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# The WIC Program: Background, Trends, and Economic Issues, 2015 Edition

Victor Oliveira and Elizabeth Frazão





United States Department of Agriculture

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## Abstract

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) provides supplemental food, nutrition education (including breastfeeding promotion and support), and referrals to health care and other social services to low-income, nutritionally at-risk women, infants, and children up to 5 years of age. On average, over half of all infants in the United States, over a quarter of all pregnant and postpartum women, and over a quarter of all children less than 5 years of age participate in the program. The Healthy, Hunger-Free Kids Act of 2010, which authorized funds for WIC, is set to expire on September 30, 2015. The reauthorization process provides an important opportunity to reexamine the operation and effectiveness of the program and to consider improvements. This report explains how WIC works, examines program trends, and discusses some of the major economic issues facing the program (including the impact of economic conditions on participation, some lesser known effects of WIC, and equity and cost-management issues).

**Keywords:** Special Supplemental Nutrition Program for Women, Infants, and Children; WIC; spillover effects; geographic distribution; economic conditions; infant formula rebates; price insensitivity; equity issues

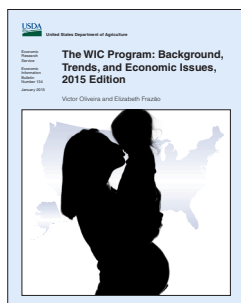
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# The WIC Program: Background, Trends, and Economic Issues, 2015 Edition

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## What Is the Issue?

Since 1974, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) has provided supplemental food, nutrition education (including breastfeeding promotion and support), and referrals to health care and other social services to low-income, nutritionally at-risk women, infants, and children up to 5 years of age. Administered by the U.S. Department of Agriculture's Food and Nutrition Service, WIC serves over 8 million people each month, and is widely recognized as one of the most successful food and nutrition assistance programs in the United States. The Healthy, Hunger-Free Kids Act of 2010 (P.L. 111-296), which authorized funds for WIC, is set to expire on September 30, 2015, and the reauthorization process provides an important opportunity to reexamine the operation and effectiveness of the program and to consider improvements. This report explains how WIC works, examines program trends, and discusses some of the major economic issues facing the program. It updates previous reports released in 2002 and 2009.

## What Did the Study Find?

WIC has served low-income, nutritionally at-risk women, infants, and children for over 40 years. While much is known about the program and its impacts, new issues arise as the program continues to evolve, including:

- **Impact of economic conditions on program participation.** For much of its early history, WIC participation was limited by the program's budget, so economic conditions had little effect on the number of participants. Since becoming fully funded in the late 1990s, however, WIC's program participation has generally been countercyclical—expanding during economic downturns and contracting during periods of economic growth. Economic conditions affect the size of the eligible population (which is also affected by the number of births) and the coverage rate (the rate of participation among eligible people). Economic conditions have a relatively greater impact on the number of children in WIC than on the number of pregnant women, infants, or postpartum women.
- **Lesser known effects of WIC.** WIC's impact on participants' health and nutrition has received much attention. However, WIC has implications that extend beyond the health and development of program participants. For example, WIC can impact the diet quality of people not in the program since products reformulated for the WIC program are also available to—and consumed by—non-WIC individuals. Additionally, because WIC participants make up a large share of infants and children in the United States, changes in the types of

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foods included in the WIC food packages can affect some food product sales. WIC may also result in higher infant formula prices for non-WIC consumers.

- **Equity issues.** A person who is eligible to participate in WIC in one geographic area may be deemed ineligible in another area due to variations in income eligibility. This is because State and local agencies have discretion in determining income eligibility, and because Medicaid and Supplemental Nutrition Assistance Program (SNAP) eligibility standards are different across States (participants in these programs are automatically income eligible for WIC).
- **WIC food packages.** Changes made to the WIC food packages, implemented in 2009, represent the most significant changes to the WIC program since its inception in the early 1970s. Studies examining their impact suggest that the revisions had a positive impact on food purchases among WIC households, improved the retail food environment, and may have reduced obesity among children.
- **Cost-management issues.** Food costs are the program's largest single cost, accounting for about 70 percent of WIC's budget. The price insensitivity of WIC participants can provide an incentive for some vendors to charge higher prices for WIC foods. To ensure that vendors charge competitive prices for WIC foods, WIC State agencies are required to establish vendor peer groups with allowable reimbursement levels for each peer group. Most State agencies use voucher costs as proxies for food prices to determine reasonable allowable reimbursement values. Partial voucher redemptions (i.e., when participants do not purchase all of the foods listed on the voucher) may present a problem in setting maximum allowable reimbursements, however, since vouchers submitted by WIC vendors for reimbursement only list the cost of the voucher and not the types or quantities of foods purchased with it. As a result, differences in the voucher costs may reflect differences in food prices or differences in the amounts of foods redeemed. Consequently, failure to account for partial voucher redemptions could result in artificially low allowable reimbursement values and potentially shortchange some vendors that have fewer partial voucher redemptions.
- **Infant formula issues.** Infant formula is the single most expensive food item for WIC. WIC State agencies are required by law to operate a cost-containment system for the purchase of infant formula. Typically, infant formula manufacturers compete for each State's infant formula contract. The winning manufacturer provides the WIC State agency with significant discounts in the form of rebates for each can of formula purchased through the program. In exchange, the WIC State agency agrees to issue the manufacturer's infant formulas as the formula of first choice to its infant participants. Rebates have been very effective in reducing costs to WIC and allowing the program to maximize the number of people who can participate in it. After rebates, WIC pays only about 8 percent of the wholesale price for formula (WIC State agencies also pay the retail markup). However, since the manufacturers choose whether or not to bid on States' WIC infant formula rebate contracts, and how much of a rebate to offer WIC, the size of the rebate provided by formula manufacturers is outside the control of WIC. If manufacturers' rebates were to fall, it could increase program costs significantly.
- **EBT.** All WIC State agencies are required to implement electronic benefit transfer (EBT) statewide to distribute food benefits by October 1, 2020. The increasing availability of WIC EBT data may make it possible to examine a number of issues, including the food choices of WIC participants, how those choices are affected by the constraints imposed by the WIC State agency, and how they affect food costs.

## How Was the Study Conducted?

Researchers from USDA's Economic Research Service examined WIC's laws and regulations; studied program trends in expenditures, participants, and infant formula rebates; reviewed numerous WIC-related research publications; and met with various Federal and State program managers, WIC researchers, representatives of WIC food manufacturers, and members of WIC advocacy groups.



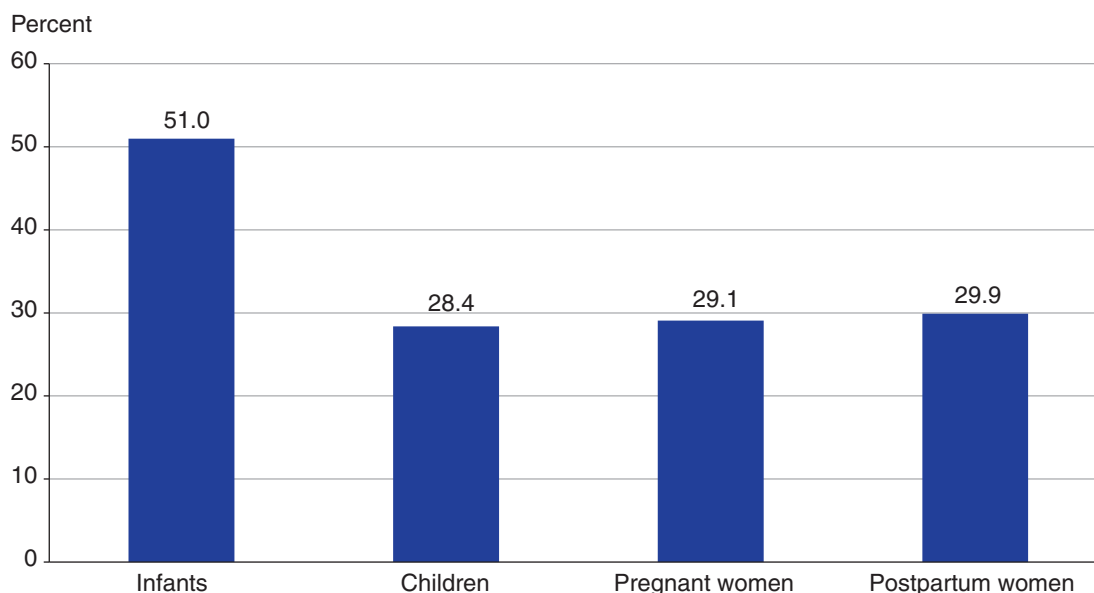
# The WIC Program: Background, Trends, and Economic Issues, 2015 Edition

## Introduction

Since 1974, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) has provided supplemental food, nutrition education (including breastfeeding promotion and support), and referrals to health care and other social services to low-income, nutritionally at-risk women, infants, and children up to 5 years of age. The program is administered by the U.S. Department of Agriculture's (USDA) Food and Nutrition Service (FNS), and over 8 million people participate in it each month. Widely recognized as one of the most successful food and nutrition assistance programs in the United States, WIC is based on the premise that early intervention during critical times of growth and development can help prevent future medical and developmental problems. WIC serves as an entry point for early nutrition and health care intervention for a large number of the Nation's infants and children. On average, over half of all infants in the United States, and over a quarter of all pregnant and postpartum women and children younger than 5 years of age, participated in the program each month in fiscal year (FY) 2012 (fig. 1).

With annual Federal expenditures of almost \$7 billion in FY 2013 (or about 6 percent of total Federal spending on food and nutrition assistance), WIC is the Nation's third-largest food and

Figure 1  
**WIC participants as a share of U.S. population subgroups, 2012**



Notes: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. Postpartum women include both breastfeeding and nonbreastfeeding women. Children refers to children younger than 5 years of age. See appendix on page 81 for information on how the percentages were estimated.

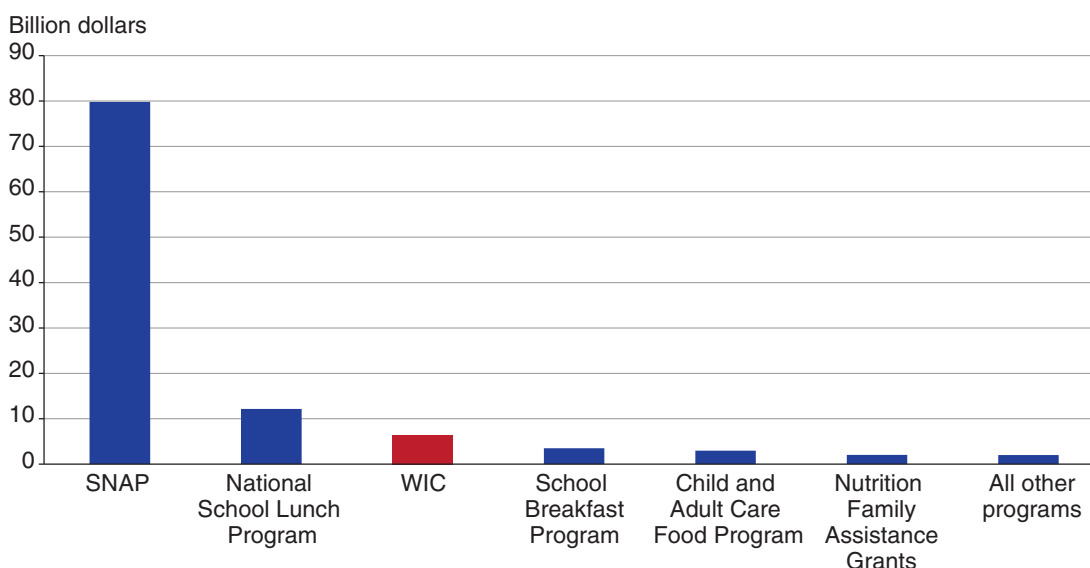
Source: USDA, Economic Research Service.

nutrition assistance program, trailing only the Supplemental Nutrition Assistance Program (SNAP, formerly the Food Stamp Program) and the National School Lunch Program (fig. 2).

Because WIC impacts millions of vulnerable people each month and represents a significant Federal investment, it is important that the program operates effectively and efficiently. The Healthy, Hunger-Free Kids Act of 2010,<sup>1</sup> which authorized funds for WIC, is set to expire on September 30, 2015. The reauthorization process provides an important opportunity for Congress to reexamine the operation and effectiveness of the program and to consider improvements.<sup>2</sup> In anticipation of the discussions surrounding the reauthorization process, the goal of this report is to provide a better understanding of how WIC works, examine program trends, identify some of the lesser known effects—both direct and indirect—of the program, and inform public debate on some of the major economic issues facing the program. This report updates previous reports released in 2002 (Oliveira et al.) and 2009 (Oliveira and Frazao).

Figure 2

**USDA expenditures for food and nutrition assistance programs, FY 2013**



Notes: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children, and FY refers to fiscal year. USDA administers 15 domestic food and nutrition assistance programs. Nutrition Family Assistance Grants are provided in lieu of the Supplemental Nutrition Assistance Program (SNAP) to Puerto Rico, the Commonwealth of the Northern Mariana Islands, and American Samoa.

Source: USDA, Food and Nutrition Service, 2013d.

<sup>1</sup>Public Law (P.L.) 111-296.

<sup>2</sup>73 *Federal Register*, No. 98, May 20, 2008, pp. 29107-29108.

# Overview of WIC

WIC is a unique and complex program that supplies specific types of foods and other benefits to a highly targeted group of participants who must meet a number of eligibility requirements. WIC is not an entitlement program, and the number of people who can be served may be limited by funding levels established by Congress on an annual basis. Cost-containment practices—in particular, the use of infant formula rebates—play a major role in reducing food costs and maximizing the number of participants the program can serve under a fixed budget.

## Participant eligibility

To qualify for WIC, applicants must meet a number of eligibility requirements:

### *Categorical eligibility*

To participate in the WIC program, a person must be either:

- A pregnant woman,
- A nonbreastfeeding woman up to 6 months postpartum,
- A breastfeeding woman up to 1 year postpartum,<sup>3</sup>
- An infant up to his/her first birthday, or
- A child up to his/her fifth birthday.<sup>4</sup>

### *Residential eligibility*

WIC applicants must reside within the State where they establish eligibility.

### *Income eligibility*

The family income of WIC applicants must meet specified guidelines.<sup>5</sup> All WIC State agencies currently set the income cutoff at the maximum 185 percent of the Federal poverty guidelines set each year by the U.S. Department of Health and Human Services (e.g., annual income of \$44,123 for a family of 4 living in the 48 contiguous States as of July 1, 2014) (table 1).<sup>6</sup> Either the income of the

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<sup>3</sup>Breastfeeding is defined as the practice of feeding a mother's breast milk to her infant(s) on average at least once a day (Title 7 CFR Pt. 246.2).

<sup>4</sup>According to a report by the U.S. General Accounting Office (1985), "Most WIC officials suggested that the Congress established the limit at age 5 to provide a bridge between participation in WIC and entry into other feeding programs that begin when children enter the educational system" (p. 15).

<sup>5</sup>WIC regulations state that the maximum allowable family gross cash income (i.e., before taxes are withheld) must not exceed the guidelines for reduced-price school meals, which are 185 percent of the Federal poverty guidelines (Title 7 CFR Pt. 246.7). State agencies may set the income guidelines equal to State or local guidelines for free or reduced-price health care as long as they are equal to or less than 185 percent of the poverty guidelines and not less than 100 percent of the poverty guidelines.

<sup>6</sup>In the case of a pregnant woman who is otherwise ineligible for participation in the program because the family of the woman is of insufficient size to meet the income eligibility standards, the pregnant woman shall be considered to have satisfied the income eligibility standards if, by increasing the number of individuals in the family of the woman by the number of embryos or fetuses in utero, the income eligibility standards would be met (Title 7 CFR Pt. 246.7).

Table 1

**WIC income eligibility guidelines for the 48 contiguous States and the District of Columbia (effective from July 1, 2014 to June 30, 2015)**

Family size	Annual income
<i>Number of people</i>	<i>Dollars</i>
1	21,590
2	29,101
3	36,612
4	44,123
5	51,634
6	59,145
7	66,656
8	74,167
For each additional member, add	+ 7,511

Notes: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. Alaska and Hawaii have higher guidelines.

Source: USDA, Food and Nutrition Service, 2014e.

family during the past 12 months or the family's current rate of income may be used to determine an applicant's income eligibility—whichever most accurately reflects the family's status.<sup>7</sup>

With some exceptions, applicants are required to provide documentation of family income and be physically present at each certification or recertification. Applicants who demonstrate current eligibility for participation in the SNAP, Medicaid, or Temporary Assistance for Needy Families (TANF) programs are adjunctively income eligible; that is, they are deemed to automatically meet the income eligibility criteria and do not have to provide documentation of income when they apply for WIC.<sup>8,9</sup> In addition, WIC State agencies have the option to deem individuals automatically income eligible if they participate in other State-administered programs that use income guidelines at or below 185 percent of the Federal poverty guidelines and which routinely require income documentation.

Once certified as eligible, WIC participants are not required to report changes in income that would make them ineligible if they were applying for the program. However, WIC participants are encouraged by local agency WIC staff to report any changes that may affect their program eligibility. Local WIC agencies must reassess a participant's income eligibility during the current certification period if the local agency receives information indicating that the participant's household income has changed and there are more than 90 days before the end of the certification period.<sup>10</sup>

<sup>7</sup>Title 7 CFR Pt. 246.7.

<sup>8</sup>Title 7 CFR Pt. 246.7.

<sup>9</sup>In some States, participation in Medicaid or SNAP confers adjunctive income eligibility to families with incomes greater than 185 percent of the Federal poverty guidelines.

<sup>10</sup>Title 7 CFR Pt. 246.7.

### ***Nutritional risk***

Applicants must be at nutritional risk as determined by a health professional (such as a physician, nutritionist, dietitian, or nurse). Federal regulations recognize five major types of nutritional risk for WIC eligibility:<sup>11</sup>

- Detrimental or abnormal nutritional conditions detectable by biochemical or anthropometric measurements (such as anemia, underweight, or overweight);
- Other documented nutritionally related medical conditions (such as nutrient deficiency diseases, metabolic disorders, or lead poisoning);
- Dietary deficiencies that impair or endanger health (such as inadequate dietary patterns);
- Conditions that directly affect the nutritional health of a person, including alcoholism or drug abuse; or
- Conditions that predispose people to inadequate nutritional patterns or nutritionally related medical conditions, including, but not limited to, homelessness and migrancy.

As part of the determination process, the height (or length) and weight of each applicant is measured and a blood test for anemia is administered to everyone except infants under 9 months. The medical history and dietary patterns of participants are also considered. Data collected during the determination process are also used to tailor the individual's food package to address nutritional needs, design appropriate nutrition education (including breastfeeding promotion and support), and make referrals to health and social services for followup.

### ***Dual participation***

Dual participation—simultaneously participating in WIC in more than one WIC clinic at the same time—is illegal.

### ***Legal status***

WIC State agencies may limit WIC participation to U.S. citizens, nationals, and qualified aliens as these terms are defined in the Immigration and Nationality Laws.<sup>12</sup> However, no State WIC agency currently employs this option.

### ***Certification periods***

WIC participants are typically eligible to receive benefits for a 6-month period. Pregnant women, however, are certified for the duration of their pregnancy and up to 6 weeks postpartum. At the WIC State agency's discretion, infants and breastfeeding women can be certified up to the infant's first birthday and children can be certified for up to a 1-year period. Once the participant's certification period ends, the participant must be recertified in order to continue receiving benefits.

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<sup>11</sup>Title 7 CFR Pt. 246.2.

<sup>12</sup>8 U.S.C. 1101 et seq.

## Participant benefits

The WIC program offers three types of benefits to participants: a supplemental food package, nutrition education, and referrals to health care and other services. All benefits are provided to participants free of charge.

### *Supplemental food package*

Food packages are the cornerstone of the program, accounting for about 70 percent of WIC costs in FY 2013 (USDA-FNS, 2013d).<sup>13,14</sup> The food package is supplemental; it is not intended to be a primary source of food or general food assistance. The foods included in the packages are high in nutrients determined to be beneficial for pregnant, breastfeeding, and postpartum women; infants; and children.<sup>15</sup> Inadequate intake of such nutrients may result in adverse health consequences.

There are seven food packages containing various combinations of foods that are designed to meet the specific needs of each participant category. FNS issued an interim rule in 2007<sup>16</sup> (implemented in 2009) which revised the WIC food packages—one of the most important changes to the WIC program in its history.<sup>17</sup> Prior to these revisions, WIC provided only quantity-based food vouchers (i.e., vouchers were redeemable for specified quantities of foods—for example, 1 dozen eggs or 4 gallons of milk). One of the most significant revisions to the food package was the introduction of a cash-value voucher (i.e., a fixed-dollar-amount voucher), which can be used to purchase a variety of fruits and vegetables of the participants' choosing for a particular dollar amount (the vouchers for the other types of food remain quantity based). Other major changes mandated by the revisions included the addition of whole-wheat bread to most food packages, eliminating juice from the infant food packages, placing restrictions on the fat content of milk (only 1-year olds and participants with qualifying medical conditions receiving Food Package III are now allowed whole milk), reducing the amount of milk that can be replaced by cheese, and increasing the types of alternative foods that State agencies may allow (e.g., soymilk and tofu for milk, brown rice and whole-wheat or soft corn tortillas for whole-wheat bread). A final rule, published in 2014, clarified and made small modifications to the interim rule.<sup>18</sup> (For a summary of the impacts of the revisions implemented in 2009, see section "Impact of the 2009 Implementation of the WIC Food Package Revisions.") Table 2 shows the types of foods included in each of the seven food packages.

The amount of food provided to recipients does not vary with household income. The authorized maximum monthly allowances for all WIC foods must be made available to participants if medically and nutritionally warranted.<sup>19</sup> WIC State agencies, however, may tailor an individual's food package

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<sup>13</sup>In a recent Food and Nutrition Service-funded survey of WIC participants, the participants were asked to rate the value of 12 formal and informal benefits of the program. Benefits directly related to food purchase were the most highly valued. *Money saved on grocery bills* and *vouchers for nutritious foods* were rated extremely important by 87 percent and 82 percent of participants, respectively (Geller et al., 2012a).

<sup>14</sup>The remaining 30 percent of program costs were for nutrition education, breastfeeding promotion, client services, and administration.

<sup>15</sup>Title 7 CFR Pt. 246.2.

<sup>16</sup>72 *Federal Register*, No. 234, December 6, 2007, pp. 68966-69032.

<sup>17</sup>Interim regulations allow the regulations to be implemented while providing for a comment period before a final rule is published.

<sup>18</sup>79 *Federal Register*, No. 42, March 4, 2014, pp. 12274-12300.

<sup>19</sup>See USDA's Food and Nutrition Service website at [www.fns.usda.gov/wic/wic-food-packages-maximum-monthly-allowances](http://www.fns.usda.gov/wic/wic-food-packages-maximum-monthly-allowances) for information on maximum monthly allowances of WIC foods.

Table 2

**Types of foods included in each WIC food package**

Food package type	Participant category	Foods
Food Package I	Infants 0-5 months <sup>1</sup>	Infant formula
Food Package II	Infants 6-11 months <sup>1</sup>	Infant formula, infant cereal, infant fruits and vegetables, infant meat
Food Package III	Participants with qualifying conditions <sup>2</sup>	With medical documentation: infant formula, exempt infant formula, or WIC-eligible medical foods, plus all of the foods in the packages to which they would have been eligible in the absence of their special medical needs
Food Package IV	Children 1-4 years	Juice, milk, breakfast cereal, eggs, whole-wheat bread, legumes or peanut butter, fruits and vegetables
Food Package V	Pregnant and partially breast-feeding women	Juice, milk, breakfast cereal, eggs, whole-wheat bread, legumes and peanut butter, fruits and vegetables
Food Package VI	Postpartum women (non-breastfeeding)	Juice, milk, breakfast cereal, eggs, legumes or peanut butter, fruits and vegetables
Food Package VII	Fully breastfeeding women	Juice, milk, cheese, breakfast cereal, eggs, whole-wheat bread, legumes and peanut butter, canned fish, fruits and vegetables

<sup>1</sup>Three infant feeding options are available under Food Packages I and II. Fully breastfeeding infants receive no infant formula from the WIC program but receive infant meat under Food Package II, and their mothers receive a greater variety and quantity of foods. Partially breast-feeding infants receive approximately half the formula as fully-formula-feeding infants and receive no infant meat in Food Package II (fully-formula-feeding infants also receive no infant meat in Food Package II).

<sup>2</sup>This food package is reserved for issuance to any participant with a documented qualifying condition that requires the use of a WIC formula (infant formula, exempt infant formula, or WIC-eligible medical food) because the use of conventional foods is precluded, restricted, or inadequate to address their special nutritional needs. Participants may also receive the same types and quantities of foods they would otherwise be eligible for.

Notes: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. The final rule allows States to offer substitutions, e.g., brown rice for whole-wheat bread or cheese for part of the milk (79 *Federal Register* No. 42, March 4, 2014, pp. 12274-12300); a complete list of foods is available on the Food and Nutrition Service website at <http://www.fns.usda.gov/wic/final-rule-revisions-wic-food-packages>.

Source: USDA, Economic Research Service using information from USDA, Food and Nutrition Service, 2014g.

if medically or nutritionally warranted or if the participant refuses or cannot use the maximum monthly allowances. WIC State agencies also have the authority to make adjustments to WIC foods for administrative convenience and to control costs (e.g., restricting brands, types, and physical forms or specifying minimum package sizes).

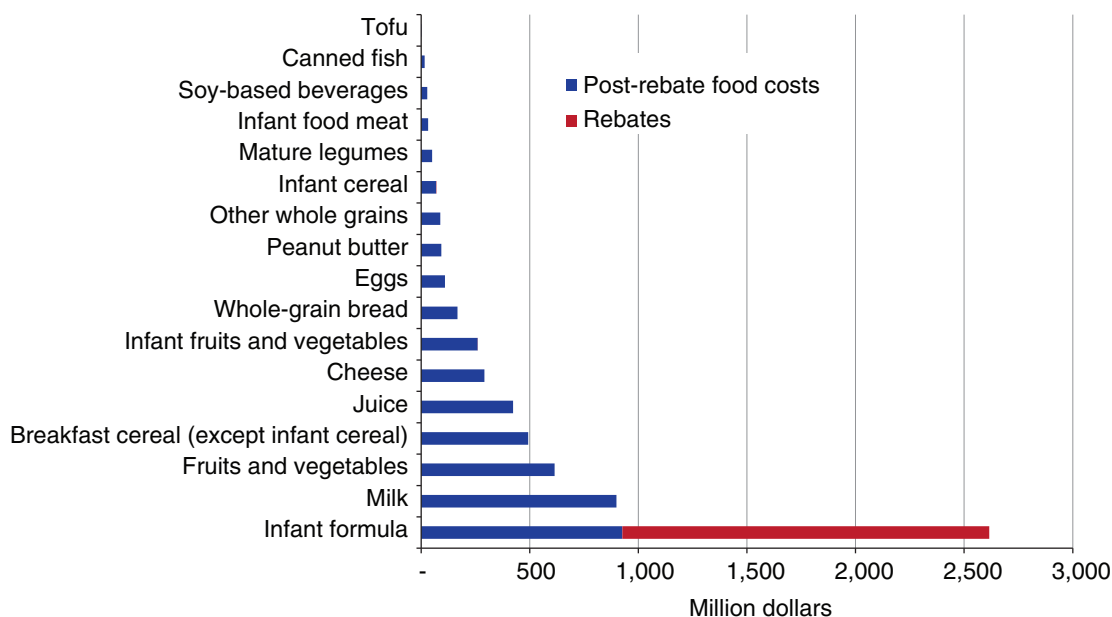
The market value of the various types of foods provided through WIC varies widely. Infant formula accounted for 42 percent of total food costs in FY 2010 before taking into account rebates from infant food manufacturers (fig. 3).<sup>20</sup> The next most costly food item was milk (14 percent of pre-rebate food costs), then fruits and vegetables (10 percent of pre-rebate food costs). In contrast, tofu, canned fish, and soy-based beverages combined accounted for less than 1 percent of pre-rebate food costs.

<sup>20</sup>The estimated WIC food costs before rebates represent the retail (or market) value of the WIC foods. See “Cost Containment” section for information on rebates.



