cheddar		
Colby		
Monterey Jack		
Mozzarella		
Muenster		

Store brand	Size	Price
Store label:		
Cheddar		
Colby		
Monterey Jack		
Muenster		

Fill this section only if no specified national brands are found.		
Other brand	Size	Price
Private label:		
Cheddar		
Colby		
Monterey Jack		
Muenster		

Mozzarella cheese in blocks or balls	Size	Price
Cacique		
Frigo		
Messana		
Precious		
Polly-O		
Store brand:		
Other brand*:		

Deli cheese		Go to deli counter for these prices
Record <u>lowest</u> price for each type of cheese		
	Price / lb.	
American		
Muenster		
Provolone		
Swiss		

\* Fill in other brand only if no listed brands on shelf.

**INSTRUCTIONS: Enter price in space provided. Enter "X" if item is not available in store.**

**Infant Cereal, *without fruit***

Beechnut	8 oz	16 oz
	Price	
Barley		Not Available
Oats		
Rice		
Mixed		

**Infant Juice**

Beechnut	32 oz or 1 liter
	Price
Apple	
Pear	
White Grape	
Mixed Fruit	

Gerber	8 oz	16 oz
	Price	Price
Barley		
Oats		
Rice		
Mixed		

Gerber	32 oz or 1 liter
	Price
Apple	
Pear	
White Grape	
Mixed Fruit	

Heinz	8 oz	16 oz
	Price	Price
Barley		
Oats		
Rice		
Mixed		

Heinz	32 oz or 1 liter
	Price
Apple	
Pear	
White Grape	
Mixed Fruit	



**INSTRUCTIONS: Enter price in space provided. Enter "X" if item is not available in store.**

## Grocery Items

### Peanut Butter - 18 oz jar, regular creamy or crunchy

Peanut butter	Price
Jif	
Peter Pan	
Reese's	
Skippy	
Store label:	

### Dry Beans/Peas [Check bean aisle and imported foods aisle]

Goya		1-lb bag Price	Store-brand or private label		1-lb bag Price
			Label name		
Black beans			Black beans		
Black-eyed peas			Black-eyed peas		
Lentils			Lentils		
Mayacoba beans			Mayacoba beans		
Pinto beans			Pinto beans		
Red kidney beans			Red kidney beans		
Small red beans			Small red beans		

### Milk in the grocery aisle [Check the baking aisle]

Evaporated Milk* (12 oz can)		Price	Dry, powdered milk (box)		Price
			Size (ounces)		
Carnation			Carnation nonfat dry milk		
PET			PET nonfat dry milk		
Store label:			Store label:		
Private label:			Private label:		

\* Be sure to get evaporated milk, not sweetened condensed milk.

**INSTRUCTIONS: Enter price in space provided. Enter "X" if item is not available in store.**

**100% Juice - National Brands**

National Brands	46 oz can Price	46 oz plastic bottle Price	64 oz plastic bottle Price	11.5 or 12 oz can of concentrate Price
Campbell's Tomato				Not available
Campbell's V-8				
Del Monte Pineapple				
Dole Pineapple				
Hansen's Apple				
Juicy Juice (any variety)				Not available
Langer's Apple				
Langer's Orange				
Mott's Apple				
Northland Cranberry				
Seneca Apple				
Tree Sweet Orange				
Tree Top Apple				
Tropicana Orange (64 oz bottle)	Not available			
Welch's Grape (purple or white)				
Welch's Juicemaker (any flavor)	Not available			
White House Apple				

**100% Juice - Store brand**

	46 oz can Price	46 oz plastic bottle Price	64 oz plastic bottle Price
Apple			
Grape (purple or white)			
Grapefruit			
Orange			
Pineapple			
Tomato			
Vegetable			

**100% Juice - Private label**

Private label	46 oz can Price	46 oz plastic bottle Price	64 oz plastic bottle Price
Apple			
Grape			
Grapefruit			
Orange			
Pineapple			
Tomato			
Vegetable			

**INSTRUCTIONS: Enter price in space provided. Enter "X" if item is not available in store.**

**100% Juice - Frozen Concentrate - 11.5 or 12 oz can**

<b>National Brands</b>	<b>Price</b>
Dole Pineapple	
Dole Orange-Strawberry-Banana	
Minute Maid Apple	
Minute Maid Grapefruit	
Minute Maid Orange (original)	
Minute Maid Orange Pulp-free	
Old Orchard Apple	
Old Orchard Orange	
Seneca Apple	
Seneca Grape	
Tree Top Apple	
Tropicana Orange (original)	
Tropicana Season's Best Orange	
Welch's Grape (purple or white) - yellow strip	
Welch's White Grape-Raspberry	

<b>Store brand</b>	<b>Price</b>
Apple	
Grape (purple or white)	
Grapefruit	
Orange	
Pineapple	

<b>Private label</b>	<b>Private label</b>	<b>Price</b>
Apple		
Grape (purple or white)		
Grapefruit		
Orange		
Pineapple		

**INSTRUCTIONS: Enter price in space provided. Enter "X" if item is not available in store.**

**Hot Breakfast Cereal - National Brands**

<b>Quaker</b>	<b>Size</b>	<b>Price</b>
Instant Grits, regular/original	12 oz	
	24 oz	
Sun Country Quick Oats	16 oz	
Quaker Oatmeal		
Old Fashioned	18 oz	
Quick	18 oz	
Quaker Oat Bran Hot	16 oz	
<b>Little Crow Foods</b>		<b>Price</b>
CoCo Wheats		

<b>Nabisco</b>	<b>Size</b>	<b>Price</b>
Cream of Wheat, Regular	28 oz	
Cream of Wheat, Quick	14 oz	
	28 oz	
Cream of Wheat, Instant	28 oz	
<b>Malt-O-Meal</b>		<b>Price</b>
Quick	14 oz	
	28 oz	
Chocolate	28 oz	

**INSTRUCTIONS: Enter price in space provided. Enter "X" if item is not available in store.**

## Cold Breakfast Cereal - National Brands

General Mills	Size (oz)	Price
Cheerios	10	
	15	
	20	
	35	
Cheerios, Multi-grain	11.5	
	16	
Chex, Corn	12	
	17.5	
Chex, Rice	12	
	17.5	
Chex, Multibran	16	
Chex, Wheat	16	
Fill in size larger than 16, if available →		
Country Corn Flakes	12	
Kix, regular	9	
	13	
	36	
Total, Corn Flakes	10	
Total, Whole Grain	12	
	18	
Wheaties, regular	12	
	18	
Para Su Familia:		
Cinammon Corn Stars	15.5	
Raisin Bran	18	
Quaker	Size	Price
Crunchy Corn Bran	12	
King Vitaman	12	
Life, plain	15	
	21	
Oat Bran (red)	15.5	
Oatmeal Squares (blue)	16	
Toasted Oats	10	
Toasted Oatmeal (red)	16	

Kellogg's	Size (oz)	Price
Complete Oat Bran Flakes	14.8	
Complete Wheat Bran Flakes	17.3	
Corn Flakes	12	
	18	
	24	
Frosted Mini Wheats, Regular	16	
	20.4	
Frosted Mini Wheats, Bite Size	19	
	24.3	
Mini Wheats, Raisin	16.5	
Mini Wheats, Strawberry	16.5	
Product 19	12	
Special K	12	
	18	

Malt-O-Meal	Size (fill in)	Price
Puffed Rice		
Toasty-O's		

Post	Size	Price
100% Bran (blue)	17	
Banana Nut Crunch	15.5	
Bran Flakes (red)	16	
Grape Nut Flakes	14	
Grape Nuts	16	
	24	
Honey Bunches of Oats	16	
Almonds		
Graham	16	

\* Color of box appears in parentheses for lesser known brands.

**INSTRUCTIONS: Enter price in space provided. Enter "X" if item is not available in store.**

**Private Label and Store Brand Breakfast Cereal**

Enter store and private labels atop columns.  
 Enter size and price for each item. If multiple sizes available, choose size closest to 15 oz.

**Cold Cereals**

Store label:			Private label:		
	Size (oz)	Price		Size (oz)	Price
Bran Flakes			Bran Flakes		
Corn Flakes			Corn Flakes		
<b>Circle one:</b>			<b>Circle one:</b>		
Corn Puffs			Corn Puffs		
Crispy Corn Puffs			Crispy Corn Puffs		
Corn Crisps			Corn Crisps		
Silly Spheres			Silly Spheres		
Crispy Flakes			Crispy Flakes		
Crispy Hexagons			Crispy Hexagons		
Crispy Rice/ Crisp Rice			Crispy Rice/ Crisp Rice		
<b>Circle one:</b>			<b>Circle one:</b>		
Crunchy Corn			Crunchy Corn		
Toasted Corn			Toasted Corn		
Square-Shaped Corn			Square-Shaped Corn		
Corn Biscuits			Corn Biscuits		
<b>Circle one:</b>			<b>Circle one:</b>		
Crunchy Rice			Crunchy Rice		
Toasted Rice			Toasted Rice		
Square-Shaped Rice			Square-Shaped Rice		
Rice Biscuits			Rice Biscuits		
Rice Weaves			Rice Weaves		
Frosted Shredded Wheat (Reg)			Frosted Shredded Wheat (Reg)		
Frosted Shredded Wheat (Bite-Size)			Frosted Shredded Wheat (Bite-Size)		
<b>Circle one:</b>			<b>Circle one:</b>		
Nutty Nuggets			Nutty Nuggets		
Crunchy Nuggets			Crunchy Nuggets		
Krunchy Nutties			Krunchy Nutties		
<b>Circle one:</b>			<b>Circle one:</b>		
Tasteos			Tasteos		
Toasted Oats			Toasted Oats		
Toasty O's			Toasty O's		

## Appendix C

### WIC Transaction Data

Data on food items purchased during WIC transactions were obtained from six supermarket chains in five States over a 6-week period in late January through mid-March 2001. Two supermarket chains in North Carolina provided data; data were not obtained from Oklahoma. Table C-1 summarizes the characteristics of the transaction data.

The amount of data received from each supermarket chain varied widely. The study's goal was to collect data for as many of each chain's stores within the State as possible, but this was sometimes limited if the chain operated separate data systems for subsets of stores. One chain in North Carolina operates stores Statewide and provided data for all of its supermarkets within the State.

**Table C-1—Characteristics of WIC transaction data**

<b>State / supermarket chain</b>	<b>Stores (<i>n</i>)</b>	<b>Weeks (<i>n</i>)</b>	<b>Data collection period</b>	<b>WIC trans- actions (<i>n</i>)</b>	<b>Average trans- actions per store per week</b>	<b>WIC food items (<i>n</i>)</b>	<b>Average items per WIC trans- action</b>
California	12	6	Jan 29 - Mar 11	46,871	651	120,129	2.6
Connecticut	16	6	Feb 4 - Mar 17	4,722	49	18,315	3.9
North Carolina #1	446	5	Feb 4 - Mar 17	223,796	84	930,553	4.2
North Carolina #2	17	6	Feb 4 - Mar 10	4,444	52	28,330	6.4
Ohio	25	5	Feb 4 - Mar 10	55,500	444	170,307	3.1
Texas	80	5	Feb 14 - Mar 21	230,412	576	411,031	1.8

The study provided each participating supermarket chain with a desired file layout for the data they would be providing. The prescribed layout specified one record per food item. The supermarket chains then sent the transaction data each week to SmartSource Direct, a subcontractor that helped recruit chains for the study. SmartSource Direct formatted the data and forwarded them to Abt Associates.





# **Appendix D**

## **Interviews with Stakeholders**

At the beginning of the study, individuals from the following organizations were interviewed to learn about their perspectives on, and concerns about, cost-containment practices in the WIC program. All interviews were conducted by telephone, except where noted.

### **Food Marketing Institute (FMI)**

December 14, 1999  
Elizabeth Tansing, State Government/WIC Relations  
Kate Coler, Lobbyist  
Joe Williams, Gulf Coast Grocers Association

### **Grocery Manufacturers of America (GMA)**

December 15, 1999  
Chip Kunde, Manager, Federal Affairs  
Nick Pyle, Welch's  
Robert Bird, General Mills  
Mary Katherine Token, General Mills  
Cynthia Brizell, Kellogg's  
Larry Sawyer, Kellogg's  
David Drake, Gerber

### **National Grocers Association (NGA)**

December 16-17, 1999  
Thomas Wenning, Vice President and General Counsel  
Jim Smotherman, Alabama Grocers Association  
Jerry Fleagle, Iowa Grocers Association  
Pat Hicks, Kentucky Grocers Association  
Kathy Siefken, Nebraska Grocers Association  
Linda Doherty, New Jersey Food Council  
Wes Ball, Tennessee Grocers Association  
Rick Johnson, Texas Food Industry Association  
Jim Olsen, Utah Food Industry Association  
Michelle Kussow, Wisconsin Grocers Association

## **National WIC Association (NWA)<sup>1</sup>**

November 30, 1999

Doug Greenaway, Executive Director

Don Johnson, President; WIC Director, Utah

Bill Eden, Vice President; WIC Director, Colorado

Peggy Trouba, Food Cost Management Committee; WIC Director, Nebraska

Terry Bryce, WIC Director, Oklahoma

Phil Wagner, Vendor Management/Rebates, Colorado

## **Private Label Manufacturers Association (PLMA)**

December 1, 1999

Brian Sharoff, President

Ken Clarfield, Director, Industry Relations

Tim Simmons, Vice President, Public Relations

## **USDA, Food and Nutrition Service**

(All USDA staff are from Supplemental Food Programs unless otherwise noted)

### **National Headquarters**

November 24, 1999

Dawn Aldridge, Office of Analysis and Evaluation

Chris Casey

Linda Clark

### **Mid-Atlantic Regional Office**

November 12, 1999

Roberta Hodsdon

Sylvia Ryan

Delores Stewart

Diana Torrice

### **Midwest Regional Office**

November 15, 1999

Liza Cowden

Carla McGill-Yearby

Sandra Slayton

Steve Vrabel

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<sup>1</sup> Formerly the National Association of WIC Directors (NAWD).

**Mountain-Plains Regional Office**

November 22, 1999

Ralph Anzur

Jean Liekhus

Jeanette Montano

Karen Painter-Jacques

**Northeast Regional Office**

In-person interviews on November 10, 1999

Robert Mulvey

Eric Norman

Candice Stoiber

**Southeast Regional Office**

November 8, 1999

Lorine Bizelle

Peggy Fouts

Larilyn Pittman

**Southwest Regional Office**

November 10, 1999

Henry Barber

Bob Graybill

Ron Gwinn

Susan Mayer

**Western Regional Office**

November 10, 1999

Mike Drew

Lisa Medeiros

Ron Rizzo



# Appendix E

## State Cost-Containment Practices

State WIC agencies use several different approaches to control the costs of WIC food packages. These include:

- **Vendor selection practices**—Reducing prices of WIC foods obtained by participants by selecting lower priced stores for vendor authorization.
- **Item selection practices**—Reducing the unit price by restricting the brands, types, or package sizes allowed for purchase with WIC food instruments.
- **Manufacturer rebates**—Entering into agreements with specific manufacturers to negotiate a lower unit price for certain food items.

This appendix presents information on the general prevalence of cost-containment practices among all State WIC agencies.<sup>1</sup> The practices covered affect vendor selection, food-item selection, and manufacturer rebates for foods other than infant formula. The information provides a background to the indepth discussion of cost-containment practices in the six States selected for the study. The material in this appendix previously appeared in the evaluation’s interim report.<sup>2</sup> This information was used in selecting the six States to represent the variety of cost-containment practices.

The information in this appendix came primarily from documents collected in Fall 1999 from State WIC agencies (including State WIC-approved food lists and State vendor materials) and from discussions with national and regional WIC officials. Two national databases created and maintained by the USDA Food and Nutrition Service were used as well: the Store Tracking and Redemption Subsystem (STARS) database, to obtain counts of retailers authorized to participate in the Food Stamp Program (FSP) by State and store type classification (for example, supermarkets and grocery stores); and the Integrity Profile (TIP) database, to obtain counts of WIC-authorized vendors by State. Specific practices and individual States may have changed since 1999, but the overall patterns remain informative.

### Vendor Selection Practices

As stated in FNS regulations, the following principle governs the authorization of WIC vendors:

The State agency shall authorize an appropriate number and distribution of food vendors in order to assure adequate participant convenience and access and to assure that State or local officials can effectively manage review of authorized food vendors in their jurisdiction.<sup>3</sup>

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<sup>1</sup> The appendix includes information for the 50 States and the District of Columbia. State WIC agencies representing Indian tribal organizations; Puerto Rico and the U.S. territories are not included.

<sup>2</sup> Kirlin, John A. and Nancy Cole. *Assessment of WIC Cost-Containment Practices: An Interim Report to Congress*. Abt Associates, Inc. for U.S. Department of Agriculture, Economic Research Service, under contract number 53-K06-9-11, February 2001.

<sup>3</sup> 7 CFR 246.12(e)(2).

Thus, States must balance the goals of adequate participant access and adequate oversight. The regulations recognize this tradeoff by allowing, but not mandating, the States to establish criteria to limit the number of vendors.

State WIC agencies restrict the number of authorized vendors in two ways: by limiting the number, and by establishing selection criteria that applicant stores must meet or exceed to be authorized. Vendor limits are defined either in terms of a maximum number of those authorized (for the whole State or portions of it) or as a minimum ratio of WIC participants to vendors.<sup>4</sup> Selection criteria may require that vendors maintain a minimum inventory of WIC foods, charge competitive prices, be authorized for FSP participation, have WIC sales exceeding a certain dollar amount or certain percentage of total vendor sales, or have no history of WIC or FSP violations.<sup>5</sup> As of October 1, 2002, all States were required to use criteria for competitive prices, minimum variety and quantity of supplemental foods, and business integrity.<sup>6</sup>

### **Competitive Pricing**

The principal vendor selection criterion used for cost containment is a competitive pricing standard to exclude high-priced vendors. States with this criterion require that vendors charge a “fair and competitive price.” States differ in defining this price and in whether they use a competitive pricing criterion at application or in evaluating redemptions.

Table E-1 presents information on the use of competitive pricing standards in 1999, based on vendor application materials and vendor handbooks collected for this study from all States using retail food delivery systems. For the purpose of the study, the contractor identified whether competitive pricing was used at application and, if so, the relative stringency of the criterion.

Table E-1 shows that almost all States with retail delivery systems used competitive pricing at application. The relative stringency of the competitive pricing criterion is shown in the classification of States as “highly restrictive” or “less restrictive” in the table (last column). States requiring that applicants’ prices be lower than 110 percent of existing vendors’ average prices were classified as having a “highly restrictive” criterion; those with a threshold greater than 110 percent were classified as having a “less restrictive” criterion. Twenty of the 45 States with competitive pricing used the 110-percent, highly restrictive threshold; they are shown in the last column with an “H.” States using a less restrictive threshold (and those for whom the threshold could not be determined) are shown with an “L.”

Competitive pricing policies identify States that seek to contain WIC food costs by restricting WIC vendor selection based on price. It is apparent from table E-1, however, that the precise details of competitive pricing criteria could not be discerned for some States (those for which “NS%” is

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<sup>4</sup> According to 1999 vendor application materials collected from States for this study, 23 States set a limit on the number of authorized WIC vendors. Ten States limited the ratio of participants to vendors, 1 State limited the absolute number of authorized vendors in the State, and 1 State used both methods. Eleven States limited the number of vendors but did not specify the mechanism in their vendor application materials.

<sup>5</sup> Other selection criteria, used less frequently, include minimum specifications for days and hours of operation, store size or total food sales volume, and distance from the nearest authorized WIC vendor.

<sup>6</sup> 7 CFR 246.12(g)(3).

**Table E-1—Use of competitive pricing for vendor selection, 1999**

State (alphabetical by region)	State used competitive pricing	Competitive pricing criterion <sup>a</sup>	Stringency of criterion <sup>b</sup>
<b>Northeast</b>			
Connecticut	✓	Prices < avg + NS%	L
Maine	✓	Prices < avg + 10%	H
Massachusetts	✓	No <sup>c</sup>	H
New Hampshire	✓	Prices < avg + NS%	L
New York	✓	Prices < avg + 10%	H
Rhode Island	✓	Prices < avg + NS%	L
Vermont (home delivery)			
<b>Mid-Atlantic</b>			
Delaware (price-bid contracts)			
District of Columbia	✓	Prices < avg + NS%	L
Maryland	✓	Prices < avg + 25%	L
New Jersey	✓	Prices < avg + NS%	L
Pennsylvania	✓	Prices < max allowed	L
Virginia	✓	If vendor limit reached	L
West Virginia	✓	Prices < avg + 10%	H
<b>Southeast</b>			
Alabama	✓	Prices < avg + NS%	L
Florida	✓	Prices < avg + NS%	L
Georgia	✓	Prices < avg + 10%	H
Kentucky	✓	Prices < avg + 10%	H
Mississippi (home delivery)			
North Carolina			
South Carolina	✓	Prices < avg + NS%	L
Tennessee	✓	Prices < avg + 10%	H
<b>Midwest</b>			
Illinois	✓	Prices < avg + 5%	H
Indiana	✓	Prices < avg + 10%	H
Michigan	✓	Prices < avg + NS%	L
Minnesota	✓	Prices < avg + 20%	L
Ohio	✓	If vendor limit reached <sup>d</sup>	L
Wisconsin	✓	Prices < avg + 15%	L
<b>Mountain Plains</b>			
Colorado	✓	Prices < avg + 10%	H
Iowa	✓	Prices < avg + 5%	H
Kansas	✓	Prices < avg + NS%	L
Missouri	✓	Prices < avg + 10%	H
Montana	✓	Prices < avg + NS% <sup>e</sup>	L
Nebraska	✓	Prices < avg + 10%	H
North Dakota			
South Dakota	✓	Prices < avg + 15%	L
Utah	✓	Prices < avg + 5%	H
Wyoming	✓	Prices < avg + 15%	L
<b>Southwest</b>			
Arkansas	✓	Prices < avg + 10%	H
Louisiana	✓	Prices < avg + 10%	H
New Mexico	✓	Prices < avg + 10%	H

See footnotes at end of table.

—Continued

**Table E-1—Use of competitive pricing for vendor selection, 1999**

State (alphabetical by region)	State used competitive pricing	Competitive pricing criterion <sup>a</sup>	Stringency of criterion <sup>b</sup>
Oklahoma	✓	Prices < avg + 5% <sup>f</sup>	H
Texas	✓	Prices < avg + 8%	H
<b>Western</b>			
Alaska	✓	Prices < avg + NS %	L
Arizona	✓	Prices < avg + 30%	L
California	✓	Prices < avg + NS %	L
Hawaii	✓	Prices < avg + 30%	L
Idaho	✓	Prices < avg + 25%	L
Nevada	✓	Prices < avg + 5%	H
Oregon			
Washington	✓	Prices < avg + 20%	L
<b>Total</b>	45		

- a “Price < avg + NS %” denotes that State used competitive pricing at application, but vendor materials did not specify the terms of the competitive pricing scheme.
- b Twenty States with limits of 10 percent or less above average prices are rated as “H—highly restrictive; 25 States using prices for selection are rated as “L—less restrictive.”
- c Massachusetts did not reject applicants based on prices, but the State informed applicants if prices were above average and likely to incur penalties. The effect of this process was considered highly selective.
- d Ohio required new vendors to accept payment at no more than 90 percent of the maximum value of food instruments unless they applied during the regular authorization period, which occurred once every three years in each county.
- e Montana vendor selection information is from FNS profile; no materials received from State.
- f Oklahoma used competitive pricing criteria only at reauthorization.

specified for pricing criterion). Moreover, vendor selection practices that are comparable across States may result in different levels of participant access to vendors, depending on the precise details of implementation and the grocery retailing environment in each State.

### Ratio of WIC Vendors to FSP Vendors

To compare the effective levels of participant access to WIC vendors across States, the number of WIC vendors in each State was tabulated and compared to the number of FSP-authorized retailers. The FSP data are used to create a comparable measure across States. The ratio of the number of WIC vendors to the number of FSP-authorized retailers indicates the effective restrictiveness of WIC vendor policies. The higher this ratio, the greater the number of retailers participating in WIC and the less restrictive the State’s WIC vendor selection policy; States with more restrictive policies had lower ratios.

Table E-2 presents the number of WIC-authorized stores, by category of store, and the ratio of WIC- to FSP-authorized retailers for three store categories: supermarkets, grocery stores, and other retailers (all other store types). The last two columns of the table indicate the relative restrictiveness of a State’s vendor selection policies according to the ratio.



**Table E-2—Number of WIC vendors by State and vendor type, and ratio of WIC vendors to FSP stores within vendor category, 1999**

State (alphabetical by region)	Number WIC vendors by category <sup>a</sup>										Ratio of WIC/FSP retailers			Level of vendor restrictions <sup>b</sup>	
	Military commissary	Direct distribution	Home delivery	Pharmacy	WIC-only stores	Super- market	Grocery store	Other retailer	Type unknown	Super- market	Grocery store	Other retailer	Super- market	Grocery store	
<b>Northeast</b>															
Connecticut	1			78		267	257	200	32	0.93	0.70	0.35		L	
Maine	4			3		141	124	94	15	1.06	0.62	0.08	L	L	
Massachusetts	2			130		370	171	157	4	0.78	0.34	0.09	H		
New Hampshire				27		127	28	65	3	0.97	0.44	0.15			
New York				163		1,555	2,527	342	195	0.84	0.44	0.07	H		
Rhode Island				4		50	72	60	6	0.70	0.53	0.14	H	L	
<b>Mid-Atlantic</b>															
Delaware	1			3		47	13	4	2	0.64	0.18	0.02	H	H	
Dist. of Columbia	1			2		20			3	0.51	0.00	0.00	H	H	
Maryland	8			22		430	41	25	50	0.81	0.07	0.02	H	H	
New Jersey	2			33		430	96	12	32	0.63	0.06	0.01	H	H	
Pennsylvania						957	289	78	45	0.76	0.14	0.02	H	H	
Virginia	13			9	2	797	173	92	33	0.96	0.27	0.04		H	
West Virginia				15		274	136	88	21	0.98	0.31	0.06			
<b>Southeast</b>															
Alabama						671	170	129	14	1.01	0.43	0.07	L		
Florida	12			6	45	1,450	227	101	42	0.93	0.20	0.02		H	
Georgia	12			155		915	333	135	153	0.94	0.42	0.05			
Kentucky	2			78		565	389	294	32	0.90	0.44	0.13	H		
North Carolina	6			126	2	1,134	305	452	153	1.01	0.62	0.17	L	L	
South Carolina	7			116		607	97	58	30	1.03	0.32	0.04	L		
Tennessee	1			92	2	734	284	131	43	0.98	0.32	0.06			
<b>Midwest</b>															
Illinois		13				857	414	323	161	0.74	0.24	0.14	H	H	
Indiana		2		95		569	102	9	17	0.83	0.22	0.01	H	H	
Michigan				50		977	383	310	42	1.02	0.41	0.09	L		
Minnesota			10	156		433	285	310	33	1.06	0.73	0.17	L	L	
Ohio			2	170		675	248	120	41	0.55	0.20	0.04	H	H	
Wisconsin	2			130		595	316	103	34	1.01	0.69	0.09	L	L	
<b>Mountain Plains</b>															
Colorado	4			12		311	66	5	5	0.87	0.31	0.01	H		
Iowa				114		349	270	30	15	1.00	0.85	0.03	L	L	
Kansas	3			10		262	88	2	2	0.77	0.44	0.00	H		
Missouri	2			31		601	134	39	5	0.86	0.33	0.02	H		
Montana	1		17	7		139	99	46	4	1.03	0.68	0.10	L	L	
Nebraska	1			40		184	196	13	5	0.99	0.74	0.03		L	
North Dakota	1		3	19		98	124	16	8	0.98	0.96	0.06		L	
South Dakota	1					104	151	21	13	1.13	0.89	0.08	L	L	
Utah	2		3	23	1	204	56	26	6	1.03	0.53	0.07	L	L	
Wyoming				4		66	20	3	8	0.97	0.56	0.02		L	
<b>Southwest</b>															
Arkansas	1	1		1	3	365	175	18	9	1.02	0.34	0.02	L		
Louisiana	3			4		518	302	115	12	0.95	0.32	0.06			
New Mexico	2			8	3	182	58	29	2	0.98	0.38	0.04			
Oklahoma	4			31	5	387	134	17	5	1.04	0.44	0.01	L		
Texas	14			32	87	1,928	248	218	77	1.01	0.13	0.03	L	H	

See notes at end of table.

—Continued

**Table E-2—Number of WIC vendors by State and vendor type, and ratio of WIC vendors to FSP stores with (continued) category, 1999**

State (alphabetical by region)	Number WIC vendors by category <sup>a</sup>										Ratio of WIC/FSP retailers			Level of vendor restrictions <sup>b</sup>	
	Military commissary	Direct distribution	Home delivery	Pharmacy	WIC-only stores	Super- market	Grocery store	Other retailer	Type unknown	Super- market	Grocery store	Other retailer	Super- market	Grocery store	
	<b>Western</b>														
Alaska	6			1		65	29	97	5	1.33	0.31	0.29	L		
Arizona	1			4		437	64	18	6	0.97	0.24	0.01		H	
California				5	153	2,595	647	268	109	0.89	0.14	0.03	H	H	
Hawaii	6					107	11	8		0.91	0.06	0.01		H	
Idaho	1	4	2	6		158	92	14	3	1.02	0.73	0.06	L	L	
Nevada	2					131	9	14	1	0.99	0.09	0.04		H	
Oregon				7		376	98	29	98	0.90	0.28	0.03	H	H	
Washington	6			2		632	91	31	33	0.95	0.21	0.02		H	

a WIC retailers are categorized as “supermarket,” “grocery store,” or “other retailer” based on a match of the TIP and STARS databases. Vermont and Mississippi are excluded from the table because they use home delivery of WIC food items.

b An “H” indicates a highly restrictive policy in authorizing WIC vendors, with “highly restrictive” defined as having a ratio that falls in the lowest one-third of the distribution of ratio values. Those States whose ratios are in the top one-third of the distribution are labeled as “L,” or having less restrictive policies. States with neither an “H” nor an “L” have ratios falling in the middle one-third of the distribution.

Sources: WIC vendors: USDA, Food and Nutrition Service, *The Integrity Profile (TIP) Database*, October 1999.

Food stamp retailers: USDA, Food and Nutrition Service, *Store Tracking and Redemption Subsystem (STARS)*, August 1999.

The ratios in table E-2 are based on data in two databases. The number of FSP-authorized retailers comes from the FNS August 1999 Store Tracking and Redemption Subsystem (STARS), and the number of WIC-authorized vendors comes from FNS’ October 1999 The Integrity Profile (TIP) database.

For supermarkets, the ratio of WIC vendors to FSP retailers varied from a low of 0.55 in Ohio to a high of 1.33 in Alaska.<sup>7</sup> The distribution for grocery stores varied from a low of 0.06 in both Hawaii and New Jersey to a high of 0.96 in North Dakota. In many instances, States with a highly restrictive rating for one ratio had the same rating for both ratios. Similarly, many States had the less restrictive rating for both ratios.

For the purpose of this study, the contractor used the vendor ratios presented in table E-2 as a consistent measure of the restrictiveness of vendor selection across States. It should be noted, however, that the contractor could not—with complete certainty—attribute all differences in vendor ratios across States to the competitive pricing criteria implemented for cost-containment purposes. Other vendor selection policies, unrelated to cost containment (such as numeric limits and minimum standards), restricted the number of vendors to a level that could be effectively managed by State

<sup>7</sup> Because the TIP data are for a later month than the STARS data, some WIC/FSP stores may have been counted in one file and not the other. Also, WIC vendors may choose not to participate in the FSP. These factors explain the apparent anomaly of having more WIC vendors than FSP retailers.

agencies and ensured that vendors met standards to adequately provide program benefits. These vendor-selection policies also may have contributed to variation in ratios across States.<sup>8</sup>

## Item-Selection Practices

Federal regulations define standard food packages for seven categories of WIC participants: (I) infants 0 through 3 months; (II) infants 4 through 12 months; (III) children and women with special dietary needs; (IV) children 1 to 5 years; (V) pregnant and breastfeeding women (basic package); (VI) non-breastfeeding postpartum women; and (VII) breastfeeding women (enhanced package).<sup>9</sup> The regulations specify the types of foods in each package and the maximum quantities of each food that may be prescribed.

For participants receiving packages I, II and III, the purchase of infant formula, or medically prescribed formula, is the principal food expense. Food packages II and III also contain infant or adult cereal and juice. Food packages IV through VII each contain four major food groups: milk or cheese, eggs, breakfast cereal, and juice. In addition, packages IV and V contain legumes (peanut butter or dry beans), and package VII contains legumes, canned tuna fish, and carrots.<sup>10</sup>

Within the guidelines provided by the Federal regulations, States establish more specific policies for the quantities of foods prescribed to participants. By FNS policy, food quantities must not be reduced for cost-saving reasons, but States may tailor food packages to reduce quantities of foods for individual participants—or categories of participants—based on their nutritional needs, to accommodate participant preferences, intolerances, or household conditions. States, however, are encouraged by FNS to consider cost as well as nutritional impact when determining the allowable types and forms of foods in each food group. The flexibility to make “administrative adjustments” to allowable packaging and brands of foods is an important tool for controlling WIC costs.<sup>11</sup>

State WIC agencies implement the Federal regulations by assembling a list of “WIC-approved foods” that satisfy both the Federal regulations and the selection criteria of the State. Detailed State selection criteria are not always codified in State plans, but selection is generally based on:

- item availability within the State,
- participant preferences.
- per unit cost, and
- nutrient content (a few States specify criteria more stringent than Federal regulations).

States review and revise their WIC-approved food list annually or biennially to add new food items, drop discontinued items, or implement new selection criteria.

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<sup>8</sup> All States with numeric limits also had competitive pricing criteria. Discussions with FNS regional staff, confirmed by comparison of numeric limits with actual numbers of vendors, suggested that numeric limits were rarely binding on a Statewide basis, although they may have been binding in certain areas within a State.

<sup>9</sup> 7 CFR 246.10.

<sup>10</sup> Food packages IV through VI provide either milk or cheese or a combination of the two; package VII provides specific quantities of both milk and cheese.

<sup>11</sup> FNS Final WIC Policy Memorandum #97-7, May 1997.

Cost-containment item restrictions limit WIC participants' choice of the foods that may be purchased within the prescribed food package. WIC food lists collected from the States indicated four main methods by which item-selection was limited:

- “least expensive brand” policies,
- limits on package size,
- limits on product types and forms, and
- limits on the number of approved brands.

These item restriction policies are summarized in table E-3, as is the related use of manufacturer rebates.

Different methods of cost containment were often applied to the various categories of WIC foods (milk, cheese, eggs, peanut butter, cereal, juice). For the most part, States used different strategies for “dairy” items (milk, cheese, and eggs) and “branded” items (cereal, juice, and peanut butter). These differences arose because participants are more likely to have stronger choice preferences among branded items than among dairy items.

Brands of milk, cheese, and eggs are not highly differentiated in terms of ingredients, nutrient content, and product quality. As a result, limits on product choice within these food categories may not adversely affect participant satisfaction with WIC purchases. The cost-containment practices most often observed within the dairy food groups were “least expensive brand” policies, limits on package sizes, and limits on package form.

Breakfast cereal, juice, and peanut butter are branded grocery items. These products may be highly differentiated in terms of ingredients, nutrient content, or product quality. All State WIC-approved food lists included enumeration of allowable brands and types of breakfast cereal and juice; most States allowed purchase of any brand of peanut butter.

The next sections describe the specific ways in which item restrictions were implemented on State WIC-approved food lists.

### **Least Expensive Brand Requirements**

As noted in table E-3, State agencies with a least expensive brand policy specified on the WIC-approved food list that participants “must buy least expensive brand” for one or more particular food groups. Details of what this means varied slightly from State to State. Variants of the least expensive brand policy included:

Current lowest price:	Within a food category, participants must select the brand that is least expensive at the time of purchase.
Traditionally least expensive:	Within a food category, items chosen for the food list are those that have traditionally been least expensive.
Store brand or least expensive brand:	Within a food category, participants are required to purchase either the store brand or the least expensive brand.

**Table E-3—Types of item restriction cost-containment practices, 1999**

Type of practice	Definition	Examples
Require least expensive brand	Food list specifically stated "must buy least expensive brand." The policy was most often used for "commodity items": milk, cheese, eggs. The most common statements of this policy, appearing on food lists, are listed at right.	<p>"Least expensive is defined as the least expensive brand on the shelf at the time of purchase." (AR, FL, KS, NM)</p> <p>"Least expensive brand in the category of the participant's choice." (LA, ME)</p> <p>"Store brand/least expensive." (CT, NH)</p> <p>"Generic or store brand if available." (CO)</p> <p>"Must buy least cost brand." (CA, OK)</p> <p>"Least expensive brand." No further guidance. (GA, IL, MA, NV, NC, TX, UT, VA)</p>
Limit package size	Food list specified minimum allowable package sizes. The goal was to limit choice to products with low unit cost or to prohibit package sizes that would preclude purchase of full food prescription.	<p>Milk: restrict to 1/2 gallon or gallon size</p> <p>Cheese: restrict to 8-oz. size or larger</p> <p>Eggs: restrict to dozen per package</p> <p>Frozen juice: restrict to 12-oz. size</p> <p>Peanut butter: restrict to 18-oz. jar</p> <p>Cereal: restrict to 9-oz. size or larger</p>
Limit types and product forms	Food list specified certain product forms as prohibited, or listed certain allowable product forms. The goal was to limit choice to products with low unit cost, while meeting nutritional requirements.	<p>Cheese: prohibit string, shredded, grated, whips, spreads, "cheese foods"</p> <p>Eggs: limit to "large white" eggs</p> <p>"Shelf juice": prohibit liquid concentrates</p> <p>Peanut butter: prohibit organic, low-fat, added jelly, or added honey</p> <p>Infant cereal: prohibit cereal with fruit</p>
Limit brands	Food list contained a subset of available foods meeting Federal WIC nutrient requirements, to limit choice to products with low unit cost, or to keep the list of items "manageable."	<p>Juice: limit number of national brands listed in each flavor category</p> <p>Cereal: limit number of national brands and/or the number of products for each national manufacturer</p>
Manufacturer rebates	Contracts negotiated between State WIC agencies and manufacturers, specifying rebate amount on items purchased with WIC food instruments. The State WIC-approved food list limited choice to the rebate item within the food category.	Some States had contracts for infant cereal, infant juice, or adult juice.

States often adopted a “traditionally least expensive” approach because of the difficulties of implementing a food list with a lowest price policy. Whereas the “current lowest price policy” placed the burden on participants and vendors to determine the lowest price item at the time of purchase, the traditionally least expensive approach allowed the State to enumerate specific items on the food list. The “store brand or least expensive” approach was also adopted as an alternative to the lowest price policy approach, to allow for the purchase of national brand items when they were on sale, or when use of a coupon made the national brand less expensive than the store brand.

### **Limits on Package Sizes**

Choice of package size was generally limited for one of two reasons. The primary reason was to reduce food cost: larger packages generally have lower unit prices. Package size also was limited sometimes to ensure that the entire food prescription was purchased.<sup>12</sup>

When setting package size restrictions, States took into account the circumstances of participants and retailers. States with many small retailers (either in older cities or in rural areas) may have to be more flexible, because smaller retailers do not carry as many different sizes as larger supermarkets. Some States chose to take an educational approach rather than a regulatory one: they stressed the lower unit cost of larger packages in nutrition education.

### **Limits on Product Types and Forms**

Some food lists prohibited certain product forms within a product group (e.g., string, shredded, or grated cheese) or indicated allowable product types (e.g., cheddar and American cheese) or product forms (e.g., large white eggs). In either case, the goal was to limit choice to products with low unit prices (e.g., cost per ounce), thereby cutting the total cost of the food package.

### **Limits on Brands of Items Due to Nutrient Requirements and Cost**

As previously stated, peanut butter, breakfast cereal, and juice may be highly differentiated by brand in terms of ingredients, nutrient content, or product quality. Because of this, not all items within a WIC product category may meet the Federal WIC nutrient requirements. The primary purpose of State WIC-approved food lists is to enumerate products that meet the requirements; a secondary purpose is to enumerate products that meet State criteria for cost savings.

All peanut butter brands meet Federal WIC requirements for nutrient content, except forms with added jelly, honey, or other sweeteners. As a result, most WIC States approved all peanut butter brands for WIC purchase but excluded the types of peanut butter that did not meet Federal requirements.

Only six States restricted peanut butter purchases for cost containment, requiring the least expensive brand of peanut butter. As noted, the meaning of this requirement varied from State to State, so it is not clear whether some or all of these States effectively required the purchase of store-brand peanut

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<sup>12</sup> For example, Federal WIC food package regulations stipulate 18 ounces of peanut butter per month. Most States require purchase of peanut butter in 18-ounce jars. This package size requirement is likely due to the fact that purchase of 12- or 16-ounce jars of peanut butter cannot be supplemented with purchases of 6- or 2-ounce jars (because peanut butter is not available in these sizes). Therefore, only purchase of an 18-ounce jar represents full food package consumption.

butter, which would usually be least expensive. A few States, such as Texas, experimented with requiring store brands for peanut butter but then withdrew these requirements before 1999, citing participant dissatisfaction and reduced consumption of peanut butter.<sup>13</sup>

Within the cereal and juice categories, there is a wide range of choice in a typical supermarket, but only subsets of all manufactured cereals and juices meet the Federal WIC nutrient requirements. Within those subsets, each State WIC agency selected items eligible for WIC purchase and enumerated specific products (by brand and type) on the State's WIC-approved food list.

There was considerable variation across States in the number of breakfast cereals and juices on the food lists. Some variation in the number of branded items appeared to be due to the time and effort required to update the lists. States must annually review the nutrient content of items on their WIC-approved food list. By limiting the number of items, a State conserves costs of reviewing current items, approving newly available ones, and disseminating the changes to local agencies, participants, and vendors. Competing priorities for program managers also may lead some States to lag behind others in responding to the introduction of new brands in the marketplace.

Many of the State limits on branded food items, however, were clearly for cost-containment reasons. Typically, item restrictions for cost-containment purposes limited participants to items with low unit cost. For example, containment of food costs was clearly the motive when WIC agencies required purchase of store brands or placed limits on package size.<sup>14</sup> These two types of restrictions were directly observable on State WIC-approved food lists. (Some States used a per unit price cutoff when approving items for their food list, but the actual price cutoffs were generally not documented in State publications.)

In addition to restricting food lists to low-cost brands, WIC agencies were increasingly aware of the cost-reducing advantages of adding store brands to their food lists. Both FNS and industry sources indicated that numerous States have opened up their food lists to increasing numbers of store brands in recent years, responding to the availability and popularity of these alternatives to national brands. Because State agencies often track the food lists of neighboring States, this change has tended to spread on a regional basis.

### **Summary of Item Restrictions**

The item restrictions observed on State WIC-approved food lists are summarized in table E-4. For this table, and in the subsequent discussion, the focus is on the main categories of food that account for most WIC purchases, for example, fluid milk as opposed to evaporated, dry, or lactose-free milk; or peanut butter as opposed to dried beans or peas. The first three columns of table E-4 contain indicators of least expensive brand policies, store-brand requirements, and product-size restrictions, respectively. In each of these columns, food groups are denoted by abbreviation ("m" stands for milk, "c" for cheese, "e" for eggs, and so on, as defined in the footnote to the table).

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<sup>13</sup> Interview with Texas WIC director conducted on February 27, 1997 by Peter Bramble and Leigh White, U.S. General Accounting Office.

<sup>14</sup> Except, as noted above, for peanut butter.

Under “Range of choice,” table E-4 indicates whether the range is “narrow” or “broad” for branded food items. States were classified as either narrow or broad choice based on the number of national-brand breakfast cereals and juices on the State food list. States with a number of items in the top quartile were classified as broad choice; those with a number of items in the bottom quartile were classified as narrow choice. For example, approximately one-fourth of all States allowed 22 or fewer juice choices for WIC purchase, and approximately one-fourth of States allowed 13 or fewer national brands of cold breakfast cereals. These States were classified as narrow-choice States in table E-4. Conversely, States allowing the highest number of choices (in the top quartile) were classified as broad choice.

**Table E-4—Item cost-containment practices, 1999 (alphabetical by region)**

State	Least expensive brand	Require store brands	Restrict product size <sup>a</sup>	Range of choice		
				Cold cereals	Adult juices <sup>b</sup>	Rebates on foods
<b>Northeast</b>						
Connecticut	m,c,e,j,pb		cer,fj			Gerber (cereal)
Maine	j		cer,fj	Narrow		
Massachusetts	m		cer,fj	Broad		
New Hampshire	m,e,pb		m,fj			
New York			m,cer,fj	Narrow		Gerber (cereal)
Rhode Island (missing food list)						
Vermont (home delivery)						
<b>Mid-Atlantic</b>						
Delaware			c	Narrow	Narrow	Gerber (cereal/juice)
District of Columbia					Narrow	Gerber (cereal/juice)
Maryland			m,fj		Broad	Gerber (cereal/juice)
New Jersey			m,cer,fj			
Pennsylvania			cer,fj			
Virginia	m		m,fj			
West Virginia			fj			Gerber (cereal/juice)
<b>Southeast</b>						
Alabama			m,fj			
Florida	m,e,j		m,cer		Narrow <sup>b</sup>	
Georgia	e,j		m,c,cer			
Kentucky			fj			
Mississippi (home delivery)						
North Carolina	m		cer,fj		Broad	
South Carolina			fj		Broad	
Tennessee			m,cer,fj	Broad	Broad	
<b>Midwest</b>						
Illinois	m,c		m,fj	Broad	Broad	
Indiana			m,cer,fj			Beechnut (cereal)
Michigan			cer,fj		Broad	
Minnesota			m,cer,fj	Broad	Broad	
Ohio			m	Broad	Broad	
Wisconsin			m,fj	Broad	Broad	
<b>Mountain Plains</b>						
Colorado		m,c,e	c,fj	Broad		
Iowa			fj	Broad		
Kansas	m,c,e,j,pb,ic		c,cer,fj	Narrow		
Missouri (missing food list)						
Montana				Broad		
Nebraska		m	fj		Narrow	

See footnotes and definitions at end of table.

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**Ta(continued) | cost-containment practices, 1999 (alphabetical by region)**

State	Least expensive brand	Require store brands	Restrict product size <sup>a</sup>	Range of choice		Rebates on foods
				Cold cereals	Adult juices <sup>b</sup>	
North Dakota			m	Broad		
South Dakota			cer			
Utah	m,c,e,j,pb		fj		Narrow <sup>c</sup>	
Wyoming			fj		Narrow <sup>c</sup>	
<b>Southwest</b>						
Arkansas	m,c,e,j		c	Broad		
Louisiana	m		m,c,fj	Narrow		
New Mexico	m,c,e,j,pb		cer,fj	Narrow	Narrow <sup>c</sup>	
Oklahoma	m,c,e	cer	m,cer,fj	Narrow	Narrow	
Texas	m,j		m,cer,fj	Narrow	Narrow <sup>b</sup>	Gerber (cereal)
<b>Western</b>						
Alaska			fj		Broad	
Arizona			fj	Narrow		
California	m		m,c,cer,fj	Narrow	Narrow	Gerber (cereal); adult juice
Hawaii			m,cer,fj	Narrow	Narrow	
Idaho			fj	Narrow		
Nevada	m,e,pb		cer		Narrow <sup>b</sup>	Gerber (cereal)
Oregon			fj		Narrow	
Washington			fj		Broad	

a Restricted product size is indicated if minimum size was: 1/2 gallon or 1 gallon for milk; 9 oz. or larger for cheese; larger than 6 oz. of frozen juice; any specified size for cereal. If food list required "least expensive or store brand," then only "least expensive" column is checked.

b Least expensive brand policy reduced number of allowed national brands.

c Only frozen juice allowed

Definitions:

c = cheese  
cer = cereal  
e = eggs  
fj = frozen juice

ic = infant cereal  
j = juice  
m = milk  
pb = peanut butter

## Manufacturer Rebates

Manufacturer rebates were the third type of cost-containment practice examined by this study. WIC State agencies competitively solicit sole-source rebate contracts for a particular food item, such as infant cereal. In exchange for a rebate for each unit of food purchased, the State agency issues only the contracted food item to participants. For example, a State having a rebate agreement with Gerber for infant cereal approves only the Gerber brand for WIC purchases. Thus, from the WIC participant's view, a manufacturer's rebate appears as an item restriction.<sup>15</sup> In 1969, California had negotiated rebate contracts with several juice manufacturers; each contract specified the manufacturer's brand as the sole authorized brand for one or more types of juice.

<sup>15</sup> Some States (such as Missouri and Ohio) received grants from a juice manufacturer based on total sales of the manufacturer's juices, without having any formal agreement. In the Northeast region, the State agencies received compensation to offset the effects of the region's dairy compact on wholesale prices. These arrangements are not considered as rebates in this study because they had no impact on participants' choice of WIC foods.

Manufacturer rebate contracts are shown in the last column of table E-4. Nine States and the District of Columbia had rebate contracts in place in fall 1999. Nearly all rebate contracts were for infant cereal and infant juice; the exception was California's contracts for adult juice, which expired in January 2000.

# Appendix F

## Administrative Costs of Cost Containment

This appendix describes the method of estimating the administrative costs of cost-containment practices, including the data collection process, and presents the estimates for each practice covered by the study. This information is provided primarily to explain the sources and limitations of the overall cost estimates presented in chapter 2. Readers are cautioned to keep the data limitations in mind when reviewing the detailed results.

### Data Sources and Limitations

The six case study States did not collect specific data on the administrative costs associated with cost-containment practices. Federal reporting requirements do not require identification of these costs, so none of the States tracked the costs at the necessary level of detail.<sup>1</sup> Only one State, California, had studied some of these costs.

Due to the absence of data, this study relied on estimates of staff time (and other costs, where possible) collected from WIC agency officials through structured interviews. This approach depended on a combination of experience and subjective estimates, but provided the best available insight into the administrative costs of cost-containment practices.

The State and local staff members were asked to identify which of these tasks they performed, how often they did each task, and how much time they spent on each task (per event or per year). To convert time estimates into costs, data were collected on salaries, fringe benefits, and indirect costs for the staff involved in cost containment.<sup>2</sup>

If a task was not performed solely for cost containment, staff members were asked to estimate what proportion was attributable to the cost-containment practice. This estimate was based on the relative importance of cost-containment objectives or the share of resources attributable to them. For example, some local staff members were most comfortable estimating the total time spent providing training to new participants on program objectives and procedures. They then gave their best estimates of the proportion of this training devoted to restrictions on food purchases shaped by cost-containment practices (for example, requirements to purchase the least expensive brand).