Figure 3

### Estimated WIC food costs by food item, FY 2010



Notes: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. Post-rebate food costs represent costs after taking into account rebates from infant formula and infant food manufacturers. Rebates from infant formula manufacturers totaled \$1.7 billion in FY 2010. The market value of the foods is equivalent to the sum of post-rebate food costs and rebates.

Source: Vericker et al., 2013.

### Nutrition education

WIC makes nutrition education—including breastfeeding promotion and support—available to all participants (or to the parents or caretakers of infant and child participants). The nutrition education is designed to achieve two broad goals:

1. Emphasize the relationship between nutrition, physical activity, and health—with special emphasis on the nutritional needs of pregnant, postpartum, and breastfeeding women; infants; and children under 5 years of age—and raise awareness about the dangers of using drugs and other harmful substances during pregnancy and while breastfeeding.
2. Assist the individual who is at nutritional risk in improving health status and achieving a positive change in dietary and physical activity habits, and prevent nutrition-related problems through the optimal use of supplemental foods and other nutritious foods. This is to be taught in the context of the ethnic, cultural, and geographic preferences of the participants and with consideration for educational and environmental limitations experienced by the participants.<sup>21</sup>

Nutrition education may be provided through the use of individual or group counseling sessions, as well as through online education modules. Local WIC agencies are required to offer nutrition education sessions to participants or caretakers at a quarterly rate or more. Individuals who do not attend the nutrition education activities are not denied the WIC food package.

<sup>21</sup>Title 7 CFR Pt. 246.11.



All pregnant participants are encouraged to breastfeed, unless contraindicated for health reasons.<sup>22</sup> Each State agency is required to spend, for nutrition education and breastfeeding promotion and support activities, an amount that is at least one-sixth of its cost for Nutrition Services and Administration (NSA) and an amount equal to its proportionate share of the national minimum expenditure for breastfeeding promotion and support activities.<sup>23,24</sup>

### ***Referrals to health care and social services***

WIC was designed to serve as an adjunct to good health care during critical times of growth and development. Local WIC agencies assist WIC participants in obtaining health care and social services (such as immunizations, SNAP, and Medicaid) either through onsite health services or referrals to other agencies.

## **Food delivery systems**

To provide program participants with supplemental food packages, WIC State agencies may use three types of food delivery systems (or any combination of the three):

- Retail—participants obtain supplemental food by exchanging a food instrument at retail stores (i.e., vendors) authorized by the WIC State agency.
- Home delivery—supplemental food is delivered directly to the participant’s home.
- Direct distribution—participants pick up supplemental food from designated storage facilities operated by the State or local agency.

Under retail food delivery systems, WIC State agencies provide food instruments to participants who exchange them for supplemental foods at authorized retail outlets. State WIC agencies then reimburse the retail vendors for the food purchased by WIC participants. There are three types of food instruments used in retail food delivery systems: checks, vouchers, and electronic benefit transfer (EBT).

- Checks: Vendors deposit the checks to their bank accounts and the State reimburses them through their banks.
- Vouchers: Food instruments that the vendor submits directly to the State agency for payment (Executive Office of the President, 2012).
- EBT: Replaces paper food instruments (checks or vouchers) with an electronic system, similar to a debit card transaction, which allows a recipient to authorize transfer of their Government benefits from a Federal account to a retailer account to pay for purchased products. Although most WIC participants currently receive paper food instruments, the use of EBT is increasing—as of August 2014, 10 WIC State agencies (FL, KY, MA, MI, NM, NV, TX, VA, WV, and WY) and

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<sup>22</sup>Breastfeeding WIC mothers receive a more substantial food package and are eligible to participate in the program longer than nonbreastfeeding, postpartum women.

<sup>23</sup>Title 7 CFR Pt. 246.14.

<sup>24</sup>See “Administration of WIC” section for information on Nutrition Services and Administration (NSA). The national minimum expenditure for breastfeeding promotion and support activities is equal to \$21 multiplied by the number of pregnant and breastfeeding women in the program. Starting on October 1, 1996 (and each October 1 thereafter), the \$21 is adjusted for inflation.

4 Indian Tribal Organizations (ITOs) operated statewide EBT systems (USDA-FNS, 2014f). All WIC State agencies are required to implement WIC EBT statewide by October 1, 2020.<sup>25</sup>

The food instruments specify the types and quantities of supplemental foods that can be purchased and the time period the food instrument may be used.<sup>26</sup> No more than a 3-month supply of food instruments may be issued at any one time to any participant (each food instrument is usually valid for 30 days).<sup>27,28</sup> Most participants pick up their paper food instruments in person at the local agency or clinic, although WIC State agencies may provide for issuance through an alternative means (such as mailing). With EBT, food benefits are automatically downloaded to the recipient's account, although participants are encouraged to come to the clinic for nutrition education.

For both home delivery and direct distribution, WIC State agencies may purchase the supplemental food in bulk lots to take advantage of discounts. Home delivery is used in Vermont, while direct distribution is used in Mississippi and parts of Illinois.<sup>29</sup> Most State agencies found that these systems were not feasible due to the costs associated with administering the program or because of its impact on participants (USDA-FNS, 1991a).<sup>30</sup> As a result, most participants receive their supplemental foods via retail food delivery systems.<sup>31</sup>

## WIC vendors

Retail food stores (vendors) are an important component of the WIC Program. Only vendors authorized by the WIC State agency may accept WIC food instruments. WIC State agencies determine how many and what types of retail vendors to authorize. Although WIC State agencies are not required to authorize all qualified stores, they must authorize an appropriate number and geographic distribution of stores that ensures the lowest practicable food prices consistent with adequate participant access and effective WIC State agency management, oversight, and review of its authorized vendors.<sup>32</sup> In FY 2013, there were more than 48,000 authorized WIC vendors nationwide (Gleason et al., 2013). Vendors

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<sup>25</sup>78 *Federal Register*, No. 40, Feb. 28, 2013, pp. 13549-13563.

<sup>26</sup>As a result of the 2009 implementation of the WIC food package revisions, WIC provides participants a cash-value voucher (i.e., a fixed-dollar-amount voucher) to purchase a variety of fruits and vegetables of the participants' choosing.

<sup>27</sup>The requirement that prevents WIC agencies from issuing more than a 3-month supply of paper food instruments to a recipient at a single time was first implemented in 1977 to encourage recipients to attend the local WIC clinic more frequently than once every 6 months (the length of the certification period for most WIC participant categories at that time) and thus take part in nutrition education classes and health services (42 *Federal Register*, No. 166, August 26, 1977, pp. 43206-43220).

<sup>28</sup>Under direct distribution and home delivery, participants are issued 1 month of supplemental foods at a time.

<sup>29</sup>Vermont uses a retail food delivery system for redemption of the cash-value vouchers for fruits and vegetables and anticipates switching entirely to the retail food delivery system in 2016 (based on authors' communication with the Vermont State WIC Director in February 2014).

<sup>30</sup>A review of the direct distribution system in Mississippi concluded that the system was not economically efficient, resulted in lower food access to healthy foods for both WIC recipients and nonparticipants, and hindered food retailers' ability to grow by excluding them from WIC transactions, and recommended that the State move to a retail food delivery system (Simon and Leib, 2011). The State is preparing to switch to retail food delivery when it transitions to electronic benefit transfer (EBT) (based on authors' communication with the Mississippi State WIC Director in February 2014).

<sup>31</sup>Some States may also use home delivery or direct distribution for some of their participants or for delivering special formulas or medical foods.

<sup>32</sup>Title 7 CFR Pt. 246.12.

include a variety of store types, such as supermarkets, large and small grocery stores, mass merchandisers, convenience stores, gas station food marts, commissaries, and pharmacies.<sup>33</sup>

WIC State agencies are also required to establish minimum requirements for the variety and quantity of WIC foods that vendors must stock. With the implementation of the revised food packages in 2009, vendors must now stock at least two varieties of fruits, two varieties of vegetables, and at least one whole-grain cereal. State agencies may establish different minimums for different types of stores.

Vendors are authorized for a maximum of 3 years, at which time they must apply for reauthorization. To ensure that vendors charge competitive prices for WIC foods, WIC State agencies are required to establish a vendor peer group system with distinct competitive price criteria and allowable reimbursement levels for each peer group.<sup>34</sup> Vendors are required to redeem a food instrument only within the specified time period, and WIC food purchases are not subject to State or local sales taxes.<sup>35</sup>

## The WIC Farmers' Market Nutrition Program

The WIC Farmers' Market Nutrition Program (FMNP) was established in 1992 to provide fresh, unprepared, locally grown fruits and vegetables to WIC participants and to expand the awareness of, use of, and sales at farmers' markets.<sup>36</sup> Women, children, and infants over 4 months who have either been certified to receive WIC program benefits or who are on a waiting list for WIC certification are eligible to participate in the FMNP (State agencies may serve some or all of these participant categories). Participants are issued FMNP coupons in addition to their regular WIC food instruments. These coupons can be used to buy fresh, unprepared fruits, vegetables, and herbs from farmers, farmers' markets, or roadside stands approved by the FMNP State agency (prior to the 2009 implementation of the WIC food package revisions, FMNP provided the only source of fruits and vegetables not in juice form to WIC participants other than the provision of carrots to breastfeeding women). The Federal food benefit level for FMNP recipients may not be less than \$10 or more than \$30 per year per recipient. State agencies may supplement the Federal benefit level with State, local, or private funds.

Federal funds support 100 percent of the FMNP's food costs and 70 percent of its administrative costs; States operating the FMNP must contribute the rest of the program's total administrative cost.<sup>37</sup> As of September 2013, FMNP operated in parts of 36 States, the District of Columbia, Guam, Puerto Rico, the Virgin Islands, and 6 ITOs (USDA-FNS, 2013b).

During FY 2012, 1.7 million WIC participants received FMNP benefits (USDA-FNS, 2013e). That same year, 18,246 farmers, 3,392 farmers' markets, and 2,969 roadside stands were authorized to accept FMNP checks or coupons. Checks and coupons redeemed through the program resulted in over \$14.3 million in revenue to farmers during the year.

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<sup>33</sup>WIC-authorized pharmacies are only authorized to redeem special formula.

<sup>34</sup>The objective of vendor peer groups is to group vendors with similar characteristics who should be charging comparable prices for WIC foods. State agencies must include at least two criteria for establishing peer groups, one of which must be a measure of geography, such as metropolitan or other statistical areas that form distinct labor and product markets (Title 7 CFR Pt. 246.12).

<sup>35</sup>Title 7 CFR Pt. 246.12.

<sup>36</sup>Title 7 CFR Pt. 248.1.

<sup>37</sup>Indian State agencies may receive a lower match but not less than 10 percent of the administrative cost of the program. Trust Territories are exempt from match requirements.

## Administration of WIC

As USDA's largest discretionary program, WIC is funded annually by congressional appropriations. Consequently, WIC can only serve as many participants as funding allows.<sup>38</sup>

WIC operates through a Federal/State/local partnership:

- At the Federal level, WIC is administered by FNS, which provides separate cash grants for food benefits and for NSA to 90 WIC State agencies, including all 50 States, the District of Columbia, 34 ITOs, and 5 territories (American Samoa, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, Guam, and the U.S. Virgin Islands).<sup>39</sup> In addition, FNS issues regulations, monitors compliance with these regulations, provides technical assistance to the WIC State agencies, and conducts studies of program health benefits, operations, and compliance.
- The 90 WIC State agencies are responsible for program operations within their jurisdictions. They award subgrants to local WIC agencies, negotiate rebate contracts with infant formula manufacturers, and provide assistance to local agencies with respect to program operations. WIC State agencies have considerable latitude in operating their programs within broad regulatory guidelines.<sup>40</sup> For example, WIC State agencies decide the specific brands, forms, and package sizes to include in their list of approved WIC foods.
- About 1,900 local WIC agencies, mostly State and county health departments but also some public and private nonprofit health and human service agencies, provide services to WIC participants either directly or through about 10,000 local service sites or clinics, including county health departments, hospitals, mobile vans, community centers, schools, and migrant health centers and camps (USDA-FNS, 2013a). Local WIC clinics certify applicants, provide nutrition education, make referrals to health care and other social services, and distribute food instruments.

Unlike other food and nutrition assistance programs, WIC is 100-percent federally funded (i.e., State matching funds are not required).<sup>41</sup> Federal grants to WIC State agencies are divided into food grants and NSA grants. Food grants cover the cost of supplemental foods, while NSA grants cover nonfood costs such as certifying participants; determining nutritional risks; conducting blood tests for anemia; providing outreach and nutrition education services, breastfeeding promotion and support, and referrals to health and social services; printing food instruments; administering the food delivery system; and staff salaries. At least one-sixth of a State agency's NSA expenditures must be used for nutrition education, and an additional portion of NSA funds must be used for breastfeeding promotion and support.<sup>42</sup>

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<sup>38</sup>In contrast, USDA's largest food and nutrition assistance program—SNAP—is an entitlement program whereby everyone who meets the eligibility criteria may receive benefits if they choose.

<sup>39</sup>The USDA, Food and Nutrition Service (FNS) allocates funds to the States based on funding formulas prescribed in the WIC program regulations (Title 7 CFR Pt. 246.16). Unspent funds are recovered by FNS and reallocated to State agencies.

<sup>40</sup>The most successful cost-containment strategy used in WIC—the use of infant formula rebates—was initiated by State agencies.

<sup>41</sup>States can use their own funds to supplement the Federal grant.

<sup>42</sup>Title 7 CFR Pt. 246.14.

## Priority system

When limited funds prevent WIC from serving all eligible applicants, WIC uses a seven-point priority system to ensure that people with the greatest nutritional risk and who are most likely to benefit from WIC intervention receive program benefits (table 3). Once a local agency has reached its maximum participation level (i.e., is serving the maximum number of participants under its current budget), it is required to maintain a waiting list of individuals who visit the local agency to express interest in receiving program benefits and who are likely to be served. The priority system is applied to individuals on the local agency's waiting list when caseload slots become available. In general, priority is given to people demonstrating medically based nutritional risks (such as anemia) over dietary nutritional risks, to infants and pregnant and breastfeeding women over children, and to children over postpartum women. Increases in funding and savings from infant formula rebates during the 1990s allowed a greater number of lower priority applicants, such as children, to participate. As a result, the role of the seven-point priority system in allocating available program slots among applicants decreased in importance relative to previous years (when program funds were more limited). Anecdotal evidence indicates that, since the late 1990s, the program has been fully funded (i.e., funding has been sufficient to provide benefits to all eligible people seeking to enroll in the program, including those at the lowest priority levels).<sup>43</sup>

Table 3

**WIC nutritional-risk priorities**

Priority (from highest to lowest)	Description
I	Pregnant women, breastfeeding women, and infants at nutritional risk as demonstrated by hematological or anthropometric measurements, or other documented nutritionally related medical conditions that demonstrate the need for supplemental foods.
II	Except those infants who qualify for Priority I, infant up to 6 months of age of Program participants who participated during pregnancy, and infants up to 6 months of age born of women who were not program participants during pregnancy but whose medical records document that they were at nutritional risk during pregnancy due to nutritional conditions detectable by biochemical or anthropometric measurements or other documented nutritionally related medical conditions that demonstrated the person's need for supplemental foods.
III	Children at nutritional risk as demonstrated by hematological or anthropometric measurements or other documented medical conditions which demonstrate the child's need for supplemental foods.
IV	Pregnant women, breastfeeding women, and infants at nutritional risk because of an inadequate dietary pattern.
V	Children at nutritional risk because of an inadequate dietary pattern.
VI	Postpartum women at nutritional risk.
VII	Individuals certified for WIC solely due to homelessness or migrancy and, at State agency option, previously certified participants who might regress in nutritional status without continued provision of supplemental foods.

Note: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children.

Source: 7 CFR 246.7.

<sup>43</sup>Since national-level data are not available on whether applicants were turned away from local WIC clinics because of a lack of funds, it is not possible to determine the exact time when the program became fully funded.

## Cost containment

Because WIC can serve only as many participants as funding allows, WIC State agencies have tried to reduce food costs through a variety of cost-containment measures. The most effective measure has been the use of infant formula rebates. Although WIC promotes breastfeeding as the optimal source of nutrition for infants, the program provides infant formula to infants whose mothers do not fully breastfeed. WIC is the major purchaser of infant formula in the United States, accounting for well over half of all infant formula sales in the United States (Oliveira et al., 2010). Since 1989, Federal law has required that WIC State agencies enter into cost-containment contracts for the purchase of the infant formula used in WIC. Typically, WIC State agencies obtain significant discounts in the form of rebates from infant formula manufacturers for each can of formula purchased through the program. In exchange for the rebates, the State agency agrees to issue the manufacturer's infant formulas as the formula of first choice to its infant participants. These single-supplier contracts are awarded to the manufacturer offering the WIC State agency the lowest net price, as determined by the manufacturer's wholesale price minus the rebate. As a result, the brand of formula provided by WIC varies by State, depending on which company holds the rebate contract.

Rebates are an important component of WIC's cost management. A recent ERS study found that, among contracts in effect as of February 2013, the average rebate as a percentage of the wholesale price was 92 percent (Oliveira et al., 2013). In other words, WIC was paying only 8 percent of the wholesale price for formula (although, since WIC participants obtain their infant formula from retail vendors, WIC State agencies also pay the retail markup for formula).<sup>44</sup> In FY 2010, the estimated average monthly food package costs before rebates (i.e., the estimated retail cost of WIC foods at the time of purchase) for infants was \$114.21 per participant per month, compared to only \$49.36 after rebates (fig. 4). Infant formula rebates totaled almost \$1.9 billion in FY 2013 (USDA-FNS, 2014b).

Some WIC State agencies have instituted rebate systems for other foods, such as infant cereal and infant fruit juice, but their savings are much smaller than for infant formula.<sup>45</sup> Additional cost-containment practices used by some WIC State agencies include limiting authorized food vendors to outlets with lower food prices and limiting food-item selection according to brand, package size, flavors, form, or price (for instance, requiring purchase of least-cost items) (Kirlin et al., 2003; Davis and Leibtag, 2005).

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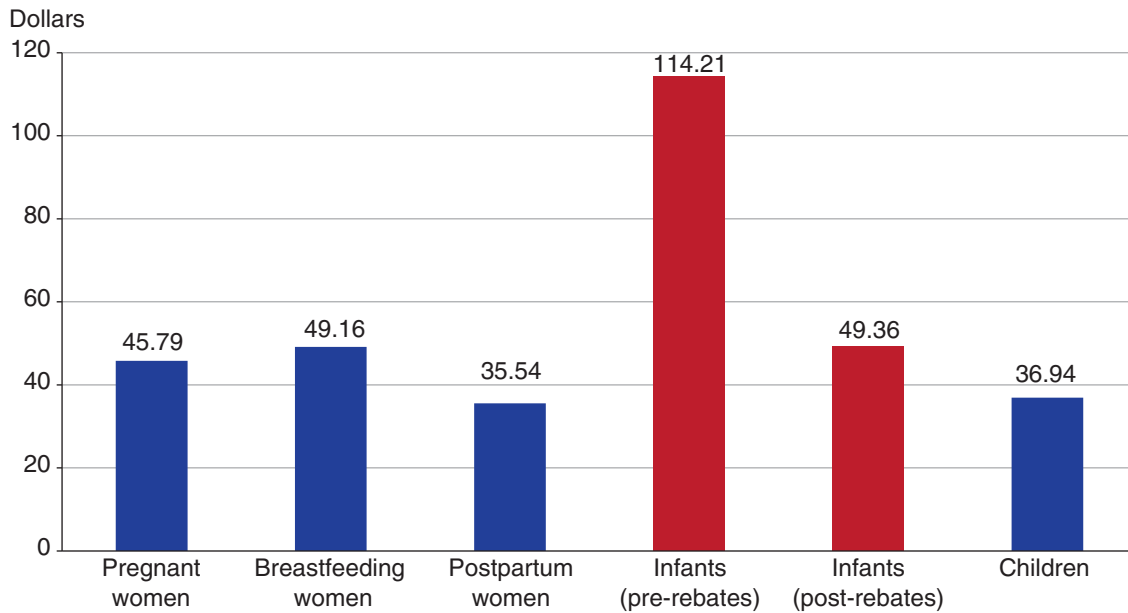
<sup>44</sup>Both supply-side and demand-side characteristics of the infant formula market offer possible explanations about how formula manufacturers can afford to offer such high percentage discounts. On the supply side, the formula market is highly concentrated—there are only three major manufacturers, a factor that is often associated with higher profit margins and that gives manufacturers a cushion to offer high rebates. On the demand side, WIC participants purchase over half of all infant formula, ensuring large sales for the contract-winning manufacturer. In addition, manufacturers may realize spillover benefits from winning a WIC contract—retailers generally devote more shelf space and better product placement to the WIC contract brand. This results in greater product visibility, which in turn may spur sales to non-WIC consumers. See box, “Infant Formula Manufacturers May Realize Spillover Effects” (p. 36).

<sup>45</sup>Savings from rebates for other food products are lower than for infant formula for several reasons: (1) no other single product accounts for as large a portion of WIC costs as infant formula; (2) WIC accounts for a large share of all formula sales; and (3) there is a small number of formula manufacturers.



Figure 4

**Estimated monthly WIC food package costs per person, pre- and post-rebate, by participant category, FY 2010**



Notes: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. The average monthly food package cost for all participants was \$56.80 before rebates and \$41.44 after rebates.

Source: Vericker et al., 2013.

## Program Trends

This section provides a timeline of the major events that have impacted the program and examines historical trends in program expenditures, number of participants, and infant formula rebates.

### WIC's legislative and regulatory history

WIC was created as a 2-year pilot program in 1972; it began operations in 1974 and was made a permanent program the following year. Throughout WIC's history, numerous legislative acts and Federal regulations have shaped the program (Oliveira and Frazao, 2009). As a mature program, WIC has undergone fewer major changes in recent years than in the program's earlier years (table 4). Two major exceptions were the 2007 interim rule that revised regulations governing the WIC food packages (which WIC State agencies implemented in 2009) and the ongoing transition to EBT.<sup>46</sup>

### WIC expenditures

Since the program's initiation in 1974, nominal (i.e., not adjusted for inflation) Federal expenditures for the program increased each year before peaking at \$7.2 billion in FY 2011 (fig. 5). These annual increases resulted from congressional appropriations, which were stimulated, in large part, by program evaluations that showed WIC to be successful and cost effective. For example, a study by Devaney et al. (1990), based on 1987-88 data from five States, found that each dollar spent on prenatal WIC services to low-income women yielded a \$1.77 to \$3.13 savings in Medicaid costs for newborns and mothers over the first 60 days after birth.<sup>47</sup> The U.S. General Accounting Office (1992) statistically combined results from 17 studies conducted between 1971 and 1988 that compared rates of low birth weight among WIC participants and similar nonparticipants; it concluded that "each Federal dollar invested in WIC benefits returns an estimated \$3.50 over 18 years in discounted present value" (p. 4). In FY 2012 and FY 2013, nominal expenditures decreased for the first time in the program's history.

In real terms (i.e., after adjusting for inflation), the increase in expenditures from FY 1974 to FY 2011 was much flatter. As the program reached full participation in the late 1990s, the annual increases in participation (along with congressional appropriations) slowed, and real expenditures increased at a slower rate. Between FY 1998 and FY 2013, real expenditures decreased in 6 of the 15 years.

### Number of participants

Trends in the number of participants in WIC are marked by several distinct periods that have been influenced by a variety of factors, including funding levels, cost-containment practices, economic conditions, and number of births.

The first period, from the program's inception in FY 1974 to FY 1997, was characterized by large annual increases in participation, driven primarily by increases in the program's budget (fig. 6). Large annual increases in congressional appropriations during this period allowed the program to

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<sup>46</sup>72 *Federal Register*, No. 234, December 6, 2007, pp. 68966-69032.

<sup>47</sup>The Food and Nutrition Service is exploring the feasibility of replicating the study by Devaney to update the findings and expanding the study to include WIC cost-benefit and cost-effectiveness analyses of pregnant women and other categories of WIC participants (USDA-FNS, 2013c).

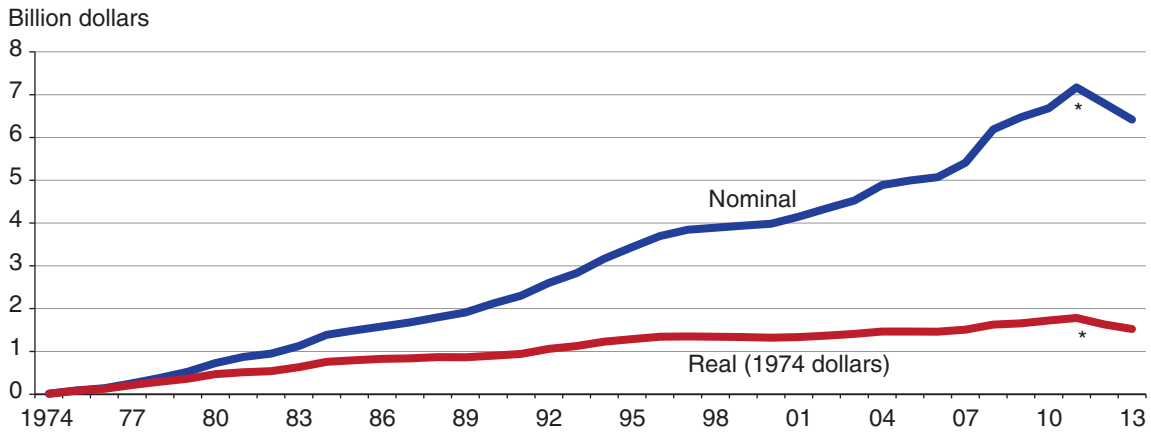


Table 4  
**WIC timeline**

1972	Legislation created the Special Supplemental Food Program for Women, Infants, and Children (WIC) as a 2-year pilot project (P.L. 92-433).
1974	The first WIC site officially opened in Pineville, KY.
1975	Legislation established WIC as a permanent national health and nutrition program (P.L. 94-105).
1978	The Child Nutrition Amendments of 1978 (P.L. 95-627) established a national income standard for program eligibility based on income standards prescribed for reduced-price school lunches. The standards in 1978 were that a household's income had to be 195 percent of the Federal poverty guidelines or lower. The Act also strengthened WIC's nutrition education component by requiring that nutrition education be provided to all program participants.
1979	The WIC Nutritional Risk Priority System was established.
1980	USDA set a maximum level of 6 grams of sugar per dry ounce for adult cereals in the WIC food package rule.
1981	The maximum income level for reduced-price lunches was lowered from 195 percent to 185 percent of the Federal poverty guidelines. Since the WIC income eligibility standard was tied to the eligibility standard of the National School Lunch Program, the maximum income level for WIC was also lowered to 185 percent of poverty.
1986	Tennessee became the first State to implement an infant formula rebate program.
1988	The Hunger Prevention Act of 1988 (P.L. 100-435) provided grants in up to 10 States to conduct Farmers' Market Demonstration Projects.
1989	The Child Nutrition and WIC Reauthorization Act of 1989 (P.L. 101-147) required WIC agencies with retail food distribution systems to use competitive bidding to procure infant formula unless another cost-containment approach yielded equal or greater savings. The Act established adjunct income eligibility for Food Stamp, Medicaid, and Aid to Families with Dependent Children (AFDC) recipients. The Act also required that USDA promote breastfeeding.
1992	The WIC Farmers' Market Nutrition Act of 1992 (P.L. 102-314) established the WIC Farmers' Market Nutrition Program.
1992	An enhanced WIC food package (Food Package VII) was established for women who exclusively breastfeed their infants in order to encourage breastfeeding among WIC mothers (73 Federal Register, No. 229, November 27, 1992, pgs. 56231-56241).
1994	The Healthy Meals for Healthy Americans Act of 1994 (P.L. 103-448) changed the name of the program to the Special Supplemental Nutrition Program for Women, Infants, and Children to emphasize its role as a nutrition program.
1997	USDA kicked off the National Breastfeeding Promotion Campaign to encourage WIC participants to begin and continue breastfeeding.
Late 1990s	WIC is fully funded— i.e., funding levels are sufficient to allow all eligible applicants to participate.
1998	The William F. Goodling Child Nutrition Reauthorization Act of 1998 (P.L. 105-336) required at certification that, except in limited circumstances, all applicants for WIC certification must be physically present, document their income, and present proof of residency.
1999	WIC State agencies are required to use WIC nutritional risk criteria from a national list established for use in the WIC program. States are not required to use all of the nutritional risk criteria on the list.
2004	The Child Nutrition and WIC Reauthorization Act of 2004 implemented provisions to maintain competitive pricing among WIC vendors, including peer group pricing.
2007	An interim rule revised regulations governing the WIC food packages by introducing a cash-value voucher for the purchase of fruits and vegetables, adding whole grains, reducing the amounts of certain foods in the existing packages (e.g., juice and milk), and allowing greater substitution of foods to allow for different cultural eating patterns.
2009	All WIC State agencies were required to implement the new WIC food packages by October 1.
2010	The Healthy, Hunger-Free Kids Act of 2010 (P.L. 111-296) required that food package reviews be conducted not less than every 10 years, and required all States to implement an Electronic Benefit Transfer (EBT) system for WIC by 2020.
2014	Final rule revising the WIC food packages was published.