With rare exceptions, the respondents could identify only labor costs. Several cost-containment practices require support from automated data processing (ADP) systems, but these ADP costs could not be broken out, either for operations or for initial implementation, because of the highly integrated nature of the ADP systems.<sup>3</sup>

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<sup>1</sup> State WIC agencies report their WIC nutritional and administrative service (NSA) costs to FNS, by function. The functional framework does not differentiate the very specific administrative costs associated with cost containment.

<sup>2</sup> Some States (e.g., Connecticut) do not charge indirect costs against their WIC NSA grants. Indirect costs are included in the administrative cost estimates for all States so that the estimates are complete and comparable.

<sup>3</sup> State staff members often noted that the most significant expenditure of ADP resources to facilitate cost containment was in the development stage of their systems, when the staff and contractors were designing and testing the on-line functions and reports.

To incorporate other costs associated with staff activities, State and local indirect cost rates were added to the hourly cost of staff time (including salaries and fringe benefits).<sup>4</sup> Respondents occasionally noted other costs that might theoretically be included (such as a share of travel costs for store visits to collect prices and other information onsite). There was no basis for estimating these costs, however, and they were generally thought to be too small to affect the estimates in a noticeable way.

The cost estimates in this chapter are presented with the recognition that they rely on subjective interpretation of experience. Individual responses may be subject to random estimation error, and respondents may have been biased toward estimating their costs high or low. The interviewers probed carefully to minimize the likelihood of error or bias. The availability of multiple estimates for each activity provides the opportunity for errors and biased responses to offset each other. Therefore, the discussion in the chapter focuses primarily on the average administrative cost for each cost-containment practice, rather than on the extremes.

Each table of administrative cost estimates includes an average cost figure for all six States or a subset of the States. In computing these averages, the State-level estimates were given equal weight, without regard to the size of the State. This approach, used both here and in the main report, is appropriate because the study is treating the experiences in the States as case studies. The averages are not meant to be generalizable to a larger population of States.

## **Costs of Using Price Data in Vendor Authorization**

As shown in table F-1, five of the six States provided data to estimate the administrative costs of using price data in vendor authorization. The estimated costs ranged from \$0.01 per participant per year (PPY) in Ohio to \$0.10 PPY in Oklahoma. Among the States with estimated costs for this practice, the average was \$0.06 PPY. Three States (California, Connecticut, and Texas) had costs within \$0.02 PPY of the average. North Carolina did not identify any costs associated with this practice, because it did not restrict vendor authorization based on price. Instead, the State included costs for its price surveys in its costs for using price data to limit vendor payments (discussed in appendix G).

The State respondents varied in their treatment of the costs of collecting and processing vendor data, because they used the data for several purposes: to check the prices of applicants and authorized vendors, to set or modify maximum food prices, and to gather information for projecting food package costs. Therefore, the responses were affected by the different approaches to using price data in vendor authorization, as follows:

- For California and Connecticut, the costs of price surveys used during authorization cycles were included in the costs of using price data for vendor authorization. The costs of price surveys between authorization cycles were included in the cost of another function, using price data to limit vendor payments.<sup>5</sup>
- For North Carolina, all costs associated with collecting and analyzing price survey forms were included in the costs of using price data to limit vendor payments.

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<sup>4</sup> Indirect cost rates typically included generic expenses such as telephone service, postage, paper, copying, office equipment, and space.

<sup>5</sup> See appendix G for further information on this vendor management function.

- For Ohio and Oklahoma, only the in-store price checks at the time of application were included, because the States relied primarily on these price checks for authorization decisions. All price survey costs were included in the costs of using price data to limit vendor payments.<sup>6</sup>
- For Texas, costs for this function included price checks by local WIC staff members during preauthorization visits and monitoring of prices based on redemption data to identify vendors subject to warnings for excessive prices. Texas did not use vendor price surveys for authorization or reauthorization.

**Table F-1—Use of price data in vendor selection**

State	Total labor (w/ fringe)	Total indirect	Total loaded labor	Cost per participant per year	FY 2001 average participation
		<i>Dollars</i>			<i>Number</i>
California <sup>a</sup>	46,641	8,395	55,036	0.04	1,243,509
Connecticut <sup>a,b</sup>	2,902	1,103	4,005	0.08	49,253
North Carolina <sup>c</sup>	—	—	—	—	200,121
Ohio <sup>a</sup>	1,416	318	1,733	0.01	247,092
Oklahoma <sup>d</sup>	7,443	1,063	8,506	0.10	87,467
Texas <sup>e</sup>	45,871	4,239	50,111	0.07	750,122
Average <sup>f</sup>				0.06	

a Includes all vendor price survey costs (see text).

b State indicated uncertainty of plus or minus 20 percent.

c Not applicable; see text.

d Some uncertainty about cost-containment percentage.

e Redemption data used for renewals.

f Includes all but North Carolina.

Source: Interviews with State officials.

Each State's costs represent the activities necessary for the State's use of price data in vendor authorization. Only in Texas did the interim monitoring of vendor prices between authorization cycles have a direct effect on the reauthorization of vendors. In the other States, the interim monitoring of prices through periodic surveys was a vendor management practice linked to the setting of maximum values for food instruments. Vendor management might have had an indirect effect on vendor authorization, but not a sufficient connection to warrant inclusion of interim survey costs in table F-1.

The scope of the included activities does not fully explain the differences in estimated costs per participant between California and Connecticut, which used price surveys, and also between Ohio and

<sup>6</sup> As discussed in chapter 2, Ohio's vendor price criteria became effective only when vendor applications for a given county exceeded the State's limit on the number of vendors. Although the numeric limits have not been reached, the presence of the price criteria entails the cost of the onsite price checks. Therefore, Ohio has a cost for this practice, even though it is non-binding.

Oklahoma, which relied on onsite visits to vendors for price data used in authorization. Several other factors may have contributed to these differences. The differences in scale of WIC operations may help explain higher costs in Connecticut and Oklahoma, the two smallest of the study States. The other States that used similar methods might have been able to process vendor price information more efficiently. Second, there might have been differences in the quantity of price information obtained for each vendor or the quality of the information provided by the vendors. Such differences would affect the costs of compiling and using the vendor price data. Oklahoma put greater emphasis on using vendor price data in authorization than Ohio, and this difference may have contributed to staff spending more time to collect price data during store visits. Third, the estimates are based on the experience of State officials, but there is a subjective element. The Connecticut and Oklahoma respondents may have perceived cost-containment tasks as more time-consuming than did the other respondents; lacking direct objective measures of time spent, it was not possible to determine whether such a bias was present or which States' perceptions were more accurate.<sup>7</sup>

More generally, the data do not indicate whether the cost differences are the result of real differences in process and cost structure, measurement error, or a combination of these factors. Given these uncertainties, the cost data should be used with appropriate caution, with more reliance on the averages than on individual State estimates.

## **Costs of Using Cost Criteria for Food-Item Restrictions**

The administrative costs of food-item restrictions include three components, each analyzed separately for this report:

- Using cost criteria in constructing WIC food lists;
- Communicating information on price-based restrictions on allowable foods to participants; and
- Communicating information on price-based restrictions on allowable foods to vendors.

The study also analyzed the administrative costs associated with infant cereal rebate contracts in the three States that had them.

### **Constructing WIC Food Lists**

Estimates for the first component, using cost criteria in constructing WIC food lists, are presented in table F-2. As indicated, these costs were estimated for four of the six States, excluding California and Ohio. Both those States applied cost criteria in constructing and updating their food lists, but neither was able to provide information on the associated level of effort and administrative costs. The estimated costs were \$0.03 PPY or less for North Carolina, Oklahoma, and Texas. In contrast, the estimated cost for Connecticut was \$0.71 PPY.

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<sup>7</sup> The Connecticut estimates were obtained through in-person interviews, whereas the other estimates were obtained through telephone interviews and correspondence. The method of obtaining the data may have influenced the estimates. Lacking other data from in-person interviews, there was no way to determine whether the data collection method affected the results, or which approach should be considered more reliable.

**Table F-2—Use of price data in selecting allowable brands, varieties, and packages**

State	Total labor (w/ fringe)	Total indirect	Total loaded labor	Cost per partici- pant per year
	<i>Dollars</i>			
California <sup>a</sup>	—	—	—	—
Connecticut <sup>b</sup>	25,395	9,650	35,045	0.71
North Carolina <sup>c</sup>	4,714	844	5,558	0.03
Ohio <sup>d</sup>	—	—	—	—
Oklahoma <sup>e</sup>	1,517	217	1,733	0.02
Texas <sup>e</sup>	1,756	116	1,872	<0.01
Average <sup>f</sup>				0.19

a Did not provide data; excluded from average.

b Half of food package formulation cost—percentage may be high.

c Cost-containment percentage uncertain—cost containment total could range  $\pm$  50 percent.

d No cost-containment percentage estimate, but appears very small from description.

e See text regarding changes over time.

f Includes all but California and Ohio.

Source: Interviews with State officials.

Several of the States were able to estimate their overall administrative effort for constructing their WIC food lists, but had difficulty estimating the proportion of time spent on cost issues. This was the primary barrier to formulating estimates for California and Ohio. The process descriptions indicate that the California WIC staff spent a substantial amount of time looking at the cost of foods under consideration, but that the Ohio staff did not. For North Carolina, estimating this cost left a substantial amount of uncertainty—as much as 50 percent of the estimated \$0.03 PPY cost. Given the small size of the overall cost, however, the uncertainty would not translate into a large dollar amount PPY. Connecticut respondents estimated that half the time spent on food list development was related to cost containment. In Connecticut, a low proportion of stores are supermarkets, and the other WIC vendors necessary to assure adequate access have relatively high prices. This situation makes it particularly challenging to hold down food package costs.<sup>8</sup> Texas and Oklahoma, on the other hand, were able to estimate directly the modest amount of time spent by their staffs on cost-containment issues related to their food lists.

The proportion of WIC food-list development time devoted to cost issues may vary considerably over time. In discussions of the evolution of their WIC food lists, the States indicated that their relative degree of concern over food costs had fluctuated a good deal over the last decade, as the challenges of growth had been supplanted by the challenges of maintaining participation. The States did not

<sup>8</sup> The Connecticut estimate would also vary substantially if the proportion attributed to cost containment were increased or decreased. As a hypothetical example, if the cost-containment portion of food package development costs in Connecticut were 25 percent instead of 50 percent, the estimated cost would be \$0.36 PPY and the overall average for the four States with estimated costs would be \$0.10 PPY. The estimated level may appear high, but food cost is clearly an important consideration in this process. Connecticut was investigating the costs of implementing a more culturally appropriate food package for its increasing minority populations. As a result, the overall level of effort for food package development may have been greater than usual.

discuss the effect of these shifts on the allocation of staff time. It is likely that some States—especially Texas and Oklahoma—devoted more staff time to analyzing the cost implications of food-list choices in the early- to mid-1990s than they did later. In the late 1990s, as economic conditions improved, these States were under less pressure to minimize food costs.

Differences in scale played a minor role in the cost differences among the States for this function. Food-list development is a centralized activity, and the level of effort is almost entirely independent of the State’s size. Thus, a very large State (such as Texas) will have a much smaller cost on a PPY basis than a smaller State (such as Oklahoma) that spends a similar amount of staff time on this function. The small size of the Connecticut WIC population may have contributed to the high cost per participant for this activity.

### Communicating Information on Price-Based Food Restrictions to Participants

The estimated costs for communicating information on price-based restrictions on allowable foods to participants averaged \$0.52 PPY among the four States providing cost data on this function, as shown in table F-3. This involved providing training and other information on all cost-containment practices affecting food selections by participants, including least expensive or store-brand restrictions, package-size restrictions, and specific brands or food types authorized by the State. This activity represented by far the largest average administrative cost of all of the cost-containment practices analyzed in this report. The range was relatively narrow (in percentage terms), from \$0.44 PPY in North Carolina to \$0.67 PPY in California. Costs were not estimated for Connecticut and Oklahoma, as discussed below.

**Table F-3—Communicating information on price-based food restrictions to participants**

State	Total labor (w/ fringe)	Total indirect	Total loaded labor	Other costs	Grand total	Cost per participant per year
	<i>Dollars</i>					
California <sup>a</sup>	731,136	104,883	836,019	—	836,019	0.67
Connecticut <sup>b</sup>	—	—	—	—	—	—
North Carolina <sup>c</sup>	85,252	3,027	88,279	—	88,279	0.44
Ohio <sup>d</sup>	100,971	11,106	112,078	—	112,078	0.45
Oklahoma <sup>e</sup>	—	—	—	—	—	—
Texas <sup>f</sup>	315,514	30,395	345,908	26,819	372,727	0.50
Average <sup>f</sup>						0.52

a Local costs ranged from \$.36 to \$.88 per participant.

b Two sites said no impact; one could not estimate. See text for discussion.

c Local costs ranged from \$0.00 (two sites) to \$1.32 per participant.

d Local costs ranged from \$0.00 (one site) to \$1.30 per participant.

e No cost-containment impact identified. See text for discussion.

f Local costs ranged from \$.16 (one site) to \$1.00 (one site) per participant.

g Includes all but Connecticut and Oklahoma.

Source: Interviews with State and local officials.



Unlike other costs analyzed for this chapter, the costs for this function were derived almost entirely from local agency interviews. For each local agency, the cost PPY was estimated from the interview data. For each State, the simple average of the local agency estimates was computed to estimate the statewide cost PPY, and the statewide annual cost was computed using this figure and the average statewide participation level for FY2001. This method was used for other local agency costs, but these were rarely identified for other functions. State costs were included in this function when reported (primarily for developing training materials and training local agencies). The interview sample was very small for statewide estimates, but the average cost PPY is representative of the areas where participant data were collected for the study.<sup>9</sup>

In 8 of the 18 local agencies contacted for the study (including 2 of the Connecticut sites and all 3 Oklahoma sites), local respondents expressed the view that cost-containment restrictions had no impact on participant training costs. This response can be interpreted two ways. The respondents may have meant that they truly spent no resources (or at least so little as to be immaterial) on this function, or they may have meant that their training costs would be the same if the restrictions were eliminated (thus assuming that training on other functions would be increased to substitute for time spent on cost containment). In the States with a broad range of estimated costs for this function, the analysis conservatively assumed that the intent was to report that the costs were essentially zero, and the data from these sites were included in the averages. On the other hand, in the absence of any positive estimates from local agencies in Connecticut and Oklahoma, we chose not to estimate this cost for those States. It is impossible to tell whether these local agencies truly experienced no costs or whether they were just unable to separate this portion of participant training from other aspects (nutritional content of WIC foods, use of food instruments, etc.).

The estimated costs for informing participants about price-based restrictions on food selection are larger than for other cost-containment functions because this task requires direct communication with individuals or groups. Thus, there are no great economies of scale, although larger agencies sometimes provided training on WIC shopping in a group setting. The relatively consistent cost PPY among the four States with estimates reflects similarities in the training process and in the average time devoted during training to cost-containment restrictions.

This consistency should not be overemphasized, because the local agencies varied widely in the magnitude and precision of their estimates. Among the local agencies with non-zero estimates, the range was from \$0.06 PPY in the largest Ohio site to \$1.32 PPY in one of the North Carolina sites. In 3 of the 4 States, the highest local estimate for this task was \$1.00 PPY or more. The presence of estimates of this magnitude in North Carolina and Ohio is particularly surprising, given the minimal restrictions on food choices in these States. California and Texas had the clearest evidence that local agencies generally spent a measurable amount of resources on this function, with minimum local agency estimates of \$0.36 PPY and \$0.16 PPY, respectively. Given the amount of variation among the local agencies, it is unclear whether the differences among States reflect State policies or the specific practices of the local agencies in the sample.

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<sup>9</sup> As discussed in appendix A, the local agencies selected for interviews served the largest number of participants in the sample frame for the participant survey.

## Communicating Information on Price-Based Food Restrictions to Vendors

### *Training and Responding to Inquiries*

Table F-4 presents the estimated costs for communications with vendors regarding price-based restrictions on allowable foods. The average cost among the three States that provided estimation data was \$0.07 PPY, ranging from \$0.02 PPY in Oklahoma and Texas to \$0.16 PPY in Connecticut. These costs include training vendors and answering inquiries from vendors about all price-based food-item restrictions, including least expensive and store-brand restrictions, package-size limitations, and specific brands or types authorized by the State.

**Table F-4—Communicating information to vendors on price-based food restrictions and monitoring vendor compliance**

State	Total labor (w/ fringe)	Total indirect	Total loaded labor	Cost per participant per year
	<i>Dollars</i>			
California <sup>a</sup>	—	—	—	—
Connecticut <sup>b</sup>	5,750	2,185	7,934	0.16
North Carolina <sup>c</sup>	—	—	—	—
Ohio <sup>d</sup>	—	—	—	—
Oklahoma <sup>e</sup>	1,817	260	2,076	0.02
Texas <sup>f</sup>	16,507	1,300	17,807	0.02
Average <sup>g</sup>				0.07

a Provided total training time; missing cost-containment percentage— excluded from average.

b May include vendor communications on other cost-containment practices not covered elsewhere.

c State said not applicable, but did have least expensive milk restriction that must be explained to vendors.

d No State cost; one county estimated \$214/year. According to State, no other local agencies did this.

e No cost-containment percentage estimated for compliance enforcement; not a priority, but State does test.

f Includes vendor calls handled by local agencies (two at \$0, one at \$0.02 PPY). No compliance cost.

g Includes all but California, North Carolina, and Ohio.

Source: Interviews with State officials.

The States that provided estimates for this function were generally able to identify the overall time spent on vendor training, which was a scheduled and standardized activity. To the extent that the training addressed specific cost-containment practices, such as least expensive brand requirements, the States could estimate the amount of time spent explaining these practices in vendor training. Practices that revolved around the specification of particular brands or types did not generally require any identifiable training effort, other than presentation of the authorized food lists. Thus, the States that relied more on brand/type selection had little or no identifiable time spent on vendor training on food-item restrictions. In particular, California, North Carolina, and Ohio had no identifiable staff time for vendor training on cost-containment practices. Although North Carolina had a least expensive brand restriction on milk, this was not a significant topic of discussion in vendor training, according to the State, because the policy was long-standing and vendor compliance was high.

The cost of answering vendor questions about food-item restrictions was very difficult for the States to estimate. They recognized that State staff members (and sometimes local agencies) received frequent inquiries on this topic, but there were no tracking systems to quantify the calls or the time spent answering them. At best, the States made educated guesses as to how much time in a typical day their vendor management staff spent on these inquiries.

There is no clear reason why the Connecticut estimate in table F-4 is eight times that of the Texas and Oklahoma estimates. Connecticut had a lower ratio of participants to vendors and more independent vendors, so the training costs can be expected to be somewhat higher, but not by as much as indicated. Connecticut had more WIC foods subject to least expensive brand requirements, so this may also have been a factor. Connecticut's estimate includes training on the hidden maximum (or "not-to-exceed") value policy as well on as the food-item restrictions.<sup>10</sup> The responses from Oklahoma and Texas were less clear as to whether training on their maximum value policies was included, although the cost-containment time during preauthorization visits in these States may include some explanation of maximum value and least expensive brand policies. It is possible that the Connecticut estimate more completely accounted for (or even overstated) the level of effort to respond to vendor questions. Finally, as with other cost-containment practices, the measurement method or the perspective of the respondents may have contributed to the difference in estimated costs.

### ***Monitoring Vendor Compliance***

None of the States estimated any time for the enforcement of food-item restrictions. As noted in chapter 2, compliance enforcement efforts focused on more serious violations, and the States relied mainly on complaints from participants to detect violations of food-item restrictions. Of the three States with any estimated costs for this function, only Oklahoma indicated that a number of investigations included violations of food-item restrictions. The State could not estimate a share of investigative costs attributable to food-item restrictions, because tests for these violations were combined with other violations in the same "buys."

## **Costs of Infant Cereal Rebate Contracts**

### **Establishing and Renewing the Contracts**

The estimated administrative costs for establishing and renewing rebate contracts for infant cereal are presented in table F-5 for the three study States that had these contracts: California, Connecticut, and Texas.<sup>11</sup> The estimated costs of establishing and reviewing the rebate contracts ranged from less than \$0.01 PPY in Texas to \$0.05 PPY in the other two States, and the average was \$0.03 PPY. The relatively small cost reflects, in part, the fact that all three States had these rebates in place for several contracting cycles, so the effort was less than when they first solicited the contracts. In addition, the cost estimates reflect the fact that the winning bidder has been the same manufacturer each time, so there were no costs for changing food instruments and training materials.

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<sup>10</sup> Connecticut staff were unable to separate time for explaining item restrictions (a cost-containment practice) from time spent explaining maximum values (a vendor-management practice).

<sup>11</sup> Other States had similar rebate contracts with food manufacturers in 1999, as shown in appendix E, table E-4.

**Table F-5—Establishing/reviewing rebate contracts (nonformula)**

State	Total labor (w/ fringe)	Total indirect	Total loaded labor	Cost per partici- pant per year
			<i>Dollars</i>	
California	48,886	8,799	57,685	0.05
Connecticut	1,659	630	2,289	0.05
North Carolina <sup>a</sup>	—	—	—	—
Ohio <sup>a</sup>	—	—	—	—
Oklahoma <sup>a</sup>	—	—	—	—
Texas	1,726	114	1,841	<0.01
Average <sup>b</sup>				0.03

a Not applicable.

b Includes California, Connecticut, and Texas.

Source: Interviews with State officials.

It is surprising that the total estimated administrative cost is so much larger in California (\$57,685 per year) than in Connecticut (\$2,289 per year) and Texas (\$1,841 per year). It is reasonable to expect that this cost is largely independent of the size of the WIC program in the State, because a single contract covers the State. One factor in the cost difference is that California resolicits its infant cereal rebate contract every two years, whereas the other two States resolicit their contracts every three years. It is possible that California's procurement process is more elaborate, or that State WIC staff are more involved than in the other two States, but the interview data are insufficient to determine the role of these factors.<sup>12</sup>

### Tracking and Claiming the Rebates

The administrative costs for tracking and claiming infant cereal rebates are presented in table F-6. These costs were estimated for the three States that have these contracts: California, Connecticut, and Texas. All three States estimated very small costs for this function—from less than \$0.01 PPY in California and Texas to \$0.03 PPY in Connecticut, with an overall average of \$0.01 PPY. Unlike the cost of renewing these contracts, the estimates show evidence of economies of scale, in that the total cost for California is larger than for Connecticut, but the cost PPY is much smaller. On the other hand, it is unclear why the total cost for Texas was so much smaller than for California, because both States obtained direct counts of infant cereal purchases from redemption data.

<sup>12</sup> California's cost reflects a level of effort of 1,127 hours per year. Some of this time may be devoted to infant formula rebates.

**Table F-6—Tracking and claiming manufacturer rebates (nonformula)**

State	Total labor (w/ fringe)	Total indirect	Total loaded labor	Cost per partici- pant per year
			<i>Dollars</i>	
California	4,018	723	4,741	<0.01
Connecticut	1,161	441	1,602	0.03
North Carolina <sup>a</sup>	—	—	—	—
Ohio <sup>a</sup>	—	—	—	—
Oklahoma <sup>a</sup>	—	—	—	—
Texas	737	49	785	<0.01
Average <sup>b</sup>				0.01

a Not applicable.

b Includes California, Connecticut, and Texas.

Source: Interviews with State officials.

## Total Administrative Costs of Cost-Containment Practices

Table F-7 summarizes the administrative cost estimates for the six States in the study, including State and local costs for all of the functions for which estimates were previously presented. The total administrative costs ranged from \$0.14 PPY in Oklahoma to \$1.03 PPY in Connecticut, with an average of \$0.58 PPY.<sup>13</sup> Each State's total reflects only the functions for which positive costs were estimated. Thus, to the extent that some States' estimates did not include all functions for which the true cost was not zero, these States' total cost estimates are not entirely comparable to the totals for States that provided data for all functions. The totals for California and Connecticut are most likely to be underestimated, but missing data may affect the totals for the other States as well. Along with missing data, the totals are also affected by the uncertainty of responses, as discussed.

The most important conclusion from the administrative cost totals is that these cost-containment practices were quite inexpensive to operate, when compared with the overall costs of NSA operations. Even Connecticut's cost was only 0.6 percent of its FY2001 NSA cost of \$177.96 PPY. The Oklahoma estimate of \$0.14 PPY was only 0.1 percent of the State's NSA cost of \$155.45 PPY. Even if the administrative costs are substantially underestimated, it is clear that the ongoing administrative burden of these practices was very small. The overall average administrative cost of cost-containment practices is estimated at \$0.58 PPY. Across the six States, the estimated cost-containment costs represented an average of 0.4 percent of the total NSA cost.

<sup>13</sup> The average cost of \$0.58 effectively treats both "zero" and "missing" estimates as zeroes. It does not equal the sum of the averages for the individual functions, which exclude missing and zero values.