Source: USDA, Economic Research Service.

Figure 5  
**Federal expenditures for WIC, FY 1974-2013**

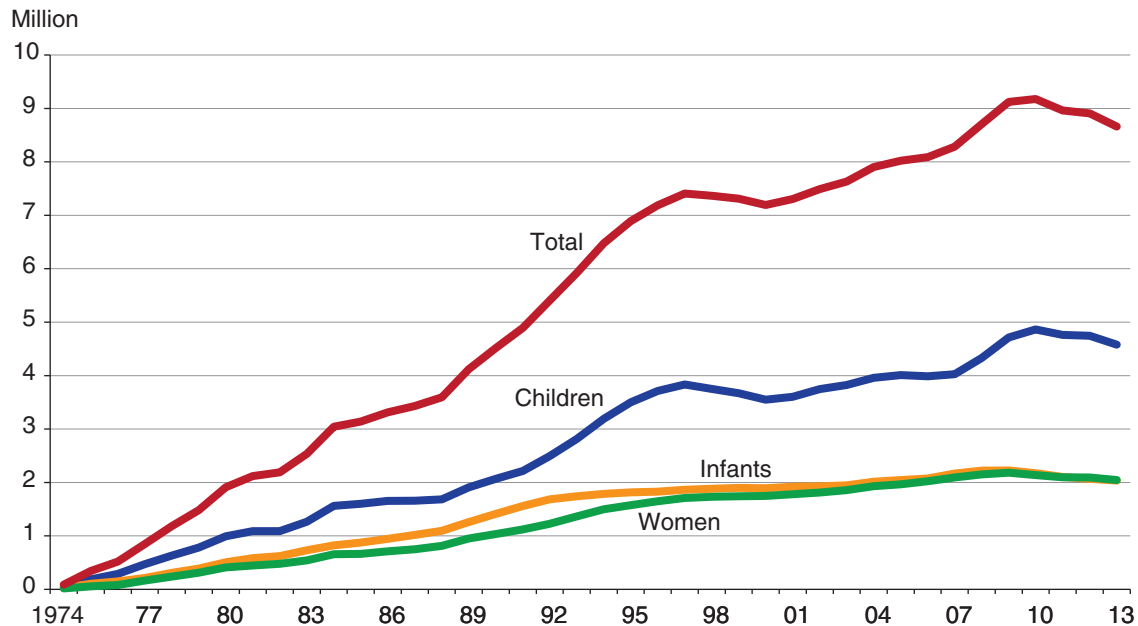


\*Beginning October 1, 2011, there was a change in the way State agencies report rebates. The Healthy, Hunger-Free Kids Act of 2010 (P. L. 111-296) requires State agencies to report rebate payments from manufacturers in the month in which the payments are received. Previously, rebates were reported in the month the rebate was earned. Although this change does not affect how much rebate is earned, reported rebates (and reported total WIC expenditures) for FY 2011 and FY 2012 are not comparable to rebates and total WIC expenditures reported in prior years. For example, as a consequence, fewer rebates were credited to FY 2011 than in FY 2010 or 2012, resulting in a spike in program costs in FY 2011.

Note: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children.

Source: Nominal expenditures from USDA, Food and Nutrition Service, 2014c. Real expenditures from USDA, Economic Research Service calculations of nominal expenditures adjusted by the Consumer Price Index for Food at Home (U.S. Department of Labor, 2014a).

Figure 6  
**Average monthly participation in WIC, FY 1974-2013**



Note: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children.

Source: USDA, Food and Nutrition Service, *Keydata*, various years.

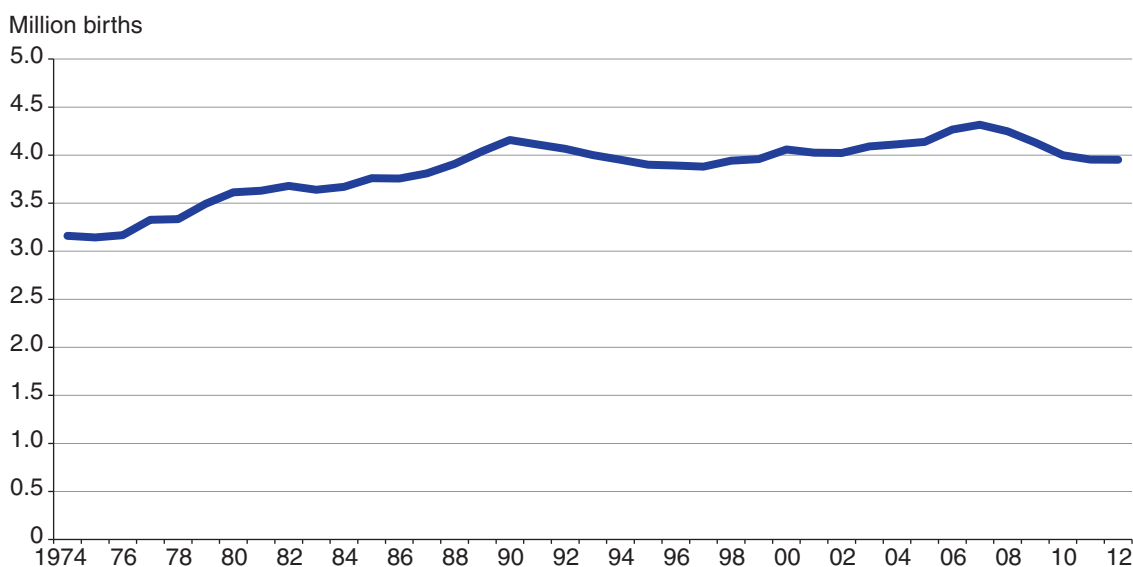
expand coverage among the eligible population. The rate of program expansion increased noticeably around FY 1989, coinciding with the startup of the infant formula rebate program (which lowered food costs).

Anecdotal evidence suggests that WIC became fully funded sometime in the late 1990s, enabling all eligible applicants to participate in the program. From FY 1997 to 2000, total participation decreased slightly (1 to 2 percent per year). This decrease in total participation—the first in the program’s history—was driven by a decline in the number of children participating in WIC, as well as by improving economic conditions (see “Impact of Economic Conditions on Program Participation” for a more detailed discussion of the role of the economy on program participation). While the number of women in WIC increased each year during this 3-year period, and the number of infants increased in 2 of the 3 years, the number of children in WIC fell each year. Although the number of births increased during this period, a decrease in births during the mid-1990s likely contributed to the decrease in the number of children participating in the program (fig. 7).

After 2000, participation once again increased—although at a slower rate than during the early period—and reached a peak of almost 9.2 million participants per month in FY 2010. It is likely that the increase in births during much of this period contributed to this increase in WIC participation.

From FY 2010 to FY 2013, participation once again fell each year. In each of these 3 years, participation for all three groups—women, infants, and children—fell; this is the only time in the program’s history that this occurred. It is likely that the decrease in participation was largely the result of the decline in U.S. births beginning in 2008.<sup>48</sup>

Figure 7  
**U.S. births, 1974-2012**



Source: Martin et al., 2013.

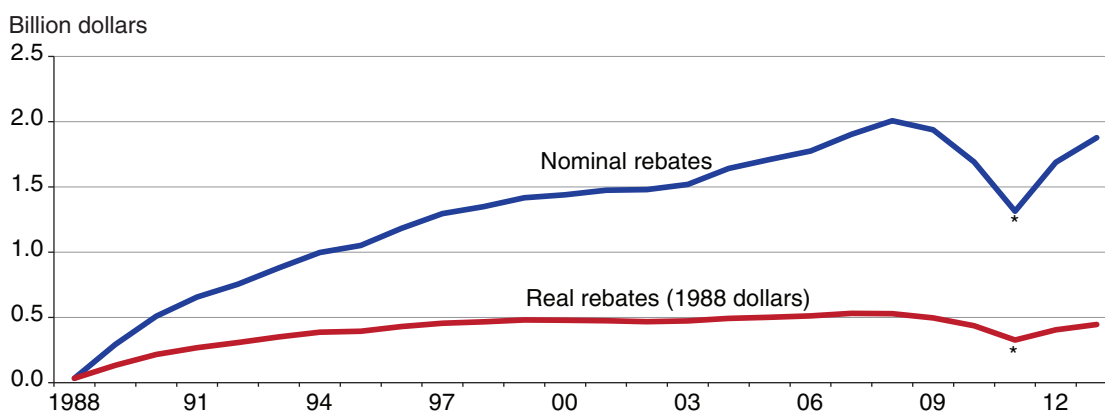
<sup>48</sup>It is unlikely that the decrease in participation was related to the WIC food package revisions that were implemented in 2009. The coverage rate (i.e., the percent of eligible people that participated in the program) actually increased in 2010 and 2011 (the latest data available) (Johnson et al., 2014).

Throughout the program's history, participation patterns have varied among the three participant groups. In general, the number of children in WIC has fluctuated more than the number of women and infants. Infants and pregnant and breastfeeding women have a higher priority in WIC than children do, so they may be more protected when program funds are limited. Conversely, as funding increases, there may be greater outreach efforts aimed at bringing children into the program since eligible infants and pregnant and breastfeeding women are more likely to already be in the program. Once the program became fully funded in the late 1990s, WIC caseloads became more responsive to economic conditions, impacting both the number of people eligible to participate and the rate of participation among eligible people. As discussed in the section, "Impact of Economic Conditions on Program Participation," economic conditions have a relatively greater impact on children than on the other participant categories.

## Infant formula rebates

Rebates from infant formula manufacturers are an important component of the WIC program. Since the use of rebates began in the late 1980s, the amount of the rebates in nominal terms increased steadily each year, peaking at \$2 billion in FY 2008 (fig. 8). In real terms, most of the increase in rebates occurred between FY 1988 and FY 1994 as real rebates were relatively flat for the following 10 years. Between FY 2009 and 2011, rebates (in both nominal and real terms) fell sharply. Much of this drop can be attributed to a reduction in rebates provided by the formula manufacturers (Oliveira et al., 2010; Oliveira et al., 2013). Although average real per-ounce rebates have increased in recent years, less formula is being purchased through WIC as the number of infants participating in WIC has declined, breastfeeding rates among WIC infants have increased, and the average amount of formula provided in the WIC infant food packages has declined.<sup>49</sup> Thus, even as real per-ounce rebates have increased, total rebates have remained below the FY 2008 peak.

Figure 8  
**Total infant formula rebates, FY 1988-2013**



\*Beginning October 1, 2011, there was a change in the way State agencies report rebates. The Healthy, Hunger-Free Kids Act of 2010 (P. L. 111-296) requires State agencies to report rebate payments from manufacturers in the month in which the payments are received. Previously, rebates were reported in the month the rebate was earned. Although this change does not affect how much rebate is earned, reported rebates for FY 2011 and FY 2012 are not comparable to rebates reported in prior years. For example, as a consequence, fewer rebates were credited to FY 2011 than in FY 2010 or 2012, resulting in a downward dip in rebates in FY 2011.

Source: USDA, Economic Research Service calculations of real infant formula rebates based on unpublished data from USDA, Food and Nutrition Service (pre-FY 2009 estimates of rebates) and USDA, Food and Nutrition Service (2014b) (FY 2009 to FY 2013 estimates of rebates) adjusted by the Consumer Price Index for Food at Home (U.S. Department of Labor, 2014a).

<sup>49</sup>Oliveira et al. (2013) found that real rebates increased by 14 percent between States' contracts in effect in February 2013 and their previous contracts.

## Participant Characteristics and Geographic Distribution

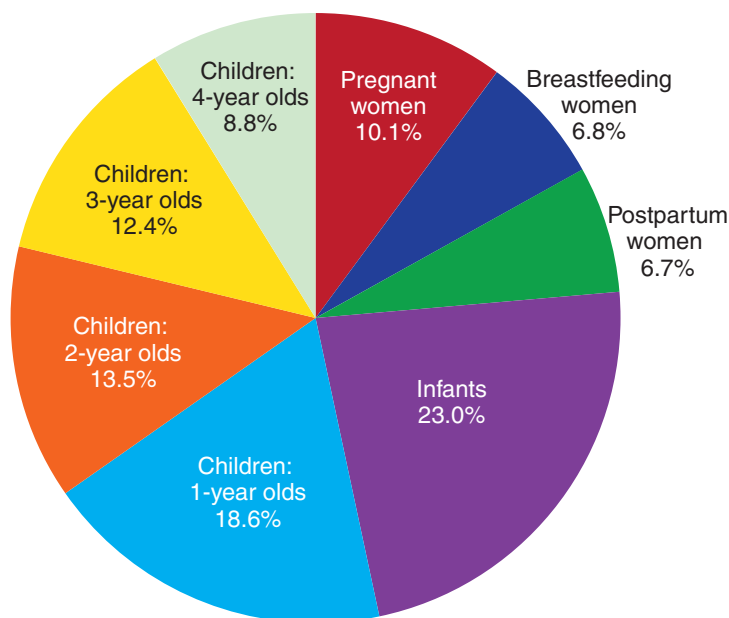
This chapter examines the distribution of WIC participants by participant category and describes how various participant characteristics have changed over time.<sup>50</sup> It also presents State-level information on the number of WIC participants, coverage rates, and WIC infants as a share of all infants.

### WIC participants by category, age of children, and trimester of enrollment

In April 2012, 9.7 million women, infants, and children were enrolled in WIC.<sup>51</sup> Over half (53.3 percent) were children, 23.0 percent were infants, and 23.6 percent were women (fig. 9). Participation of children decreased as children aged—over twice as many 1-year olds (18.6 percent of all participants) participated in the program as 4-year olds (8.8 percent).<sup>52</sup> Pregnant women accounted for 10.1 percent of all participants, breastfeeding women accounted for 6.8 percent, and

Figure 9

**Distribution of WIC participants by participant group, April 2012**



Note: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children.  
Source: Johnson et al., 2013.

<sup>50</sup>Every 2 years, the Food and Nutrition Service publishes the WIC Participant and Program Characteristics report (WIC PC) based on a census of WIC participants in April of the reporting year. The information related to participant characteristics in this chapter is based primarily on data reported in the 2012 report (Johnson et al., 2013).

<sup>51</sup>Participants are defined here as people on WIC master lists or people listed in WIC operating files that were certified to receive WIC benefits in April 2012 regardless of whether or not they used a WIC food instrument to obtain food that month. This definition differs from the definition of participants used throughout the rest of this report, which is based on the number of people who use a WIC food instrument to obtain WIC food during a month (Johnson et al., 2013).

<sup>52</sup>Results from a study by Castner et al. (2009) suggest that the transition from the WIC infant food package to the child food package may influence the drop in participation among children around their first birthday. In addition, results from Jacknowitz and Tiehen (2009) suggest that participants who are relatively better off are more likely to exit the program early.

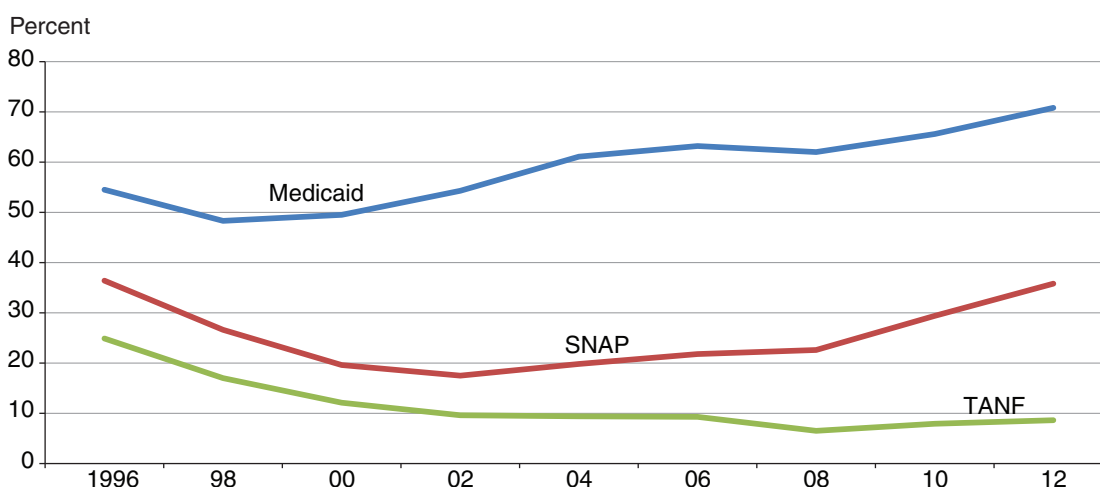
postpartum women accounted for 6.7 percent. Among pregnant women, over half (56.9 percent) enrolled in WIC in their first trimester, another third (34.7 percent) enrolled in their second trimester, and 7.8 percent enrolled in their third trimester.<sup>53</sup>

## Participation in other programs

WIC applicants are deemed adjunctively income eligible for WIC if they participate in other means-tested assistance programs, such as Medicaid, SNAP, or TANF. This simplifies the WIC application process and improves administrative efficiency. Among those participating in WIC in April 2012, nearly 75 percent reported participating in Medicaid, SNAP, or TANF at the time of certification—a 5-percentage-point increase from 2010.

A large majority of WIC participants reported participating in Medicaid at the time of certification—over 70 percent in 2012, up from 65.6 percent in 2010, and a continuation of the upward trend that started around 1998 (fig. 10).<sup>54</sup> Over a third (35.8 percent) of WIC participants also reported participating in SNAP at the time of certification, up from 29.4 percent in 2010 and continuing an upward trend that started in 2002. The WIC PC data, however, underreport SNAP participation, both because they only capture participation at certification (and not participation among WIC

Figure 10  
**Percent of WIC participants reporting participation in other programs at certification, 1994-2012**



Notes: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. SNAP refers to the Supplemental Nutrition Assistance Program, and TANF refers to Temporary Assistance for Needy Families. SNAP values may underestimate SNAP participation at certification because once an individual being certified reports participating in Medicaid—which confers adjunctive eligibility to WIC—WIC clinics may not always follow up and ask about participating in SNAP.

Source: Bartlett et al. (2002), Bartlett et al. (2007), and Johnson et al. (2013).

<sup>53</sup>Trimester of enrollment was not reported by 0.6 percent of pregnant women (Johnson et al., 2013).

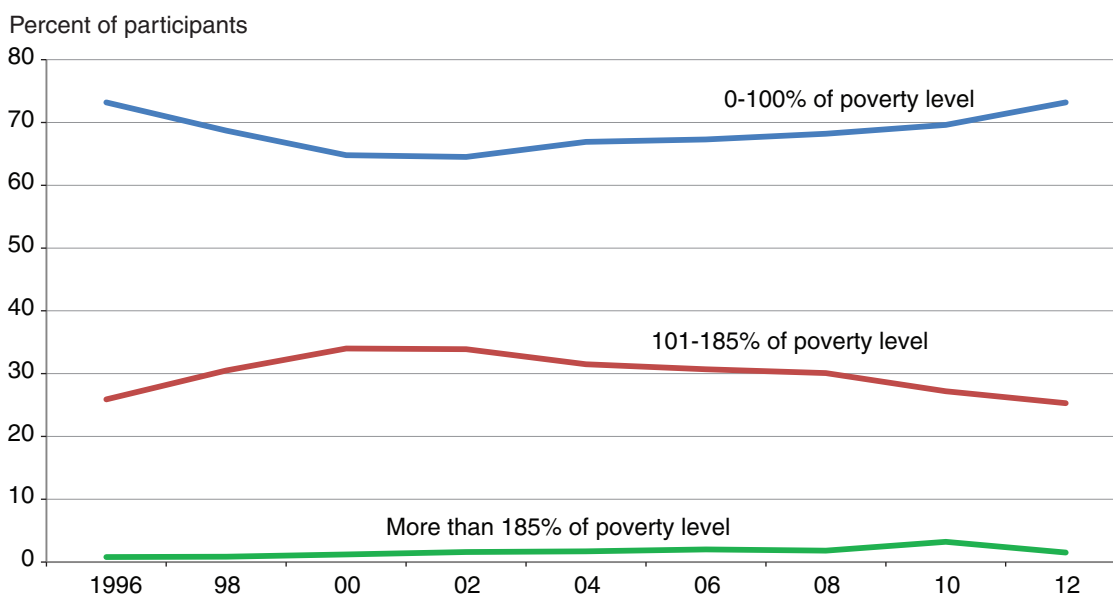
<sup>54</sup>The large proportion of WIC participants enrolled in Medicaid at the time of certification raises questions as to whether WIC serves as an entry point into the health care system or vice-versa. However, because the information on program participation was recorded at the time of certification (or recertification) for WIC, it is not possible to determine the extent to which individuals are referred to Medicaid by WIC or vice-versa. For example, a large number of WIC participants may be referred to Medicaid when they first apply for WIC, and, as a result, enroll in Medicaid. At their next certification, they would then appear as being a Medicaid participant.

participants who enroll in SNAP after certifying for WIC) and because once a certified individual reports participating in Medicaid—which confers adjunctive eligibility to WIC—WIC clinics may not always follow up and ask about participation in SNAP. According to the National Survey of WIC Participants II (Geller et al., 2012a), 53 percent of WIC participants reported participating in SNAP in 2009 (that estimate includes those who enrolled in SNAP after certifying for WIC). Reported participation in TANF at certification is much smaller than in the other programs, only 8.6 percent in 2012 or only slightly more than the 7.9 percent in 2010. Participation in TANF has decreased significantly since the mid-1990s.

## Poverty status

WIC participants mostly come from poor households.<sup>55</sup> Over two-thirds (73.2 percent) of those who participated in WIC in April 2012 reported incomes at or below the Federal poverty level (fig. 11).<sup>56,57</sup> This continues a trend that started in 2002 of steadily increasing poverty among WIC participants. For example, in 2002, 64.5 percent of participants had incomes at or below the Federal

Figure 11  
**Distribution of WIC participants by percent of poverty level, 1996-2012**



Notes: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. Percentages are based on WIC participants reporting income.  
Source: Randall et al. (1998), Bartlett et al. (2000), Bartlett et al. (2002), Bartlett et al. (2007), and Johnson et al. (2013).

<sup>55</sup>WIC applicants must document their income, either directly or through another program that confers adjunctive eligibility. The WIC PC data used for this section had income information for 91.7 percent of participants (Johnson et al., 2013). Most (74.6 percent) of those without reported income were adjunctively eligible to participate in WIC. For some applicants, States reported actual income—that is, the dollar amounts provided by WIC applicants. For other applicants who were adjunctively income eligible, States reported income ranges rather than dollar amounts. For those households, the midpoint of the range was assigned as household income. The income data were then combined with data on household size to calculate the percent of poverty.

<sup>56</sup>Households not reporting income and households reporting zero income were excluded from the calculations. About 9 percent of WIC participants had no reported income in 2012 (Johnson et al., 2013).

<sup>57</sup>In comparison, 15 percent of the U.S. population, and 22.9 percent of people in families with children younger than 6 years, had income at or below the Federal poverty level in 2012 (Johnson et al., 2013).



## Effects of Immigration on WIC

While other safety-net programs such as SNAP include restrictions on the eligibility of many immigrants (especially the unauthorized), WIC—at the State’s option—is open to all income-eligible applicants regardless of their (or their parents’) immigrant status. An ERS-funded study in 2010 utilized a micro-simulation model to assess the extent to which immigrant children and women and native-born children of immigrant parents were eligible for and participated in WIC between 1997 and 2006 (Vericker et al., 2010).

Between 1997 and 2006, the share of children of immigrants—including both children who were immigrants and native-born children with immigrant parents—participating in WIC increased from 22 percent to 31 percent of all participants. The largest growth in the share of children participating in WIC between 1997 and 2006 was among native-born children with unauthorized immigrant parents. In 1997, 6.8 percent of all participants were native-born children with one or two unauthorized immigrant parents, and by 2006, that share had increased to 11.7 percent of all participants. The study found that, for children of immigrants, their share of participants was generally comparable to their share of the eligible population (the increase in the share of immigrants participating in WIC occurred at the same time that the population of low-income immigrants and their children in the United States was increasing). That is, children of immigrants did not become significantly more likely than other children to participate—given their eligibility—over the period of study. The share of children participating in WIC who were themselves unauthorized immigrants was low—less than 1 percent in both 1997 and 2006.

Between 1997 and 2006, the percentage of immigrant mothers participating in WIC—both authorized and unauthorized—increased from 21 percent to 28 percent. Most of this increase was due to unauthorized immigrant mothers, who represented 7 percent of all WIC mothers in 1997 and 12 percent of all WIC mothers in 2006. Unlike the finding for children with immigrant parents, immigrant mothers did disproportionately increase their WIC participation relative to native-born mothers. That is, unauthorized immigrant mothers were more likely to participate in WIC than native-born mothers in 2006.

poverty level. One-third of WIC participants had incomes at or below 50 percent of the Federal poverty level in 2012.

Since 1996, less than 2 percent of WIC participants reported income greater than 185 percent of the Federal poverty level (the income eligibility cutoff for the program); the one exception was in 2010 (2.9 percent). The presence of WIC participants with reported incomes greater than 185 percent of poverty may be attributed to adjunctive eligibility through Medicaid or SNAP since income eligibility for those programs is greater than 185 percent of the Federal poverty level in some States.<sup>58,59</sup> In comparison, 68.5 percent of the U.S. population and 57 percent of people in families with children younger than 6 years had income greater than 185 percent of the poverty level in 2012 (Johnson et al., 2013).

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<sup>58</sup>When adjunctive eligibility was established by P.L. 101-147 in 1989, the income eligibility criteria for these other programs were lower than those for WIC. Since that time, eligibility rules and practices in some States now enable people with incomes greater than 185 percent of poverty to enroll in Medicaid or SNAP and therefore be income eligible for WIC.

<sup>59</sup>It may also be due to certification error.