**Table F-7—Annual cost per participant by State and function**

<b>Function</b>	<b>CA</b>	<b>CT</b>	<b>NC</b>	<b>OH</b>	<b>OK</b>	<b>TX</b>	<b>Average</b>
				<i>Dollars</i>			
Use of price data in vendor selection	0.04	0.08	–	0.01	0.10	0.07	0.06
Use of cost criteria in constructing WIC food lists	–	0.71	0.03	–	0.02	<0.01	0.19
Communicating information on price-based restrictions on allowable foods to participants	0.67	–	0.44	0.45	–	0.50	0.52
Communicating information to vendors on price-based food restrictions	–	0.16	–	–	0.02	0.02	0.07
Establishing/renewing rebate contracts (nonformula)	0.05	0.05	–	–	–	<0.01	0.03
Tracking and claiming manufacturer rebates (nonformula)	<0.01	0.03	–	–	–	<0.01	0.01
Total <sup>a</sup>	0.77	1.03	0.47	0.46	0.14	0.59	0.58
NSA cost	146.71	177.96	136.87	148.68	155.45	140.11	150.97
				<i>Percent</i>			
Total as percent of NSA cost <sup>a</sup>	0.5	0.6	0.3	0.3	0.1	0.4	0.4

a Includes zeros for not applicable or not available.

Source: Interviews with State and local officials.

As noted before, these estimates do not include implementation costs. States considering the adoption of these cost-containment practices would need to develop their own estimates of implementation costs, in order to make a more comprehensive determination of the financial impact and viability of these practices.

# Appendix G

## Use of Food Price Information to Limit Payments to Vendors

As a practice for managing authorized vendors and ensuring the integrity of the food delivery system, all six States in the study used price standards for individual WIC foods to set limits on payments for redeemed food instruments, otherwise known as maximum, or “not-to-exceed,” values. This appendix describes these practices and presents information on their costs.

In all of the six States except Texas, each food instrument had a maximum total value that depended on the items on the instrument. If a vendor submitted a food instrument that exceeded the State’s maximum value for that food instrument, the State rejected the instrument or reduced the reimbursement to the specified maximum.<sup>1</sup>

Texas, on the other hand, set a maximum price for each item on the food instrument. The vendor recorded the actual prices on the instrument for the foods taken by the participant. If the price for an item exceeded the maximum, the State reduced the vendor’s reimbursement by the amount of the excess.

Maximum values for food instruments have two purposes. First, the process catches errors and deliberate overcharging by vendors. For example, if a clerk enters an extra zero on the price, so that the vendor deposits a WIC check for two gallons of milk for \$45.00 instead of \$4.50, this error will be detected if the State has a maximum value of \$6.00 for the check. Second, the maximum values prevent the WIC program from paying prices that are high relative to the competitive price level among WIC vendors. This practice gives the State more control of food package costs, particularly under the Texas model.

The maximum-value policy is closely related to the use of food prices in vendor selection. As noted in chapter 2, States notified vendors if the prices they submitted at the time of application exceeded the standards used by the State to set maximum values for food instruments. Vendor price surveys and redemption data were the principal sources of market data for setting maximum values. The use of maximum values, in turn, provided feedback to the vendors: if their prices were high, the State rejected or reduced their requests for reimbursement.

Unlike the WIC cost-containment restrictions described in this report, the use of maximum values is not intended to affect vendor participation or participants’ choice of WIC foods.<sup>2</sup> Rather, maximum value standards serve to ensure that authorized WIC vendors maintain competitive pricing and avoid overcharging, thus promoting vendor management goals. Therefore, the study did not look for any such effects or compare participant outcomes on the basis of differences in the implementation of this practice.

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<sup>1</sup> State WIC agencies often contract with banks or other firms to process food instruments redeemed by vendors. For ease of exposition, the text that follows treats the contractors acting as the State’s agents as if they were part of the State WIC agency.

<sup>2</sup> Ohio’s cost-containment contracts for new vendors do not exclude any vendors, although it is possible that some potential vendors choose not to accept this contract.

Nevertheless, the study collected information on the use of maximum values in the six States because of the possibility that this practice could have an indirect impact on vendor participation. A stringent set of maximum values might have the effect of discouraging participation by small independent stores whose prices are high because of high costs for wholesale food and other expenses. This would help hold down food costs, but it could also reduce access to WIC foods for participants lacking access to large chain stores, including inner-city and rural communities. This result would be contrary to Federal rules requiring adequate geographic distribution of WIC vendors. As discussed below, the available evidence suggests that such effects are minimal or nonexistent, primarily because of the steps the States take to avoid this problem.

## **Procedures for Applying Maximum Values**

The use of maximum values for food instruments involves the following activities:

- Collecting market prices for WIC foods
- Determining and updating maximum prices for WIC foods and food instruments
- Providing information on maximum values for foods or food instruments to vendors
- Rejecting or adjusting food instruments that exceed maximum values
- Reconsidering food instruments rejected or adjusted because of prices that exceed maximum values

The text below describes these activities and compares approaches among the six States in the study. Table G-1 summarizes this information.

### **Collecting Market Price Information for WIC Foods**

Except for Texas, all the States collected information on market prices for WIC foods from vendor surveys (as summarized in table 2-2). Connecticut, North Carolina, Ohio, and Oklahoma collected price surveys from all authorized vendors 2 to 4 times per year. California and Oklahoma collected prices from all vendors during annual monitoring visits, but these States also collected supplementary price surveys from samples of vendors when needed to update prices for foods where the maximum values might be out of line with the market. Ohio also collected vendor prices during annual monitoring visits, and Connecticut checked vendor prices during visits every 1 to 3 years prior to vendor reauthorization.

For Texas, the vendor prices recorded on WIC vouchers were the primary data source. The other five States used redemption data as well, primarily to monitor the proportion of food instruments redeemed at or near the maximum value. This information is one indicator that a vendor may be overcharging or committing other WIC program violations. Individual stores with high rates of redemptions near the maximum value are often labeled as “high-risk” and targeted for compliance investigations or audits. On a more systemic level, if a large number of stores redeemed food instruments at or near the maximum value, the State usually reviewed the redemption and survey data to determine whether to revise the price standards used to set the maximum values.



**Table G-1—Use of food price information to limit payments to vendors**

<b>Practice</b>	<b>CA</b>	<b>CT</b>	<b>NC</b>	<b>OH</b>	<b>OK</b>	<b>TX</b>
Basis for maximum value of food instrument	Maximum value for food instrument based on price of all items	Maximum value for food instrument based on price of all items	Maximum value for food instrument based on price of all items	Maximum value for food instrument based on price of all items	Maximum value for food instrument based on price of all items	Maximum prices for individual food items
Collecting market price information for WIC foods	Vendor prices submitted at application, sample surveys of vendors, farm milk prices, redemption data	Vendor surveys and redemption data	Vendor surveys and redemption data	Vendor surveys, farm milk prices, redemption data, grocer input	Vendor surveys, redemption data	Vendor prices submitted on redeemed vouchers
Determining maximum prices for WIC foods and food instruments	Administrative decision based on price data, program cost constraints, and stakeholder concerns	Administrative decision approximately based on average vendor prices	Maximum set about 25% above average price to ensure that all stores can redeem at valid prices	Administrative decision approximately based on average vendor prices and allowance for higher priced stores	Based on average for vendor peer group with highest prices, set so that checks can be redeemed at any authorized grocer	Based on average prices, adjusted if large number of stores exceed maximum values
Informing vendors about maximum values	Printed on check except for milk/dairy checks Maximum values for milk/dairy checks sent monthly to vendors	Maximum value is hidden so vendors do not set charges at or near maximum	Printed on check	Printed on check	Printed on check	Maximum unit prices of items printed on voucher
Actions taken if price on food instrument exceeds maximum value	Check rejected	Check rejected	Check rejected	Excess amount deducted, vendor paid maximum amount	Check rejected	Excess amount deducted, vendor paid maximum amount at item level
Options for vendor if food instrument exceeds maximum value	Vendor may resubmit to have check paid, up to maximum value	Vendor may resubmit to have check paid, up to maximum value	Vendor may resubmit to have check paid, up to maximum value or more, if justified	Vendor may resubmit to have payment adjusted by amount of actual sale above maximum value, if justified	Vendor may resubmit to have check paid, up to maximum value	No appeal or adjustment
Rejected food instruments as proportion of value of food instruments (gross)	(not available)	0.18% <sup>a</sup>	0.15%	(not applicable)	0.09%	(not applicable)
Reductions to food instruments as proportion of value of food instruments (net)	0.03%	0.12% <sup>b</sup>	(not available)	0.37% <sup>c</sup>	(not available)	0.39% <sup>d</sup>

a May be understated; based on number of instruments rejected for excessive price, average dollar value of all rejected instruments.

b May be understated; based on number of instruments paid for excessive price, average overall dollar value of all rejected instruments.

c Partial data from FY2000. Preliminary data for FY2001 indicate a 0.49 percent net reduction.

d FY2000 data (most recent available).

Some of the States used other data sources for setting their maximum values. California updated maximum values for milk-only and dairy-combination food instruments on a monthly basis, using information on farm milk prices set by the California Department of Agriculture. Ohio also used farm price information from the Ohio Department of Agriculture in setting price standards for milk. In addition, Ohio obtained information from the Ohio Grocer's Association on methods for setting maximum values, taking into account wholesale prices and typical grocer markups.

### **Determining Maximum Prices for WIC Foods and Food Instruments**

In all six States, the maximum values for food instruments depended on the price standards established for each category of WIC food. Where the maximum value was for the entire food instrument, the State computed this value based on the items on the food instrument, their quantities, and the price standards for each item.

The States based the price standards for individual foods on average prices charged by WIC vendors, but they exercised judgment in setting the standards. On the one hand, they wanted to prevent overcharging and hold down food costs. At the same time, they recognized that some vendors had legitimately high operating costs, especially in areas with relatively few stores that could meet WIC participants' needs. They were also aware that their price information could lag behind the market, and that food instruments are issued up to 2 months before they can be used. Therefore, the States made some allowances for expected price increases to avoid rejecting food instruments for a large number of vendors. All the States indicated that when they saw a high rate of food instruments rejected, particularly when larger stores were involved, they updated their price standards. The States monitored prices regularly, but adjustments to price standards were intermittent.

State officials described different approaches to finding the right balance in setting maximum standards for foods. Officials in North Carolina and Oklahoma emphasized the importance of making sure that participants could redeem food instruments at full value in all stores, including the smaller stores that served more remote areas. North Carolina set its price standards about 25 percent above statewide averages, and Oklahoma focused on the average prices for the vendor peer group with the highest prices. Oklahoma officials also noted, however, that their price standards remained set for extended periods, potentially bringing down peer group averages by pushing out the most expensive authorized vendors. Connecticut officials described a similar need to make sure that prices of smaller stores were taken into account, because participants in inner-city areas often relied on these stores.

In California, Ohio, and Texas, officials emphasized the need for cost containment and their authority to limit what the State will pay for WIC foods. California officials described their process as taking into account both vendor concerns and cost constraints. If the trend in food package costs indicated a risk of exceeding the WIC grant, the State set price standards at a lower level than it would have if there had been less concern about overspending. Ohio officials worked with the Ohio Grocer's Association to develop the process for setting maximum values, but they also stressed that they did not try to accommodate all retailers in this process. Instead, the State set the prices it was willing to pay and let the retailers choose whether to participate. Texas officials closely monitored vendor prices and the incidence of prices exceeding the maximum, but they rarely adjusted their maximum

prices (except for infant formula).<sup>3</sup> As in Ohio, officials in Texas view the maximum prices as a statement of what they were willing to pay on behalf of the taxpayers.

### **Informing Vendors about Maximum Values**

Four of the six States printed maximum total values on their food instruments: North Carolina, Ohio, and Oklahoma did this on all of their food instruments, and California printed maximum values on most, but not all, food instruments. Because of the State's three-month check issuance cycle and the monthly review of price standards for milk, California did not print the maximum value on the milk-only and dairy-combination food instruments. Instead, the State sent monthly updates on the maximum values for these food instruments to vendors and posted them on the Internet.

As noted, Texas printed maximum values on its food instruments for each food category. Texas vendors do not receive more than the maximum amount for a category, whereas vendors in the other States can offset high prices in one food category with low prices in another to keep within the State's maximum total.

Connecticut kept maximum values hidden so that vendors could not abuse the program by setting their charges at or close to the stated maximum. Instead, vendors learned that their prices were too high by having their checks rejected. After the State adopted the hidden maximum value and several other cost-containment initiatives in 1996, its food package costs dropped from \$36.36 per person in FY1995 to \$34.23 per person in FY1997.<sup>4</sup> The other States addressed the problem of "pricing to the max" by targeting vendors that consistently charged at or near the maximum for followup, such as telephone contacts, covert compliance visits, or audits.

### **Actions Taken if Price on Food Instrument Exceeded Maximum Value**

Of the States that used printed maximum values, all five instructed vendors not to submit food instruments totaling more than the maximum value. In Connecticut, the food instruments did not have printed maximum values, but vendors acted with the knowledge that some limit existed. The other States also prohibited vendors from requesting payment of the excess amount from the participant or denying a participant a prescribed food. The States differed, however, in the procedure that cashiers should follow if the prices for a participant's food selections exceeded the maximum value. Only Ohio prohibited the vendor from asking the participant to replace a selected item with a lower priced WIC-approved item to bring the total purchase within the maximum value. California and Texas explicitly authorized vendors to request that the participant switch to a lower priced, WIC-approved item. Vendor handbooks and rules in North Carolina and Oklahoma neither prohibited nor authorized this practice.

When a vendor submitted a food instrument that exceeded the maximum value, Ohio and Texas automatically reduced the payment to the maximum value; the other four States rejected the entire

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<sup>3</sup> Texas officials indicated that retail prices for infant formula were subject to larger fluctuations than for other WIC foods, primarily because of fluctuations in wholesale prices.

<sup>4</sup> The proportion of savings specifically attributable to hiding the maximum value is unknown. The State previously had a fixed maximum value for all food instruments, regardless of the items included. Along with the hidden maximum value, the State also began to review vendors' reimbursements in relation to their reported prices and to follow up on discrepancies, as discussed in the section on vendor selection.

food instrument. Five of the States had procedures for vendors to resubmit food instruments when the State rejected the instrument or reduced payment due to excessive prices, but the rules for this process differed. Texas did not allow resubmission of food instruments when payment had been reduced due to excessive prices.

Two States, North Carolina and Ohio, paid the vendor's shelf price even if it was greater than the maximum value, but only if the vendor provided documentation of the shelf price and justified it on the basis of wholesale cost. In North Carolina, a vendor could submit a food instrument that exceeded the maximum value to the local WIC office for "revalidation" to avoid having it rejected by the State's processing agent. In areas served mainly by small stores with high prices, these revalidations were common.

The other four States would not pay more than the maximum for the food instrument. California, Connecticut, and Oklahoma adjusted payment up to the actual amount of sale or the maximum (whichever was less) to correct errors by the vendor or the State's agent.

To varying extents, food instruments rejected for excessive prices in California, Connecticut, North Carolina, and Oklahoma were not resubmitted, so the State sometimes saved the entire amount, not just the excess. Vendors resubmitted nearly all food instruments rejected for excessive prices in California, but only 35 percent were resubmitted and paid in Connecticut.<sup>5</sup> North Carolina and Oklahoma could not provide data on the proportion of rejected food instruments resubmitted by vendors.

Table G-1 provides information on the approximate scale of savings due to food instruments rejected or payments reduced because of prices exceeding the maximum value. Some of the States could provide only the gross value of food instruments rejected, whereas others provided the net value of savings based on the difference between the amount claimed by the vendor and the amount paid at or below the maximum value. Both rates are quite small—less than 0.5 percent of total food costs in all six States.

Among the States providing the gross value of food instruments rejected for exceeding the maximum value, Connecticut had the highest rate (at least 0.18 percent of food costs). North Carolina's rate was somewhat smaller (0.15 percent), and Oklahoma's rate was smaller still (0.09 percent). Actual savings in all three States were smaller than indicated, to the extent that rejected food instruments were resubmitted at or below the maximum value. Connecticut's net savings are estimated at 0.12 percent of food costs, although this estimate may be low (as discussed in the notes to table G-1). The other States could not estimate the net savings after resubmission of rejected food instruments.

Ohio and Texas had similar rates of net reductions in payment due to maximum values: 0.37 percent of food costs for Ohio and 0.39 percent for Texas (based on FY2000 data).<sup>6</sup> These reductions were substantially greater than the gross figures for Connecticut, North Carolina, and Texas, but still quite small as a percentage of food costs. California's net reduction of 0.03 percent is the smallest of the 4

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<sup>5</sup> Oklahoma and North Carolina did not provide estimates of the proportion of rejected food instruments resubmitted and paid.

<sup>6</sup> Preliminary data indicate an 0.49-percent reduction in Ohio for FY2001. Data for FY2001 were not available for Texas.

States that had these figures available, as might be expected given the high proportion of rejected food instruments resubmitted by vendors.

Taken by themselves, these data suggest that Ohio and Texas had the most stringent limits on food instrument payments through their maximum values, whereas those in Oklahoma and California were the least stringent. The data are insufficient to make such a judgment, for two reasons. First, available data from Oklahoma suggest that the actual rejections represent the “tip of the iceberg” relative to the total value of food instruments for which the vendor’s shelf prices exceed the maximum value. In Oklahoma, about 0.5 percent of food instruments (by value) were redeemed at the maximum—over five times the proportion rejected for being over the maximum. At least a fraction of the food instruments redeemed at the maximum represent situations where the vendor was reimbursed less than the shelf price. Furthermore, an unknown amount of potential overcharging was deterred by the maximum value.<sup>7</sup> Secondly, differences in the proportion of food instruments rejected for excessive prices may in part reflect differences in the underlying distribution and variability of retail food prices among the States. For any given standard relative to the average vendor prices, the proportion of food instruments rejected, and thus the apparent stringency of maximum values, will depend on the variation of prices across vendors and over time.

## **Administrative Costs of Using Price Data To Limit Payments to Vendors**

As shown in table G-2, five of the six States provided data to estimate the administrative costs of using price data to limit payments to vendors. The estimated costs ranged from \$0.01 PPY in California to \$0.53 PPY in Connecticut, with a cross-State average of \$0.21 PPY. The wide variation in costs reflects differences in both the process and the available information on costs.

Texas indicated that there were no incremental costs for this practice. The State explained that the major activities that contributed to its process for limiting vendor payments—including the entry of item prices during food instrument processing, likely the largest cost component—have always been in place and would occur even in the highly unlikely event that limits on item costs were lifted. As noted in chapter 2, monitoring of vendors with excessive prices is part of the estimated cost for using price data in vendor authorization in Texas.

The costs estimated for the use of price data to limit vendor payments fall into two categories, present in varying degrees in the five States with estimated costs for this function. First, some States treated some or all of their costs for collecting, tabulating, and analyzing vendor prices as part of this function, because this was the primary use of the price data. The five States reported administrative costs as follows:

- In addition to vendor price survey costs, California’s cost for this function included time spent monitoring actual redemption costs relative to maximum prices, in order to ensure that the maximum prices were neither too high nor too low.<sup>8</sup>

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<sup>7</sup> A recent FNS study estimated that overcharges account for 0.9 to 1.6 percent of WIC redemptions. Across all types of transactions conducted for the study, vendors overcharged in 8.7 percent of transactions (FNS, 2001).

<sup>8</sup> California was unable to estimate the costs for tracking dairy prices, updating maximum values for milk and dairy-combination food instruments, and disseminating this information to vendors.

**Table G-2—Use of price data to limit vendor payments**

State	Total labor (w/ fringe)	Total indirect	Total loaded labor	Cost per participant per year
	<i>Dollars</i>			
California <sup>a</sup>	41,654	7,498	49,152	0.04
Connecticut <sup>b</sup>	20,628	7,839	28,467	0.58
North Carolina <sup>a</sup>	48,709	2,108	50,817	0.25
Ohio <sup>c</sup>	11,227	2,600	13,827	0.06
Oklahoma <sup>d</sup>	13,650	1,950	15,600	0.18
Texas <sup>e</sup>	—	—	—	—
Average <sup>f</sup>				0.22

a Includes price surveys of selected vendors. See text and footnotes regarding scope of estimate.

b Includes interim price surveys and followup on rejected food instruments resubmitted for payment; some uncertainty about average time per instrument.

c Assumes all data entry of price surveys is for cost containment.

d Includes interim price surveys. Respondents viewed estimates for some components as probably high and for other components as probably low.

e No separable cost; embedded in voucher processing, monitoring of food costs for financial management.

f Includes all but Texas.

Source: Interviews with State WIC officials.

- Connecticut's cost included interim price surveys conducted between vendor authorization cycles.
- North Carolina treated all of its price data collection, tabulation, and analysis costs as part of this function, as did Ohio.<sup>9</sup>
- Ohio's process involved much less review of individual vendor surveys, so the resulting cost was substantially lower.
- Oklahoma included its quarterly vendor price survey costs in this function, but not its on-site price reviews during authorization and monitoring visits.

Second, three States had identifiable costs for processing WIC checks or vouchers resubmitted after being rejected for excessive prices. This activity represents part of the estimated cost for this function in Connecticut, North Carolina, and Ohio. California allowed vendors to resubmit rejected food instruments, but there was no special handling and therefore no identifiable cost beyond the basic check processing expenses.

The vast majority of the cost for using price data to limit vendor payments in North Carolina was for activities conducted by local agencies. The local offices collected the vendor price surveys and checked them for completeness before sending them to the State office for tabulation. Local WIC staff members processed vendors' requests to revalidate food instruments that had been rejected because of excessive prices (and other reasons not included in the estimate). Two of the three local

<sup>9</sup> North Carolina was unable to estimate the cost of entering the price survey data, a function performed by a unit outside the State WIC bureau.

agency respondents gave cost data for these activities, and their estimates were similar (\$.21 PPY and \$.27 PPY). The third local agency was unable to provide cost data for these activities, so the unweighted average of the other two agencies was used.<sup>10</sup> The cost for revalidating WIC food instruments could vary much more than indicated by the data, according to the State, because the volume of requests varied a great deal. The State lacked precise data on this volume, so the estimates rely on the very small sample of two local agencies.

In considering the cost estimates for limiting vendor payments by using price data, it is important to recognize that price surveys also serve as input for monitoring and projecting food package costs. Thus, a portion of these costs might be attributed to financial management objectives other than cost containment. In addition, the initial process of setting maximum prices is more time consuming than the ongoing costs of maintaining this practice. After maximum prices have been established, the States do not want to change them too often, because stable limits encourage vendors to keep prices down, but the States also recognize the need to respond when market prices rise (particularly wholesale costs). The initial costs could not be estimated, because all of the States had maintained their maximum value systems for 5 or more years and because key ADP costs were embedded in those of much larger WIC management information system projects. As with the cost-containment costs presented in appendix F, the costs in Connecticut are higher than in any of the other States, and the reasons may include both real differences in cost structure and measurement error.

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<sup>10</sup> Weighting of local agency averages was not appropriate, given the sampling method used.





# Appendix H

## WIC Food Packages, as Defined in the Code of Federal Regulations (7 CFR 246.10)

(1) *Food Package I—Infants 0 Through 3 Months.*

Food	Quantity
<b>Formula:</b>	
Concentrated liquid formula.	403 fluid oz. (11.9 L).
Or	
Powdered formula ..	May be substituted at the rate of 8 lbs. (3.6 kg) per 403 fluid oz. (11.9 L) of concentrated liquid formula.
Or	
Ready-to-feed formula.	May be substituted at the rate of 26 fluid oz. (.8 L) per 13 fluid oz. (.4L) of concentrated liquid formula.

(2) *Food Package II—Infants 4 through 12 Months.*

Food	Quantity
<b>Formula:</b>	
Concentrated liquid formula.	403 fluid oz. (11.9 L).
Or	
Powdered formula.	May be substituted at the rate of 8 lb. (3.6 kg) per 403 fluid oz. (11.9 L) of concentrated liquid formula.
Or	
Ready-to-feed formula.	May be substituted at the rate of 26 fluid oz. (.8 L) per 13 fluid oz. (.4 L) of concentrated liquid formula.
<b>Infant cereal</b>	24 oz. dry (.7 kg).
<b>Juice:</b> <sup>1</sup>	
Single strength adult juice.	92 fluid oz. (2.7 L).
Or	
Frozen concentrated juice.	96 fluid oz. reconstituted (2.8 L).
Or	
Infant juice	May be substituted at the rate of 63 fluid oz. (1.9 L) of infant juice per 92 fluid oz. (2.7 L) of single strength adult juice.

<sup>1</sup> Combinations of single strength or frozen concentrated juice may be issued as long as the total volume of juice does not exceed the amount specified for single strength juice.

(3) *Food Package III—Children/Women with Special Dietary Needs.*

Food	Quantity
<b>Formula:</b>	
Concentrated liquid formula.	403 fluid oz. (11.9 L).
Addition <sup>1</sup>	52 fluid oz. (1.5 L).
Or	
Powdered formula.	May be substituted at a rate of 8 lb. (3.6 kg) per 403 fluid oz. (11.9 L) of concentrated liquid formula.
Addition <sup>1</sup>	1 lb. (.4 kg).
Or	
Ready-to-feed formula.	May be substituted at the rate of 26 fluid oz. (.8 L) per 13 fluid oz. (.4 L) of concentrated liquid formula.
Addition <sup>1</sup>	104 fluid oz. (3.1 L).
<b>Cereal (hot or cold)</b>	36 oz. dry (1 kg).
<b>Juice:</b> <sup>2</sup>	
Single strength juice	138 fluid oz. (4.1 L).
Or	
Frozen concentrated juice.	144 fluid oz. reconstituted (4.3 L).