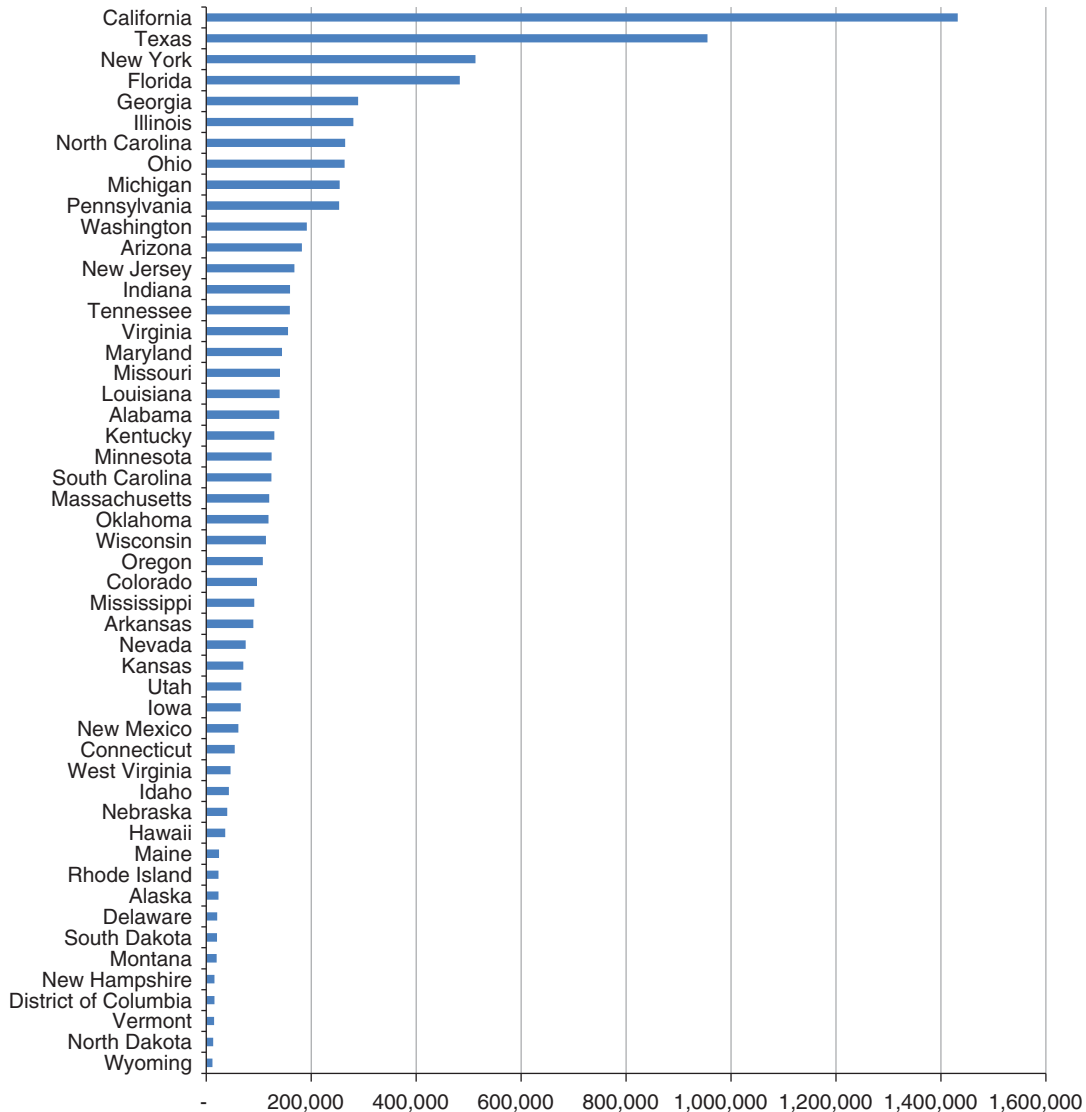


## Geographic distribution of WIC participants

WIC participants are unevenly distributed across States. In FY 2013, two States—CA and TX—accounted for over a quarter of all WIC participants, and eight States (CA, TX, NY, FL, GA, IL, NC, and OH) accounted for over half of all WIC participants (fig. 12). At the other extreme, four States (WY, ND, VT, NH) combined, along with the District of Columbia, accounted for less than 1 percent of all WIC participants.

Figure 12

### Average monthly number of WIC participants by State, FY 2013



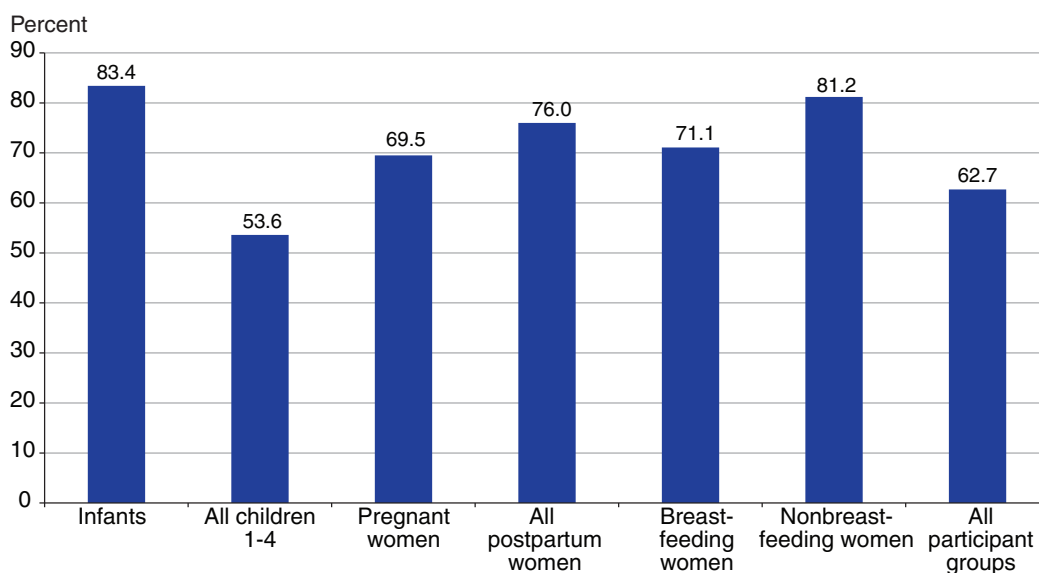
Notes: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. Based on preliminary data. State totals include participants on Indian Tribal Organizations located in the geographical State.  
Source: USDA, Food and Nutrition Service, 2014b.

## Coverage rates

The number of WIC participants depends on the size of the eligible population as well as the coverage rate—the percentage of the eligible population that actually applies for and receives WIC benefits.<sup>60</sup> Although funding has been sufficient to serve all eligible people seeking to enroll in WIC in recent years, many eligible people still do not participate. The latest estimates of program coverage show that in an average month in 2011, WIC served an estimated 63 percent of those eligible for the program (Johnson et al., 2014). Coverage rates varied substantially across participant category; they were highest for infants (83 percent) and nonbreastfeeding women (81 percent) and lowest for children (54 percent) in 2011 (fig. 13).

Coverage rates also varied significantly by State (fig. 14); Vermont (87 percent) and California (82 percent) had the highest coverage rates, while Montana, Utah, and Idaho had coverage rates less than 50 percent.

Figure 13  
**Coverage rates by WIC participant category, 2011**

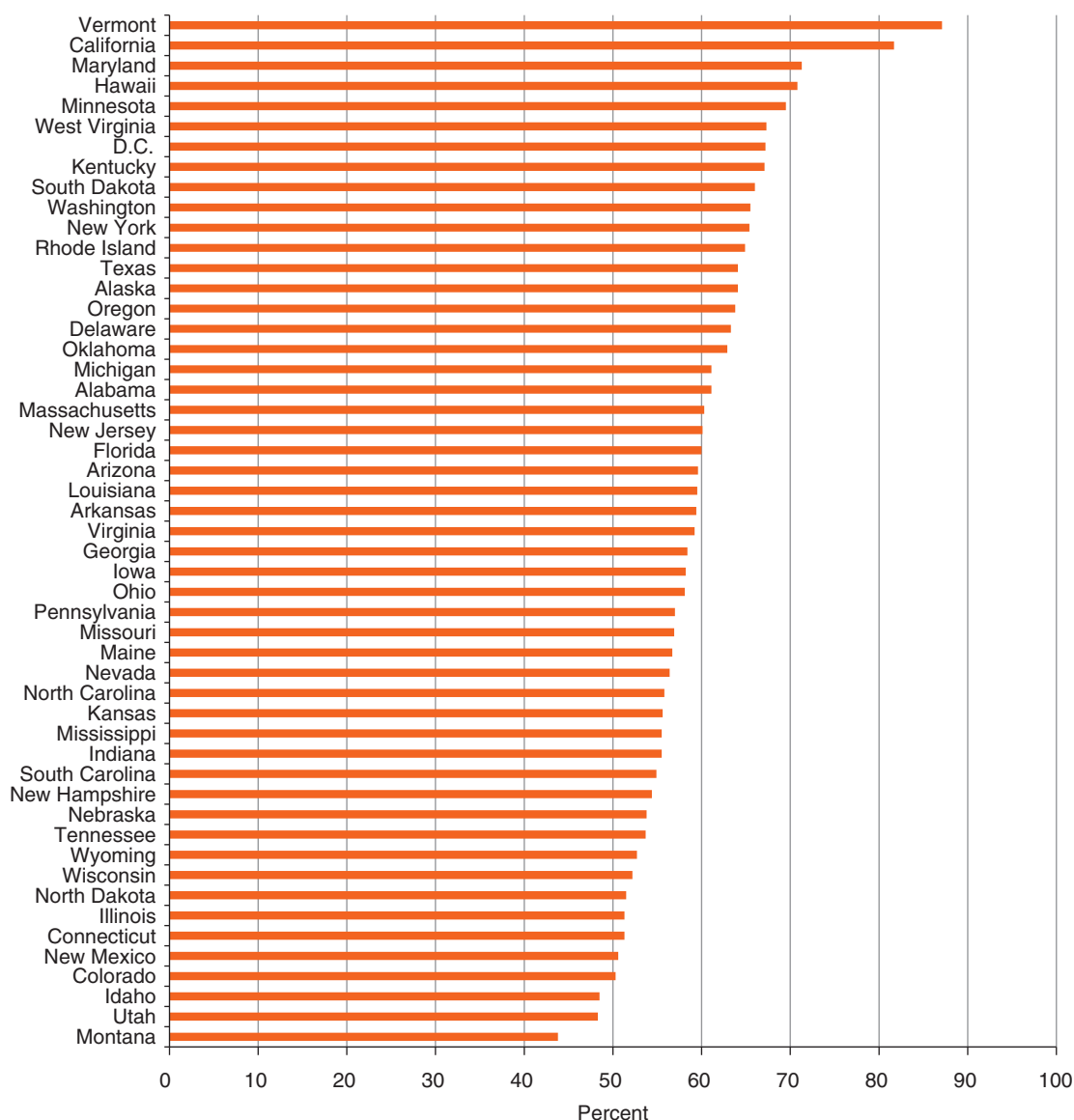


Note: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. The coverage rate is equal to the ratio of program participants to eligible people. All postpartum women includes breastfeeding women and nonbreastfeeding women.

Source: Johnson et al., 2014

<sup>60</sup>See Johnson et al., 2014 for information on the number of eligible people by State in 2011.

Figure 14  
**WIC coverage rates by State, 2011**

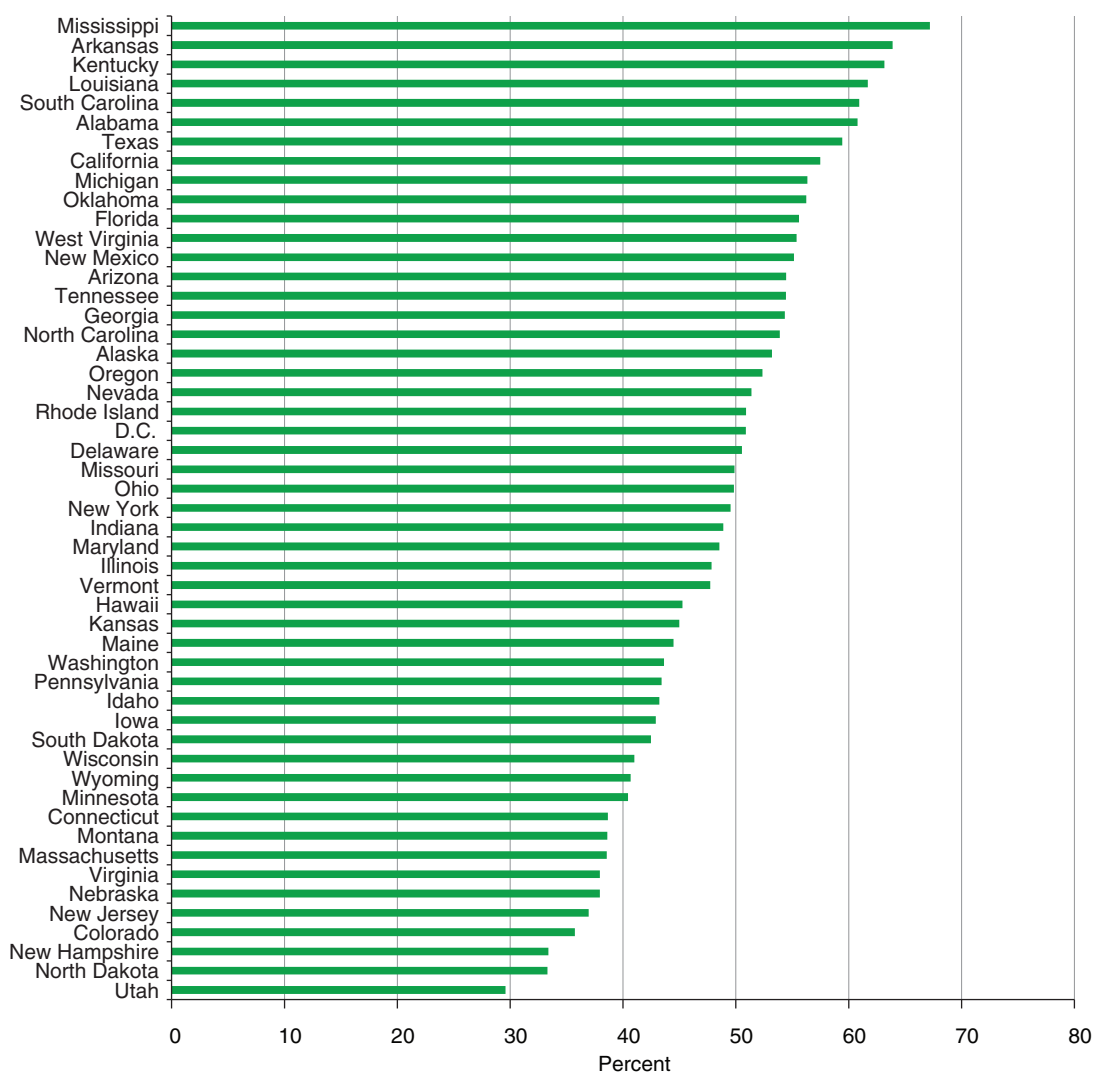


Note: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children.  
Source: Johnson et al., 2014.

## WIC infants as a percentage of all infants by State

Because of differences across States in the size and composition of the population, the number of WIC participants and coverage rates may not accurately indicate the presence or impact of WIC in a particular State. One indication of WIC's influence in a particular State may be derived by estimating the number of WIC infants as a percentage of all infants in that State (fig. 15). In FY 2012, that percentage ranged from a low of less than 30 percent in Utah to a high of 67 percent in Mississippi. In six States (MS, AK, KY, LA, SC, and AL)—all located in the southeastern United States—over 60 percent of all infants participated in WIC.

Figure 15  
**WIC infants as a share of all infants by State, FY 2012**



Notes: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. WIC infants' share of all infants in each State was estimated by dividing the average monthly number of infants participating in WIC in FY 2012 by the number of births in the State in 2012. State totals include participants on Indian Tribal Organizations located in the geographical State.

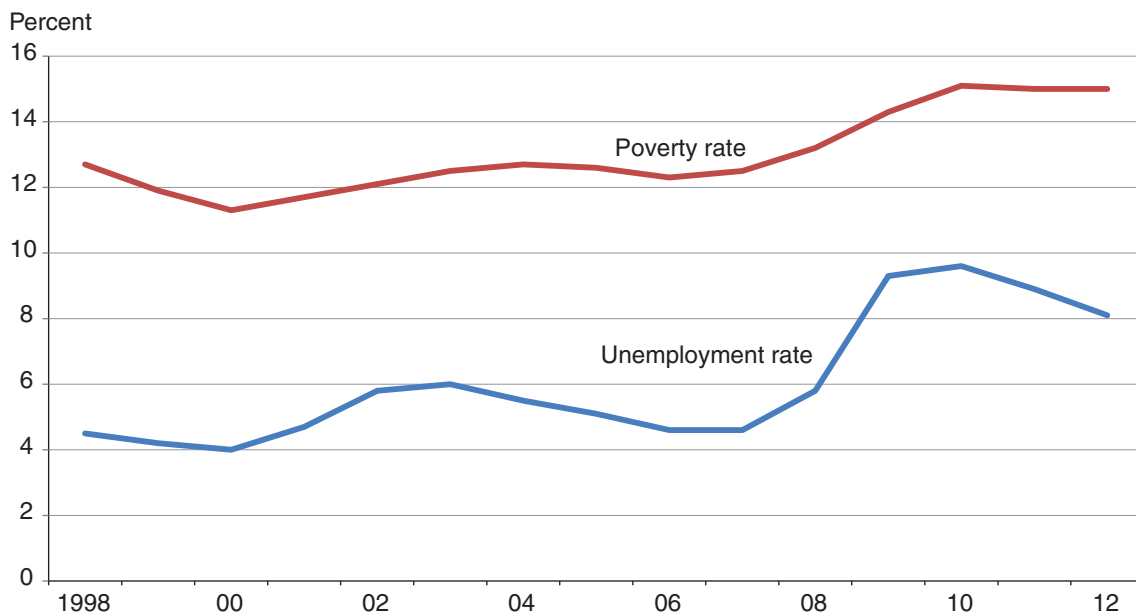
Source: USDA, Economic Research Service calculations of USDA, Food and Nutrition Service data (2014b) and National Center for Health Statistics data (Martin et al., 2013).

## Impact of Economic Conditions on Program Participation

This section looks at the relationship between U.S. economic conditions—as measured by the unemployment rate—and WIC participation.

For much of its early history, WIC participation was limited by the program’s budget, and economic conditions had little effect on the number of participants. As the program became fully funded in the late 1990s, economic conditions became an important factor in determining participation levels—participation has generally increased during economic downturns and decreased during periods of economic growth. Hanson and Oliveira (2012) found that after reaching full funding, WIC participation increased during the two periods of economic decline that followed (2001-03 and 2008-10) and decreased during one of the two periods of economic growth (1998-2000).<sup>61</sup> However, during the second period of economic growth (2004-07), WIC participation increased despite a declining unemployment rate. This unexpected result of increasing participation while the economy was growing was also found in the relationship between SNAP participation and the unemployment rate (Hanson and Oliveira, 2012). Although the unemployment rate was falling, the poverty rate remained close to the levels reached during the 2001 recession, which suggests that the economic situation for a significant segment of the U.S. population did not improve with the decline in unemployment (fig. 16).

Figure 16  
**U.S. unemployment and poverty rates, 1998-2012**



Source: U.S. Department of Labor (2014b) and DeNavas-Walt and Proctor (2014).

<sup>61</sup>Periods of economic decline were characterized by a rising annual unemployment rate, and periods of economic growth by a falling annual unemployment rate.

Economic conditions can affect participation in WIC by influencing the size of the eligible population and/or by influencing the rate of participation among eligible people.

## Size of the eligible population

The size of the eligible WIC population generally increases during recessionary periods (when the number of unemployed and poor people increases) and decreases during periods of economic growth (when the number of unemployed and poor people decreases).<sup>62</sup> At the time of this study, the latest available data on the number of people eligible for WIC was from 2000 to 2011 (i.e., a period of full funding (Johnson et al., 2013)). Contrary to expectations, the number of eligible people for most of the WIC participant categories showed little relationship to the number of unemployed people during this period. The correlation coefficient between the number of unemployed people and the number of eligible infants, pregnant women, and all postpartum women (including breastfeeding women) was less than 0.30, indicating a weak relationship between the variables (table 5).<sup>63</sup> The only exception was for children (correlation coefficient of 0.82). Because children make up over half of all WIC participants, the correlation coefficient for all participants was also relatively high at 0.70. The results suggest that the number of eligible children is more responsive to economic conditions than the number of pregnant women, infants, and postpartum women. This may be because mothers of children are more likely to work if jobs are available—and thus contribute to a family’s income and become income ineligible for WIC—than are mothers of infants or women immediately before and after giving birth.

Another reason for the generally low correlation observed between eligible people and the number of unemployed for most of the participant categories is likely related to the impact of births on WIC

Table 5  
**Correlations associated with number of people eligible for WIC, 2000-11**

Participant category	Number of eligibles and number of unemployed people	Number of eligibles and number of births <sup>1</sup>
<i>Correlation coefficient</i>		
Infants	0.13	0.65
Children	0.82	0.09
Pregnant women	0.14	0.64
All postpartum women	0.29	0.37
Total eligibles	0.70	0.29

<sup>1</sup>Correlations were computed between number of eligibles and the number of births occurring in the same year. No attempt was made to correlate the number of eligibles and the number of births in previous years.  
Note: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children.  
Source: USDA, Economic Research Service calculations of Johnson et al. (2014), U.S. Department of Labor (2014b), and Martin et al. (2013).

<sup>62</sup>The size of the eligible population is also affected by birth rates. Although it is frequently assumed that birth rates fall when economic conditions are worse, empirical research on the impact of economic conditions on birth rates is limited and mixed. Therefore, we do not address this issue in this report.

<sup>63</sup>The correlation coefficient measures the strength and direction of the linear relationship between two variables. A value of 1 signifies a perfect positive fit—i.e., as one variable increases (decreases), the other variable increases (decreases) to the same degree—while a value of 0 indicates no relationship between the variables. A negative value indicates a negative relationship between the variables—i.e., as one increases, the other decreases.

participation. Just as the number of unemployed people in 2008 started to spike sharply, the number of births began to steadily fall (see fig. 7). The drop in the number of births reduced the potential pool of WIC-eligible people. Not surprisingly, the correlation coefficients between the number of eligible people and the number of births were highest for infants and pregnant women, and, to a lesser degree, all postpartum women—the groups most immediately impacted by a birth.<sup>64</sup> The number of eligible children, on the other hand, was relatively unaffected by the fall in births (correlation coefficient of 0.09).

## Coverage rates

In addition to its effect on the size of the eligible population, economic conditions can affect the number of WIC participants by influencing the rate of participation among eligible people (the coverage rate). Unlike the number of people who are eligible for the program, the coverage rate is unaffected by changes in the number of births.

Examination of the annual unemployment rate and the coverage rate for all WIC participant categories shows a moderate positive relationship—all of the correlation coefficients were above 0.53 (table 6). In general, as the unemployment rate increases, the coverage rate also increases. This was especially true for children (correlation coefficient of 0.76), suggesting once again that economic conditions have a relatively greater impact on children than on the other participant categories.

## Implications

Information on how economic conditions impact the number of eligible people and the coverage rate can help in anticipating WIC's future funding needs. Research suggests that, since becoming fully funded, WIC is typically countercyclical—expanding during economic downturns and contracting during periods of economic growth. In other words, WIC helps reduce economic hardships for millions of participants when the economy falters and unemployment rises. It also has implications for WIC-authorized vendors, particularly those whose customer base is comprised of a relatively large percentage of WIC participants. Since the program is countercyclical, it provides vendors with a steady source of revenue even during economic downturns.

Table 6  
**Correlation coefficients between coverage rates and the unemployment rate, 2000-11**

Participant category	Coverage rates and the unemployment rate
	<i>Correlation coefficient</i>
Infants	0.53
Children	0.76
Pregnant women	0.57
All postpartum women	0.61
All participants	0.74

Source: USDA, Economic Research Service calculations of Johnson et al. (2014) and U.S. Department of Labor (2014b).

<sup>64</sup>In this analysis, postpartum women included breastfeeding women.

## Lesser Known Effects of WIC

WIC policies were developed to improve the health and nutrition of infants, young children, and their mothers. A large number of studies have examined the effect of WIC on participants' health and nutrition, and their findings were synthesized in two comprehensive USDA reports (see box, "WIC's Impact on Health and Nutrition: An Overview of the Research"). However, WIC has economic and health implications that extend beyond the health and development of program participants, and these impacts have received much less attention. To evaluate the full impact of the program, it is necessary to account for all the program's effects, direct and indirect, intended and unintended, positive as well as negative. Not taking into account all of the effects may result in underestimating or overestimating program impacts, which may lead to erroneous policy conclusions. This section examines some of the often overlooked impacts of the WIC program, focusing primarily on indirect (spillover) effects—that is, WIC's effects on individuals, food manufacturers, and retail food vendors that are not directly involved in the program.

### WIC's Impact on Health and Nutrition: An Overview of the Research

WIC is the most widely studied of all USDA food and nutrition assistance programs with respect to impacts on birth, nutrition, and health (Colman et al., 2012). A comprehensive review and synthesis of published research (primarily up to 2002) was published by the Economic Research Service in 2004 (Fox et al., 2004). The review concluded that most studies of WIC's impact on nutrition and health suggest that WIC participation leads to improved birth outcomes and increases in children's iron status and nutrient intake. However, these studies were based on a program that has changed considerably since they were conducted.

In 2012, the Food and Nutrition Service published an update that reviewed all research on WIC impacts published between 2002 and 2010 (Colman et al., 2012). The review concluded that "research suggests that WIC is associated with improved diets among children, as measured by the intake of fats, carbohydrates, added sugars and variety of foods consumed" (p. 81). While finding that "research continues to find a positive association between birth weight and prenatal WIC participation" (p. 81), the results indicate a weaker association after adjusting for gestational age bias (whereby women who enroll in WIC late in their pregnancy are more likely to have positive birth outcomes not because of WIC but because of longer gestation). The review also concluded that WIC was generally associated with a higher utilization of preventive and curative health care services for both primary health care and dental care. However, the review found "a lower likelihood of breastfeeding and a higher likelihood of formula feeding among WIC participants relative to nonparticipants" (p. 81).

Importantly, both of the reviews acknowledged methodological issues that afflict most evaluations of WIC's impact on health and nutrition. The major issue is selection bias, which occurs if WIC participants (or their caretakers) differ in important, unobserved ways from eligible but nonparticipating people. Selection bias can either enhance or downplay the effects of WIC participation on health and nutrition. For example, it can exaggerate the benefits of WIC when individuals who value health and nutrition are more likely to participate in the program than individuals who are at higher risk and do not see the value of participating. WIC's effects can also be downplayed in research if those not participating in WIC are at lower health risk than the WIC sample. Although a number of methodological approaches have been utilized in an attempt to control for selection bias, questions about their effectiveness remain and caution is urged when interpreting the findings from the research.



## Effects of WIC on nonparticipants

### *Prevalence of childhood anemia*

An example of a positive WIC spillover effect is WIC's role in decreasing childhood iron-deficiency anemia. The prevalence of anemia among low-income children declined from 7.8 percent in 1975 (when WIC was just starting) to 2.9 percent in 1985 (Yip et al., 1987). By requiring that all infant formula and all infant and ready-to-eat cereals provided through WIC be fortified with iron, WIC had a direct effect on reducing the prevalence of anemia among participating children. Additionally, WIC has been cited as having had an indirect effect on the reduction of anemia among non-WIC children as well, which has been attributed to the fact that the iron-fortified products reformulated for the WIC program were also available to—and consumed by—non-WIC individuals (Devaney, 2007).

### *Access to healthy foods*

Another recent example of a positive spillover effect of WIC was due to the 2009 implementation of the WIC food package revisions. A number of small studies measured the impact of the revised food packages on the availability of healthy foods in WIC-authorized stores in various geographic locations. Using different study designs and locations, the studies consistently found that availability of healthy foods (as proxied by the newly added WIC foods) typically increased after implementation of the new food packages, although the magnitude of the improvements differed across foods, stores, and States (Andreyeva et al., 2011a; Gleason et al., 2011; Andreyeva et al., 2012; Hillier et al., 2012; Zenk et al., 2012; Havens et al., 2012). Because WIC-authorized stores serve both WIC participants and non-WIC clients, the improved availability of healthy foods in WIC-authorized stores increased access to healthy foods for the entire neighborhood, not just for WIC participants.

### *Diets of other family members*

WIC's supplemental foods are intended solely for participants.<sup>65</sup> The sharing of WIC foods, even among other family members, undermines the program's objectives by diverting food from its intended target. Ver Ploeg (2009) examined whether the benefits of WIC participation extended to other children in WIC families who were too old to be categorically eligible for the program. Results of the study showed that children in WIC families scored higher on the Healthy Eating Index (a measure of diet quality that assesses conformance to Federal dietary guidance) than children in non-WIC families. This association was stronger for children in families with two or more WIC participants compared with children living with only one or no WIC participants, suggesting that a larger dose of WIC benefits had a larger impact on the diets of other children in the family. Woodward and Ribar (2012) also found evidence suggesting that WIC impacts the diets of nonparticipating family members. They found that WIC participation by others in the household was associated with increased consumption of milk and cereal and decreased consumption of toast at breakfast by older children.

These findings do not necessarily mean that WIC benefits are being diverted from WIC participants to nonparticipating family members. For example, Ver Ploeg (2009) suggests that this could occur if “the nutrition education and counseling sessions that WIC participants receive impact the diets and behaviors of other family members if the WIC participant uses what was learned in nutritional

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<sup>65</sup>WIC regulations state that WIC State agencies must ensure that local agencies “advise participants or their caretaker, when appropriate, that the supplemental foods issued are only for their personal use” (Title 7 CFR Pt. 246.10, p. 391).

education and counseling to prepare meals for other members of the family or if the WIC participant shares the information,” or if the benefits of participation in WIC have an income effect whereby “money that would otherwise have been spent on food or infant formula could be spent on other foods (or on other goods) that could impact the diets of nonparticipating family members” (p. 413).

### *Cost of infant formula*

Over half of the infant formula sold in the United States is purchased with WIC benefits. By providing low-income families with free formula, WIC essentially replaces price-sensitive consumers from the infant formula market with price-insensitive consumers. As a result, both manufacturers and retailers increase their prices.<sup>66</sup> In an ERS-funded study of the WIC program’s impact on the wholesale price of infant formula, Betson (2009) concluded that the wholesale price of formula exceeds what it would have been if WIC and its infant formula rebate program did not exist.<sup>67</sup>

An ERS study found that, for a given set of wholesale prices, WIC and its rebate program resulted in modest increases in the supermarket price of the WIC-authorized brand of infant formula (Oliveira et al., 2004). Furthermore, as the number of WIC-formula-fed (i.e., price insensitive) infants increased relative to the number of non-WIC-formula-fed (i.e., price sensitive) infants in a State, prices increased for both the WIC-authorized and the non-WIC brands of formula. The study concluded that WIC and its rebate program had a small impact on the prices that non-WIC consumers paid for infant formula.

Together, these two studies suggest that WIC impacted both the wholesale price and the retail markup of formula, resulting in higher prices for non-WIC consumers and impacting the budgets of families with formula-fed infants.<sup>68</sup>

## Effects of WIC on the farm sector and food manufacturers

### *The farm sector*

An ERS report estimated the revenues that farmers derive from sales of WIC foods, taking into account the recent revisions to the WIC food packages (Hanson and Oliveira, 2009). In FY 2008, farmers received almost \$1.3 billion from the sale of commodities used in producing the \$4.6 billion in estimated WIC retail food sales (after rebates).

However, this does not represent the net impact of WIC on the farm sector since many of the foods purchased through WIC would have been purchased by WIC participants even in the absence of the program. In other words, although participants who receive a dollar of benefits from a program

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<sup>66</sup>There is a limit to the degree to which WIC vendors can take advantage of the price insensitivity of WIC participants by charging higher prices for the WIC contract brand of formula. Because most WIC vendors serve both WIC and non-WIC customers, the non-WIC customers may shop at another store if a WIC vendor’s prices are too high.

<sup>67</sup>Betson (2009) differentiated the effect of WIC—specifically, the provision of free formula to low-income families—from that of the rebate program and its use of exclusive rights contracts. He determined that the WIC program was the main factor in the increase in real wholesale prices of formula. However, he also concluded that the wholesale price with the rebate program is lower than what it would be in its absence.

<sup>68</sup>The study of retail prices by Oliveira et al. (2004) was based on 1994-2000 data, and changes in both the infant formula market and in the WIC program since then may have affected the relationship between WIC and retail formula prices. One of the most important changes was the passage of the Child Nutrition and WIC Reauthorization Act of 2004 (P.L. 108-265), which included several vendor cost-containment provisions. As a result of the new provisions, it is not known the degree to which non-WIC consumers pay more for infant formula than if there were no WIC program. The Economic Research Service is currently updating its analysis of the effect of WIC on the retail price of infant formula.

may spend the entire dollar on food, they may reduce the amount they spend on food from their own cash income. Thus, the net impact of WIC on the farm sector depends largely on the program's additionality—the amount by which a dollar of program spending results in additional food spending. Using an additionality value that was based on estimates of additionality associated with SNAP, the authors estimated that the net addition to farmers' revenues from WIC was \$331 million, of which \$184 million went to livestock farms—predominantly dairy farms—and \$147 million went to crop farms—mostly fruit and vegetable farms (table 7).<sup>69,70</sup>

### *Infant formula manufacturers*

WIC and its use of sole-source infant formula contracts have a significant impact on infant formula manufacturers. An ERS study of scanner-based retail sales data from over 7,000 stores in 30 States examined the effect of winning a WIC contract on infant formula manufacturers' market share in supermarkets (Oliveira et al., 2011). Results indicate that volume sales of the manufacturer holding the WIC contract brand accounted for the vast majority (84 percent) of all milk-based powder—the primary type of formula—sold in supermarkets by the top three infant formula manufacturers. The impact of a switch in the manufacturer that holds the WIC contract was considerable—the market share of the manufacturer of the new WIC contract brand increased by an average 74 percentage points after winning the contract. This increase was mirrored by a decrease in the market share of the manufacturer that lost the contract. Although most of the increase was a direct effect of WIC recipients switching to the new WIC contract brand, manufacturers also realized a spillover effect

Table 7  
**Farm revenue from WIC food sales by type of farm, 2008**

Type of farm	Farm revenue	
	From producing WIC foods	Net increase due to additionality <sup>1</sup>
	\$ million	
All farms	1,274.20	331.3
Livestock farm:	707.3	183.9
Dairy	568.9	147.9
Poultry and eggs	92.8	21.5
Meat animals	55.6	14.5
Crop:	566.9	147.4
Grains	171.2	44.5
Fruits and vegetables	292.2	76.0
Other crops	103.4	26.9

<sup>1</sup>Based on an additionality value of 0.26. Additionality is the amount by which a dollar of program spending results in additional food spending.  
Note: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children.  
Source: Hanson and Oliveira, 2009.

<sup>69</sup>Since a widely accepted estimate of WIC's additionality does not exist, the authors assumed that the economic behavior of WIC participants resembles that of SNAP recipients.

<sup>70</sup>The authors note that WIC may impact the nonfarm sector as well if funds that WIC participants normally would have spent out of pocket for food are instead spent on nonfood items.

from winning the WIC contract because sales of their formula purchased outside of the program also increased (see box, “Infant Formula Manufacturers May Realize Spillover Effects”).

These spillover effects are important to the formula manufacturers since they do not pay a rebate on formula that is purchased outside the program. For example, since the average rebate of contracts in effect in February 2013 was 92 percent of the wholesale price, the revenue received by formula manufacturers for each can of non-rebated formula was more than 12 times greater than the revenue for each can of formula purchased through WIC (Oliveira et al., 2013).

### ***Food manufacturers***

Because WIC participants make up a large share of infants and children in the United States, changes in the types of foods included in the WIC food packages (i.e., WIC-approved foods) can have repercussions on some food product sales. The lobbying efforts by various sectors of the food industry for changes in the WIC food packages, along with the responses of producers to program requirements, provide an indication of the importance they place on the WIC market.

#### **Infant Formula Manufacturers May Realize Spillover Effects**

- Since WIC infants account for a large portion of infant formula consumers, retailers may devote more shelf space and better product placement to the WIC contract brand. This results in greater product visibility, which may spur sales of the contract brand to non-WIC consumers.
- Sales may also rise if hospitals and/or physicians recommend the WIC contract brand to all mothers, both WIC and non-WIC.
- Being identified as the WIC brand may increase the credibility of the product among non-WIC consumers. That is, the increase in demand for the WIC brand among non-WIC consumers may be due to the Government’s tacit endorsement of the product. A study by the U.S. Government Accountability Office (2006) found that companies were using the WIC trademark to market infant formula.
- To the degree that the quantity of formula provided by WIC does not meet all of their infant’s formula needs, mothers of WIC infants may be reluctant to feed a different brand of formula to their infants and are likely to supplement the formula provided through WIC by purchasing the same brand of formula out of pocket.
- Former WIC recipients may demonstrate brand loyalty by buying the same WIC-provided brand they used with one infant when they have subsequent babies after leaving the WIC program. WIC recipients who are satisfied with the WIC contract brand of formula may also recommend the brand to their non-WIC friends and relatives.
- Formula manufacturers that also produce baby foods (such as Gerber) may also benefit from a spillover effect if consumers exhibit brand loyalty that extends beyond the purchase of infant formula into the manufacturer’s other product lines.

Source: Oliveira et al., 2011.

### *Breakfast cereals*

Meeting the specifications to be eligible for inclusion in the WIC food packages can have an especially large impact on the manufacturers of breakfast cereal. WIC children who grow up consuming a particular brand of WIC cereal may develop a preference for that product that extends past their time in the program (i.e., a positive spillover effect for cereal manufacturers). Prior to 1980, WIC regulations did not specifically address the amount of sugar contained in cereal.<sup>71</sup> As a result, cereals high in sugar were eligible to be included in the WIC food packages, although States had the option to restrict eligible cereals to those with low levels of sugar. In 1980, USDA established a maximum limit of 6 grams of sugar per ounce of dry cereal for WIC cereals. This regulation was, in large part, in response to advice from nutrition and health experts, the WIC community, and the general public, as well as the recognition that sugars in foods play a role in the development of tooth decay (dental caries).<sup>72</sup>

Some members of the cereal industry have long lobbied USDA to change the regulation that limits the amount of sugar in WIC cereals, stating that USDA's 6 grams-per-ounce limit was arbitrary and deprived WIC recipients of some raisin-bran-type cereals of high nutritional value. They further argued that the sugar limit should only apply to added sugars, and that the natural sugars in the raisins should be exempt from the rule (Leonard, 1999; McAllister, 1998; USDA-FNS, 1991b).<sup>73</sup> The lobbying effects led USDA to conduct several reviews of the sugar restriction in WIC cereals, but USDA concluded each time that the limit was appropriate and should stand (USDA-FNS, 1991b; Leonard, 1999).

### *White potatoes*

White potatoes provide the latest example of the importance that producers place on WIC. The recent revisions to the WIC food packages—based largely on recommendations from the National Academies' Institute of Medicine (IOM)—included the introduction of fruits and vegetables. The only restriction placed on the participant's choice of fresh vegetables was to disallow white potatoes.<sup>74</sup> IOM's recommendation to exclude white potatoes was based on food intake data indicating that consumption of starchy vegetables meets or exceeds recommended amounts and "that white potatoes are the most widely used type of vegetable" (Institute of Medicine of the National Academies, 2005, p. 119). The presumption was that excluding white potatoes would encourage a greater variety of vegetables to be consumed.

The potato industry responded by lobbying members of Congress to include white potatoes in the list of foods approved for WIC. In June 2012, 93 members of the House signed a letter urging the Secretary of Agriculture to reconsider the ban on white potatoes (Congress of the United States, 2012). The following year, an amendment to the House Agriculture Appropriations Bill was introduced that would allow WIC recipients to purchase white potatoes and an amendment to the Farm Bill was introduced to have white potatoes added to the WIC list (Rhodan, 2014). In response to these efforts, the National WIC Association voiced concern that the potato industry was "attempting

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<sup>71</sup>P.L. 95-627, enacted in 1978, directed that the Secretary of USDA shall, to the degree possible, "assure that the fat, sugar, and salt content of the prescribed foods is appropriate" (92 STAT. 3616).

<sup>72</sup>61 *Federal Register*, No. 53, March 18, 1996, pp. 10903-10907.

<sup>73</sup>Lobbying efforts were led by Kellogg's, maker of Raisin Bran cereal, which currently exceeds the 6-gram sugar limit. If the sugar contained in the raisins was excluded from the sugar restrictions, Raisin Bran would meet the WIC cereal sugar standard.

<sup>74</sup>Participants may not purchase frozen and canned fruits and vegetables with added sugars, fats, or oils.



to circumvent the scientific review process” and, if successful, it would lead “other, potentially unhealthy foods, to be forced into the WIC food package” (National WIC Association, 2014a).

In an explanatory statement of the Consolidated Appropriations Act of 2014, the Chairman of the House Committee on Appropriations stated that the agreement expects the Secretary of USDA to amend program regulations to include all varieties of vegetables, except those with added sugars, fats, and oils, to be available to WIC participants (Rogers, 2014). However, the final rule regarding the revisions in the WIC food packages, released March 4, 2014, retained the exclusion of white potatoes from the list of foods that can be purchased with the cash-value WIC voucher.<sup>75</sup>

The Consolidated and Further Continuing Appropriations Act (2015) requires USDA to remove the restriction on white potatoes and allow any variety of fresh, whole, or cut vegetables (except for vegetables with added sugars, fats, or oils) to be eligible for the WIC Program. In addition, the Act requires USDA to commence the next regular review of the supplemental foods available in the WIC food package, including a review of the nutrient content of all vegetables. On August 1, 2014, FNS entered into a contract with the Institute of Medicine of the National Academies to conduct a comprehensive review of the WIC food packages. This contract includes the delivery of a report that either confirms or updates the previous IOM recommendation on white potatoes.<sup>76</sup> According to the Act, upon completion of the review, the Comptroller General of the United States shall conduct an audit of the scientific research and data used to conduct the review.

### ***Reformulating and repackaging WIC foods***

A number of food manufacturers have reformulated their products or changed package sizes in response to WIC program requirements, thus providing additional examples of the importance they place on WIC. For example, in 1985, General Mills increased the amount of iron in Cheerios—one of the most popular WIC-eligible cereals—so that it would meet program requirements (Birnbaum, 1995). A more recent example of product modification came in response to the interim rule revising the WIC food packages that added 2 pounds of 100 percent whole-wheat bread to the children’s food package and 1 pound to the food package for pregnant and breastfeeding women. Concern was raised at that time that WIC participants might have difficulty finding 16-oz loaves of whole-wheat bread at retail stores (bread is most commonly sold in 24-oz loaves), which could make it difficult for participants to purchase the maximum monthly allowance of 1 or 2 pounds.<sup>77</sup> Despite these concerns, FNS chose to maintain the proposed maximum monthly allowances, emphasizing its belief that manufacturers could (and would) respond to the need for whole-wheat and whole-grain bread in 1-pound packages. In their 2014 final rule revising the WIC food packages, FNS wrote that “bread manufacturers have increasingly produced WIC-eligible breads in 16-ounce package sizes to

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<sup>75</sup>79 *Federal Register*, No. 42, March 4, 2014, pp. 12274-12300. The final rule states: “The restriction of white potatoes, as recommended by the IOM, is based on data indicating that consumption of starchy vegetables meets or exceeds recommended amounts, and food intake data showing that white potatoes are the most widely used vegetable. Including white potatoes in the WIC food packages would not contribute towards meeting the nutritional needs of the WIC population and would not support the goal of expanding the types and varieties of fruits and vegetables available to program participants, as recommended by the IOM. Therefore, the provision to exclude white potatoes from the WIC food packages is retained in this final rule. The Department recognizes that white potatoes can be a healthful part of one’s diet. However, WIC food packages are carefully designed to address the supplemental nutritional needs of a specific population. Although white potatoes are not offered in the WIC food package, nutrition education provided to WIC participants will continue to include white potatoes as a healthy source of nutrients and an important part of a healthful diet.”

<sup>76</sup>Based on authors’ communication with the Food and Nutrition Service in November 2014.

<sup>77</sup>72 *Federal Register*, No. 234, December 6, 2007, pp. 68966-69032.

respond to the changes in WIC. As such, all State agencies have breads in appropriate size packages on their WIC food lists.”<sup>78</sup>

## Effects of WIC on retail food vendors

### *WIC-authorized vendors*

The retail food delivery systems used by most State agencies, whereby participants obtain their WIC food by exchanging a food instrument at retail food stores, provides direct, as well as in some cases indirect, financial benefits to the vendors.<sup>79</sup> The direct effect results from the sale of the WIC-authorized foods to WIC participants. However, stores may also realize indirect effects by drawing WIC participants (who may not normally shop at their store) into their store and who then purchase non-WIC foods.

Vendors must meet a number of requirements in order to be WIC-authorized. For example, vendors are required to stock a minimum variety and quantity of WIC foods as established by the WIC State agency, participate in training, and maintain inventory records used for Federal tax reporting purposes (as well as other records that the State agency may require). In addition, WIC transactions—at least in non-EBT States—increase the cashier responsibilities and may increase time spent at checkout for both WIC and non-WIC customers. Despite these increased administrative responsibilities and inconveniences, over 48,000 vendors nationwide were authorized in 2013 (Gleason et al., 2013). This suggests that the financial benefits from sales exceed the financial and nonfinancial costs associated with being a WIC-authorized vendor. A study of the perceptions of owners or managers of small WIC-authorized stores in Connecticut regarding the revised WIC food packages found that retailers cited additional sales, customer traffic, financial stability in economic downturns, and spillovers of sales into non-WIC products as benefits of participating in WIC (Andreyeva et al., 2011b). Interviews with small storeowners in Colorado, New Hampshire, Pennsylvania, and Wisconsin (Gleason et al., 2011) and small storeowners in low-income urban areas across seven States (Gittelsohn et al., 2012) indicated that many store owners reported that stocking the new WIC-approved foods brought in new WIC customers and that the broader variety of foods under the revised food packages attracted non-WIC customers as well as non-WIC purchases by WIC participants.

### *Non-WIC vendors*

As discussed in the section on “Effects of WIC on nonparticipants,” the 2009 implementation of the food package revisions improved access to healthy foods in WIC-authorized stores. Furthermore, positive changes in the availability of healthy foods were also observed in non-WIC convenience and grocery stores that were not required to stock the new WIC foods (Andreyeva et al., 2012; Havens et al., 2012; Ayala et al., 2012; and Hillier et al., 2012). Andreyeva et al. (2012) suggest that this spillover effect may be the result of competition with WIC stores and improved distribution chains resulting from suppliers—who serve both WIC and non-WIC stores—carrying the new WIC foods. This suggests the potential for a spillover effect on non-WIC households regardless of whether they shop at WIC-authorized stores or other stores. Increased local access to healthy foods for both WIC and non-WIC customers could have long-term impacts on diet quality and obesity among both WIC and non-WIC households.

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<sup>78</sup>79 *Federal Register*, No. 42, March 4, 2014, p. 12282.

<sup>79</sup>Benefits also accrue to those farmers, farmers’ markets, and roadside stands that are authorized to participate in WIC’s Farmers’ Market Nutrition Program.



## Equity Issues

This section examines how both the WIC eligibility determination and the value of some WIC program benefits can vary across geographic areas.

### WIC eligibility determination

Because of variations in the way that income eligibility for WIC is determined, a person who is eligible to participate in WIC in one geographic area may be ineligible in another. This issue of equity—that program benefits are not distributed equally—is due to two factors: (1) discretion among State and local agencies in determining income eligibility; and (2) differing Medicaid and SNAP eligibility standards across States (enrollment in these programs confers adjunctive income eligibility for WIC).

#### *Discretion in determining income eligibility*

To participate in WIC, applicants must meet income-eligibility requirements in addition to categorical, residential, and nutritional-risk eligibility requirements. State and local agencies are granted substantial discretion in determining income eligibility in WIC. For example, Federal regulations:

- State that “the State agency may instruct local agencies to consider the income of the family during the past 12 months and the family’s current rate of income to determine which indicator more accurately reflects the family’s status.”<sup>80</sup> The timeframe for determining current rate of income is not defined. States differ in how they define the time period covered by current income, with some looking at income from the most recent 30 days and others using longer time periods. In a review of 10 State WIC policy manuals, the U.S. Government Accountability Office (GAO) found that 2 States defined current income as income from the last 30 days, 1 defined it as income from the last 60 days, 2 States did not define it, and 5 passed on the federally allowed discretion for determining income eligibility to their local agencies (U.S. Government Accountability Office, 2013).
- Define family as “a group of related or nonrelated individuals who are living together as one economic unit.”<sup>81</sup> Because Federal poverty guidelines vary by family size, the number of people in the family (and the income of each family member) impacts income eligibility. States have discretion in defining the family or economic unit to be used in determining income eligibility for WIC (i.e., which members of an applicant’s household should be considered part of the applicant’s family).
- Include a long—but not exhaustive—list of income sources that must be included and excluded to determine the applicant’s income.<sup>82</sup> As a result, State policies also vary to some extent as to the sources of income that are included when determining an applicant’s income eligibility for WIC. For example, while nearly all States count wages, salary, self-employment income, unemployment compensation, and child support as income, only about one-third of States include energy (32 percent), rental (36 percent), or medical (38 percent) assistance when assessing an applicant’s income (Geller et al., 2012b).

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<sup>80</sup>Title 7 CFR Pt. 246.7 (p. 374).

<sup>81</sup>Title 7 CFR Pt. 246.7 (p. 357).

<sup>82</sup>Title 7 CFR Pt. 246.7.

### *State differences in adjunctive eligibility*

The Child Nutrition and WIC Reauthorization Act of 1989 established adjunctive income eligibility, which automatically confers income eligibility with no need to provide income documentation, to WIC applicants who receive benefits from Medicaid, SNAP, or TANF. This was intended to simplify the WIC application process since, at the time the legislation was enacted, the income eligibility cutoffs for these other programs were lower than those for WIC.

However, since this legislation, some States have expanded eligibility for these programs to include those with incomes above the WIC eligibility threshold. As of July 1, 2014, many States had set the income eligibility for Medicaid higher than 185 percent of the Federal poverty guidelines for several WIC participant categories, particularly pregnant women and infants (table 8) (see box, “The Affordable Care Act and WIC”). Similarly, because of the broad-based categorical eligibility policy that makes some households categorically eligible for SNAP, SNAP income eligibility thresholds in 15 States were 200 percent of the Federal poverty guidelines as of July 2014 (USDA-FNS, 2014a).

As a result, applicants with incomes higher than 185 percent of the Federal poverty level are eligible to participate in WIC in some States due to their adjunctive eligibility, while applicants with the same income but residing in a different State may be ineligible to participate. However, FNS data from a census of WIC participants in April 2012 indicated that only 1 percent of WIC participants had incomes greater than 185 percent of the Federal poverty level (income data were missing from

Table 8

#### **Number of States with Medicaid income eligibility higher than 185 percent of Federal poverty level**

Participant category	Number of States (including the District of Columbia) as of July 1, 2014
Infants	36
Pregnant women	36
Postpartum women	3
Children 1-5 years	20

Source: Centers for Medicare & Medicaid Services, 2014.

### **The Affordable Care Act and WIC**

The Affordable Care Act (ACA), enacted in March 2010, aimed to increase health insurance coverage in the United States, particularly among low-income people (American Public Health Association, 2013). One way of doing this was to widen the safety net by increasing Medicaid income eligibility, and automatically enroll income-eligible individuals in Medicaid. As a result, ACA is predicted to increase the number of individuals participating in Medicaid. Because participation in Medicaid confers adjunctive income eligibility to WIC, it may also affect the number of people eligible for, or who choose to participate in, WIC. However, since most States already offer higher Medicaid income eligibility for pregnant women, infants, and children, it is not clear whether ACA will increase the number who are eligible for, and choose to participate in, Medicaid. ACA may, however, increase the number of postpartum women (breastfeeding or not) who become eligible for, and choose to participate in, Medicaid. At the moment, little is known about the impact of ACA on Medicaid or on WIC.

7 percent of participants), even though three-quarters of all participants reported receiving benefits from at least one of the public assistance programs that made them adjunctively income eligible for WIC (including 71 percent who participated in Medicaid and 36 percent who participated in SNAP at the time of the most recent WIC certification) (Johnson et al., 2013).

A recent GAO study examined how State and local criteria for determining WIC income eligibility vary across geographic areas (U.S. Government Accountability Office, 2013). The report acknowledged that “as the federal government continues to seek ways to manage with fewer resources, ensuring the program serves those it is intended to is critical” (p. 20). However, GAO concluded that “While state and local income eligibility determination policies for WIC differ to some extent and result in families’ eligibility for the program being somewhat dependent on where they live, the discretion granted in federal regulations and guidance suggests this result may be in line with program goals” (p. 20). For example, GAO recognized the importance of the use of discretion due to the “unique income and family situations that make income determination particularly difficult” and noted that the USDA “does not intend WIC income eligibility determination to be a complicated and lengthy procedure” (p. 8). Shortly after the release of the GAO report, FNS released a policy memorandum to the WIC State agencies providing clarification regarding WIC’s income eligibility determination (USDA-FNS, 2013f). The memo, to “provide more consistency and accountability,” encourages WIC State agencies to define “current income” as all income received by the household during the 30 days prior to the application and requires justification of any other definition of current income (p. 2).<sup>83</sup>

The same GAO report concluded that it is less clear whether program goals continue to be served with the use of adjunctive eligibility. “Given the current economic constraints, the impact of adjunctive eligibility may not be in line with program goals. However, if modifications to adjunctive eligibility are considered, because the policy currently eases administrative and participant burden for the majority of WIC participants, such changes should carefully weigh the potential benefits and costs” (p. 20).

## Cash-value vouchers and food prices

Prior to the 2009 implementation of the WIC food package revisions, WIC provided only quantity-based food vouchers (i.e., vouchers were redeemable for specified quantities of foods, e.g., 1 dozen eggs or 4 gallons of milk). The 2009 revisions provided participants with cash-value vouchers to purchase a variety of fruits and vegetables of their choosing in addition to the quantity-based food vouchers.<sup>84</sup> The monthly voucher amount depends on the participant category—as of June 2014, children receive \$8 per month and all women receive \$10 per month.<sup>85</sup>

The introduction of the cash-value voucher was based on recommendations by the Committee to Review the WIC Food Packages of the Institute of Medicine of the National Academies (2005). The committee recommended issuing the new fruit and vegetable benefit in the form of a cash-value voucher as a means of facilitating participant choice in the purchase of fruits and vegetables within

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<sup>83</sup>The memo stated that if a family’s sole support has been laid off and has been authorized to receive unemployment benefits for the next 6 months, then current income refers to the family’s income in the next 30 days.

<sup>84</sup>The term cash-value voucher in this report refers to all WIC payment methods, including checks, electronic benefit transfer, and vouchers.

<sup>85</sup>Federal regulations allow for inflation adjustments in the cash-value vouchers in \$1 increments (7 CFR Part 246.16).

the program's budget constraints. The cash-value vouchers were expected to lead to increased fruit and vegetable consumption, thereby potentially decreasing both short- and long-term health risks faced by pregnant and postpartum women, infants, and children. However, because food prices vary across the country, the fixed-value provision of the vouchers may undercut their effectiveness for WIC participants in higher priced market areas. Unlike other WIC food benefits, the quantity of fruit and vegetable benefits that can be purchased by participants may differ based on prices where the participants live, as well as the mix of items chosen.

ERS researchers examined the prices of individual fruits and vegetables across market areas to assess the possible impact of price variation on the purchasing power of WIC fruit and vegetable vouchers (Leibtag and Kumcu, 2011). Findings from their study, based on 2004-06 data, indicate that:

- Most fruit and vegetable prices were 30 to 70 percent higher in the most expensive market area than in the lowest priced area. However, the overall price range was wider: 26 percent for pears—the smallest price spread across markets—to 140 percent for grapefruit—the largest spread across markets.
- The Metro South 2 market (Nashville, Birmingham, Memphis, and Louisville) tended to have the lowest average prices, while San Francisco tended to have the highest. Average prices were more than 20 percent higher in San Francisco than in the Metro South 2 area.
- Among the more commonly purchased fruits and vegetables, the most expensive vegetables were peppers and tomatoes, and the most expensive fruits were strawberries and grapes. The lowest cost vegetables were cabbage and corn, while bananas and oranges were the lowest cost fruits.
- A \$10 voucher could purchase 17 percent more tomatoes per month or 13 percent more apples per month in the lowest priced market compared with the national average, while it could buy 15 percent fewer tomatoes and 11 percent fewer apples in the most expensive market (table 9).

The authors concluded that, given the considerable price variations across the country, WIC participants in higher cost areas cannot purchase as many fruits and vegetables with their fixed-value voucher as participants in lower priced areas. This could lead to differences in the nutritional benefits that the voucher is intended to make available for WIC participants, which could in turn potentially impact both short- and long-term health risks faced by program participants.

Table 9

**Buying power of \$10 vouchers for selected fruits and vegetables in different markets, by weight**

Fruit or vegetable	Market with maximum price	National average	Market with minimum price
<i>--Pounds--</i>			
Tomatoes	5.1	6.0	7.0
Onions	6.0	7.5	10.5
Green beans	7.6	10.4	16.8
Carrots	7.3	8.5	10.1
Broccoli	6.2	7.5	9.1
Cabbage	14.2	19.1	24.0
Bananas	16.2	20.4	25.1
Apples	8.1	9.1	10.3
Watermelon	8.4	11.5	20.2
Oranges	8.0	11.8	13.9
Peaches	7.1	8.9	10.5
Pears	8.4	9.5	10.6

Note: Based on 2004-06 data.