<sup>1</sup> Additional formula may be issued on an individual basis provided the need is demonstrated and documented in the individual's certification file by the competent professional authority.

<sup>2</sup> Combinations of single strength and frozen concentrated juice may be issued as long as the total volume does not exceed the amount specified for single strength juice.

(4) *Food Package IV—Children 1 to 5 Years.*

Food	Quantity
<b>Milk:</b>	
Fluid whole milk	24 qt. (22.7 L).
Or	
Fluid skim or low fat milk.	May be substituted for fluid whole milk on a quart-for-quart (.9 L) basis.
Or	
Cultured buttermilk	May be substituted for fluid whole milk on a quart-for-quart (.9 L) basis.
Or	
Evaporated whole milk.	May be substituted for fluid whole milk at the rate of 13 fluid oz. (.4 L) per qt. (.9 L) of fluid whole milk.
Or	
Evaporated skimmed milk.	May be substituted for fluid whole milk at the rate of 13 fluid oz. (.4 L) per qt. (.9 L) of fluid whole milk.
Or	
Dry whole milk	May be substituted for fluid whole milk at the rate of 1 lb. (.4 kg) per 3 qt. (2.8 L) of fluid whole milk.
Or	
Nonfat or lowfat dry milk.	May be substituted for fluid whole milk at the rate of 1 lb. (.4 kg) per 5 qt. (4.7 L) of fluid whole milk.
Or	
Cheese	May be substituted for fluid whole milk at the rate of 1 lb. (.4 kg) per 3 qt. (2.8 L) of fluid whole milk. 4 lbs. (1.8 kg) is the maximum amount which may be substituted. <sup>1</sup>
<b>Eggs:</b>	
Eggs	2 doz. or 2 <sup>1</sup> / <sub>2</sub> doz.
Or	
Dried egg mix	May be substituted at the rate of 1.5 lb. (.7 kg) egg mix per 2 doz. Fresh eggs or 2 lb. (.9 kg) egg mix per 2 <sup>1</sup> / <sub>2</sub> doz. fresh eggs.
Cereals (hot or cold) ..	36 oz. dry (1 kg).
<b>Juice:</b> <sup>2</sup>	
Single strength juice	276 fluid oz. (8.2 L).
Or	
Frozen concentrated juice.	288 fluid oz. reconstituted (8.5 L).
<b>Legumes:</b>	
Dry beans or peas	1 lb. (.4 kg).
Or	
Peanut butter	18 oz. (.5 kg).

<sup>1</sup> Additional cheese may be issued on an individual basis in cases of lactose intolerance, provided the need is documented in the participant's file by the competent professional authority.

<sup>2</sup> Combinations of single strength and frozen concentrated juice may be issued as long as the total volume does not exceed the amount specified for single strength juice.

(5) Food Package V—Pregnant and Breastfeeding Women (Basic).

Food	Quantity
<b>Milk:</b>	
Fluid whole milk	28 qt. (26.5 L).
Or	
Fluid skim or lowfat milk.	May be substituted for fluid whole milk on a quart-for-quart (.9 L) basis.
Or	
Cultured buttermilk	May be substituted for fluid whole milk on a quart-for-quart (.9 L) basis.
Or	
Evaporated whole milk.	May be substituted for fluid whole milk at the rate of 13 fluid oz. (.4L) per qt. (.9 L) of fluid whole milk.
Or	
Evaporated skimmed milk.	May be substituted for fluid whole milk at the rate of 13 fluid oz. (.4 L) per qt. (.9 L) of fluid whole milk.
Or	
Dry whole milk	May be substituted for fluid whole milk at the rate of 1 lb. (.4 kg) per 3 qt. (2.8 L) of fluid whole milk.
Or	
Nonfat or lowfat dry milk.	May be substituted for fluid whole milk at the rate of 1 lb. (.4 kg) per 5 qt. (4.7 L) of fluid whole milk.
Or	
Cheese	May be substituted for fluid whole milk at the rate of 1 lb. (.4 kg) per 3 qt. (2.8 L) of fluid whole milk. 4 lbs. (1.8 kg) is the maximum amount which may be substituted. <sup>1</sup>
<b>Eggs:</b>	
Eggs	2 doz. or 2½ doz.
Or	
Dried egg mix	May be substituted at the rate of 1.5 lb. (.7 kg) egg mix per 2 doz. fresh eggs, or 2 lb. (.9 kg) egg mix per 2½ doz. fresh eggs.
<b>Cereals (hot or cold) ..</b>	
<b>Juice:</b> <sup>2</sup>	
Single strength juice	276 fluid oz. (8.2 L).
Or	
Frozen, concentrated juice.	288 fluid oz. reconstituted (8.5 L).
<b>Legumes:</b>	
Dry beans or peas	1 lb. (.4 kg).
Or	
Peanut butter	18 oz. (.5 kg).

<sup>1</sup> Additional cheese may be issued on an individual basis in cases of lactose intolerance, provided the need is documented in the participant's file by the competent professional authority.

<sup>2</sup> Combinations of single strength or frozen concentrated juice may be issued as long as the total volume does not exceed the amount specified for single strength juice.

(6) Food Package VI—Nonbreastfeeding Postpartum Women.

Food	Quantity
<b>Milk:</b>	
Fluid whole milk	24 qt. (22.7 L).
Or	
Fluid skim or lowfat milk.	May be substituted for fluid whole milk on a quart-for-quart (.9 L) basis.
Or	
Cultured buttermilk	May be substituted for fluid whole milk on a quart-for-quart (.9 L) basis.
Or	
Evaporated whole milk.	May be substituted for fluid whole milk at the rate of 13 fluid oz. (.4 L) per qt. (.9 L) of fluid whole milk.
Or	
Evaporated skimmed milk.	May be substituted for fluid whole milk at the rate of 13 fluid oz. (.4 L) per qt. (.9 L) of fluid whole milk.
Or	
Dry whole milk	May be substituted for fluid whole milk at the rate of 1 lb. (.4 kg) per 3 qt. (2.8 L) of fluid whole milk.
Or	
Nonfat or lowfat dry milk.	May be substituted for fluid whole milk at the rate of 1 lb. (.4 kg) per 5 qt. (4.7 L) of fluid whole milk.
or	
Cheese	May be substituted for fluid whole milk at the rate of 1 lb. (.4 kg) per 3 qt. (2.8 L) of fluid whole milk. 4 lbs. (1.8 kg) is the Maximum amount which may be substituted. <sup>1</sup>
<b>Eggs:</b>	
Eggs	2 doz. or 2½ doz.
or	
Dried egg mix	May be substituted at the rate of 1.5 lb. (.7 kg) egg mix per 2 doz. Fresh eggs of 2 lb. (.9 kg) egg mix per 2½ doz. fresh eggs.
<b>Cereal (hot or cold)</b>	
<b>Juice:</b> <sup>2</sup>	
Single strength juice	184 fluid oz. (5.4 L).
or	
Frozen concentrated juice.	192 fluid oz. reconstituted (5.7 L).

<sup>1</sup> Additional cheese may be issued on an individual basis in cases of lactose intolerance, provided the need is documented in the participant's file by the competent professional authority.

<sup>2</sup> Combinations of single strength or frozen concentrated juice may be issued as long as the total volume does not exceed the amount specified for single strength juice.

(7) Food Package VII—Breastfeeding Women (Enhanced).

Food	Quantity
<b>Milk:</b>	
Fluid whole milk	28 qt. (26.5 L).
Or	
Cheese	May be substituted for fluid whole milk at the rate of 1 lb. (.4 kg) per 3 qt. (2.8 L) of fluid whole milk. 4 lbs. (1.8 kg) is the maximum amount which may be substituted. Additional cheese may be issued on an individual basis in cases of lactose intolerance, provided the need is documented in the participant's file by the competent professional authority.
Or	
Fluid skim or lowfat milk	May be substituted for fluid whole milk on a quart-for-quart (.9 L) basis.
Or	
Cultured buttermilk	May be substituted for fluid whole milk on a quart-for-quart (.9 L) basis.
Or	
Evaporated whole milk	May be substituted for fluid whole milk at the rate of 13 fluid oz. (.4 L) per qt. (.9 L) of fluid whole milk.
Or	
Evaporated skimmed milk	May be substituted for fluid whole milk at the rate of 13 fluid oz. (.4 L) per qt. (.9 L) of fluid whole milk.
Or	
Dry whole milk	May be substituted for fluid whole milk at the rate of 1 lb. (.4 kg) per 3 qt. (2.8 L) of fluid whole milk.
Or	
Nonfat or lowfat dry milk	May be substituted for fluid whole milk at the rate of 1 lb. (.4 kg) per 5 qt. (4.7 L) of fluid whole milk.
<b>Cheese:</b>	
Cheese	1 lb. (.4 kg).
<b>Eggs:</b>	
Eggs	2 doz. or 2 $\frac{1}{2}$ doz.
Or	
Dried egg mix	May be substituted at the rate of 1.5 lb. (.7 kg) egg mix per 2 doz. fresh eggs, or 2 lb. (.9 kg) egg mix per 2 $\frac{1}{2}$ doz. fresh eggs.
<b>Cereals:</b>	
Cereals (hot or cold)	36 oz. dry (1 kg).
<b>Juice:</b>	
Single strength juice	322 fluid oz. (9.6 L).
Or	
Frozen concentrated juice	336 fluid oz. reconstituted (10.0 L). Combinations of single strength or frozen concentrated juice may be issued as long as the total volume does not exceed the amount specified for single strength juice.
<b>Legumes:</b>	
Dry beans or peas and	1 lb. (.4 kg). May be substituted for peanut butter at the rate of 1 lb. of dry beans or peas per 18 oz. of peanut butter.
Peanut butter	18 oz. (.5 kg). Peanut butter may not be substituted for mature dry beans or peas at any rate.
<b>Fish:</b>	
Tuna	26 oz. (.8 kg).
<b>Vegetable:</b>	
Raw carrots or	2 lb. (.9 kg).
Frozen carrots or	May be substituted for fresh at the rate of 1 lb. frozen per 1 lb. fresh.
Or	
Canned carrots	May be substituted for fresh at the rate of 1 16–20 ounce can of carrots per 1 lb. fresh.



# Appendix I

## Participant Satisfaction with and Use of Prescribed Foods, Selected Food Categories

Chapter 6 of this report provides a detailed discussion of WIC participants' satisfaction with and use of prescribed cheese and breakfast cereal. This appendix provides a parallel discussion of the participants' satisfaction with and use of prescribed milk, eggs, infant cereal, juice, peanut butter, and dried beans/peas. The results are based on responses to the Survey of WIC Participants. See chapter 6 for a discussion of the research approach.

### Milk

Four of the six case study States—Connecticut, North Carolina, Oklahoma, and Texas—required WIC participants to purchase the least expensive brand of milk available, and all the States imposed some restrictions on package size or allowable types of milk (see table 3-1 in chapter 3 for a complete description of WIC-approved milk in each State). The four States with least expensive brand policies are treated as the “restrictive” group of States in examining satisfaction with allowed brands and the purchase and consumption of prescribed milk.<sup>1</sup> California, Ohio, and Oklahoma, with a minimum container size of one gallon, form the “restrictive” group in examining participants' satisfaction with allowed package sizes for milk.

All survey respondents were asked whether they were satisfied with brands of food and package sizes allowed for several different food categories, including milk. If the food item was not currently in their food package prescription, they were asked whether they had been satisfied with the item in the past.<sup>2</sup> The top two sections of table I-1 present responses for satisfaction with milk brands and package sizes, respectively. There is very little evidence of dissatisfaction in any of the States. Overall, an average of 89.3 percent of respondents in each State said they were “very satisfied” with the brand(s) of milk they could purchase, and 89.4 percent said they were “very satisfied” with the allowed package size(s) for milk. Fewer than 3 percent of respondents in any State said they were “not satisfied” with either allowed milk brands or package sizes. When the distributions of responses within States with brand or package-size restrictions are compared with those of States without restrictions (the “No restriction” and “Restriction” columns in the table), there are no significant differences in responses. Within these six States, there is no relationship between participant satisfaction and the presence of least expensive brand policies or package-size restrictions.

The “Percent with prescription” panel of table I-1 shows that milk was prescribed for a cross-State average of 94.2 percent of the sampled WIC families.<sup>3</sup> Respondents in the two States without brand restrictions were more likely to have milk prescribed (an average of 96.4 percent) than respondents

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<sup>1</sup> California used to require purchase of the least expensive brand of milk, but dropped the requirement after receiving complaints from vendors and participants that the requirement was confusing.

<sup>2</sup> If the food item had never been prescribed, a response of “not applicable” was recorded.

<sup>3</sup> Recall that the survey sample does not include families in which the only WIC participant is an infant, so table I-1 overstates the percentage of all WIC families for which milk was prescribed.

Table I-1—Satisfaction with, purchase, and consumption of milk

	Individual States						State groups			Group difference
	CA	CT	NC	OH	OK	TX	All States	No restrictions	Restriction	
	<i>Percent</i>									
Satisfaction with brands <sup>a</sup>										
Very satisfied	86.2	87.4	92.0	90.1	89.1	91.0	89.3	88.1	89.9	
Somewhat satisfied	11.2	10.4	8.0	7.6	10.3	7.8	9.2	9.4	9.1	
Not satisfied	2.6	2.2	0.0	2.3	0.6	1.2	1.5	2.4	1.0	
Sample size (number)	204	227	222	215	202	198	1,268	419	849	
Satisfaction with package sizes <sup>a</sup>										
Very satisfied	86.4	87.8	94.1	90.1	91.2	86.9	89.4	89.6	89.2	
Somewhat satisfied	12.6	9.8	5.9	9.4	7.4	10.3	9.2	8.7	9.8	
Not satisfied	1.0	2.4	0.0	0.6	1.4	2.8	1.4	1.7	1.0	
Sample size (number)	206	225	222	214	203	197	1,267	644	623	
Percent with prescription	95.6	93.4	96.0	97.2	93.3	89.6	94.2	96.4	93.1	-3.3*
Sample size (number)	178	198	195	191	167	190	1,099	369	730	
Amount purchased <sup>a</sup>										
All	92.8	94.0	89.9	88.6	93.3	88.4	91.2	90.7	91.4	0.7
Some	6.4	6.0	9.1	11.4	6.7	11.6	8.6	8.9	8.4	
None	0.7	0.0	1.0	0.0	0.0	0.0	0.3	0.4	0.2	
Sample size (number)	170	183	184	183	154	153	1,027	353	674	
Amount consumed <sup>a</sup>										
All	93.8	81.5	78.8	85.4	81.1	86.1	84.5	89.6	81.9	-7.7**
Some	6.2	18.5	20.4	14.6	17.8	13.9	15.2	10.4	17.6	
None	0.0	0.0	0.8	0.0	1.1	0.0	0.3	0.0	0.5	
Sample size (number)	168	182	185	183	154	153	1,025	351	674	

a A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Connecticut, North Carolina, Oklahoma, and Texas required purchase of least expensive brand of milk. California, Ohio, and Oklahoma had the most restrictive package sizes, requiring purchase of milk in gallon containers.

Source: Survey of WIC Participants.

from the four States with restrictions (93.1 percent), but this statistically significant difference in prescription rates is unrelated to cost-containment efforts. States are not allowed to alter food package prescriptions in an effort to reduce food package costs.<sup>4</sup>

All respondents with prescribed milk were asked whether they purchased “all,” “some,” or “none” of the milk in the month prior to the interview. As shown in the “Amount purchased” panel of table I-1, a cross-State average of 91.2 percent of respondents said they purchased all of the milk prescribed, 8.6 percent said some, and fewer than 1 percent said none. A chi-squared test on the difference in distributions indicates that the average distribution of responses in the two States without restrictions (California and Ohio) is not significantly different from the average distribution of responses from the four States requiring purchase of the least cost brand of milk. So few participants answered “none,” however, that the distribution of responses is nearly binomial (“all” vs. “some”). A significance test was therefore performed for the percentage of respondents who said they purchased all the prescribed milk; the difference between the two groups (0.7 percentage points) is not statistically significant.<sup>5</sup>

All respondents who purchased at least some of the prescribed milk were asked whether the WIC participants in the family drank “all,” “some,” or “none” of the milk; responses are shown in the bottom panel of table I-1. In the States with least expensive brand restrictions, a cross-State average of 81.9 percent of respondents said they drank all the milk purchased, 17.6 percent said they drank some of the milk, and 0.5 percent said they did not drink any of the milk. (Note that these responses are conditional upon at least some of the prescribed milk being purchased.<sup>6</sup>) The average distribution of responses is not significantly different in the two States without restrictions, but a test of just the percentage saying they drank all the purchased milk shows that respondents in the States with restrictions were 7.7 percentage points less likely to drink all the milk than respondents in States without restrictions, and this difference is statistically significant at the 0.01 level.

Is the significant difference in amount consumed attributable to the least expensive brand policies of Connecticut, North Carolina, Oklahoma, and Texas? Survey respondents who did not buy all the milk prescribed, or did not drink all the milk purchased, were asked why. As displayed in table I-2, the reasons generally are not associated with the State policies on buying the least expensive brand of milk. Thus, the evidence does not support a hypothesis that WIC participants’ purchase or consumption of milk was affected by State policies designed to reduce food package costs.

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<sup>4</sup> This policy is described in “Final WIC Policy Memorandum: #97-7,” dated May 1997. The memorandum states that, although prescribed quantities may be reduced for sound nutrition reasons, “nutrition tailoring must not be done for cost reasons, although lower costs may be an incidental result” (p. 4).

<sup>5</sup> Significance tests were not conducted for differences in the average percentage of respondents saying they purchased “some” or “none” of the prescribed milk. Because such tests would not be independent (of each other or the test on “all”), stricter conditions for evaluating statistical significance would have to be used. The report instead uses the usual criteria for evaluating the statistical significance of differences in the “all” category.

<sup>6</sup> If one wanted to know the percentage of respondents who said they drank all the milk that was prescribed, the “all” percentages in the panel on “amount consumed” would need to be multiplied by the “all” percentages in the panel on “amount purchased”. In California, for example, 87.0 percent of respondents drank all the milk that was prescribed (that is, 93.8 percent of the 92.8 percent who bought all their prescribed milk).

**Table I-2—Reasons for not purchasing or consuming prescribed milk**

	All States <sup>a</sup>	No restrictions	Restriction	Group difference
	<i>Percent</i>			
Reasons for not purchasing some or all of prescribed item <sup>b</sup>				
Don't like	6.3	4.6	7.2	2.6
Voucher expired or lost	17.7	6.9	23.2	
Too much	43.3	63.5	33.1	
Can't get to store	14.8	5.0	19.6	
Other	18.0	20.0	16.9	
<i>Sample size (number)</i>	<i>86</i>	<i>29</i>	<i>57</i>	
Reasons for not drinking some or all of prescribed item <sup>b</sup>				
Don't like	16.4	15.4	16.9	1.4
Too much	37.2	26.6	41.5	
Don't normally drink	4.5	9.4	2.1	
Went bad	14.8	29.1	7.6	
Consumed by others	22.1	8.8	28.7	
Other	5.0	8.6	3.2	
<i>Sample size (number)</i>	<i>148</i>	<i>34</i>	<i>114</i>	

a Results presented for the six States in the study. Due to small sample sizes, State-specific results are not reported.

b A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Connecticut, North Carolina, Oklahoma, and Texas required purchase of the least expensive brand of milk. California, Ohio, and Oklahoma had the most restrictive package sizes, requiring gallon containers.

Source: Survey of WIC Participants.

State-specific results are not presented in table I-2 because the sample sizes in individual States are generally too small to support reliable estimates of the distribution of reasons across response categories. Among the six States, however, the two most common reasons given for not buying some or all of the prescribed milk were that the WIC clinic prescribed too much of it (mentioned by a cross-State average of 43.3 percent of the 86 respondents in the group) and that respondents lost their WIC voucher, or it expired, before they could use it (an average of 17.7 percent). A cross-State average of only 6.3 percent said they did not like milk. This response could be related to brand dissatisfaction; the 2.6 percentage-point difference between States with and without least cost brand restrictions, however, is not statistically significant.<sup>7</sup> Overall, the two group distributions of responses in the top panel of table I-2 are not significantly different.

<sup>7</sup> In both table I-2 and later tables examining why participants did not purchase or consume all of their prescribed food items, an argument could be made that reasons other than “don’t like” could be related to cost-containment restrictions. For instance, in table I-2, more respondents in the States with restrictions than in those without said they did not



When asked why they did not drink some or all of the purchased milk (the bottom panel of table I-2), a cross-State average of 16.4 percent said they did not like the milk. The 1.4 percentage-point difference between the two groups of States is not significantly different from zero. The most common reasons cited for not drinking purchased milk were that too much was prescribed (a cross-State average of 37.2 percent), and that non-WIC members of the family consumed the milk (an average of 22.1 percent).<sup>8</sup> The group distributions are not significantly different from one another.

## Eggs

The six States varied somewhat in the restrictions they imposed on eggs. North Carolina was the only State to allow purchase of brown as well as white eggs, but it allowed only Grade A eggs, whereas the other States were either less restrictive on grade or allowed Grade AA eggs. The States also differed in which size eggs could be purchased, with Ohio being the least restrictive and Connecticut the most. Two States—Connecticut and Oklahoma—required WIC participants to purchase the least expensive brand of eggs available in the store. For examining the effects of cost-containment practices, tables I-3 and I-4 focus on the impacts of imposing least expensive brand provisions on eggs.

An average of 92.4 percent of survey respondents in the six States had eggs included in their WIC prescriptions (table I-3). A cross-State average of 95.5 percent of these respondents said they purchased all the eggs included in their food package, with less than 1 percent saying that they did not purchase any. There is no significant difference in the distribution of amount purchased between States with and without least expensive brand restrictions.

Among those respondents who purchased at least some of their prescribed eggs, an average of 79.0 percent said they ate all they purchased. A cross-State average of 20.5 percent said they ate some of the eggs. The overall average distribution of amount consumed within States without least cost restrictions is not significantly different from the average distribution for the States with restrictions. The 12.5 percentage-point difference in respondents saying they ate **all** of the eggs, however, is significant at the 0.01 level.

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purchase all their milk because their voucher expired or was lost. If participants did not like the available choices of a particular food item, they could simply have let their vouchers expire (or not tried to get to the store, or let non-WIC family members consume the item, or taken any number of actions). In this situation the study would be underestimating the impact of the restrictions on purchasing behavior. Given that the survey asked for the **main** reason the prescribed item was not bought, however, “don’t like” seems a more straightforward measure of reasons related to cost-containment restrictions. That is, if a participant did not buy a prescribed item because she did not like the available choices, it was simpler for her to say she did not like the item than to provide another reason not directly related to preferences.

<sup>8</sup> California officials report that the complaints they receive about “too much” milk involve prescriptions for young toddlers. Mothers say that these children cannot finish the milk before it spoils.

Table I-3—Purchase and consumption of eggs

	Individual States						State groups			Group difference
	CA	CT	NC	OH	OK	TX	All States	No restrictions	Restriction	
						<i>Percent</i>				
Percent with prescription	91.8	94.6	93.4	95.7	90.7	88.1	92.4	92.2	92.6	0.4
<i>Sample size (number)</i>	<i>178</i>	<i>198</i>	<i>195</i>	<i>191</i>	<i>168</i>	<i>171</i>	<i>1,101</i>	<i>735</i>	<i>366</i>	
Amount purchased <sup>a</sup>										
All	98.1	97.6	93.5	96.9	91.2	95.7	95.5	96.0	94.4	
Some	1.8	2.4	6.5	3.1	8.8	1.9	4.1	3.3	5.6	
None		0.0	0.0	0.0	0.0	2.4	0.4	0.6	0.0	
<i>Sample size (number)</i>	<i>163</i>	<i>185</i>	<i>183</i>	<i>180</i>	<i>150</i>	<i>151</i>	<i>1,012</i>	<i>677</i>	<i>335</i>	
Amount consumed <sup>a</sup>										
All	93.3	75.0	75.7	75.9	66.2	87.7	79.0	83.1	70.6	-12.5**
Some	6.7	24.4	22.7	23.8	33.4	12.3	20.5	16.4	28.9	
None	0.0	0.6	1.6	0.4	0.3	0.0	0.5	0.5	0.4	
<i>Sample size (number)</i>	<i>162</i>	<i>184</i>	<i>183</i>	<i>180</i>	<i>151</i>	<i>148</i>	<i>1,008</i>	<i>673</i>	<i>335</i>	

a A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Connecticut and Oklahoma required purchase of the least expensive brand of eggs.

Source: Survey of WIC Participants.

Table I-4 shows that a State average of only 2.1 percent of respondents said they did not buy some or all of the prescribed eggs because they did not like eggs; the 3.1 percentage-point difference between the States with and without restrictions is not statistically significant. As displayed in the bottom panel of table I-4, the main reason given for not eating some or all of the eggs was that too many eggs were purchased. There is no significant difference in either the overall average distributions of reasons given or in the percentage of respondents saying they did not eat the eggs because they did not like them. Thus, there is no evidence that least expensive brand restrictions had an impact on the purchase or consumption of eggs.