Source: Leibtag and Kumcu, 2011.

## Cost-Management Issues

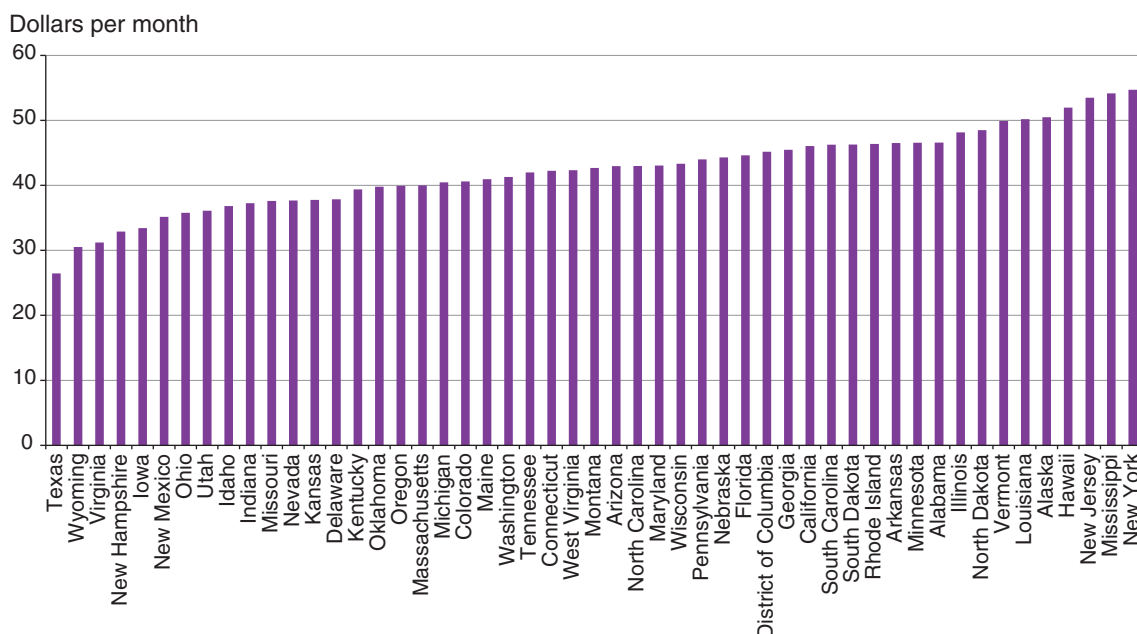
As a discretionary program, WIC can only serve as many participants as its federally allocated budget allows. Cost-savings practices help ensure the best use of available funds and allow WIC to provide benefits to more participants within the same total budget. The WIC program has two main cost components: food costs and Nutrition Services and Administration (NSA) costs.<sup>86</sup>

### Food costs

Food costs are the program's largest single cost, accounting for about 70 percent of WIC's budget. Policies that are effective in controlling food costs without lowering WIC participation or participant satisfaction with the program increase WIC's efficiency and effectiveness. Although WIC cost-containment practices have proven effective in the past (see box, "WIC and SNAP Per-Person Food Costs Have Diverged Over Time"), given the tight Federal budget and current political climate, controlling costs in USDA's food assistance programs, including WIC, will continue to receive increased attention from lawmakers.

Average monthly food package costs differ considerably across WIC State agencies. For example, in FY 2013, the average monthly food package cost in Texas (\$26.46) was less than half that of New York (\$54.71) (fig. 17). Some of the differences in food package costs may be due to factors that are outside of a State agency's control, such as geographic variation in food prices or caseload composition (i.e., WIC average food costs per person vary by participant category as seen in fig. 4) (Davis and

Figure 17  
**Average food cost per person by State, FY 2013**



Source: USDA, Food and Nutrition Service, 2014b.

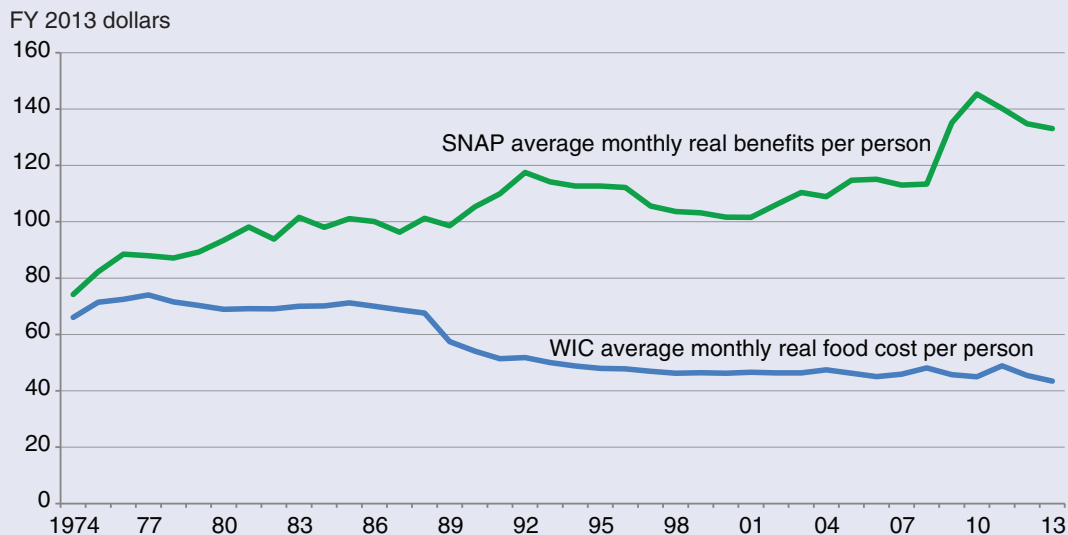
<sup>86</sup>In addition to food and Nutrition Services and Administration costs, total expenditures include funds for the Farmers' Market Nutrition Program, program evaluation and monitoring, special projects, and infrastructure grants. These other costs accounted for 1 percent of total program expenditures in FY 2013.

## WIC and SNAP Per-Person Food Costs Have Diverged Over Time

A comparison of the changes over time in per-person food costs between WIC and the SNAP program illustrates the effectiveness of WIC's cost-containment practices, particularly the use of infant formula rebates. When WIC was initiated in 1974, the average monthly WIC per-person food cost was similar to the average monthly per-person SNAP benefit. However, per-person food costs for SNAP and WIC have diverged significantly since then. While real (i.e., inflation-adjusted) per-person SNAP benefits have generally trended upward, real per-person WIC food costs have trended downward. For example, average monthly per-person SNAP benefits increased by 79 percent from FY 1974 to FY 2013, while the average monthly per-person WIC food package cost decreased by 34 percent over the same period. The largest decrease in real per-person WIC food costs took place in the late 1980s, coinciding with the start-up of the infant formula rebate program.

Since the mid-1990s, real average monthly per-person WIC food costs have continued to decrease, but at a much slower rate. However, real per-person food benefits for SNAP have continued to fluctuate, due in large part to legislative changes that either increased or decreased benefit levels (for example, the American Recovery and Reinvestment Act of 2009 (ARRA) temporarily raised SNAP benefits starting in April 2009).

### Average real monthly SNAP benefits and WIC food costs per person, FY 1974-2013



Notes: SNAP refers to the Supplemental Nutrition Assistance Program, and WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. WIC real food cost per person reflects post-rebate cost. Source: USDA, Economic Research Service calculations of USDA, Food and Nutrition Service (2014c), and USDA, Food and Nutrition Service (2014d) adjusted by the Consumer Price Index for Food at Home (U.S. Department of Labor, 2014a).



Leibtag, 2005). Differences may also be related to whether the WIC State agency requires participants to purchase all of the WIC foods listed on the voucher, State policies regarding brands and package sizes of allowable foods, the number and types of WIC-authorized stores, EBT use, whether the State's Medicaid program covers the cost of special formula, and the State agency's ability to negotiate a favorable rebate contract (particularly with the manufacturers of infant formula).

### ***Limiting participant food choices***

Except for the cash-value voucher for fruits and vegetables, WIC provides quantity-based, rather than dollar-based, benefits (i.e., participants redeem their food instruments at retail food stores for a specified quantity of specific foods), regardless of how much the WIC-allowed item costs. Since WIC participants receive a fixed quantity of food at no cost to themselves, there is no incentive for them to consider the cost of food items in their selections.<sup>87</sup> As a result, WIC participants may be price insensitive in their WIC food choices, which can lead to higher food costs if WIC participants choose to purchase the most expensive options.

WIC State agencies have considerable flexibility, within broad Federal operational guidelines, in choosing the brands, flavors, and package sizes that are acceptable for use in their States, and they determine the specific food items from which their participants can choose. Most of the WIC State agencies allow a wide variety of brands, types, flavors, and package sizes within each food category in order to meet personal and cultural tastes and preferences and to increase participants' access (as different stores may carry different products).<sup>88</sup> However, some WIC State agencies have implemented a number of practices to limit participants' selection in order to reduce the costs of the food packages, including limiting participants' food-item selection to specific brands, economically priced package sizes and product forms, or least-cost brands (Kirlin et al., 2003). However, severely restricting participant choices has the potential to increase costs to WIC if retailers perceive the item to be mainly purchased by price-insensitive WIC customers and raise the item's price as a result. It may also result in participant dissatisfaction and exit from the program. Concern over the potential negative impact of overly restrictive practices on participation limits the implementation of some of these practices in some States. The challenge of limiting WIC food costs while maintaining participant satisfaction has led to interest in the potential application of behavioral economics as a possible mechanism to ensure low WIC food costs (see box, "Using Behavioral Economics To Incentivize WIC Food Shopping").

### ***Vendor management***

The price insensitivity of WIC participants can provide an incentive for some vendors to charge higher prices for some WIC foods with little fear that WIC participants will stop purchasing the food. However, market forces discourage most WIC vendors from doing so. Most WIC vendors serve both WIC and non-WIC customers, and if a WIC vendor charges a higher price for the WIC foods than competing vendors, their non-WIC customers may choose to shop at another store, resulting in a loss of revenue for the vendor.<sup>89</sup> However, for those stores in which WIC participants make up a

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<sup>87</sup>SNAP recipients, on the other hand, receive electronic benefits for a fixed dollar amount and recipients choose the types and quantities of food to purchase with it. Therefore, SNAP recipients have an incentive to pay attention to food prices in order to maximize the amount of food they can purchase.

<sup>88</sup>For example, Michigan WIC allows participants to choose from among 13 different brands of tortillas; 29 brands of whole-wheat or whole-grain bread; 33 national brands and flavors of cold, ready-to-eat cereals; 12 store brands of cold, ready-to-eat cereals; and 9 brands of hot cereals (Michigan Department of Community Health, 2013).

<sup>89</sup>WIC-authorized vendors cannot charge WIC customers more than they charge non-WIC customers for the same food.

## Using Behavioral Economics Insights To Incentivize WIC Food Shopping

Tightening Federal budgets and rising food costs have led to interest in exploring innovative ways, other than severely limiting food choices, to incentivize WIC participants' behaviors that could help reduce WIC food costs. For example, encouraging WIC participants to shop at lower price stores could help reduce overall food costs to WIC. A large proportion of WIC participants (84 percent) report purchasing their WIC items at the same store where they do most of their food shopping (Geller et al., 2012a). However, some of those participants may still purchase some of their WIC items at other (perhaps more convenient and higher cost) stores and some participants may do most of their WIC shopping at higher cost stores. Overall, food costs could also be reduced by nudging participants to voluntarily choose less expensive items or package sizes, regardless of the store where they shop.

In 2014, ERS and FNS jointly established a Center for Behavioral Economics and Healthy Food Choice Research (the BECR Center). The Center, a partnership between Duke University and the University of North Carolina at Chapel Hill, will consider how behavioral economics might be applied to incentivize behaviors of WIC participants, vendors, and program staff to help reduce WIC food costs without adversely affecting the program's effectiveness.

large share of their customers, there is less economic incentive to keep prices low—the increase in revenues resulting from the sale of higher priced WIC foods may exceed the loss in revenue resulting from the non-WIC customers switching to a lower price store.

WIC-only stores—stores that sell only or predominantly WIC foods and serve only or predominantly WIC participants—began to appear in the 1990s, and their numbers increased rapidly in the early 2000s (particularly in California). To address concerns about the increasing number of WIC-only stores (which generally had voucher costs higher than in other WIC-authorized stores), the Child Nutrition and WIC Reauthorization Act of 2004<sup>90</sup> included several vendor cost-containment provisions for *all* WIC-authorized vendors. To ensure that vendors charge competitive prices for WIC foods, WIC State agencies are now required to establish a vendor peer group system based on common characteristics or criteria that affect food prices, with allowable reimbursement levels for each peer group. WIC State agencies must use at least two criteria to assign vendors to peer groups, one of which must be a measure of geography.<sup>91</sup> Other criteria may be related to the number of cash registers, WIC sales volume, and type of ownership (sole proprietorship, corporate, or partnership), indicating that all of the vendors in a peer group are expected to have similar prices. However, little is known regarding the effectiveness of current methods developed by State agencies to establish vendor peer groupings and allowable reimbursement methodologies (see box, “The California WIC Vendor Moratorium”). FNS has funded a national study of WIC peer grouping systems to assess their effectiveness and to develop alternative methodologies.<sup>92</sup>

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<sup>90</sup>P.L. 108-265.

<sup>91</sup>7 CFR Pt. 246.12.

<sup>92</sup>Based on authors' communication on January 6, 2014, with the Altarum Institute, the organization conducting the study.

## **The California WIC Vendor Moratorium**

The implementation of the peer-grouping system is complex and administratively challenging. For example, California set the maximum allowable reimbursement rates for various peer groups (which are based on the number of registers and geographic location) based on the average redemption amount charged by vendors in each peer group (based on a rolling average of WIC redemption amounts) plus “a tolerance amount to account for variation of product availability, participant selection, and shelf prices” (California Department of Public Health, 2009, p. 1). As a result of a large increase in small vendors (one to four registers) entering the program with inflated food prices, average prices for that peer group rose rapidly, along with the allowable reimbursement rate. The California WIC program responded by placing a temporary moratorium on all new stores applying to be a WIC-authorized vendor starting in April 2011 (Mieszkowski, 2012; California Department of Public Health, 2011; and California WIC Association, 2012). The following year, USDA directed California WIC to continue the moratorium until the State “develops and fully implements an effective cost containment and vendor management system” (California Department of Public Health, 2013, p. 1).

The Act also mandated special cost-containment requirements for a new category of vendors, defined as retail food vendors who derive more than 50 percent of their annual food sales revenue from WIC food instruments and labeled ‘above-50-percent’ or ‘A-50’ stores. In particular, the Act required that WIC State agencies ensure that the authorization of A-50 vendors does not result in higher program food costs and restricted their maximum allowable reimbursement to the statewide average for all other stores.

In addition to ensuring that vendors charge competitive prices for WIC foods, WIC State agencies can determine the selection criteria, number, and types of retail food stores—such as supercenters, supermarkets, large/medium/small grocery stores, and convenience stores—that they choose to authorize. For example, State agencies can choose to limit authorized vendors to stores with the lowest prices (unless a higher price store is needed to ensure participant access to food).

### ***Partial voucher redemptions***

Partial voucher redemptions occur when a participant does not purchase all of the foods in the prescribed quantities. Most, but not all, WIC State agencies allow partial voucher redemptions.<sup>93</sup> Partial voucher redemptions have implications for cost management in non-EBT States as well as on the nutritional benefit of the intended food packages.

In most States, participants obtain paper vouchers listing the types and quantities of food that can be purchased with that voucher. Each WIC voucher usually lists a combination (or bundle) of foods, such as 2 gallons of milk, 36 ounces of cereal, 18 ounces of peanut butter, and 1 dozen eggs.<sup>94</sup> Participants must purchase all of the foods listed on a voucher at the same time they redeem the voucher, or they lose the unpurchased items. Although participants in most States may voluntarily

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<sup>93</sup>A recent study of WIC vendors stated that 3 of the 40 WIC State agencies included in the study prohibited partial redemptions when purchasing traditional WIC food items (Gleason et al., 2013).

<sup>94</sup>Anecdotal evidence suggests that combination vouchers—a single voucher that lists a combination of WIC foods that must be purchased at the same time—became more prevalent with the implementation of the revised food packages in 2009 as a way of accommodating the increased number of foods provided by the program.

choose to not purchase some of the foods listed on the voucher, anecdotal evidence suggests that sometimes the decision to forgo an item may be dictated by circumstances. For example, the desired item may not be available at the store, or the participant finds out at the checkout register that the wrong item was chosen, and rather than hold up the line and go look for the correct item, the participant may choose to forgo the item.

Most State agencies use voucher costs as convenient proxies for food prices to determine whether particular vendors or vendor groups are charging higher prices and to determine reasonable allowable reimbursement values. When a vendor submits a voucher for reimbursement by WIC, the only information available is the cost of the entire voucher, not the types, quantities, or prices of foods purchased with the voucher. Differences in the voucher costs may reflect differences in the amounts of foods redeemed, differences in food prices, or differences in both amounts and prices.<sup>95</sup> Consequently, failure to account for partial voucher redemptions could result in artificially low allowable reimbursement values and potentially shortchange some vendors that have fewer partial voucher redemptions. Anecdotal evidence suggests that participants may be more likely to fully redeem their vouchers at WIC-only stores, and that this may partly explain their higher voucher costs.<sup>96</sup>

Information on the extent of partial voucher redemptions is limited. A few State agencies recognize the potential problems due to partial voucher redemptions and have developed methods to try to account for partial voucher redemptions—however, the effectiveness of these methods is not known. The likely impact of partial voucher redemptions on WIC voucher costs will become moot when all State agencies implement EBT (EBT provides participants with the flexibility of purchasing their WIC items individually and provides information on what items were purchased and their cost). However, only 13 of the 90 WIC State agencies (9 States—FL, KY, VA, WV, MI, NM, NV, TX, WY—and 4 ITOs) currently have EBT statewide, and many other States are not likely to implement EBT until the mandated date of October 1, 2020 (USDA-FNS, 2014f).

In addition to helping determine actual WIC food voucher costs, determining the extent of partial voucher redemptions is important for reasons related to program operations. For example, partial voucher redemptions may be the result of participants voluntarily choosing to not redeem the full amount of their vouchers, indicating that WIC is either providing too much of some types of food or that some WIC participants are consuming suboptimal amounts of their authorized WIC foods (in which case WIC needs to increase efforts to inform participants of the importance of consuming WIC's targeted nutrients).

On the other hand, partial voucher redemptions may be indicative of problems WIC participants experience exchanging their food instruments for foods (i.e., transaction issues), including the unavailability of some WIC foods in some stores, limited variety of some WIC foods (e.g., only a few flavors of juice or brands of cereal), or problems participants may have in identifying WIC brands in authorized package sizes. With EBT, participants can purchase as much or as little of their allotted foods during any shopping trip and purchase the remainder at any time during the valid time period (WIC food

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<sup>95</sup>Other factors also make the determination of competitive prices among vendors challenging, including price differences in the various brands of food offered to WIC participants (e.g., low- or high-price brands of breakfast cereals) and differences in price structures for allowable substitutions (e.g., lower price tortillas for higher price whole-wheat bread or higher price soy milk for lower price milk).

<sup>96</sup>The business practice in many WIC-only stores consists of store clerks taking the WIC vouchers from the WIC participant and providing them with a complete basket of food, which results in participants obtaining all of the foods prescribed. In contrast, participants shop for their own WIC foods at other stores.

benefits are usually valid for 30 days). Some believe that this will make it easier for WIC participants to purchase their full allotment of WIC foods. However, anecdotal evidence suggests that this may not necessarily be the case. For example, participants may go to the store and purchase some of their allotment thinking that they will purchase the remainder during some future shopping trip. However, they may not make that future trip before the time period in which they are allowed to purchase the WIC food expires. Some have also suggested that the paper food instrument serves as a de facto shopping list (reminding participants of the foods they need to purchase), and that without this paper list, participants may be less likely to pick up their full allotment of WIC foods.

### ***Cost containment and State incentives***

Because of the way that WIC is structured, WIC State agencies face a potential moral hazard with regard to implementing cost-containment measures. A moral hazard occurs when one party—in this case, a WIC State agency—alters its behavior because a different party—in this case, the Federal Government—incurs the cost. WIC is entirely funded by Federal funds, with no State match requirement. WIC State agencies must spend at least 97 percent of their allocated food grant or else they must return funds to WIC (for reallocation to other States) and their food grant for the next year is reduced.<sup>97</sup> Since the annual funding they receive for food each year is based, in part, on their previous year's funding, WIC State agencies face conflicting incentives in their efforts to reduce food costs. When funding is tight and the number of eligible applicants is increasing (or food prices rise rapidly), effective cost-containment practices help the States to maximize the number of people they can serve—i.e., the States benefit directly by reducing program food costs. However, when the demand for services falls (e.g., when the economy improves and/or the number of births falls), State WIC agencies may have a disincentive to reduce total program costs since it could result in reduced funding in future years.

### **Nutrition Services and Administration costs**

In addition to food grants, WIC receives grants for Nutrition Services and Administration (NSA). In FY 2013, NSA accounted for approximately 30 percent of program costs. WIC has been criticized in the past for having a large share of program expenditures going to administration (Neuberger, 2011). However, as seen in fig. 18, only about 31 percent of NSA expenditures in FY 2012—or an average of 9 percent of total program costs—were actually spent on program management (i.e., administration). The remaining 69 percent of NSA expenditures were used for participant services—e.g., nutrition education, breastfeeding promotion and support, and other client services (such as conducting diet and health assessments and referring clients to other health care and social services).

It should also be noted that Federal law determines the amount of the national average NSA grant per participant, which is equal to an “amount equal to the national average per participant grant for NSA issued for the preceding fiscal year, adjusted for inflation.”<sup>98, 99</sup>

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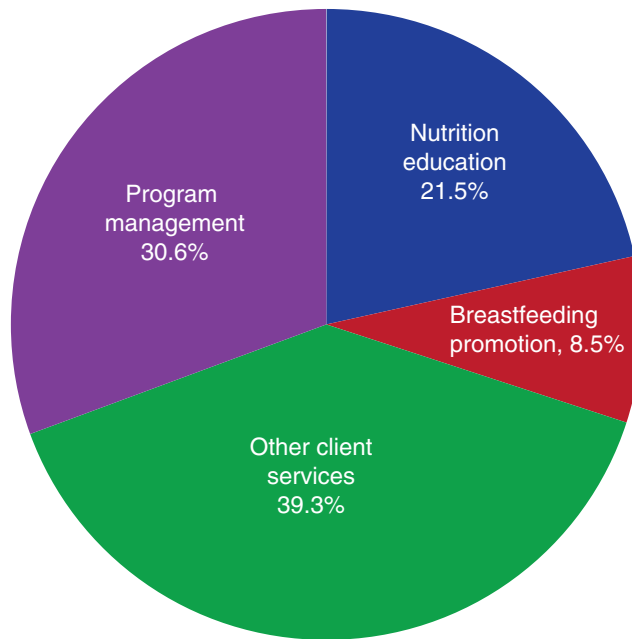
<sup>97</sup>64 *Federal Register*, No. 203, Oct. 21, 1999, pp. 56669-56675.

<sup>98</sup>7 CFR 246.16 (p. 432-433).

<sup>99</sup>The Food and Nutrition Service is currently funding a national study of Nutrition Services and Administration expenditures that will look at the major contributors to WIC administrative costs and the cost variation among State agencies (USDA-FNS, 2012).

Figure 18

**Distribution of NSA funds by activity, FY 2012**



Note: NSA refers to Nutrition Services and Administration.

Source: USDA, Economic Research Service estimates using information from the National WIC Association, 2014b.



## Infant Formula Issues

Infant formula is the single most expensive food category for WIC. Before taking into account rebates from infant formula manufacturers, infant formula accounted for 42 percent of total WIC food costs in fiscal 2010 (Vericker et al., 2013)<sup>100</sup> The next most expensive food category—milk—accounted for only 14 percent. Even after accounting for rebates, infant formula and milk each accounted for about 20 percent of WIC food costs. Over half of all infant formula sold in the United States is purchased through WIC, and no other food offered by WIC accounts for as large a share of that item's total sales. Infant formula is also the only WIC food item for which Federal law requires that WIC State agencies operate a cost-containment system—usually in the form of a rebate program—for its procurement.

Infant-formula-related issues include: (1) cost implications of WIC's infant formula rebate program; (2) the cost-effectiveness of new additives in infant formula; and (3) the potential effects that providing free infant formula has on breastfeeding prevalence.

### Cost implications of WIC's infant formula rebate program

The cost to WIC for each can of formula sold through the program can be expressed as:

$$\text{Cost to WIC} = \text{Net price} + \text{Retail markup}$$

where

$$\text{Net price} = \text{Wholesale price} - \text{Rebate}$$

*Net price:* Net price is equal to the wholesale price of formula minus the manufacturers' rebate. This is the part of WIC's infant formula costs that goes to the formula manufacturer and is the focus of WIC rebate bids.

*Retail markup:* Most WIC participants purchase infant formula from authorized retail food vendors using a WIC food instrument (such as vouchers). The WIC State agency then reimburses the vendor for the full retail price of the formula (and the manufacturer holding the WIC contract for that State reimburses the rebate to the State agency). The retail markup is the portion of WIC's infant formula costs that goes to the retailer.

These two main components of the cost to WIC are set by different market agents—infant formula manufacturers set the net price and retailers set the retail markup. An earlier ERS analysis based on 2004 data found that, in most States, the retail markup—not the net price—was the largest component of infant formula costs to WIC (Oliveira and Davis, 2006). However, it is because of the effectiveness of the rebate program that net prices are so low. For example, among contracts in effect as of February 2013, the average percentage discount—the rebate as a percentage of the wholesale price—was 92 percent (Oliveira et al., 2013). In other words, on average, the infant formula purchased through WIC cost State WIC programs only 8 percent of its wholesale price (plus the

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<sup>100</sup>In addition to rebates from infant formula manufacturers, 18 WIC State agencies have rebate contracts with manufacturers of other infant foods, including infant cereal and jarred baby food fruits and vegetables and meats (USDA-Office of the Secretary, 2014). However, the rebates WIC receives from these manufacturers are much less than the rebates received from infant formula manufacturers.



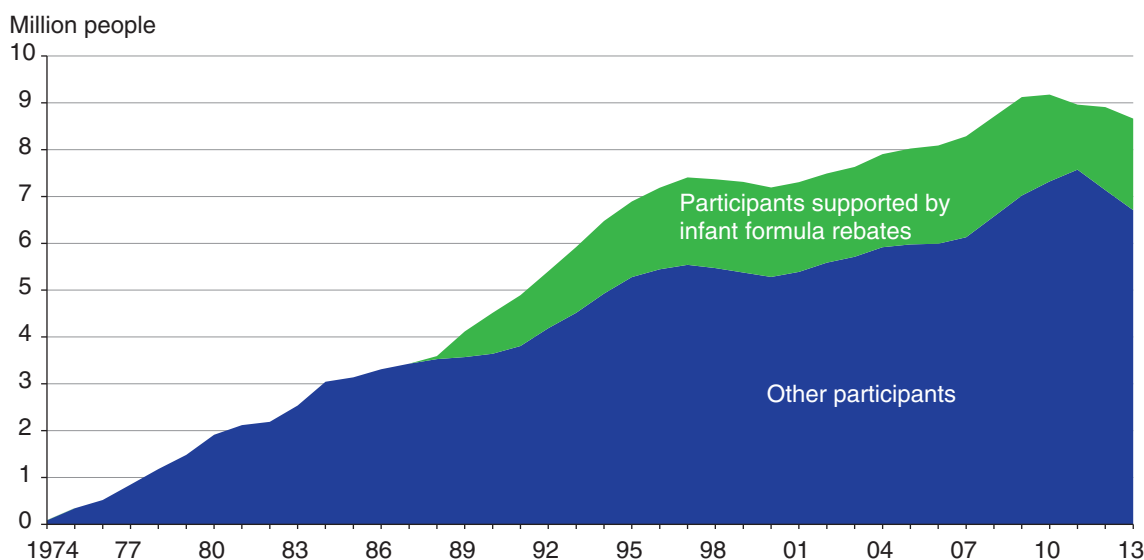
amount of the retail markup). In total, 21 States (including Washington, DC) received discounts of 95 percent or more.

Counterintuitively, it is the effectiveness of the rebate program that may be a cause for concern. WIC has come to rely on manufacturers' rebates as a critical source of savings. For example, infant formula rebates totaled almost \$1.9 billion in FY 2013, an amount that supported about 23 percent of all WIC participants or almost 2 million participants each month (fig. 19). The size of the rebate provided by formula manufacturers is determined by the rebate bids offered by infant formula manufacturers; thus, it is outside the direct control of WIC. If the manufacturers' rebates were to fall significantly, it could have a large negative impact on WIC's food costs and its ability to serve all eligible applicants. And, with rebates averaging 92 percent of the wholesale price, there is little room for them to increase.

Because the infant formula market is dynamic and constantly evolving, numerous factors (including product innovations and changes in the WIC program) could affect the net price that WIC pays for formula in the future. For example, only three firms—Abbott, Mead Johnson, and Gerber—currently bid on WIC infant formula contracts.<sup>101</sup> If one of these firms were no longer to bid for contracts, it could have a potentially large impact on the competitiveness of the bids of the remaining firms.<sup>102</sup>

Figure 19

**Average monthly number of WIC participants supported by rebates, FY 1974-2013**



Notes: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. The number of WIC participants supported by infant formula rebates was calculated by multiplying the total number of WIC participants by rebates' share of total program expenditures and rebates.

Source: USDA, Economic Research Service calculations based on USDA, Food and Nutrition Service (2014c) estimates of number of participants and USDA, Food and Nutrition Service (2014b) estimates of infant formula rebates.

<sup>101</sup>The infant formula market is highly concentrated. In 2008 (the latest available data), these same three manufacturers accounted for 98 percent of all dollar sales of formula in the United States (Oliveira et al., 2011).

<sup>102</sup>For example, having three bidders makes it less likely that a manufacturer could win a WIC contract with an unusually low rebate, which results in a high net price to the WIC State agency.

## Cost implications of new additives in infant formula

Wholesale prices and rebates determine the cost of infant formula to WIC (holding retail markup constant). Even if rebates and percentage discounts remain at the current high levels, net prices—and thus, the cost to WIC—would increase if wholesale prices were to increase. A 2010 ERS study found that, after adjusting for inflation, net prices increased by an average 73 percent between contracts in effect in December 2008 and the States' previous contracts, which resulted in WIC paying about \$127 million more for infant formula over the course of a year (Oliveira et al., 2010). Most of this increase (72 percent or about \$91 million) was due to higher wholesale prices.<sup>103</sup> The higher wholesale prices were largely due to the introduction in 2002 of formulas supplemented with the fatty acids docosahexaenoic acid (DHA) and arachidonic acid (ARA), which some studies have linked to improved vision and cognitive development in infants.<sup>104</sup> Although significantly more expensive than unsupplemented formulas, sales of DHA/ARA-supplemented formulas increased rapidly, and they soon accounted for nearly all dollar sales of formula in the United States (see box, “Did Federal Legislation Expedite the Demise of Unsupplemented Infant Formula?”).<sup>105</sup>

The higher prices of DHA/ARA-supplemented formulas led a number of organizations to question the effectiveness of new additives in infant formula—including DHA/ARA and newer additives, such as prebiotics and probiotics—and new product lines—including special formulas for fussiness, spitting up, and gas—and their impacts on WIC food costs. For example, the California WIC Association (2010) stated that “a troubling and costly cycle is beginning to affect WIC’s bottom line, in which the “designer” formulas that carry higher wholesale (and retail) prices become the standard, increasing WIC costs and requiring Congress to appropriate more funds for WIC to pay for them” (p. 3). The National WIC Association (2011) stated that suggestions that WIC is paying a premium for infant formula and other foods enhanced with DHA/ARA and other functional ingredients creates the “unfortunate and erroneous impression that WIC agencies are not good stewards of federal resources” (p. 1).

The Center on Budget and Policy Priorities also expressed concern about the growing array of additional functional ingredients in infant formula and argued that having the infant formula manufacturers decide whether formulas with new functional ingredients are offered through WIC “may squander taxpayer funds on products containing unproven ingredients” (Neuberger, 2010). They stated that “There is no mechanism within the national WIC program that requires USDA to review the research evidence on the claimed benefits of these functional ingredients or to base decisions about whether to offer foods containing such ingredients on their benefits and the specific needs of WIC participants.” The Center went on to recommend that Congress direct USDA to contract with the Institute of Medicine to review specific WIC foods with functional ingredients and make recommendations about whether offering such a food through the program is likely to yield clinical bene-

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<sup>103</sup>The remaining 28 percent of the increase was due to lower rebates.

<sup>104</sup>According to the U.S. Food and Drug Administration, the scientific evidence that the addition of docosahexaenoic acid and arachidonic acid to infant formulas is beneficial is mixed. “Some studies in infants suggest that including these fatty acids in infant formulas may have positive effects on visual function and neural development over the short term. Other studies in infants do not confirm these benefits. There are no currently available published reports from clinical studies that address whether any long-term beneficial effects exist” (U.S. Department of Health & Human Services, 2012).

<sup>105</sup>In January 2006, the wholesale price for the primary, milk-based, powder DHA/ARA-supplemented formulas was 5.5 percent (Good Start Supreme), 9.4 percent (Enfamil), and 30.6 percent (Similac) greater than the corresponding unsupplemented formulas (Oliveira et al., 2010).

## **Did Federal Legislation Expedite the Demise of Unsupplemented Infant Formula?**

The Child Nutrition and WIC Reauthorization Act of 2004 (P.L. 108-265) contained provisions that changed the procedures for determining which infant formulas are provided to WIC participants. The legislation effectively guaranteed large sales volumes for DHA/ARA-supplemented formula products.

Prior to 2004, infant formula manufacturers could submit a bid for the WIC rebate contract based on any product in their product line as long as it was suitable for routine issuance to the majority of generally healthy, full-term infants. WIC State agencies were responsible for identifying the specific infant formula products in the winning manufacturer's product line to be used in the State's WIC program. Consequently, the contract formulas provided to WIC participants in a particular State would not necessarily include the primary contract-brand product specified in the manufacturer's bid. For example, even though some of the winning bids submitted by the formula manufacturers after February 2003 identified the new DHA/ARA supplemented formulas as the primary contract brand, some States chose not to offer them to their participants.

P.L. 108-265 required that, for all contracts based on solicitations issued after September 2004, State agencies must now use the primary contract infant formula for which the manufacturer submitted its bid (and for which the contract was awarded) as the first choice of issuance (by physical form), with all other infant formulas issued as an alternative. Therefore, if the winning bid is based on a DHA/ARA-supplemented formula, then the WIC State agency is required to offer that formula to the participants in the State.

After the legislation was enacted, nearly all the bids submitted by the formula manufacturers identified DHA/ARA-supplemented formulas as the primary contract infant formula. As a result, all WIC State Agencies now offer DHA/ARA-supplemented formulas to their WIC recipients. Since WIC accounts for most of the infant formula sales in the United States, the result of the legislation was to ensure large sales volumes for these newly introduced products while increasing their visibility to non-WIC consumers. In addition, making DHA/ARA-supplemented formulas the primary WIC brand of formula may have given some non-WIC consumers the impression that the new supplemented formulas had the endorsement of the WIC program. While these factors may have helped these more expensive supplemented formulas gain shares in the market, not providing WIC participants with these supplemented formulas would have opened WIC up to criticism that it was providing WIC infants with a cheaper, inferior product.

Source: Oliveira et al., 2010.

fits. They suggested that USDA could then decide whether paying higher prices for foods with these ingredients would benefit program participants. The California WIC Association (2010) also recommended congressional action, including holding hearings to examine the impact of formula additives and their marketing on breastfeeding, requiring the U.S. Food and Drug Administration (FDA) to commission the Institute of Medicine to review and assess standards for determining the efficacy

of ingredients new to infant formula since 2000, and requiring the FDA to create and enforce more stringent approval criteria for both the safety and the efficacy of ingredients new to infant formula.

In an update to their 2010 study, Oliveira et al. (2013) compared the net price in contracts in effect in February 2013 and the States' previous contracts. In contrast to the earlier study, the results indicated that, after adjusting for inflation, net prices actually decreased by an average 43 percent, meaning that WIC paid about \$107 million less for formula over the course of a year (holding retail markup constant). However, the decrease in net price was due entirely to an increase in rebates as wholesale prices continued to increase (by 6 percent, after adjusting for inflation).<sup>106</sup> In other words, although wholesale prices increased, they were more than offset by the increase in rebates.

## Effects of providing free formula on breastfeeding

Breastfeeding offers many health advantages to both the mother and the infant. While WIC promotes breastfeeding as the feeding method of choice for infants, the program provides free infant formula for infants whose mothers choose not to exclusively breastfeed. Historically, breastfeeding rates have been lower among WIC participants than among nonparticipants, including those who are eligible to participate but do not enroll in WIC. For example, the most recent data on breastfeeding from the National Immunization Survey indicate that breastfeeding rates for infants born in 2007 were 67.5 percent for WIC participants, 77.5 percent for eligible but non-participating women, and 84.6 percent for ineligible women (Centers for Disease Control and Prevention, 2014a).

The consistently lower breastfeeding rate among WIC participants has raised concerns that the program's provision of free infant formula acts as a disincentive for mothers to breastfeed. Others, however, claim that women who plan on feeding their baby infant formula are more likely to enroll in the WIC program. WIC enrollees tend to have characteristics associated with low breastfeeding, such as being younger, less likely to be married, smokers, less educated, and lower income than even eligible women who do not enroll in the program. Thus, WIC's low breastfeeding rates may be simply reflecting selection bias, rather than an adverse effect of the program on breastfeeding (Jiang et al., 2010).

A qualitative study by Fischer and Olson (2014) found that WIC participants might have different attitudes toward breast- and formula-feeding than other women. Most of the pregnant women interviewed acknowledged that breastfeeding was best and that some circumstances required formula use. However, the interviews revealed differences toward breast- and formula-feeding between women who reported being eligible for WIC and those who were not eligible. WIC-eligible women felt that formula use was personally and socially acceptable and that formula use was inevitable when a barrier to breastfeeding arose. In contrast, the pregnant women not eligible for WIC expressed greater perseverance to continue to breastfeed by establishing small achievable goals and seeking mentors. Data from the National Survey of WIC Participants (NSWP) confirm that some WIC participants have a low likelihood of breastfeeding (Geller et al., 2012a). Among WIC mothers who chose not to breastfeed, the number one reason was "dislike for breastfeeding"; in addition,

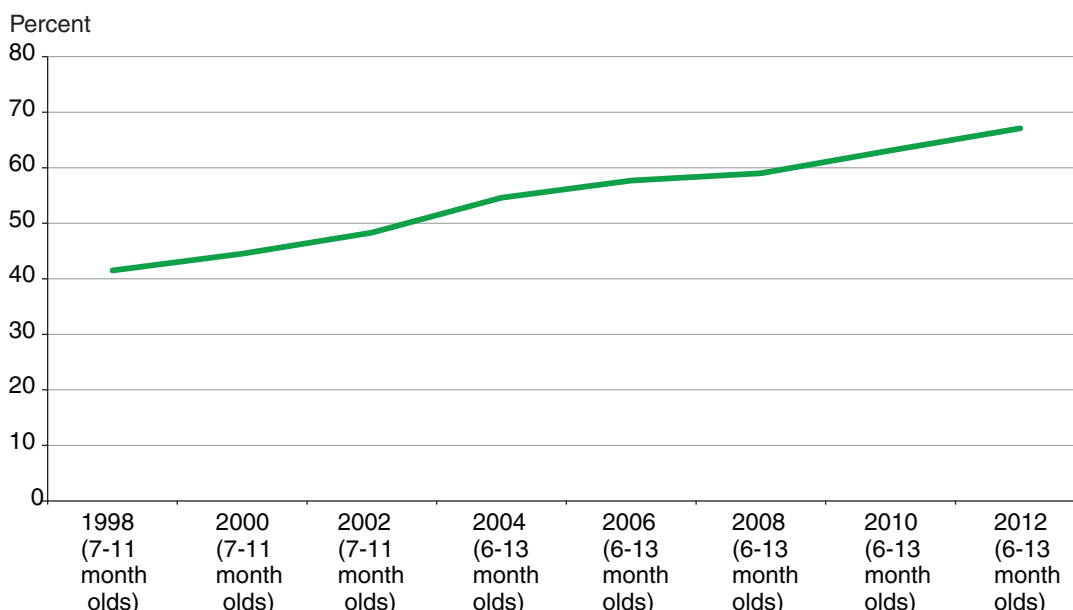
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<sup>106</sup>The decrease in net prices occurred during a period of fewer births, higher breastfeeding rates, and decreases in the average amount of formula provided in the WIC infant food package, all of which contribute to decreased demand for formula and lower total sales of formula. Infant formula manufacturers have large fixed costs associated with their manufacturing plants, and operating plants at less than their optimal level may be inefficient and lead to higher per-unit costs. In the face of a shrinking market for their product, formula manufacturers may compete more aggressively for WIC contracts in order to maintain their sales volume.

almost two-thirds (65 percent) of the nonbreastfeeding women reported that “nothing” would have helped them to breastfeed (p. 77).

FNS has long made breastfeeding promotion and support a priority for WIC.<sup>107</sup> WIC program data indicate that the proportion of WIC infants who are fully or partially breastfeeding has been increasing since 1998 and appears to have accelerated slightly after the 2009 implementation of the revised food packages (fig. 20).<sup>108</sup> However, the lack of timely national data on breastfeeding among both WIC and non-WIC mothers makes it difficult to determine whether breastfeeding among WIC mothers is increasing at a faster rate than among non-WIC mothers.

Figure 20  
**Breastfeeding initiation among WIC infants, 1998-2012**



Note: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children.  
Source: Johnson et al., 2013.

<sup>107</sup>WIC breastfeeding promotion efforts include providing breastfeeding information through individual or group education for participants and their families; sponsoring peer counselor programs, breast-pump loan programs, and support groups; creating breastfeeding-friendly clinic environments and community partnerships; and providing ongoing staff education and training.

<sup>108</sup>Some of the changes made to the WIC food packages aimed to increase breastfeeding initiation, intensity, and duration.

# Impact of the 2009 Implementation of the WIC Food Package Revisions

The WIC food package changes implemented in 2009 represent the most significant changes to the WIC program since its inception in the early 1970s. A number of studies have examined the impact of the revised WIC food packages on participants' purchases, consumption of the new WIC foods and their substitutes, and the retail food environment. This section highlights some of the major changes in WIC foods resulting from the WIC food package revisions and describes the findings of some of the major studies examining their impacts.

## Changes to the WIC food packages

When WIC first began operating in 1974, WIC foods included infant formula, milk, cheese, eggs, infant and adult cereals, and fruit juice. Although several foods were added to the food packages of some participants in later years, the packages remained largely unchanged for the next three decades.<sup>109</sup> In 2003, USDA's Food and Nutrition Service contracted with the National Academies' Institute of Medicine (IOM) to conduct an evaluation of the WIC food packages. The IOM established a committee of experts that was tasked with making cost-neutral recommendations that were culturally suitable, nonburdensome to administer, and efficient for nationwide distribution and vendor checkout. In 2005, the IOM released its recommendations (Institute of Medicine of the National Academies, 2005). FNS issued an interim rule in 2007 that largely followed the IOM recommendations.<sup>110</sup> WIC State agencies were required to implement the revisions by October 2009. A few States implemented the revisions early, but most of them implemented the revisions in October 2009.<sup>111</sup> A final rule in 2014 made some additional changes, clarifying and reflecting the experiences of WIC State agencies in implementing the interim rule.<sup>112</sup> The major revisions to the WIC food packages as specified in the 2007 interim rule included:<sup>113</sup>

### *New food categories*

- Fruits and vegetables
- Whole-wheat bread
- Infant foods—fruits and vegetables for all infants and meat for fully breastfed infants.

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<sup>109</sup>In 1980, dry beans and peas or peanut butter were added to the food packages for children and pregnant and breastfeeding women, and in 1992, carrots and canned tuna were added to the food packages of women who exclusively breastfed their infants.

<sup>110</sup>72 *Federal Register*, No. 234, December 6, 2007, pp. 68966-69032. The interim rule allowed the Food and Nutrition Service to obtain feedback on major changes to the WIC food packages as recommended by the Institute of Medicine while allowing implementation to move forward. The interim rule comment period ended February 1, 2010.

<sup>111</sup>DE and NY implemented the revisions in January 2009; KY and SC implemented them in May 2009; CO implemented them in June 2009; UT implemented them in July 2009; IL, KS, MI, OK, OR, and WI implemented them in August 2009; SD implemented them in September 2009; and MT implemented them in November 2009. All other States implemented the revisions in October 2009 (Joyce and Reeder, 2014).

<sup>112</sup>79 *Federal Register*, No. 42, March 4, 2014, pp. 12274-12300.

<sup>113</sup>The summary of the major revisions draws heavily from Cole et al., 2011.



### ***Revised maximum purchase quantities***

- Quantities of milk, eggs, juice, and cheese were reduced for women and children; whole milk was restricted to 1-year olds, and only lower fat milks were available to children 2 years and older and women. Juice was eliminated from infant packages. Quantities of infant formula were reduced for partially breastfed and older infants, and increased for 4- to 5-month-old infants.

### ***Optional new food-substitution policies***

- Soy beverages and tofu may be substituted for milk in the women's packages.
- Whole-grain buns and rolls, brown rice, bulgur, barley, oatmeal, or soft corn or whole-wheat tortillas may be substituted for whole-wheat bread.
- Canned beans may be substituted for dried beans.
- Canned salmon, sardines, and mackerel may be offered in addition to or instead of canned light tuna.

### ***Cash-value voucher for fruits and vegetables***

- The cash-value vouchers for fruits and vegetables are redeemable for a particular dollar amount of fruits and vegetables (all other WIC vouchers are redeemable for a particular quantity of food). The food package for children includes a \$6 cash-value voucher and food packages for women include a \$10 cash-value voucher.

### ***Redefining Food Packages I and II***

- Prior to the revisions, Food Packages I and II were for infants 0-3 and 4-11 months of age, respectively. After the revisions, Food Packages I and II apply to infants 0-5 and 6-11 months of age, respectively, with three variations of each food package for fully formula-fed, partially breastfed, and fully breastfed infants.

The revised food packages provide participants with a wider variety of foods (including fruits and vegetables and whole grains) and better align the food packages with the 2005 Dietary Guidelines for Americans and infant feeding guidance by the American Academy of Pediatrics (Institute of Medicine of the National Academies, 2005). They also provide WIC State agencies greater flexibility in prescribing food packages to accommodate the cultural food preferences of WIC participants. Some of the revisions were designed to promote and support the establishment of successful, long-term breastfeeding.

A final rule, published on March 4, 2014,<sup>114</sup> addressed public comments submitted in response to the interim rule revising the WIC food packages and made minor adjustments that improve clarity of the provisions set forth in the interim rule.<sup>115</sup> Changes to the WIC food packages included increasing the cash-value voucher for children to \$8 per month; requiring State agencies to allow split tender transactions with the cash-value voucher; allowing State agencies to authorize farmers or farmers' markets to accept WIC cash-value vouchers; increasing the number of substitutions and options available by adding yogurt, canned jack mackerel, and whole-wheat macaroni (pasta) products; making it possible for infants 9-11 months to replace half of their infant food fruits and vegetables

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<sup>114</sup>79 *Federal Register*, No. 42, March 4, 2014, pp. 12274-12300.

<sup>115</sup>The final rule does not affect the issues described in this report, which are based on the interim rule.



for a cash-value voucher; and allowing State agencies to issue fat-reduced milk to 1-year-old children receiving Food Package IV for whom overweight or obesity is a concern.

## Impact of the revised food packages on participants' food purchases

A series of studies tracked grocery store purchases among WIC households using loyalty cards for a regional supermarket chain with over 60 stores in Connecticut and Massachusetts and examined purchases of WIC, including juice (Andreyeva et al. 2013), milk and cheese (Andreyeva et al., 2014), whole-grain products (Andreyeva and Luedicke, 2013), and fruits and vegetables (Andreyeva and Luedicke, 2014) during the 9 months before implementation of the revised food packages (January-September 2009) and the same time period a year later.<sup>116</sup> The analyses showed that WIC households purchased smaller amounts of juice, whole milk, and cheese, and greater amounts of lower fat milk, whole grains (bread and brown rice), and fruits and vegetables with their WIC benefits. WIC restrictions on whole milk shifted WIC purchases to reduced-fat milk in Connecticut and low-fat milk in Massachusetts (where WIC does not allow reduced-fat milk); in addition, the smaller quantity of milk provided by WIC led to participants purchasing less milk overall. For juice and cheese, the reduced amount provided by WIC was somewhat offset by increased purchases using non-WIC funds (cash or SNAP benefits), although total amount purchased still fell. Participants also purchased more fruit drinks and other noncarbonated beverages, but fewer soft drinks. WIC-funded purchases of whole-grain bread replaced other bread purchases, WIC-funded purchases of brown rice added to total rice purchases, and WIC-funded purchases of fruits and vegetables were somewhat offset by reduced non-WIC purchases.

Because the studies above used a pre/post design and did not include a control group, it is possible that the findings might simply be reflecting trends unrelated to the WIC policy changes. In addition, although the studies suggest that the WIC food package revisions had a positive impact on purchases of WIC foods, they only provide a partial picture. To the degree that the new WIC foods replaced prior purchases made with non-WIC funds, it is not clear how participants might have redirected those savings. For example, how did WIC participants spend the money previously used to purchase bread? Did they save it by spending less on groceries overall, or did they spend it by buying more of other foods, such as more produce, or more snacks and sweets? The public health implications of these choices would be very different (Andreyeva and Luedicke, 2013).

## Impact of the revised food packages on participants' food consumption

Several studies have compared WIC participants' consumption of WIC foods before and after the food package revisions. Spaulding et al. (2014) used data from the WIC National Food and Nutrition Survey (NATFAN) to examine reported consumption of whole-grain foods and milk. NATFAN consists of two repeated cross-sectional surveys, one administered before and one after the revision of WIC food packages. Each sampling included WIC participants who attended WIC clinics. Spaulding et al. (2014) analyzed data on more than 23,000 women and 41,800 children ages 1 through 4 who had received WIC foods in the past 30 days, and found that, after implementation of the revised food packages, greater percentages of survey respondents reported consuming lower fat milk and whole-grain foods (mainly whole-grain bread), with corresponding reductions in the

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<sup>116</sup>The revised food packages were implemented in October 2009 in the study States. October-December 2009 represented a transition time during which some participants were redeeming vouchers issued under the prior food package. Thus, those 3 months are excluded from the comparison.

percentages reporting consuming whole milk and white bread, white rice, and flour tortillas. They also observed a trend toward increased consumption of fruits and vegetables, but no difference in the variety of fruits and vegetables consumed or in the frequency of consumption of 100-percent juice. Among infants, there was an increase in consumption of commercially prepared baby food fruits and vegetables, and a decrease in the percentage consuming baby food desserts, dinners, and 100-percent juice.

Ishdorj and Capps (2013) used the same NATFAN data but focused on a sample of 1,642 Native American WIC children ages 2-4 who received WIC food packages and primarily drank cow's milk. They found no change in the amount of milk consumed, even though the revised food packages provided less milk and no longer allowed whole milk. They also observed an increase in the frequency of consumption of whole-grain bread and a corresponding reduction in the frequency of consumption of white bread, suggesting a positive impact from the addition of whole-grain bread to the WIC food packages (perhaps coupled with nutrition education).

Whaley et al. (2012b) conducted random telephone surveys of WIC participants in California, prior to and after implementation of the food package revisions, to measure participants' reported behaviors related to whole grains, fruits and vegetables, and the fat content of milk. Respondents were asked whether they consumed more, less, or about the same amount of whole grains, fruits and vegetables, lower fat milk, and whole milk compared to 6 months earlier, and also about the frequency of intake of fruits and vegetables in the past week. The clearest impacts were observed in consumption of whole-grain foods and lower fat milk, suggesting that the variety of whole-grain options available to California WIC participants adequately addressed cultural preferences, and that restricting purchases of milk to lower fat milk had the intended impact on the type of milk consumed. Results also suggest that the addition of fruits and vegetables to the WIC food packages positively influenced participants' consumption, although the two measures of fruit and vegetable consumption are more difficult to interpret since they yielded different findings. One measure (consuming more compared with 6 months ago) indicated increases in vegetable consumption with no change in fruit consumption, while the second measure (frequency of intake over the past week) suggested the opposite (increases in fruit consumption with no change in vegetable consumption).

Overall, the studies suggest that the food package revisions had the anticipated positive impact on food purchases and food consumption among WIC households.

## Impact of the revised food packages on breastfeeding

Some of the food package revisions were designed to meet both the unique nutritional needs of breastfeeding women and infants and to promote and support the establishment of successful, long-term breastfeeding. To encourage the successful initiation of breastfeeding, the interim rule recommended that formula not be routinely provided during the first month after birth for infant/mother pairs initiating breastfeeding (and if formula is provided, no more than 104 ounces be provided). To encourage greater duration and intensity of breastfeeding, partially breastfed infants were limited to no more than about half of the maximum formula amount.<sup>117</sup>

To increase the market value of the breastfeeding package, as well as address the nutritional needs of breastfeeding women, fully breastfeeding women receive greater quantities and variety of foods than

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<sup>117</sup>Under the previous packages, breastfeeding infants could receive the maximum formula amount, and their mothers could receive the fully breastfeeding package.

other women, and partially breastfeeding women receive greater quantities than nonbreastfeeding postpartum women. Breastfeeding women receive benefits for a year, whereas nonbreastfeeding postpartum women only receive benefits for 6 months. Whereas fully breastfeeding infants receive no formula, they receive additional baby foods at ages 6-11 months. In addition, the revised food packages consider the infant and the mother as a unit so the mother's food package is based on how much formula the infant receives from WIC. Partially breastfeeding infant/mother pairs requiring more formula than what is provided under the partially breastfed package can receive the full formula package even if the mother is partially breastfeeding, although she would receive less food for herself and her maternal benefits would end when the infant is 6 months old.

Recognizing that the changes related to partial breastfeeding might have unintended consequences, FNS conducted a study evaluating birth-month breastfeeding changes to the food packages (Wilde et al., 2011; Wilde et al., 2012). The study focused on infants and their mothers for the first month postpartum and the next 5 months, and used a pre/post design, comparing outcomes from shortly before and after implementation of the revised food packages. The study found a nearly 11-percentage-point decline in the percentage of mothers who received the partial breastfeeding package during the infant's birth month, accompanied by a 7.3-percentage-point increase in mothers receiving the full-breastfeeding package and an 8-percentage-point increase in mothers receiving the full formula package. However, these changes did not translate into changes in breastfeeding initiation or intensity. There was only a small change in duration of breastfeeding. The results indicate that although the policy change did not result in observable adverse effects, they also did not result in positive changes in breastfeeding, raising the question as to what further policy changes might be implemented that could positively impact breastfeeding among WIC participants. Wilde et al. (2012) noted, however, considerable diversity across local WIC agencies in breastfeeding promotion, food package assignment, infant formula amounts, and breastfeeding outcomes.

In a study of California WIC participants served by the Public Health Foundation Enterprises (PHFE) (the largest local-agency WIC program in the country, serving more than 300,000 participants monthly at 60 sites in Los Angeles, Orange, and San Bernardino Counties), Whaley et al. (2012a) measured food package assignment as a proxy for breastfeeding behavior at three points in time: before an intensive staff training and participant education, before breastfeeding policy changes, and after the implementation of the revised food packages.<sup>118</sup> They noted an 86-percent increase in the issuance of the fully breastfeeding package at infant enrollment, and a 10-percent decrease in the issuance of the formula-only package. It should be noted that California WIC conducted intensive training of front-line WIC staff and participant education during the 6 months prior to implementation of the revised food package. Changes in food package issuance rates began immediately after staff training and participant education, suggesting that the training and education might at least partly explain why the California findings differ from those by Wilde et al., 2011 and Wilde et al., 2012.