**Table I-4—Reasons for not purchasing or consuming prescribed eggs**

	All States <sup>a</sup>	No restrictions	Restriction	Group difference
	<i>Percent</i>			
Reasons for not purchasing some or all of prescribed item <sup>b</sup>				
Don't like	2.1	3.1	0.0	-3.1
Other	97.9	95.9	100.0	
<i>Sample size (number)</i>	45	29	16	
Reasons for not consuming some or all of prescribed item <sup>b</sup>				
Don't like	11.3	12.0	9.8	-2.3
Too much	41.9	46.7	32.2	
Don't normally eat	21.4	24.3	15.7	
Consumed by others	19.6	10.7	37.5	
Other	5.8	6.2	4.9	
<i>Sample size (number)</i>	204	116	88	

a Results presented for the six States in the study. Due to small sample sizes, State-specific results are not reported.

b A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Connecticut and Oklahoma required purchase of the least expensive brand of eggs.

Source: Survey of WIC Participants.

## Infant Cereal

The six States did not vary in the types of infant cereal (that is, rice, oatmeal, barley, and mixed) that could be purchased with the infant's WIC voucher or check, although North Carolina and Ohio were the only two States to allow purchase of high-protein infant cereal. The States did vary in which brands of infant cereal could be purchased. California, Connecticut, and Texas had negotiated manufacturer rebates with Gerber, so Gerber was the only brand that could be purchased with WIC food

instruments in those three States. North Carolina and Ohio allowed all three of the major infant cereal brands: Beechnut, Gerber, and Heinz. Oklahoma allowed only Gerber and Heinz.

The variation in brand policy had little impact on respondents' reports of facing binding constraints on food type or brand. Only three sampled respondents in the six States indicated a binding constraint on infant cereal—a cross-State average of only 0.5 percent (table 6-2 in chapter 6). Two of these respondents, both from Connecticut, preferred the Beechnut brand. The third respondent, the only one from Texas who faced a binding constraint, preferred Heinz.

Table I-5 shows the distribution of respondents' satisfaction with allowed brands of infant cereal. The average distribution for the three States with the most restrictive policy on brands (California, Connecticut, and Texas) is not statistically different from the average distribution for the remaining three States. Overall, a cross-State average of 79.4 percent of respondents said they were very satisfied with the allowed brands; only 5.8 percent said they were not satisfied.

The only variation in packaging restrictions for infant cereal was the allowance of only 8-ounce boxes or of both 8- and 16-ounce boxes. The 8-ounce restriction was not really binding because participants could always buy two 8-ounce boxes rather than one 16-ounce box. For this reason no groups are defined in the second panel of table I-5, and no significance tests on group differences were conducted. Overall, a State average of 84.8 percent of respondents said they were very satisfied with allowed package sizes of infant cereal.

Among sampled WIC families with a participating infant, a cross-State average of 68.2 percent had cereal in their infant's prescription (the "Percent with prescription" panel of table I-5).<sup>9</sup> For those with prescribed infant cereal, a cross-State average of 89.1 percent purchased all of the prescribed cereal, with another 5.7 percent buying some. The remaining 5.1 percent did not purchase any of the prescribed cereal. The presence of brand restrictions had no statistically significant relationship with the amount purchased. With regard to consumption (bottom panel), there was no significant difference in the average distributions of amount consumed between States with and without brand restrictions. If one focuses just on the percentage who said their infants ate all of the purchased cereal, however, infants in the restricted-brand States were significantly more likely (at the 0.01 level) to eat all of their cereal than infants in the other States. This finding runs counter to the hypothesis that food-item restrictions might reduce consumption levels.

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<sup>9</sup> According to program regulations (246.10(c)2), infant cereal is part of food package 2, for infants 4 to 12 months, so not all infants are eligible for infant cereal. Furthermore, a local WIC clinic would have discretion to exclude infant cereal from a prescription on an individual basis if an infant was not developmentally ready for it.

**Table I-5—Satisfaction with, purchase, and consumption of infant cereal**

	Individual States						State groups			Group difference
	CA	CT	NC	OH	OK	TX	All States	No restrictions	Restriction	
	<i>Percent</i>									
Satisfaction with brands <sup>a</sup>										
Very satisfied	80.5	75.6	76.8	76.9	83.2	83.5	79.4	79.0	79.9	
Somewhat satisfied	12.3	16.2	14.1	19.5	13.8	12.9	14.8	15.8	13.8	
Not satisfied	7.2	8.2	9.1	3.6	2.9	3.5	5.8	5.2	6.3	
Sample size (number)	57	71	48	66	64	72	378	178	200	
Satisfaction with package sizes										
Very satisfied	84.6	77.3	93.6	86.0	83.4	83.7	84.8			
Somewhat satisfied	13.6	13.8	6.4	9.1	15.0	14.6	12.1			
Not satisfied	1.7	9.0	0.0	4.9	1.6	1.7	3.2			
Sample size (number)	57	71	48	66	64	72	383			
Percent with prescription	74.1	74.2	62.5	61.8	59.1	77.4	68.2	61.1	75.3	14.1
Sample size (number)	63	68	54	73	62	71	391	189	202	
Amount purchased <sup>a</sup>										
All	94.4	90.4	87.7	77.6	87.6	97.0	89.1	84.3	94.0	
Some	0.0	7.2	9.2	11.8	3.2	3.0	5.7	8.1	3.4	
None	5.6	2.5	3.0	10.6	9.2	0.0	5.1	7.6	2.7	
Sample size (number)	45	55	30	41	37	54	262	108	154	
Amount consumed <sup>a</sup>										
All	79.0	88.1	65.0	42.9	45.0	74.7	65.8	51.0	80.6	29.6**
Some	21.0	11.5	32.3	55.5	51.2	24.6	32.7	46.3	19.0	
None	0.0	0.4	2.7	1.6	3.8	0.7	1.5	2.7	0.4	
Sample size (number)	40	53	29	40	34	54	250	103	147	

a A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

California, Connecticut, and Texas required purchase of Gerber brand only. Oklahoma required purchase of Gerber or Heinz brands; North Carolina and Oklahoma allowed purchase of Beechnut, Gerber, or Heinz.

Source: Survey of WIC Participants.

Given that most of the sampled families purchased all of the infant cereal prescribed, only 23 respondents were asked why they did not buy some or all of the prescribed cereal. Their responses are shown in table I-6. With a sample this small, it is not possible to test whether the average distributions of responses in States with and without brand restrictions were significantly different. The average percentage of those saying their infant did not like the cereal was higher in States with restrictions (21.0 percent) than in States without (0.0 percent), and the 21.0 percentage-point difference is significant at the 0.05 level. This difference, however, is based on only three participants in California who said their infants did not like Gerber cereal. Furthermore, there were no significant differences between groups in the reasons given for not eating all of the purchased cereal. The most common reason was that there was too much to eat. The evidence, therefore, does not support a finding that brand restrictions reduced the purchase or consumption of infant cereal.

**Table I-6—Reasons for not purchasing or consuming prescribed infant cereal**

	All States <sup>a</sup>	No restrictions	Restriction	Group difference
	<i>Percent</i>			
Reasons for not purchasing some or all of prescribed item <sup>b</sup>				
Don't like	10.5	0.0	21.0	21.0*
Voucher expired or lost	11.9	0.0	23.9	
Too much	47.7	42.8	52.7	
Other	29.8	57.2	2.4	
<i>Sample size (number)</i>	23	13	10	
Reasons for not consuming some or all of prescribed item <sup>b</sup>				
Don't like	32.7	35.6	29.8	-5.8
Too much	42.0	36.0	48.0	
Don't normally eat	6.4	4.5	8.3	
Other	18.9	24.0	13.9	
<i>Sample size (number)</i>	94	49	45	

a Results presented for the six States in the study. Due to small sample sizes, State-specific results are not reported.

b A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

California, Connecticut, and Texas required purchase of Gerber brand only. Oklahoma required purchase of Gerber or Heinz brands; North Carolina and Oklahoma allowed purchase of Beechnut, Gerber, or Heinz.

Source: Survey of WIC Participants.

## Adult Juice

Four States are considered “restrictive” with respect to adult juice. Connecticut and Texas required purchase of least expensive brands for some or all of their approved juices. Oklahoma approved only store brands or private labels for most juice types. California and Texas allowed fewer types than the other States (see table 3-1 in chapter 3).

With respect to packaging, all of the case study States allowed frozen concentrates. North Carolina, Ohio, and Oklahoma also allowed liquid concentrates. Five of the six States limited purchase of shelf-stable juices (bottles and cans) to the 46-ounce size; California, however, allowed only 64-ounce containers. Furthermore, Texas limited shelf-stable juices to 46-ounce cans; plastic bottles were not allowed. Finally, Connecticut was the only State that allowed purchase of refrigerated orange juice (64- or 128-ounce cartons).

California and Texas, at 13.3 and 12.1 percent, respectively, had the highest proportion of survey respondents indicating a binding constraint on juices (table 6-2). Thus, it appears that the limited variety of juices approved in California and the least expensive brand and container size policies in Texas did restrict participant choice. Connecticut, with its least expensive brand policy, ranked third in the percentage of respondents (7.2 percent) facing binding constraints on adult juice. In Oklahoma, however, only 3.1 percent of the survey respondents preferred a federally approved type or brand of juice that was not allowed by the State.

The most common binding constraint was for cranberry juice, mentioned by 24 of the 71 respondents with a binding constraint on juice.<sup>10</sup> In addition, 4 of the 18 respondents in California with a constraint listed grapefruit as a preferred juice. Juice blends and national brands were also common responses, mentioned by 10 and 9 of the 71 respondents, respectively.

Survey respondents’ satisfaction with allowed brands is displayed in the top panel of table I-7; a cross-State average of 78.7 percent of respondents said they were “very satisfied” with allowed brands of juice, and 18.8 percent said they were “somewhat satisfied”. A chi-squared test indicates that there was not a statistically significant difference in the average distributions of satisfaction level in the States with and without restrictions.

There was also a generally high level of satisfaction with allowed package sizes of juice (second panel of table I-7); a cross-State average of 79.9 percent was very satisfied. It is difficult to identify which package sizes WIC participants would view as most restrictive, because some participants might prefer large containers and others smaller ones. Furthermore, there is not a lot of State-by-State variation in satisfaction with package sizes. For this reason, the States have not been divided into groups to see if the distributions of responses varied by packaging restrictions on juices.

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<sup>10</sup> Only North Carolina and Ohio allowed purchase of cranberry juice.

**Table I-7—Satisfaction with, purchase, and consumption of juice**

	Individual States						State groups			Group difference
	CA	CT	NC	OH	OK	TX	All States	No restrictions	Restriction	
	<i>Percent</i>									
Satisfaction with brands <sup>a</sup>										
Very satisfied	77.3	76.3	76.7	80.6	79.6	83.2	78.7	78.7	79.1	
Somewhat satisfied	22.8	20.1	22.8	18.2	18.3	15.3	18.8	20.5	19.1	
Not satisfied	1.9	5.7	2.5	3.1	4.2	3.6	2.5	2.8	3.8	
Sample size (number)	207	228	222	214	204	201	1,276	436	840	
Satisfaction with package sizes <sup>a</sup>										
Very satisfied	85.8	72.6	81.0	76.9	81.0	82.4	79.9			
Somewhat satisfied	14.2	22.9	17.8	20.8	17.2	16.7	18.3			
Not satisfied	2.0	6.6	3.2	4.4	3.8	2.9	3.8			
Sample size (number)	198	216	218	212	190	186	1,220			
Percent with prescription	96.9	97.2	97.6	96.7	96.2	98.9	97.3	97.1	97.3	0.2
Sample size (number)	178	198	196	190	168	171	1,101	386	715	
Amount purchased <sup>b</sup>										
All	99.8	98.7	95.2	93.4	95.0	98.0	96.7	94.3	97.9	3.6*
Some	0.1	1.3	4.8	6.2	5.0	0.5	3.0	5.5	1.8	
None	0.1	0.0	0.0	0.4	0.0	1.5	0.3	0.2	0.4	
Sample size (number)	174	193	191	181	162	168	1,069	372	697	
Amount consumed <sup>a</sup>										
All	96.0	82.4	85.1	82.2	80.0	84.7	85.1	83.7	85.8	2.1
Some	3.9	17.6	14.1	17.4	19.3	14.6	14.5	15.8	13.8	
None	0.1	0.0	0.8	0.3	0.6	0.7	0.4	0.5	0.4	
Sample size (number)	171	193	192	180	161	165	1,062	372	690	

a A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

b A chi-square test on the difference in distribution between States with and without restrictions was statistically significant at the 0.05 level.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Texas required purchase of the least expensive brand of juice and approved a relatively narrow choice of juice types; Connecticut required purchase of least expensive brand when buying orange and grapefruit juice. California approved a relatively narrow choice of juice types, and Oklahoma restricted choice to private label or store brands.

Source: Survey of WIC Participants.



The fourth panel of table I-7 (“Amount consumed”) shows that the average percentage of respondents saying they purchased all their prescribed juice was very high: 96.7 percent. The average distributions of amount purchased (all, some, or none) for States with and without restrictions are significantly different at the 0.05 level, as is the difference in the percent of respondents saying they purchased “all” of their prescribed juice. The 3.6 percentage-point difference is not large, however, and the direction of the effect runs counter to a hypothesis that restrictions reduce the amount of a prescribed food item that is purchased.

Respondents in the States with juice restrictions were neither more nor less likely than respondents in the other States to consume the juice they purchased; the two group distributions in the bottom panel of table I-7 are not significantly different.

Of the 46 survey respondents who said they did not buy all the prescribed juice, nobody gave “don’t like” as a reason (table I-8). Respondents in States with brand restrictions, however, were significantly more likely than respondents in the other States to say that they did not purchase juice because their food instrument expired or was lost. It is possible that some of this difference in loss/expiration rates arose because respondents in the restricted States, not liking the allowed juices, simply let the instruments expire. This interpretation, however, is inconsistent with the finding that “don’t like” was never cited as the main reason for not purchasing juice.

When asked why they did not drink the juice they purchased, a cross-State average of 10.6 percent in each group said that they did not like the juice (bottom panel of table I-8). The two overall distributions of reasons for not drinking the juice are not significantly different from one another.

Given these survey findings, there is no evidence that restrictions on allowable juice brands or types affected overall patterns of purchase or consumption of prescribed juice. Even for the respondents facing a binding constraint, the restrictions did not affect program-related behavior in hypothesized ways. As shown in table I-9, respondents with binding restrictions were more likely, not less, to purchase and drink their prescribed juice.

**Table I-8—Reasons for not purchasing or consuming prescribed juice**

	All States <sup>a</sup>	No restrictions	Restriction	Group difference
	<i>Percent</i>			
Reasons for not purchasing some or all of prescribed item <sup>b</sup>				
Voucher expired or lost	20.8	6.4	28.0	21.6*
Too much	40.4	49.8	35.8	
Can't get to store	15.6	28.9	9.0	
Other	23.1	15.0	27.2	
<i>Sample size (number)</i>	<i>46</i>	<i>24</i>	<i>22</i>	
Reasons for not drinking some or all of prescribed item <sup>b</sup>				
Don't like	10.6	10.6	10.6	0.0
Too much	48.4	48.4	48.4	
Don't normally eat	4.3	4.9	3.9	
Consumed by others	22.0	16.9	24.5	
Other	14.7	19.2	12.5	
<i>Sample size (number)</i>	<i>161</i>	<i>63</i>	<i>98</i>	

a Results presented for the six States in the study. Due to small sample sizes, State-specific results are not reported.

b A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Texas required purchase of the least expensive brand of juice and approved a relatively narrow choice of juice types; Connecticut approved a relatively narrow choice of juice types, and Oklahoma restricted choice to private-label or store brands.

Source: Survey of WIC Participants.

**Table I-9—Binding constraints and participant satisfaction with and use of prescribed juice**

	Binding	Not binding
	<i>Percent</i>	
Satisfaction with allowed brands or types		
Very satisfied	78.5	81.9
Somewhat satisfied	17.5	16.1
Not satisfied	4.1	2.0
<i>Sample size (number)</i>	<i>70</i>	<i>995</i>
Amount purchased		
Very satisfied	99.9	96.5
Somewhat satisfied	0.1	3.1
Not satisfied	0.0	0.4
<i>Sample size (number)</i>	<i>71</i>	<i>998</i>
Amount consumed		
All	90.7	85.3
Some	9.0	14.3
None	0.3	0.4
<i>Sample size (number)</i>	<i>71</i>	<i>991</i>

Weighted estimates were obtained with SUDAAN software. Group estimates give equal weight to each State in the group.

Totals may not sum to 100 due to rounding.

Source: Survey of WIC Participants

## Peanut Butter

Within the group of six case study States, Connecticut was the only one to require that WIC participants purchase the least expensive brand of peanut butter in the store. Connecticut was also the most restrictive State in terms of which types of peanut butter (e.g., plain, chunky, low sugar, or sodium) could be purchased with the WIC food instrument. Thus, when examining the possible impacts of food-item restrictions on satisfaction with, and purchase and consumption of, peanut butter, the experiences of Connecticut respondents are compared with those in the other five States.

A cross-State average of 64.9 percent of survey respondents had peanut butter prescribed in their food packages in a typical month.<sup>11</sup> Nearly all the prescribed peanut butter was purchased, with no significant difference between Connecticut and the States with no brand restrictions (table I-10). Connecticut respondents also were similar to those in the other States in terms of how much of the purchased peanut butter they (or other WIC members within the family) ate. The two group distributions in the bottom panel of table I-10 are not significantly different. Only a relatively small percentage of respondents, however, said they ate all of the purchased peanut butter—59.3 and 62.1 percent, respectively, in Connecticut and the other States.

<sup>11</sup> In the typical WIC food package, either peanut butter or dried beans/peas, but not both, is prescribed. Often, States will prescribe peanut butter one month and dried beans/peas the next. States may substitute dried beans/peas for peanut butter in participant food packages, but not peanut butter for dried beans/peas.

**Table I-10—Purchase and consumption of peanut butter**

	Individual States						State groups			Group difference
	CA	CT	NC	OH	OK	TX	All States	No restrictions	Restriction	
						<i>Percent</i>				
Percent with prescription	55.0	66.8	81.9	84.4	70.2	31.4	64.9	64.6	66.8	2.3
<i>Sample size (number)</i>	<i>178</i>	<i>196</i>	<i>195</i>	<i>190</i>	<i>166</i>	<i>171</i>	<i>1,096</i>	<i>900</i>	<i>196</i>	
Amount purchased										
All	97.8	95.4	76.4	97.4	96.4	93.1	92.7	92.2	95.4	3.2
<i>Sample size (number)</i>	<i>109</i>	<i>143</i>	<i>158</i>	<i>156</i>	<i>114</i>	<i>61</i>	<i>741</i>	<i>598</i>	<i>143</i>	
Amount consumed <sup>a</sup>										
All	51.8	59.3	62.0	63.0	57.9	75.5	61.6	62.1	59.3	
Some	45.9	39.2	35.3	34.6	41.6	22.3	36.5	35.9	39.2	
None	2.3	1.4	2.7	2.4	0.4	2.2	1.9	2.0	1.4	
<i>Sample size (number)</i>	<i>102</i>	<i>139</i>	<i>126</i>	<i>152</i>	<i>110</i>	<i>57</i>	<i>686</i>	<i>547</i>	<i>139</i>	

a A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Connecticut required purchase of the least expensive brand of peanut butter.

Source: Survey of WIC Participants.

For the 52 survey respondents who did not buy all their prescribed peanut butter, the primary reason was that they had lost their food instruments or that the instruments had expired (table I-11). This reason is particularly evident in North Carolina, where over two-thirds of those not buying all the prescribed peanut butter said their instruments had expired. A cross-State average of 29.1 percent of survey respondents said they did not buy all the peanut butter because too much was prescribed, whereas an average of 24.6 percent said they did not like peanut butter. Although 38.5 percent of Connecticut respondents who did not buy all the prescribed peanut butter said they did not like it, and though this percentage is substantially higher than the 21.8 percent average in States without brand restrictions, the 16.7 percentage-point difference is not statistically significant given the small sample sizes.<sup>12</sup>

**Table I-11—Reasons for not purchasing or consuming prescribed peanut butter**

	All States <sup>a</sup>	No restrictions	Restriction	Group difference
	<i>Percent</i>			
Reasons for not purchasing some or all of prescribed item <sup>b</sup>				
Don't like	24.6	21.8	38.5	16.7
Voucher expired or lost	30.5	36.6	0.0	
Too much	29.1	34.9	0.0	
Other	15.8	6.6	61.5	
<i>Sample size (number)</i>	<i>52</i>	<i>48</i>	<i>4</i>	
Reasons for not eating some or all of prescribed item <sup>b</sup>				
Don't like	19.5	19.1	21.4	2.3
Too much	8.3	9.3	3.5	
Don't normally eat	9.1	10.0	4.9	
Consumed by others	46.7	45.4	52.8	
Other	16.4	16.2	17.4	
<i>Sample size (number)</i>	<i>254</i>	<i>199</i>	<i>55</i>	

a Results presented for the six States in the study. Due to small sample sizes, State-specific results are not reported.

b A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Connecticut required purchase of the least expensive brand of peanut butter.

Source: Survey of WIC Participants.

<sup>12</sup> A large percentage of respondents in Ohio (60.3 percent) said they did not purchase all their peanut butter because they did not like it, but this (weighted) percentage is based on a sample of only four people.

The relatively low percentages of respondents saying they ate all of their purchased peanut butter was related to its consumption by non-WIC members of the family; a cross-State average of 46.7 percent gave that as the main reason for not eating all that they purchased (table I-11). Only about 20 percent said they did not like peanut butter, and the 2.3 percentage-point difference in group means is not significant.

## **Dried Beans/Peas**

As was shown in table 3-1 in chapter 3, little variation existed among the six States as to the types of dried beans/peas that could be purchased with a WIC food instrument, nor were there differences in allowable packaging. Oklahoma was the only State in the group, however, to restrict brands; its WIC participants had to buy the least expensive brand of dried beans/peas available in the store.

As shown in table I-12, a cross-State average of 54.7 percent of survey respondents were prescribed dried beans/peas, and a cross-State average of 86.9 percent purchased all of them.<sup>13</sup> There were no significant differences in the average responses between Oklahoma and the other States in these measures. Respondents in Oklahoma, however, were less likely than the cross-State average of respondents in the nonrestrictive States to eat all the dried beans/peas they bought (57.2 vs. 72.0 percent); the 14.8 percentage-point difference is statistically significant at the 0.05 level. The overall distributions of consumption, however, were not significantly different from one another.

The survey evidence is inconclusive as to whether Oklahoma's least expensive brand policy underlay the difference in the percentage of respondents eating all the dried beans/peas they purchased. First, with regard to why respondents did not purchase all their prescribed dried beans/peas, respondents in Oklahoma were more likely than respondents in the other five States to say they did not like these foods (top panel of table I-13). The large 13.0 percentage-point difference between the two groups (39.6 vs. 26.6 percent) is not statistically significant, however, because the sample sizes are small. Second, respondents in Oklahoma were more likely, by 11.3 percentage points, to say they did not eat all the dried beans/peas they purchased because they did not like them.

Again, this difference is not statistically different from zero. Furthermore, chi-squared tests indicate that the distributions of responses in the restrictive and nonrestrictive States were not different from one another. Thus, although the direction of the impacts suggests that Oklahoma's least expensive brand policy may be related to less consumption of dried beans/peas, the hypothesis is not supported due to lack of statistical significance.

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<sup>13</sup> The survey questionnaire did not ask if "some" dried beans/peas were purchased, only if "all" or "none" were.

**Table I-12—Purchase and consumption of dried beans/peas**

	Individual States						State groups			Group difference
	CA	CT	NC	OH	OK	TX	All States	No restrictions	Restriction	
						<i>Percent</i>				
Percent with prescription	61.6	40.0	78.8	31.0	53.4	63.4	54.7	55.0	53.4	-1.6
<i>Sample size (number)</i>	<i>178</i>	<i>198</i>	<i>192</i>	<i>189</i>	<i>166</i>	<i>171</i>	<i>1,094</i>	<i>928</i>	<i>166</i>	
Amount purchased										
All	91.2	94.4	66.5	84.8	84.8	99.4	86.9	87.3	84.8	-2.4
<i>Sample size (number)</i>	<i>97</i>	<i>56</i>	<i>144</i>	<i>43</i>	<i>89</i>	<i>109</i>	<i>548</i>	<i>459</i>	<i>89</i>	
Amount consumed <sup>a</sup>										
All	92.7	57.9	61.6	60.6	57.2	87.3	69.6	72.0	57.2	-14.8*
Some	7.3	30.0	32.0	33.8	31.5	10.8	24.2	22.8	31.5	
None	0.0	12.1	6.4	5.6	11.4	2.0	6.2	5.2	11.4	
<i>Sample size (number)</i>	<i>86</i>	<i>60</i>	<i>85</i>	<i>37</i>	<i>77</i>	<i>108</i>	<i>453</i>	<i>376</i>	<i>77</i>	

a A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Oklahoma required purchase of the least expensive brand of dried beans/peas.

Source: Survey of WIC Participants.

**Table I-13—Reasons for not purchasing or consuming prescribed dried beans/peas**

	All States <sup>a</sup>	No restrictions	Restriction	Group difference
	<i>Percent</i>			
Reasons for not purchasing some or all of prescribed item <sup>b</sup>				
Don't like	28.8	26.6	39.6	13.0
Too much	18.1	21.0	3.8	
Other	23.3	17.8	50.5	
<i>Sample size (number)</i>	<i>95</i>	<i>83</i>	<i>12</i>	
Reasons for not eating some or all of prescribed item <sup>b</sup>				
Don't like	30.4	28.5	39.8	11.3
Too much	33.3	34.8	26.0	
Don't normally eat	7.5	8.6	1.8	
Consumed by others	15.4	16.7	8.7	
Other	13.4	11.4	23.8	
<i>Sample size (number)</i>	<i>121</i>	<i>88</i>	<i>33</i>	

a Results presented for the six States in the study. Due to small sample sizes, State-specific results are not reported.

b A chi-square test on the difference in distribution between States with and without restrictions was not statistically significant.

Weighted estimates for States were obtained with SUDAAN software. Group estimates give equal weight to each State in the group. Totals may not sum to 100 due to rounding.

Significant differences in means and proportions between State groups are noted by \* (0.05 level), \*\* (0.01 level).

Oklahoma required purchase of the least expensive brand of dried beans/peas.

Source: Survey of WIC Participants.



# Appendix J

## Models of Participant Satisfaction With and Use of Prescribed Foods

This appendix provides results from the multivariate analyses described in chapter 7. For most categories of prescribed food, three general binary logit models are estimated: (1) the survey respondent being “very satisfied” with allowed brands; (2) “all” prescribed food being purchased in the month prior to the interview; and (3) “all” purchased food being consumed.<sup>1</sup> Two specifications are presented for each general model, one with and one without interaction terms between residence in a State with food-item restrictions and presence of (a) a special diet or (b) a food allergy. Explanatory variables are:

• African-American	Respondent is African-American
• Hispanic	Respondent is Hispanic
• High school graduate	Respondent graduated from high school
• Number of WIC members	The total number of WIC participants in the family
• Special diet	At least one WIC participant in family was on a special diet, with special diets including vegetarian diets, religious diets, and diets for health-related reasons
• Food allergy	At least one WIC participant in family had a food allergy, as defined in chapter 7
• Resides in State with restrictions	Respondent resides in a State with food-item restrictions, as defined in chapter 6
• Special diet * restricted State	Interaction term between special diet and restricted State
• Food allergy * restricted State	Interaction term between food allergy and restricted State

Too few respondents indicated that they followed a vegetarian or religious diet to include these diets as separate variables in the models.

Some respondents reported that they (or a WIC member of the family) had both a special diet and a food allergy. To the extent that this occurs, the variances of the estimated coefficients of the two variables will increase, and the likelihood of observing a statistically significant coefficient will decrease. The correlation in the two variables, however, is low. Of the 487 respondents reporting a special diet, only 70 reported having an allergy. Of the 130 respondents with allergies, 70 were on special diets. The Pearson correlation coefficient is 0.11.

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<sup>1</sup> The survey did not ask about satisfaction with allowed brands of eggs, peanut butter, and dried beans/peas, so no models of satisfaction are specified for these three food categories.

The excluded category in each model is White participants living in a State without food restrictions (for the food category examined) who do not have a high school education and special diet or food allergy.

For cereals, two sets of models are presented. “Model 1” treats both California and Oklahoma as States with restrictive food-item policies, whereas “model 2” considers only Oklahoma as a restrictive State with regard to allowed brands of cereals.

For each model, the following information is provided:

- dependent variable
- mean (cross-State average) of the dependent variable
- number of observations in the model
- percent of concordant pairs
- estimated coefficient for each explanatory variable in the model
- p-value, or statistical significance, of each estimated coefficient
- estimated effect of a unit change at the mean value of the dependent variable, for each explanatory variable

The percentage of concordant pairs is calculated over all pairs of observations with different responses. (Thus, for example, each observation in which the respondent said she was “very satisfied” with allowed brands is compared, one by one, with all observations in which the respondent did not indicate being “very satisfied.”) A pair of observations is concordant if the one with the affirmative response has the higher predicted value of an affirmative response. The higher the percentage of concordant pairs, the better the explanatory power of the model.

The P-value heading in the following tables stands for probability value, a measure of the statistical significance of the estimated coefficient.

A parameter’s estimated impact at the mean is calculated as  $b * p * (1-p)$ , where  $b$  is the estimated coefficient and  $p$  is the mean of the dependent variable.

Finally, in terms of interpreting the estimated coefficients of the special diet and food allergy variables, these coefficients will be negative and statistically significant if, respectively, survey respondents with special diets or food allergies were less satisfied with allowed brands than other survey respondents. Similarly, the estimated coefficients will be negative in the other models if survey respondents with dietary restrictions were less likely to purchase all the prescribed food in a category or to consume all the food purchased.

A significant negative estimated coefficient on a variable indicating a special diet or food allergy, however, does not mean that food-item restrictions are related to the decreased satisfaction or purchase or consumption behavior. One must also consider the estimated coefficients for the interactive terms in each model. If the estimated coefficients on any interactive terms are negative and statistically significant, this evidence would support a hypothesis that food-item restrictions have a disproportionate impact on WIC participants with special diets or food allergies.

**Table J-1—Participant satisfaction with allowed brands of milk**

<b>Dependent variable:</b>	<b>Very satisfied with brands of milk</b>		
<b>Mean of dependent variable:</b>	<b>0.893</b>		
<b>Number of observations</b>	<b>1,268</b>		
<b>Percent concordant pairs</b>	<b>54.5</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.605	<.0001	0.249
African-American	-0.216	0.398	-0.021
Hispanic	-0.290	0.220	-0.028
High school graduate	0.055	0.795	0.005
Number of WIC members	-0.014	0.909	-0.001
Special diet	-0.249	0.205	-0.024
Food allergy	-0.540	0.056	-0.052
Resides in State with milk restrictions	-0.076	0.714	-0.007
Connecticut, North Carolina, Oklahoma, and Texas are defined as States with milk restrictions.			

**Table J-2—Participant satisfaction with allowed brands of milk, interactive model**

<b>Dependent variable:</b>	<b>Very satisfied with brands of milk</b>		
<b>Mean of dependent variable:</b>	<b>0.893</b>		
<b>Number of observations</b>	<b>1,268</b>		
<b>Percent concordant pairs</b>	<b>53.7</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.678	<.0001	0.256
African-American	-0.220	0.388	-0.021
Hispanic	-0.283	0.230	-0.027
High school graduate	0.062	0.772	0.006
Number of WIC members	-0.011	0.931	-0.001
Special diet	-0.393	0.262	-0.038
Food allergy	-0.746	0.128	-0.071
Resides in State with milk restrictions	-0.202	0.469	-0.019
Special diet * restricted State	0.209	0.621	0.020
Food allergy * restricted State	0.297	0.617	0.028
Connecticut, North Carolina, Oklahoma, and Texas are defined as States with milk restrictions.			

**Table J-3—Purchase of prescribed milk**

**Dependent variable:** All prescribed milk purchased  
**Mean of dependent variable:** 0.912  
**Number of observations** 1,027  
**Percent concordant pairs** 55.1

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.510	<.0001	0.201
African-American	-0.217	0.437	-0.017
Hispanic	0.257	0.367	0.021
High school graduate	-0.253	0.329	-0.020
Number of WIC members	0.007	0.963	0.001
Special diet	-0.057	0.802	-0.005
Food allergy	-0.508	0.123	-0.041
Resides in State with milk restrictions	0.022	0.924	0.002

Connecticut, North Carolina, Oklahoma, and Texas are defined as States with milk restrictions.

**Table J-4—Purchase of prescribed milk, interactive model**

**Dependent variable:** All prescribed milk purchased  
**Mean of dependent variable:** 0.912  
**Number of observations** 1,027  
**Percent concordant pairs** 53.8

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.406	<.0001	0.193
African-American	-0.220	0.432	-0.018
Hispanic	0.256	0.369	0.021
High school graduate	-0.257	0.323	-0.021
Number of WIC members	-0.004	0.979	0.000
Special diet	0.346	0.411	0.028
Food allergy	-0.568	0.333	-0.046
Resides in State with milk restrictions	0.227	0.450	0.018
Special diet * restricted State	-0.583	0.245	-0.047
Food allergy * restricted State	0.070	0.921	0.006

Connecticut, North Carolina, Oklahoma, and Texas are defined as States with milk restrictions.

**Table J-5—Consumption of purchased milk**

<b>Dependent variable:</b>	<b>All purchased milk consumed</b>		
<b>Mean of dependent variable:</b>	<b>0.845</b>		
<b>Number of observations</b>	<b>1,025</b>		
<b>Percent concordant pairs</b>	<b>62.5</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	1.846	<.0001	0.242
African-American	-0.030	0.893	-0.004
Hispanic	0.667	0.005	0.087
High school graduate	-0.144	0.485	-0.019
Number of WIC members	0.189	0.124	0.025
Special diet	-0.321	0.074	-0.042
Food allergy	-0.029	0.922	-0.004
Resides in State with milk restrictions	-0.543	0.008	-0.071

Connecticut, North Carolina, Oklahoma, and Texas are defined as States with milk restrictions.

**Table J-6—Consumption of purchased milk, interactive model**

<b>Dependent variable:</b>	<b>All purchased milk consumed</b>		
<b>Mean of dependent variable:</b>	<b>0.845</b>		
<b>Number of observations</b>	<b>1,025</b>		
<b>Percent concordant pairs</b>	<b>62.7</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	1.982	<.0001	0.260
African-American	-0.038	0.863	-0.005
Hispanic	0.672	0.005	0.088
High school graduate	-0.136	0.510	-0.018
Number of WIC members	0.194	0.116	0.025
Special diet	-0.552	0.127	-0.072
Food allergy	-0.474	0.379	-0.062
Resides in State with milk restrictions	-0.744	0.009	-0.097
Special diet * restricted State	0.312	0.454	0.041
Food allergy * restricted State	0.615	0.338	0.081

Connecticut, North Carolina, Oklahoma, and Texas are defined as States with milk restrictions.

**Table J-7—Participant satisfaction with allowed brands of cheese**

**Dependent variable:** Very satisfied with allowed brands of cheese  
**Mean of dependent variable:** 0.836  
**Number of observations** 1,255  
**Percent concordant pairs** 56.4

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.087	<.0001	0.286
African-American	-0.165	0.427	-0.023
Hispanic	0.129	0.535	0.018
High school graduate	-0.129	0.486	-0.018
Number of WIC members	0.010	0.926	0.001
Special diet	-0.160	0.329	-0.022
Food allergy	-0.436	0.069	-0.060
Resides in State with cheese restrictions	-0.420	0.013	-0.058

Connecticut and Oklahoma are defined as States with cheese restrictions.

**Table J-8—Participant satisfaction with allowed brands of cheese, interactive model**

**Dependent variable:** Very satisfied with allowed brands of cheese  
**Mean of dependent variable:** 0.836  
**Number of observations** 1,255  
**Percent concordant pairs** 57.0

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.143	<.0001	0.294
African-American	-0.162	0.436	-0.022
Hispanic	0.119	0.568	0.016
High school graduate	-0.131	0.478	-0.018
Number of WIC members	0.010	0.924	0.001
Special diet	-0.267	0.214	-0.037
Food allergy	-0.492	0.118	-0.067
Resides in State with cheese restrictions	-0.549	0.015	-0.075
Special diet * restricted State	0.257	0.438	0.035
Food allergy * restricted State	0.134	0.779	0.018

Connecticut and Oklahoma are defined as States with cheese restrictions.

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**Table J-9—Purchase of prescribed cheese**

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**Dependent variable:** All prescribed cheese purchased  
**Mean of dependent variable:** 0.954  
**Number of observations** 1,004  
**Percent concordant pairs** 70.0

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<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.562	<.0001	0.112
African-American	-0.252	0.440	-0.011
Hispanic	1.893	0.001	0.083
High school graduate	0.432	0.180	0.019
Number of WIC members	0.093	0.644	0.004
Special diet	-0.736	0.012	-0.032
Food allergy	0.242	0.628	0.011
Resides in State with cheese restrictions	-0.172	0.571	-0.008

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Connecticut and Oklahoma are defined as States with cheese restrictions.

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**Table J-10—Purchase of prescribed cheese, interactive model**

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**Dependent variable:** All prescribed cheese purchased  
**Mean of dependent variable:** 0.954  
**Number of observations** 1,004  
**Percent concordant pairs** 70.5

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<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.548	<.0001	0.112
African-American	-0.262	0.426	-0.011
Hispanic	1.896	0.001	0.083
High school graduate	0.444	0.169	0.019
Number of WIC members	0.094	0.639	0.004
Special diet	-0.783	0.040	-0.034
Food allergy	0.670	0.378	0.029
Resides in State with cheese restrictions	-0.145	0.752	-0.006
Special diet * restricted State	0.101	0.866	0.004
Food allergy * restricted State	-0.864	0.389	-0.038

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Connecticut and Oklahoma are defined as States with cheese restrictions.

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**Table J-11—Consumption of purchased cheese**

**Dependent variable:** All purchased cheese consumed  
**Mean of dependent variable:** 0.788  
**Number of observations** 1,000  
**Percent concordant pairs** 63.6

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	1.180	<.0001	0.197
African-American	0.162	0.433	0.027
Hispanic	0.800	0.000	0.134
High school graduate	-0.494	0.010	-0.083
Number of WIC members	0.198	0.071	0.033
Special diet	-0.223	0.168	-0.037
Food allergy	0.377	0.192	0.063
Resides in State with cheese restrictions	-0.114	0.500	-0.019

Connecticut and Oklahoma are defined as States with cheese restrictions.

**Table J-12—Consumption of purchased cheese, interactive model**

**Dependent variable:** All purchased cheese consumed  
**Mean of dependent variable:** 0.788  
**Number of observations** 1,000  
**Percent concordant pairs** 63.5

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	1.219	<.0001	0.204
African-American	0.164	0.426	0.027
Hispanic	0.796	0.000	0.133
High school graduate	-0.498	0.010	-0.083
Number of WIC members	0.196	0.073	0.033
Special diet	-0.261	0.204	-0.044
Food allergy	0.157	0.664	0.026
Resides in State with cheese restrictions	-0.206	0.357	-0.034
Special diet * restricted State	0.104	0.755	0.017
Food allergy * restricted State	0.554	0.350	0.093

Connecticut and Oklahoma are defined as States with cheese restrictions.



**Table J-13—Purchase of prescribed eggs**

<b>Dependent variable:</b>	<b>All prescribed eggs purchased</b>		
<b>Mean of dependent variable:</b>	<b>0.955</b>		
<b>Number of observations</b>	<b>1,012</b>		
<b>Percent concordant pairs</b>	<b>62.1</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	3.109	<.0001	0.134
African-American	-0.085	0.816	-0.004
Hispanic	1.107	0.011	0.048
High school graduate	0.334	0.313	0.014
Number of WIC members	-0.247	0.164	-0.011
Special diet	-0.317	0.295	-0.014
Food allergy	-0.262	0.552	-0.011
Resides in State with egg restrictions	0.009	0.978	0.000
Connecticut and Oklahoma are defined as States with egg restrictions.			

**Table J-14—Purchase of prescribed eggs, interactive model**

<b>Dependent variable:</b>	<b>All prescribed eggs purchased</b>		
<b>Mean of dependent variable:</b>	<b>0.955</b>		
<b>Number of observations</b>	<b>1,012</b>		
<b>Percent concordant pairs</b>	<b>62.6</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	3.082	<.0001	0.132
African-American	-0.095	0.796	-0.004
Hispanic	1.111	0.012	0.048
High school graduate	0.350	0.294	0.015
Number of WIC members	-0.243	0.173	-0.010
Special diet	-0.398	0.291	-0.017
Food allergy	0.181	0.778	0.008
Resides in State with egg restrictions	0.064	0.887	0.003
Special diet * restricted State	0.193	0.760	0.008
Food allergy * restricted State	-0.971	0.270	-0.042
Connecticut and Oklahoma are defined as States with egg restrictions.			

**Table J-15—Consumption of purchased eggs**

**Dependent variable:** All purchased eggs consumed  
**Mean of dependent variable:** 0.790  
**Number of observations:** 1,008  
**Percent concordant pairs:** 67.9

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	0.817	0.003	0.135
African-American	0.192	0.332	0.032
Hispanic	1.555	<.0001	0.258
High school graduate	-0.294	0.126	-0.049
Number of WIC members	0.258	0.020	0.043
Special diet	-0.138	0.396	-0.023
Food allergy	-0.139	0.589	-0.023
Resides in State with egg restrictions	-0.245	0.141	-0.041

Connecticut and Oklahoma are defined as States with egg restrictions.

**Table J-16—Consumption of purchased eggs, interactive model**

**Dependent variable:** All purchased eggs consumed  
**Mean of dependent variable:** 0.790  
**Number of observations:** 1,008  
**Percent concordant pairs:** 68.4

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	0.739	0.008	0.123
African-American	0.195	0.325	0.032
Hispanic	1.569	<.0001	0.260
High school graduate	-0.285	0.138	-0.047
Number of WIC members	0.262	0.019	0.043
Special diet	-0.036	0.866	-0.006
Food allergy	0.057	0.872	0.009
Resides in State with egg restrictions	-0.084	0.707	-0.014
Special diet * restricted State	-0.259	0.435	-0.043
Food allergy * restricted State	-0.438	0.396	-0.073

Connecticut and Oklahoma are defined as States with egg restrictions.

**Table J-17—Participant satisfaction with allowed brands of infant cereal**

<b>Dependent variable:</b>	<b>Very satisfied with allowed brands of infant cereal</b>		
<b>Mean of dependent variable:</b>	<b>0.794</b>		
<b>Number of observations</b>	<b>378</b>		
<b>Percent concordant pairs</b>	<b>56.7</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	1.645	0.004	0.269
African-American	0.001	0.997	0.000
Hispanic	0.445	0.195	0.073
High school graduate	-0.035	0.906	-0.006
Number of WIC members	-0.049	0.805	-0.008
Special diet	-0.491	0.064	-0.080
Food allergy	-0.228	0.541	-0.037
Resides in State with infant cereal restrictions	-0.308	0.286	-0.050

California, Connecticut, and Texas are defined as States with infant cereal restrictions.

**Table J-18—Participant satisfaction with allowed brands of infant cereal, interactive model**

<b>Dependent variable:</b>	<b>Very satisfied with allowed brands of infant cereal</b>		
<b>Mean of dependent variable:</b>	<b>0.794</b>		
<b>Number of observations</b>	<b>378</b>		
<b>Percent concordant pairs</b>	<b>56.6</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	1.789	0.003	0.293
African-American	-0.007	0.985	-0.001
Hispanic	0.468	0.175	0.077
High school graduate	-0.046	0.878	-0.007
Number of WIC members	-0.058	0.769	-0.009
Special diet	-0.698	0.068	-0.114
Food allergy	-0.306	0.553	-0.050
Resides in State with infant cereal restrictions	-0.521	0.169	-0.085
Special diet * restricted State	0.417	0.434	0.068
Food allergy * restricted State	0.205	0.780	0.034

California, Connecticut, and Texas are defined as States with infant cereal restrictions.

**Table J-19—Purchase of prescribed infant cereal**

**Dependent variable:** All prescribed infant cereal purchased  
**Mean of dependent variable:** 0.897  
**Number of observations:** 262  
**Percent concordant pairs:** 64.3

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.633	0.008	0.243
African-American	0.309	0.652	0.029
Hispanic	-0.386	0.525	-0.036
High school graduate	-0.025	0.960	-0.002
Number of WIC members	-0.233	0.495	-0.022
Special diet	-0.007	0.987	-0.001
Food allergy	-0.697	0.206	-0.064
Resides in State with infant cereal restrictions	0.950	0.069	0.088

California, Connecticut, and Texas are defined as States with infant cereal restrictions.

**Table J-20—Purchase of prescribed infant cereal, interactive model**

**Dependent variable:** All prescribed infant cereal purchased  
**Mean of dependent variable:** 0.897  
**Number of observations:** 262  
**Percent concordant pairs:** 64.2

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.485	0.014	0.230
African-American	0.322	0.639	0.030
Hispanic	-0.443	0.465	-0.041
High school graduate	-0.012	0.981	-0.001
Number of WIC members	-0.199	0.564	-0.018
Special diet	-0.048	0.937	-0.004
Food allergy	-0.348	0.640	-0.032
Resides in State with infant cereal restrictions	1.153	0.086	0.106
Special diet * restricted State	0.050	0.958	0.005
Food allergy * restricted State	-0.807	0.449	-0.075

California, Connecticut, and Texas are defined as States with infant cereal restrictions.

**Table J-21—Consumption of purchased infant cereal**

<b>Dependent variable:</b>	<b>All purchased infant cereal consumed</b>		
<b>Mean of dependent variable:</b>	<b>0.658</b>		
<b>Number of observations</b>	<b>250</b>		
<b>Percent concordant pairs</b>	<b>62.9</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	-1.189	0.072	-0.268
African-American	0.459	0.233	0.103
Hispanic	0.394	0.293	0.089
High school graduate	0.003	0.993	0.001
Number of WIC members	0.369	0.111	0.083
Special diet	0.045	0.880	0.010
Food allergy	0.757	0.077	0.170
Resides in State with infant cereal restrictions	0.735	0.018	0.165
California, Connecticut, and Texas are defined as States with infant cereal restrictions.			

**Table J-22—Consumption of purchased infant cereal, interactive model**

<b>Dependent variable:</b>	<b>All purchased infant cereal consumed</b>		
<b>Mean of dependent variable:</b>	<b>0.658</b>		
<b>Number of observations</b>	<b>250</b>		
<b>Percent concordant pairs</b>	<b>64.1</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	-1.091	0.108	-0.245
African-American	0.439	0.256	0.099
Hispanic	0.396	0.293	0.089
High school graduate	-0.015	0.963	-0.003
Number of WIC members	0.368	0.112	0.083
Special diet	-0.198	0.641	-0.045
Food allergy	0.867	0.134	0.195
Resides in State with infant cereal restrictions	0.597	0.120	0.134
Special diet * restricted State	0.478	0.425	0.107
Food allergy * restricted State	-0.201	0.810	-0.045
California, Connecticut, and Texas are defined as States with infant cereal restrictions.			

**Table J-23—Participant satisfaction with allowed brands of juice**

**Dependent variable:** Very satisfied with allowed brands of juice  
**Mean of dependent variable:** 0.787  
**Number of observations** 1,276  
**Percent concordant pairs** 56.5

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	0.959	<.0001	0.161
African-American	-0.271	0.114	-0.045
Hispanic	0.492	0.008	0.083
High school graduate	0.329	0.031	0.055
Number of WIC members	0.073	0.424	0.012
Special diet	-0.013	0.929	-0.002
Food allergy	-0.066	0.769	-0.011
Resides in State with juice restrictions	-0.160	0.308	-0.027

California, Connecticut, Oklahoma, and Texas are defined as States with juice restrictions.

**Table J-24—Participant satisfaction with allowed brands of juice, interactive model**

**Dependent variable:** Very satisfied with allowed brands of juice  
**Mean of dependent variable:** 0.787  
**Number of observations** 1,276  
**Percent concordant pairs** 56.9

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	0.947	0.000	0.159
African-American	-0.276	0.107	-0.046
Hispanic	0.481	0.010	0.081
High school graduate	0.333	0.029	0.056
Number of WIC members	0.074	0.421	0.012
Special diet	-0.067	0.772	-0.011
Food allergy	0.254	0.503	0.043
Resides in State with juice restrictions	-0.134	0.513	-0.023
Special diet * restricted State	0.082	0.782	0.014
Food allergy * restricted State	-0.507	0.279	-0.085

California, Connecticut, Oklahoma, and Texas are defined as States with juice restrictions.

**Table J-25—Purchase of prescribed juice**

<b>Dependent variable:</b>	<b>All prescribed juice purchased</b>		
<b>Mean of dependent variable:</b>	<b>0.967</b>		
<b>Number of observations</b>	<b>1,069</b>		
<b>Percent concordant pairs</b>	<b>63.5</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	3.226	<.0001	0.103
African-American	0.537	0.215	0.017
Hispanic	0.420	0.333	0.013
High school graduate	-0.516	0.166	-0.016
Number of WIC members	-0.249	0.173	-0.008
Special diet	0.298	0.353	0.010
Food allergy	-0.184	0.692	-0.006
Resides in State with juice restrictions	0.604	0.070	0.019
California, Connecticut, Oklahoma, and Texas are defined as States with juice restrictions.			

**Table J-26—Purchase of prescribed juice, interactive model**

<b>Dependent variable:</b>	<b>All prescribed juice purchased</b>		
<b>Mean of dependent variable:</b>	<b>0.967</b>		
<b>Number of observations</b>	<b>1,069</b>		
<b>Percent concordant pairs</b>	<b>63.2</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	3.217	<.0001	0.103
African-American	0.537	0.215	0.017
Hispanic	0.414	0.341	0.013
High school graduate	-0.515	0.167	-0.016
Number of WIC members	-0.248	0.174	-0.008
Special diet	0.295	0.503	0.009
Food allergy	-0.117	0.858	-0.004
Resides in State with juice restrictions	0.621	0.136	0.020
Special diet * restricted State	0.004	0.995	0.000
Food allergy * restricted State	-0.137	0.882	-0.004
California, Connecticut, Oklahoma, and Texas are defined as States with juice restrictions.			

**Table J-27—Consumption of purchased juice**

**Dependent variable:** All purchased juice consumed  
**Mean of dependent variable:** 0.851  
**Number of observations:** 1,062  
**Percent concordant pairs:** 59.4

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	1.753	<.0001	0.222
African-American	0.381	0.093	0.048
Hispanic	0.804	0.001	0.102
High school graduate	-0.392	0.057	-0.050
Number of WIC members	-0.002	0.985	0.000
Special diet	-0.178	0.309	-0.023
Food allergy	-0.079	0.773	-0.010
Resides in State with juice restrictions	-0.043	0.819	-0.005

California, Connecticut, Oklahoma, and Texas are defined as States with juice restrictions.

**Table J-28—Consumption of purchased juice, interactive model**

**Dependent variable:** All purchased juice consumed  
**Mean of dependent variable:** 0.851  
**Number of observations:** 1,062  
**Percent concordant pairs:** 60.2

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	1.796	<.0001	0.228
African-American	0.379	0.095	0.048
Hispanic	0.807	0.001	0.102
High school graduate	-0.396	0.055	-0.050
Number of WIC members	-0.002	0.989	0.000
Special diet	-0.277	0.311	-0.035
Food allergy	-0.031	0.942	-0.004
Resides in State with juice restrictions	-0.109	0.668	-0.014
Special diet * restricted State	0.168	0.637	0.021
Food allergy * restricted State	-0.080	0.884	-0.010

California, Connecticut, Oklahoma, and Texas are defined as States with juice restrictions.



**Table J-29—Purchase of prescribed peanut butter**

<b>Dependent variable:</b>	<b>All prescribed peanut butter purchased</b>		
<b>Mean of dependent variable:</b>	<b>0.927</b>		
<b>Number of observations</b>	<b>741</b>		
<b>Percent concordant pairs</b>	<b>65.4</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.750	<.0001	0.186
African-American	-0.805	0.024	-0.055
Hispanic	-0.395	0.274	-0.027
High school graduate	0.345	0.260	0.023
Number of WIC members	-0.184	0.287	-0.012
Special diet	0.246	0.421	0.017
Food allergy	-0.440	0.323	-0.030
Resides in State with peanut butter restrictions	1.116	0.036	0.076

Connecticut is defined as State with peanut butter restrictions.

**Table J-30—Purchase of prescribed peanut butter, interactive model**

<b>Dependent variable:</b>	<b>All prescribed peanut butter purchased</b>		
<b>Mean of dependent variable:</b>	<b>0.927</b>		
<b>Number of observations</b>	<b>741</b>		
<b>Percent concordant pairs</b>	<b>65.5</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.723	<.0001	0.184
African-American	-0.796	0.026	-0.054
Hispanic	-0.389	0.283	-0.026
High school graduate	0.351	0.252	0.024
Number of WIC members	-0.184	0.289	-0.012
Special diet	0.296	0.359	0.020
Food allergy	-0.427	0.372	-0.029
Resides in State with peanut butter restrictions	1.418	0.078	0.096
Special diet * restricted State	-0.602	0.574	-0.041
Food allergy * restricted State	-0.203	0.874	-0.014

Connecticut is defined as State with peanut butter restrictions.

**Table J-31—Consumption of purchased peanut butter**

<b>Dependent variable:</b>	<b>All purchased peanut butter consumed</b>
<b>Mean of dependent variable:</b>	<b>0.616</b>
<b>Number of observations</b>	<b>686</b>
<b>Percent concordant pairs</b>	<b>58.0</b>

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	0.483	0.065	0.114
African-American	-0.408	0.049	-0.097
Hispanic	0.013	0.950	0.003
High school graduate	-0.060	0.742	-0.014
Number of WIC members	0.148	0.159	0.035
Special diet	-0.375	0.022	-0.089
Food allergy	0.212	0.430	0.050
Resides in State with peanut butter restrictions	-0.045	0.823	-0.011

Connecticut is defined as State with peanut butter restrictions.

**Table J-32—Consumption of purchased peanut butter, interactive model**

<b>Dependent variable:</b>	<b>All purchased peanut butter consumed</b>
<b>Mean of dependent variable:</b>	<b>0.616</b>
<b>Number of observations</b>	<b>686</b>
<b>Percent concordant pairs</b>	<b>57.9</b>

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	0.547	0.040	0.129
African-American	-0.423	0.043	-0.100
Hispanic	0.002	0.991	0.001
High school graduate	-0.075	0.683	-0.018
Number of WIC members	0.145	0.168	0.034
Special diet	-0.451	0.014	-0.107
Food allergy	0.072	0.820	0.017
Resides in State with peanut butter restrictions	-0.298	0.272	-0.070
Special diet * restricted State	0.424	0.293	0.100
Food allergy * restricted State	0.553	0.358	0.131

Connecticut is defined as State with peanut butter restrictions.

**Table J-33—Purchase of prescribed beans**

<b>Dependent variable:</b>	<b>All prescribed beans purchased</b>
<b>Mean of dependent variable:</b>	<b>0.869</b>
<b>Number of observations</b>	<b>548</b>
<b>Percent concordant pairs</b>	<b>73.5</b>

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	0.027	0.946	0.003
African-American	0.251	0.379	0.029
Hispanic	2.094	<.0001	0.238
High school graduate	0.103	0.699	0.012
Number of WIC members	0.319	0.048	0.036
Special diet	0.354	0.159	0.040
Food allergy	-0.354	0.362	-0.040
Resides in State with bean restrictions	0.787	0.029	0.090

Oklahoma is defined as State with bean restrictions.

**Table J-34—Purchase of prescribed beans, interactive model**

<b>Dependent variable:</b>	<b>All prescribed beans purchased</b>
<b>Mean of dependent variable:</b>	<b>0.869</b>
<b>Number of observations</b>	<b>548</b>
<b>Percent concordant pairs</b>	<b>74.1</b>

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	-0.032	0.935	-0.004
African-American	0.237	0.409	0.027
Hispanic	2.125	<.0001	0.242
High school graduate	0.103	0.699	0.012
Number of WIC members	0.313	0.054	0.036
Special diet	0.483	0.075	0.055
Food allergy	-0.233	0.577	-0.027
Resides in State with bean restrictions	1.195	0.014	0.136
Special diet * restricted State	-0.834	0.273	-0.095
Food allergy * restricted State	-0.592	0.594	-0.067

Oklahoma is defined as State with bean restrictions.

**Table J-35—Consumption of purchased beans**

**Dependent variable:** All purchased beans consumed  
**Mean of dependent variable:** 0.696  
**Number of observations:** 453  
**Percent concordant pairs:** 76.5

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	0.428	0.275	0.091
African-American	0.408	0.181	0.086
Hispanic	1.808	<.0001	0.383
High school graduate	-0.688	0.008	-0.146
Number of WIC members	0.172	0.235	0.036
Special diet	-0.267	0.265	-0.056
Food allergy	-0.175	0.667	-0.037
Resides in State with bean restrictions	-0.367	0.226	-0.078

Oklahoma is defined as State with bean restrictions.

**Table J-36—Consumption of purchased beans, interactive model**

**Dependent variable:** All purchased beans consumed  
**Mean of dependent variable:** 0.696  
**Number of observations:** 453  
**Percent concordant pairs:** 76.2

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	0.457	0.249	0.097
African-American	0.418	0.172	0.088
Hispanic	1.783	<.0001	0.377
High school graduate	-0.695	0.008	-0.147
Number of WIC members	0.179	0.219	0.038
Special diet	-0.352	0.190	-0.075
Food allergy	-0.081	0.852	-0.017
Resides in State with bean restrictions	-0.507	0.191	-0.107
Special diet * restricted State	0.491	0.425	0.104
Food allergy * restricted State	-0.969	0.462	-0.205

Oklahoma is defined as State with bean restrictions.

**Table J-37—Participant satisfaction with allowed brands of cereal, model 1**

<b>Dependent variable:</b>	<b>Very satisfied with allowed brands of cereal</b>		
<b>Mean of dependent variable:</b>	<b>0.529</b>		
<b>Number of observations</b>	<b>1,271</b>		
<b>Percent concordant pairs</b>	<b>61.8</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	-0.210	0.281	-0.052
African-American	0.011	0.944	0.003
Hispanic	1.108	<.0001	0.276
High school graduate	0.077	0.556	0.019
Number of WIC members	0.004	0.958	0.001
Special diet	-0.070	0.562	-0.017
Food allergy	-0.260	0.182	-0.065
Resides in State with cereal restrictions	-0.195	0.132	-0.049
California and Oklahoma are defined as States with cereal restrictions.			

**Table J-38—Participant satisfaction with allowed brands of cereal, interactive model 1**

<b>Dependent variable:</b>	<b>Very satisfied with allowed brands of cereal</b>		
<b>Mean of dependent variable:</b>	<b>0.529</b>		
<b>Number of observations</b>	<b>1,271</b>		
<b>Percent concordant pairs</b>	<b>61.5</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	-0.230	0.243	-0.057
African-American	0.003	0.982	0.001
Hispanic	1.107	<.0001	0.276
High school graduate	0.080	0.542	0.020
Number of WIC members	0.003	0.967	0.001
Special diet	-0.017	0.907	-0.004
Food allergy	-0.251	0.266	-0.063
Resides in State with cereal restrictions	-0.129	0.428	-0.032
Special diet * restricted State	-0.172	0.510	-0.043
Food allergy * restricted State	-0.038	0.931	-0.010
California and Oklahoma are defined as States with cereal restrictions.			

**Table J-39—Participant satisfaction with allowed brands of cereal, model 2**

**Dependent variable:** Very satisfied with allowed brands of cereal  
**Mean of dependent variable:** 0.529  
**Number of observations** 1,271  
**Percent concordant pairs** 62.9

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	-0.131	0.503	-0.033
African-American	-0.059	0.701	-0.015
Hispanic	0.979	<.0001	0.244
High school graduate	0.092	0.487	0.023
Number of WIC members	0.005	0.947	0.001
Special diet	-0.053	0.664	-0.013
Food allergy	-0.307	0.118	-0.076
Resides in State with cereal restrictions	-0.615	0.000	-0.153

Oklahoma is defined as State with cereal restrictions.

**Table J-40—Participant satisfaction with allowed brands of cereal, interactive model 2**

**Dependent variable:** Very satisfied with allowed brands of cereal  
**Mean of dependent variable:** 0.529  
**Number of observations** 1,271  
**Percent concordant pairs** 62.4

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	-0.140	0.478	-0.035
African-American	-0.066	0.668	-0.016
Hispanic	0.977	<.0001	0.243
High school graduate	0.089	0.499	0.022
Number of WIC members	0.004	0.958	0.001
Special diet	-0.041	0.757	-0.010
Food allergy	-0.215	0.298	-0.054
Resides in State with cereal restrictions	-0.539	0.012	-0.134
Special diet * restricted State	-0.033	0.921	-0.008
Food allergy * restricted State	-1.070	0.184	-0.267

Oklahoma is defined as State with cereal restrictions.

**Table J-41—Purchase of prescribed cereal, model 1**

<b>Dependent variable:</b>	<b>All prescribed cereal purchased</b>		
<b>Mean of dependent variable:</b>	<b>0.916</b>		
<b>Number of observations</b>	<b>1,041</b>		
<b>Percent concordant pairs</b>	<b>64.5</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.498	<.0001	0.192
African-American	0.325	0.268	0.025
Hispanic	1.336	<.0001	0.103
High school graduate	-0.104	0.689	-0.008
Number of WIC members	-0.237	0.076	-0.018
Special diet	0.131	0.567	0.010
Food allergy	-0.445	0.160	-0.034
Resides in State with cereal restrictions	-0.319	0.194	-0.025
California and Oklahoma are defined as States with cereal restrictions.			

**Table J-42—Purchase of prescribed cereal, interactive model 1**

<b>Dependent variable:</b>	<b>All prescribed cereal purchased</b>		
<b>Mean of dependent variable:</b>	<b>0.916</b>		
<b>Number of observations</b>	<b>1,041</b>		
<b>Percent concordant pairs</b>	<b>64.8</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.530	<.0001	0.195
African-American	0.338	0.250	0.026
Hispanic	1.346	<.0001	0.104
High school graduate	-0.103	0.693	-0.008
Number of WIC members	-0.236	0.079	-0.018
Special diet	0.002	0.994	0.000
Food allergy	-0.357	0.329	-0.027
Resides in State with cereal restrictions	-0.434	0.157	-0.033
Special diet * restricted State	0.469	0.363	0.036
Food allergy * restricted State	-0.405	0.574	-0.031
California and Oklahoma are defined as States with cereal restrictions.			

**Table J-43—Purchase of prescribed cereal, model 2**

**Dependent variable:** All prescribed cereal purchased  
**Mean of dependent variable:** 0.916  
**Number of observations** 1,041  
**Percent concordant pairs** 64.5

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.509	<.0001	0.193
African-American	0.304	0.302	0.023
Hispanic	1.195	0.000	0.092
High school graduate	-0.102	0.696	-0.008
Number of WIC members	-0.235	0.079	-0.018
Special diet	0.136	0.551	0.010
Food allergy	-0.458	0.150	-0.035
Resides in State with cereal restrictions	-0.412	0.128	-0.032

Oklahoma is defined as State with cereal restrictions.

**Table J-44—Purchase of prescribed cereal, interactive model 2**

**Dependent variable:** All prescribed cereal purchased  
**Mean of dependent variable:** 0.916  
**Number of observations** 1,041  
**Percent concordant pairs** 65.4

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	2.548	<.0001	0.196
African-American	0.321	0.278	0.025
Hispanic	1.177	0.000	0.091
High school graduate	-0.096	0.713	-0.007
Number of WIC members	-0.229	0.089	-0.018
Special diet	-0.029	0.909	-0.002
Food allergy	-0.390	0.265	-0.030
Resides in State with cereal restrictions	-0.642	0.055	-0.049
Special diet * restricted State	0.850	0.158	0.065
Food allergy * restricted State	-0.563	0.504	-0.043

Oklahoma is defined as State with cereal restrictions.



**Table J-45—Consumption of purchased cereal, model 1**

<b>Dependent variable:</b>	<b>All purchased cereal consumed</b>		
<b>Mean of dependent variable:</b>	<b>0.724</b>		
<b>Number of observations</b>	<b>1,021</b>		
<b>Percent concordant pairs</b>	<b>62.7</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	0.822	0.001	0.164
African-American	0.258	0.166	0.051
Hispanic	1.049	<.0001	0.210
High school graduate	-0.225	0.170	-0.045
Number of WIC members	0.011	0.903	0.002
Special diet	-0.207	0.155	-0.041
Food allergy	-0.089	0.708	-0.018
Resides in State with cereal restrictions	-0.173	0.289	-0.035
California and Oklahoma are defined as States with cereal restrictions.			

**Table J-46—Consumption of purchased cereal, interactive model 1**

<b>Dependent variable:</b>	<b>All purchased cereal consumed</b>		
<b>Mean of dependent variable:</b>	<b>0.724</b>		
<b>Number of observations</b>	<b>1,021</b>		
<b>Percent concordant pairs</b>	<b>63.5</b>		
<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	0.867	0.000	0.173
African-American	0.288	0.124	0.058
Hispanic	1.073	<.0001	0.214
High school graduate	-0.224	0.175	-0.045
Number of WIC members	0.021	0.822	0.004
Special diet	-0.428	0.013	-0.085
Food allergy	0.100	0.712	0.020
Resides in State with cereal restrictions	-0.406	0.046	-0.081
Special diet * restricted State	0.848	0.012	0.169
Food allergy * restricted State	-0.969	0.087	-0.194
California and Oklahoma are defined as States with cereal restrictions.			

**Table J-47—Consumption of purchased cereal, model 2**

**Dependent variable:** All purchased cereal consumed  
**Mean of dependent variable:** 0.724  
**Number of observations** 1,021  
**Percent concordant pairs** 62.3

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	0.822	0.000	0.164
African-American	0.249	0.183	0.050
Hispanic	0.976	<.0001	0.195
High school graduate	-0.224	0.172	-0.045
Number of WIC members	0.014	0.880	0.003
Special diet	-0.202	0.164	-0.040
Food allergy	-0.098	0.680	-0.020
Resides in State with cereal restrictions	-0.215	0.264	-0.043

Oklahoma is defined as State with cereal restrictions.

**Table J-48—Consumption of purchased cereal, interactive model 2**

**Dependent variable:** All purchased cereal consumed  
**Mean of dependent variable:** 0.724  
**Number of observations** 1,021  
**Percent concordant pairs** 63.0

<b>Parameter</b>	<b>Estimated coefficient</b>	<b>P-value</b>	<b>Effect at mean</b>
Intercept	0.841	0.000	0.168
African-American	0.260	0.165	0.052
Hispanic	0.965	<.0001	0.193
High school graduate	-0.217	0.186	-0.043
Number of WIC members	0.023	0.808	0.005
Special diet	-0.311	0.052	-0.062
Food allergy	-0.032	0.900	-0.006
Resides in State with cereal restrictions	-0.437	0.077	-0.087
Special diet * restricted State	0.681	0.087	0.136
Food allergy * restricted State	-0.738	0.330	-0.147

Oklahoma is defined as State with cereal restrictions.

## Appendix K

### Models of Health Outcomes

**Table K-1—Health outcomes: OLS regressions for birthweight**

	Birth weight (ounces)	
	(1)	(2)
Number of observations	52,927	52,927
R-squared	0.048	0.048
PCTINSTRU	0.03 (6.51)	
PCTCOST		0.03 (5.66)
Male infant	3.63 (22.37)	3.63 (22.38)
<i>Maternal characteristics</i>		
Age in years	1.23 (11.22)	1.24 (11.29)
Age squared	-0.02 (9.24)	-0.02 (9.28)
Height in inches	1.00 (32.65)	1.00 (32.65)
Race = Black	-4.96 (16.11)	-5.01 (16.28)
Race = Hispanic	1.59 (7.09)	1.60 (7.15)
Race = Asian	1.34 (1.00)	1.34 (1.00)
Race = American Indian	-2.24 (4.84)	-2.23 (4.81)
<i>Household characteristics</i>		
Participation in food stamps	-1.42 (4.67)	-1.44 (4.72)
Participation in TANF	1.31 (4.11)	1.36 (4.28)
Participation in Medicaid	0.30 (1.72)	0.30 (1.69)
Family size	0.46 (8.89)	0.46 (8.96)
Family income as percent of poverty	0.004 (3.88)	0.004 (3.87)
Rural	-1.85 (6.78)	-1.85 (6.81)
Urban	-0.67 (3.68)	-0.67 (3.72)
Intercept	29.95 (12.21)	29.78 (12.08)

Categories “left out” of regressions were: race = white, and location = suburban.

Sample is pregnant women certified in WIC in November 2000 who gave birth and recertified by April 2001. T-statistics in parentheses.

**Table K-2—Health outcomes: OLS regressions for change in height-for-age**

	Change in height-for-age	
	(1)	(2)
Number of observations	158,798	158,798
R-squared	0.011	0.011
PCTINSTRU	0.02 (7.68)	
PCTCOST		0.02 (6.88)
Male infant	29.28 (18.17)	29.29 (18.18)
Number days between height measurements	-0.002 (1.27)	-0.002 (1.29)
Age in months at Nov 2000 height measurement	2.28 (35.56)	2.28 (35.56)
Age in months squared	-0.03 (33.98)	-0.03 (33.98)
Male × age in months at Nov 2000 height measurement	-1.59 (17.66)	-1.59 (17.66)
Male × age in months squared	0.02 (17.09)	0.02 (17.09)
Race = Black	1.71 (10.49)	1.69 (10.37)
Race = Hispanic	0.44 (3.77)	0.45 (3.84)
Race = Asian	0.36 (0.68)	0.37 (0.69)
Race = American Indian	-0.03 (0.14)	-0.02 (0.09)
Participation in food stamps	-0.12 (1.00)	-0.12 (1.02)
Participation in TANF	0.04 (0.32)	0.06 (0.45)
Participation in Medicaid	-0.02 (0.20)	-0.01 (0.16)
Family size	-0.11 (4.52)	-0.11 (4.41)
Family income as percent of poverty	0.001 (2.02)	0.001 (2.05)
Migrant status	-0.44 (1.36)	-0.44 (1.34)
Rural	-0.72 (5.49)	-0.73 (5.56)
Urban	-0.25 (2.84)	-0.25 (2.87)
Intercept	-42.39 (34.96)	-42.42 (34.82)

Categories “left out” of regressions were: race = white, and location = suburban.

Sample includes children aged 2 years and older, certified in September through November 2000, and recertified by April 2001. Interactions between male and race were also included in the model, but were not statistically significant and are not shown. T-statistics in parentheses.

**Table K-3—Health outcomes: Logistic regressions for probability of “exiting” anemia**

	Probability of “exiting” anemia		
	(1)	(2)	(3)
Number of observations	24,521	24,521	24,521
R-squared	0.02	0.02	0.02
PCTINSTRU	-0.001 (0.69)		
PCTCOST		-0.004 (0.24)	
PCTCEREAL			-0.003 (24.69)
Male	-0.04 (2.07)	-0.04 (2.06)	-0.04 (2.21)
Number days between blood iron measurements	-0.001 (1.72)	-0.001 (1.65)	-0.001 (1.45)
Age in months at Nov 2000 height measurement	0.01 (0.48)	0.01 (0.51)	0.01 (0.48)
Age in months squared	0.0002 (1.14)	0.0002 (1.02)	0.0002 (1.21)
Age between 12-23 months	0.34 (5.63)	0.32 (4.96)	0.36 (6.28)
Age between 24-35 months	0.22 (3.00)	0.21 (2.57)	0.24 (3.42)
Age between 36-48 months	0.15 (2.72)	0.14 (2.39)	0.16 (3.07)
Race = Black	-0.50 (89.60)	-0.50 (89.68)	-0.48 (84.60)
Race = Hispanic	-0.16 (14.80)	-0.17 (15.15)	-0.18 (17.90)
Race = Asian	-0.42 (4.83)	-0.42 (4.88)	-0.41 (4.49)
Race = American Indian	-0.83 (93.42)	-0.83 (93.96)	-0.83 (93.46)
Participation in food stamps	-0.02 (0.35)	-0.02 (0.32)	-0.03 (0.48)
Participation in TANF	0.06 (2.31)	0.06 (2.36)	0.06 (2.30)
Participation in Medicaid	0.02 (0.37)	0.02 (0.34)	0.02 (0.52)
Family size	0.01 (1.18)	0.01 (1.11)	0.01 (0.52)
Family income as percent of poverty	0.0005 (5.33)	0.0004 (5.22)	0.0004 (4.99)
Migrant status	0.11 (1.12)	0.11 (1.11)	0.11 (1.13)
Rural	0.31 (49.90)	0.31 (50.43)	0.31 (48.93)
Urban	0.27 (80.54)	0.27 (80.83)	0.26 (78.22)
Intercept	0.07 (0.08)	0.06 (0.07)	-0.31 (1.84)

Categories “left out” of regressions were: race = white, and location = suburban.

Sample includes children certified in September through November 2000, and recertified by April 2001. R-squared is calculated as  $R^2 = 1 - [L(0)/L(B)]^{2/n}$ , where L(0) = likelihood of intercept only model, L(B) = likelihood of specified model, n = sample size. Wald chi-square statistic in parentheses.

**Table K-4—Health outcomes: Logistic regressions for probability of “exiting” underweight**

	Probability of “exiting” underweight	
	(1)	(2)
Number of observations	13,177	13,177
R-squared	0.137	0.136
PCTINSTRU	0.005 (25.28)	
PCTCOST		0.004 (12.35)
Weight-for-age in November 2000	0.29 (1,503.91)	0.29 (1,505.69)
Male	0.17 (0.52)	0.17 (0.53)
Number days between weight measurements	0.01 (22.62)	0.01 (22.23)
Age in months at Nov 2000 height measurement	0.06 (21.16)	0.06 (20.26)
Age in months squared	-0.001 (35.39)	-0.001 (34.35)
Male × age in months at Nov 2000 height measurement	-0.01 (0.56)	-0.01 (0.56)
Male × age in months squared	0.0003 (1.00)	0.0003 (0.99)
Race = Black	0.10 (1.04)	0.09 (0.86)
Race = Hispanic	0.17 (5.97)	0.18 (6.52)
Race = Asian	-0.16 (0.23)	-0.16 (0.22)
Race = American Indian	0.51 (7.93)	0.51 (8.13)
Participation in food stamps	0.04 (0.47)	0.03 (0.45)
Participation in TANF	-0.03 (0.31)	-0.02 (0.16)
Participation in Medicaid	-0.10 (5.95)	-0.10 (6.06)
Family size	-0.01 (0.57)	-0.01 (0.43)
Family income as percent of poverty	-0.0001 (0.08)	-0.0001 (0.06)
Migrant status	0.15 (0.81)	0.15 (0.81)
Rural	-0.21 (11.83)	-0.21 (12.39)
Urban	-0.17 (13.37)	-0.17 (13.53)
Intercept	-3.76 (144.90)	-3.64 (133.63)

Categories “left out” of regressions were: race = white, and location = suburban.

Sample includes children aged 2 years and older, certified in September through November 2000, and recertified by April 2001. Interactions between male and race were also included in the model, but were not statistically significant and are not shown. R-squared is calculated as  $R^2 = 1 - [L(0)/L(B)]^{2/n}$ , where  $L(0)$  = likelihood of intercept only model,  $L(B)$  = likelihood of specified model,  $n$  = sample size. Wald chi-square statistics in parentheses.