## Impact of the revised food packages on childhood obesity

Some of the food package revisions aimed to address the growing prevalence of obesity. Thus, the revised food packages provide fewer calories than the previous packages for most participants, beginning at age 4 months; the addition of fruits and vegetables and the emphasis on whole grains

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<sup>118</sup>Ideally, the study would compare the outcome variable breastfeeding behavior through maternal interviews. However, data on dose and frequency of breastfeeding are not collected this way, nor are they available in the administrative information system for all infants. Thus, the study used data on food package assignment as a proxy for breastfeeding rates. A recent study by Whaley et al. (2012c) validated the use of infant food packages as a proxy for breastfeeding behavior.

are consistent with recommendations for food patterns that may contribute to a healthy body weight, and the revised food packages aimed to promote breastfeeding may also reduce the risk of obesity (Institute of Medicine of the National Academies, 2005). Together with nutrition education, the WIC food package revisions were expected to play an important role in reducing childhood obesity and promoting optimal pregnancy weight gain and postpartum weight status.

Data from the National Health and Nutrition Examination Survey (NHANES) indicate that, whereas the prevalence of obesity among 2- to 5-year olds remained fairly stable between 1999-2000 and 2009-10 (Ogden et al., 2012), the prevalence of obesity among 2- to 5-year olds declined from 12.1 percent in 2003-04 to 8.1 percent in 2011-12 (Ogden et al., 2014, Centers for Disease Control and Prevention, 2014b). Some have interpreted this as evidence that the WIC food package revisions are impacting the weight status of young children; others, however, question whether the numbers indicate a true decline, given the small sample sizes in NHANES and the large margins of error in the estimates (Begley, 2014).

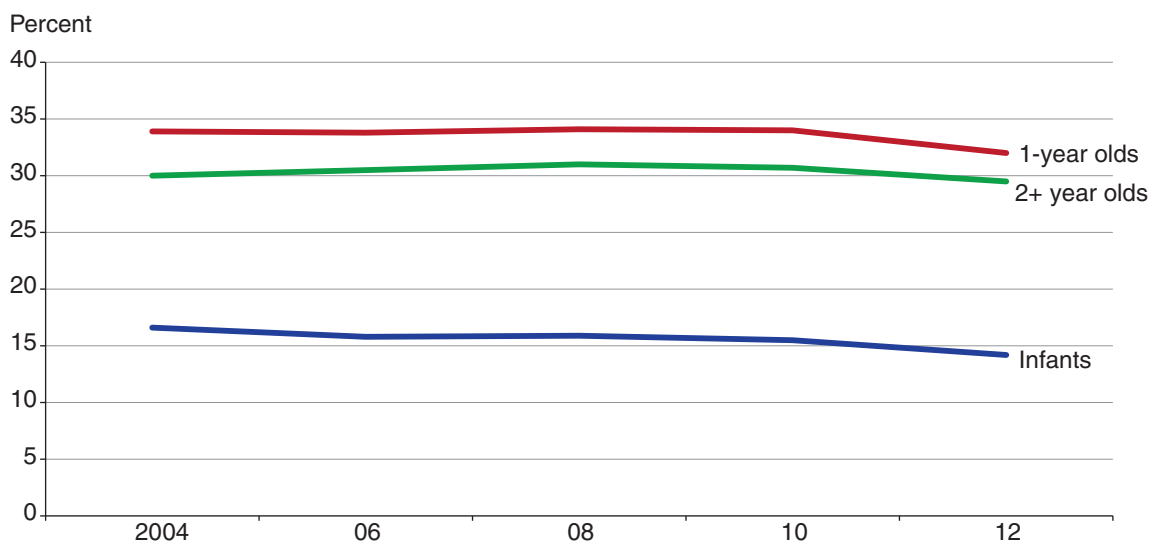
However, other data (on large numbers of infants and preschool children) also document small but significant decreases in childhood obesity in a number of States, which may be consistent with the timing of the implementation of the revised food packages. For example, data from the Pediatric Nutrition Surveillance System (PedNSS) indicate that, among low-income preschool children, the prevalence of obesity declined between 2008 and 2011 in 18 States, did not change in 20 States, and increased in the remaining 3 States (May et al., 2013). Similarly, Sekhobo et al. (2013) indicate that, among 3- to 4-year-old WIC children in Los Angeles County, the prevalence of obesity declined between 2009 and 2011, reversing the earlier trend observed between 2003 and 2009 of increasing obesity prevalence. However, the pattern in New York City—declining prevalence of obesity among 3- to 4-year-old WIC children between 2003 and 2009 and virtually no change between 2009 and 2011—is inconsistent with the revised WIC food packages having a positive impact on childhood obesity. Data from the WIC Participant and Program Characteristics Study (Johnson et al., 2013) also appear to support some improvement in childhood obesity among WIC infants and children between 2010 and 2012 (fig. 21).<sup>119</sup>

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<sup>119</sup>Children falling at or above the 85th percentile and below the 95th percentile are considered "at risk for overweight"; children at or above the 95th percentile are considered overweight.

Figure 21

**Percent of WIC infants and children with high weight-for-length or weight-for-height**



Notes: WIC refers to the Special Supplemental Nutrition Program for Women, Infants, and Children. For infants, high weight-for-length is defined as greater than or equal to the 90th Center for Disease Control and Prevention (CDC) percentile for infants, and greater than or equal to the 85th CDC percentile for 1-year olds; high weight-for-length is defined here as greater than or equal to the 85th CDC percentile for 2-year olds.

Source: Connor et al. (2010) and Johnson et al. (2013).

## Research Issues and Data Needs

WIC has served low-income, nutritionally at-risk women, infants, and children for over 40 years and has become an important component of the Federal Government's food and nutrition safety net. While much is known about the program and its impacts, new issues arise as the program continues to evolve. Given the current Federal fiscal landscape and competition for resources, it is important for WIC to address questions related to the program's integrity and cost-effectiveness. There are a number of issues that would benefit from additional research, and new data sources may prove beneficial in helping to provide answers.

### Research issues

#### *Food choices and food package costs*

Because food accounts for about 70 percent of WIC program costs, States implement a number of cost-management strategies focusing on reducing food package costs, such as placing limits on the brands, types, and food package sizes that WIC participants can purchase with their benefits. Little research is available on the food choices that WIC participants make, how those choices are affected by the constraints imposed by the WIC State agency, and how those food choices affect food voucher costs. For example, do participants tend to purchase the most economical items regardless of other options, or do many of them tend to purchase the most expensive option available with the WIC benefits? When States place strict limits on WIC foods, does that result in some of the food items being purchased mostly by WIC participants, and do retailers take advantage of their price insensitivity and raise the price of those food items? And, to what extent, if any, do the food limits affect participation in the program?

#### *Partial voucher redemptions*

Most paper food instruments require participants to purchase a combination of WIC foods at the same time. However, paper food instruments provide no information on the types or prices of foods that WIC participants purchase, only the total cost of the purchase. Partial voucher redemptions—when participants do not purchase all the foods listed on the paper food instruments in the prescribed amounts—can therefore affect voucher costs, reflecting differences in quantities purchased rather than differences in prices. Yet many State agencies use differences in voucher costs across stores as a proxy for price differences. Because of the lack of data, the degree to which partial redemptions occur is unknown. Research is needed on the extent of partial voucher redemptions, its impact on voucher costs, and likely reasons for partial voucher redemptions. For example, how is it affected by household size and the number of WIC participants in the household? Is it more common among some types of food categories (e.g., milk) than others? To what extent is partial voucher redemption a participant choice or due to problems participants experience when using their food instruments? Are partial redemptions more common in some types of stores or among certain participant categories than others?

In States with EBT, participants no longer have to purchase combinations of WIC items at the same time and WIC benefits are aggregated at the household level. Anecdotal evidence suggests that food package costs decline—at least in the short run—when States transition to EBT, although the reasons for this are not quite clear. Is it because participants forget to purchase some of the foods, or is it because they now choose to purchase smaller quantities of some of the foods or not purchase some foods at all?



### ***A-50 stores***

The issue of WIC-only stores is complex and controversial. On one hand, they increase access to program benefits and reduce stigma for some participants. On the other hand, they have been associated with higher food costs. The Child Nutrition and WIC Reauthorization Act of 2004 imposed restrictions on WIC-only stores and expanded the restriction to all vendors who derive more than 50 percent of their annual food sales revenue from WIC food instruments (thus creating a new type of WIC vendor, the A-50 stores). The Act required that WIC State agencies ensure that the authorization of A-50 vendors does not result in higher program food costs (A-50s can only be paid the state-wide average for each food voucher). These WIC regulations can serve as a disincentive for these types of stores to participate in WIC. The monitoring of A-50s also increases the administrative burden for States, many of which have decided not to allow any A-50s.

More research is needed on the costs and benefits associated with A-50s. For example, are there different types of A-50s and do they operate under different business models? To what degree are their food voucher costs higher, and to what extent is this due to their having fewer partial voucher redemptions? Have the restrictions reduced the incentive for A-50s to encourage participants to fully redeem their WIC food vouchers? What are the implications of selecting 50 percent of annual food sales from WIC as the cutoff for A-50s?<sup>120</sup> Would the program be better served by using a different cutoff, or a different method for managing food costs?

### ***Breastfeeding***

WIC promotes breastfeeding to all pregnant women as the optimal infant feeding choice (unless medically contraindicated). Data on breastfeeding initiation and duration among WIC infants is available every 2 years from the FNS-sponsored WIC Participant and Program Characteristics Study. However, there are no good, timely, national sources of breastfeeding data that allow for comparison of breastfeeding rates between WIC participants and nonparticipants. Currently, the only breastfeeding data that allow for this type of comparison come from the National Immunization Survey (NIS). However, given the survey design, breastfeeding data for a birth cohort are only available 5-6 years after the most recent survey. This means it is not possible to determine whether the slight increase in breastfeeding initiation indicated by the WIC data is a response to the WIC food package revisions or just reflects similar trends that might have occurred among nonparticipants also.

### ***Effects of product innovations***

Since the WIC food package expanded in October 2009, State WIC agencies have been asked to approve a growing number of food products for purchase with WIC vouchers. During this time, there has also been an increase in the number of food products with added functional ingredients, which often increases the cost of these products to consumers and to the WIC program. Some examples of added functional ingredients that are now commonly found in WIC food categories are omega-3 fatty acids in juices, breads, and cereals; added fiber in juices, bread, tortillas, and cereals; and ARA and DHA in infant formula. Not wanting to be perceived as providing inferior (unsupplemented) products, some WIC State agencies often allow the higher cost products, even though there may be no evidence that the products are nutritionally superior to the unsupplemented versions.

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<sup>120</sup>For example, anecdotal evidence suggests that some WIC vendors who are close to the 50-percent cutoff stop selling to WIC customers near the end of the month so that they do not fall into the A-50 category of stores and be taken off the program. This has resulted in a new group of stores, the so called A-49s.



Little is known about the extent to which functional ingredients are allowed by WIC State agencies, their effectiveness, and their cost impact to WIC.

### ***Periconceptional nutrition***

Studies increasingly indicate the importance of nutrition immediately prior to and after conception. While WIC does not serve women prior to their first pregnancy, the program serves millions of women after pregnancies, which represents an opportunity to optimize women's nutrition and weight status prior to the next conception. Research is needed to examine the impact of WIC participation during an earlier pregnancy on the subsequent health and nutritional status of mothers and fetal/birth outcomes and also on how WIC might enhance its effectiveness in improving postpartum women's health during the course of regular service delivery. For example, because of the short certification period for the postpartum mother, WIC focuses on the more urgent infant feeding issues. It may prove cost effective to lengthen the postpartum certification period to improve the health of postpartum women prior to their next pregnancy. Furthermore, under current Federal guidelines, if WIC funding is reduced such that all eligible participants cannot be served, nonbreast-feeding postpartum mothers are the first to be moved to a wait-list status. This has the potential to cause significant adverse impacts in the future—for postpartum mothers likely to become pregnant again, reducing their services represents not only a significant loss of nutritional support but also lessens the focus of WIC staff on postpartum women (National WIC Association, 2012).

## **Potential new data sources**

### ***WIC EBT data***

All WIC State agencies are required to switch from paper food instruments to EBT by October 2020. The increasing availability of WIC EBT data could make it possible to examine the food choices of WIC participants, how those choices are affected by the constraints imposed by the WIC State agency, and how those choices affect food costs. Merging the WIC EBT data with other WIC administrative databases, such as participant issuance data, could also shed light on the extent to which WIC participants purchase all of the benefits prescribed, what foods are less likely to be purchased, and the effect of various factors on food purchases (such as ethnicity, household size, and number of WIC participants in the family). Understanding what types of participants are more likely to underutilize their benefits would allow WIC State agencies to better develop and target nutrition education activities.

### ***WIC administrative data***

WIC programs collect vast amounts of health and food data through their management information systems (MIS) that could be used for better understanding of various issues. However, most MIS are not designed for easy data retrieval and analysis. In addition, nonstandardized definitions make it difficult to compare variables across States, and efforts to aggregate State-level data for national-level analysis are very time-intensive and expensive. As tighter budgets have reduced research funds, it is critical to consider how to make WIC program data, including EBT data, more easily available for both internal programmatic evaluations and for the broader research community. Improving the availability and quality of WIC administrative data could help WIC State agencies monitor program changes, assess the impact of food item restrictions, assist in fraud detection, and answer questions about the efficiency and effectiveness of day-to-day service delivery. It could also enhance business functionality by facilitating the development and implementation of an electronic State-to-State

transfer system for WIC certification records, facilitate comparisons across States, and conduct national-level analysis (National WIC Association, 2014a).

### ***WIC policy database***

WIC State agencies have flexibility in how they administer the program (e.g., their cost-containment practices, the foods that participants are allowed to purchase, nutrition education, etc.). Although such flexibility can improve WIC's ability to meet participants' needs, it makes comparisons across States more difficult. In particular, it is difficult to compare and evaluate the effectiveness of different practices, such as cost-containment practices or the impact on breastfeeding of not allowing formula in the first month. There is also a lack of easily available information on State policies and food lists. The creation and maintenance of such a database—with standardized content and formats across States—would provide a central source of information on State policy options in WIC and facilitate research on the effectiveness of alternative policies.

## References

- American Public Health Association. November 2013. *ACA Basics and Background*.
- Andreyeva, T., and J. Luedicke. October 2013. "Federal Food Package Revisions: Effects on Purchases of Whole-Grain Products," *American Journal of Preventive Medicine* 45(4): 422-29. <http://www.sciencedirect.com/science/article/pii/S0749379713003851> (accessed May 14, 2014).
- Andreyeva, T., and J. Luedicke. May 2014. "Incentivizing Fruit and Vegetable Purchases Among Participants in the Special Supplemental Nutrition Program for Women, Infants, and Children," *Public Health Nutrition* 9:1-9.
- Andreyeva, T., J. Luedicke, K. E. Henderson, and M.B. Schwartz. April 2014. "The Positive Effects of the Revised Milk and Cheese Allowances in the Special Supplemental Nutrition Program for Women, Infants, and Children," *Journal of the Academy of Nutrition and Dietetics* 114(4): 622-30. <http://www.sciencedirect.com/science/article/pii/S2212267213013737> (accessed May 14, 2014).
- Andreyeva, T., J. Luedicke, A.S. Tripp, and K.E. Henderson. May 2013. "Effects of Reduced Juice Allowances in Food Packages for the Women, Infants, and Children Program," *Pediatrics* 131(5): 919-27. <http://pediatrics.aappublications.org/content/131/5/919.full> (accessed May 14, 2014).
- Andreyeva, T., J. Luedicke, A.E. Middleton, M.W. Long, and M.B. Schwartz. June 2012. "Positive Influence of the Revised Special Supplemental Nutrition Program for Women, Infants, and Children Food Packages on Access to Healthy Foods," *Journal of the Academy of Nutrition and Dietetics* 112(6): 850-58. <http://www.sciencedirect.com/science/article/pii/S2212267212002869> (accessed May 14, 2014).
- Andreyeva, T., J. Luedicke, A.E. Middleton, M.W. Long, and M.B. Schwartz. April 2011a. *Changes in Access to Healthy Foods After Implementation of the WIC Food Package Revisions*, Contractor and Cooperator Report No. 66, U.S. Department of Agriculture, Economic Research Service. <http://naldc.nal.usda.gov/download/48404/PDF> (accessed May 14, 2014).
- Andreyeva, T., A.E. Middleton, M.W. Long, J. Luedicke, and M.B. Schwartz. June 2011b. "Food Retailer Practices, Attitudes and Beliefs About the Supply of Healthy Foods," *Public Health Nutrition* 14(6): 1024-31. [http://www.yaleruddcenter.org/resources/upload/docs/what/economics/FoodRetailers\\_PHN\\_6.11.pdf](http://www.yaleruddcenter.org/resources/upload/docs/what/economics/FoodRetailers_PHN_6.11.pdf) (accessed May 14, 2014).
- Ayala, G. X., M.N. Laska, S.N. Zenk, J. Tester, D. Rose, A. Odoms-Young, T. McCoy, J. Gittelson, G. D. Foster, and T. Andreyeva. September 2012. "Stocking Characteristics and Perceived Increases in Sales Among Small Food Store Managers/Owners Associated with the Introduction of New Food Products Approved by the Special Supplemental Nutrition Program for Women, Infants, and Children," *Public Health Nutrition* 15(9): 1771-9.
- Bartlett, S., E. Bobronnikov, and M. Mendelson. December 2007. *WIC Participant and Program Characteristics 2006*, Special Nutrition Programs Report No. WIC-06-PC, U.S. Department of Agriculture, Food and Nutrition Service. [http://www.fns.usda.gov/sites/default/files/pc2006\\_0.pdf](http://www.fns.usda.gov/sites/default/files/pc2006_0.pdf) (accessed May 2014).

- Bartlett, S., M. Brown-Lyons, D. Moore, and A. Estacion. May 2000. *WIC Participant and Program Characteristics 1998*, Special Nutrition Programs Report No. WIC-00-PC, U.S. Department of Agriculture, Food and Nutrition Service. <http://www.fns.usda.gov/sites/default/files/PC98rpt.pdf> (accessed April 2014).
- Bartlett, S., R. Olvera, N. Gill, and M. Laramie. July 2002. *WIC Participant and Program Characteristics 2000*, Special Nutrition Programs Report No. WIC-02-PC, U.S. Department of Agriculture, Food and Nutrition Service. <http://www.fns.usda.gov/sites/default/files/pc2000.pdf> (accessed May 2014).
- Begley, S. March 16, 2014. "A Plunge in U.S. Preschool Obesity? Not So Fast, Experts Say." *Reuters*. <http://www.reuters.com/article/2014/03/16/us-usa-health-obesity-insight-idUSBRE-A2F0CX20140316> (accessed May 14, 2014).
- Betson, D. January 2009. *Impact of the WIC Program on the Infant Formula Market*, Contractor and Cooperator Report No. 51, U.S. Department of Agriculture, Economic Research Service. <http://naldc.nal.usda.gov/download/32816/PDF> (accessed May 14, 2014).
- Birnbaum, J. April 3, 1995. "The Politics of Cereal: When Sugar Isn't Sweet," *Time*. <http://content.time.com/time/magazine/article/0,9171,982750,00.html> (accessed May 14, 2014).
- California Department of Public Health. September 2009. *VENDOR ALERT 2009-15*. <http://www.cdph.ca.gov/programs/wicworks/Documents/VendorAlerts/WIC-Grocer-Alert-2009-15.pdf> (accessed May 14, 2014).
- California Department of Public Health. March 2011. *VENDOR ALERT 2011-01*. <http://www.cdph.ca.gov/programs/wicworks/Documents/VendorAlerts/WIC-Vendor-Alert-2011-01.pdf> (accessed May 14, 2014).
- California Department of Public Health. June 2013. *VENDOR ALERT 2013-03*. <http://www.cdph.ca.gov/programs/wicworks/Documents/VendorAlerts/WIC-VMV-Vendor-Alert-2013-03.pdf> (accessed May 14, 2014).
- California WIC Association. March 2010. *Concerns About Infant Formula Marketing and Additives*. [http://babymilkaction.org/sites/info.babymilkaction.org/files/Formula%20Issue%20Brief%20March%202010\\_0.pdf](http://babymilkaction.org/sites/info.babymilkaction.org/files/Formula%20Issue%20Brief%20March%202010_0.pdf) (accessed May 14, 2014).
- California WIC Association. March 2012. *WIC Grocery Store Authorizations Need to Remain Frozen Until High Prices Can Be Controlled*. [http://calwic.org/storage/documents/state/2014/CWA\\_WIC\\_STORES\\_PAPER\\_FINAL.pdf](http://calwic.org/storage/documents/state/2014/CWA_WIC_STORES_PAPER_FINAL.pdf) (accessed May 14, 2014).
- Castner, L., J. Mabli, and J. Sykes. April 2009. *Dynamics of WIC Program Participation by Infants and Children, 2001 to 2003: Final Report*, Mathematica Policy Research, Inc. <http://www.fns.usda.gov/sites/default/files/WICDynamics2001-2003.pdf> (accessed May 16, 2014).
- Centers for Medicare & Medicaid Services, Centers for Medicaid & CHIP Services. 2014. *State Medicaid and CHIP Income Eligibility Standards*. <http://www.medicare.gov/AffordableCareAct/Medicaid-Moving-Forward-2014/Downloads/Medicaid-and-CHIP-Eligibility-Levels-Table.pdf> (accessed September 10, 2014).

- Centers for Disease Control and Prevention. 2014a. *Breastfeeding Among U.S. Children Born 2000–2011*, CDC National Immunization Survey. [http://www.cdc.gov/breastfeeding/data/NIS\\_data/index.htm](http://www.cdc.gov/breastfeeding/data/NIS_data/index.htm) (accessed May 14, 2014).
- Centers for Disease Control and Prevention. February 2014b. “New CDC Data Show Encouraging Development In Obesity Rates Among 2 to 5 Year Olds,” CDC Newsroom, Press Release. <http://www.cdc.gov/media/releases/2014/p0225-child-obesity.html> (accessed May 14, 2014).
- Cole, N., J. Jacobson, I. Nichols-Barrer, and M. K. Fox. June 2011. *WIC Food Packages Policy Options Study*, Report No. WIC-11-Food, U.S. Department of Agriculture, Food and Nutrition Service, Office of Research and Analysis. [http://www.fns.usda.gov/sites/default/files/WICFoodPackageOptions\\_0.pdf](http://www.fns.usda.gov/sites/default/files/WICFoodPackageOptions_0.pdf) (accessed May 14, 2014).
- Colman, S., I. P. Nichols-Barrer, J. E. Redline, B. L. Devaney, S. V. Ansell, and T. Joyce. January 2012. *Effects of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): A Review of Recent Research*, WIC-12-WM, U.S. Department of Agriculture, Food and Nutrition Service, Office of Research and Analysis. <http://www.fns.usda.gov/sites/default/files/WICMedicaidLitRev.pdf> (accessed May 14, 2014).
- Congress of the United States. June 2012. Letter from Members of Congress to Secretary Tom Vilsack. [http://walden.house.gov/uploads/2012\\_06\\_27--Walden-Meeks\\_WIC\\_Potato\\_Ltr\\_Vilsack\\_Signed\\_Copy.pdf](http://walden.house.gov/uploads/2012_06_27--Walden-Meeks_WIC_Potato_Ltr_Vilsack_Signed_Copy.pdf) (accessed May 14, 2014).
- Connor, P., S. Bartlett, M. Mendelson, K. Condon, and J. Sutcliffe. January 2010. *WIC Participant and Program Characteristics 2008*, Special Nutrition Programs Report No. WIC-08-PC, U.S. Department of Agriculture, Food and Nutrition Service. [http://www.fns.usda.gov/sites/default/files/pc2008\\_0.pdf](http://www.fns.usda.gov/sites/default/files/pc2008_0.pdf) (accessed May 2014).
- Davis, D., and E. Leibtag. January 2005. *Interstate Variation in WIC Food Package Costs: The Role of Food Prices, Caseload Composition, and Cost-Containment Practices*, FANRR-41, U.S. Department of Agriculture, Economic Research Service. <http://www.ers.usda.gov/publications/fanrr-food-assistance-nutrition-research-program/fanrr41.aspx> (accessed May 14, 2014).
- DeNavas-Walt, C., and B. D. Proctor. September 2014. *Income and Poverty in the United States: 2013*, Current Population Reports, P60-249, U.S. Department of Commerce, U.S. Census Bureau. <http://www.census.gov/content/dam/Census/library/publications/2014/demo/p60-249.pdf> (accessed October 2014).
- Devaney, B. December 2007. *WIC Turns 35: Program Effectiveness and Future Directions*, Paper Presented at the National Invitational Conference of the Early Childhood Research Collaborative, Minneapolis, Minnesota.
- Devaney, B., L. Bilheimer, and J. Schore. October 1990. *The Savings in Medicaid Costs for Newborns and Their Mothers from Prenatal WIC Participation in the WIC Program: Volume 1*, U.S. Department of Agriculture, Food and Nutrition Service, Office of Analysis and Evaluation. <http://www.fns.usda.gov/sites/default/files/SavVol1-Pt1.pdf> (accessed May 14, 2014).
- Executive Office of the President, Office of Management and Budget. June 2012. *OMB Circular A-133, Compliance Supplement*. [http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a133\\_compliance/2012/compliance-supplement\\_june-2012.pdf](http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a133_compliance/2012/compliance-supplement_june-2012.pdf) (accessed May 14, 2014).



- Fischer, T.P., and B.H. Olson. May 2014. "A Qualitative Study to Understand Cultural Factors Affecting a Mother's Decision to Breast or Formula Feed," *Journal of Human Lactation* 30(2): 209-16. <http://jhl.sagepub.com/content/30/2/209.full> (accessed May 14, 2014).
- Fox, M. K., W. Hamilton, and B-H. Lin. October 2004. *Effects of Food Assistance and Nutrition Programs on Nutrition and Health: Volume 3, Literature Review*, Food Assistance and Nutrition Research Report No. 19-3, U.S. Department of Agriculture, Economic Research Service. [http://www.ers.usda.gov/media/872926/fanrr19-3fm\\_002.pdf](http://www.ers.usda.gov/media/872926/fanrr19-3fm_002.pdf) (accessed May 14, 2014).
- Geller, D., M. Harrington, and G. Huang. April 2012a. *National Survey of WIC Participants II: Volume 1: Participant Characteristics (Final Report)*, Special Nutrition Programs Report No. CN-10-NSWP2-R2, U.S. Department of Agriculture, Food and Nutrition Service. <http://www.fns.usda.gov/sites/default/files/NSWP-II.pdf> (accessed May 14, 2014).
- Geller, D., M. Harrington, and A. Vinokurov. April 2012b. *National Survey of WIC Participants II: Volume 2: State and Local Agencies (Final Report)*, Special Nutrition Programs Report No. CN-10-NSWP-II-R2, U.S. Department of Agriculture, Food and Nutrition Service. [http://www.fns.usda.gov/sites/default/files/NSWP-II\\_Vol2.pdf](http://www.fns.usda.gov/sites/default/files/NSWP-II_Vol2.pdf) (accessed May 14, 2014).
- Gittelsohn J., M.N. Laska, T. Andreyeva, G. Foster, D. Rose, J. Tester, S.H. Lee, S.N. Zenk, A. Odoms-Young, T. McCoy, G.X. Ayala. September 2012. "Small Retailer Perspectives of the 2009 Women, Infants and Children Program Food Package Changes," *American Journal of Health Behavior* 36(5): 655-65.
- Gleason, S., J. Pooler, L. Bell, L. Erickson, C. Eicheldinger, J. Porter, and A. Hedershott. November 2013. *2013 WIC Vendor Management Study: Final Report*, U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support, Nutrition Assistance Program Report. <http://www.fns.usda.gov/sites/default/files/2013WICVendor.pdf> (accessed May 14, 2004).
- Gleason, S., R. Morgan, L. Bell, and J. Pooler. March 2011. *Impact of the Revised WIC Food Package on Small WIC Vendors: Insight From a Four-State Evaluation*, Altarum Institute, Ann Arbor, MI. <http://altarum.org/sites/default/files/uploaded-publication-files/FourStateWICFoodPackageEvaluation-Full%20Report-20May11.pdf> (accessed September 8, 2014).
- Hanson, K., and V. Oliveira. March 2009. *Economic Linkages Between the WIC Program and the Farm Sector*, EB-12, U.S. Department of Agriculture, Economic Research Service. <http://www.ers.usda.gov/publications/eb-economic-brief/eb12.aspx> (accessed May 14, 2014).
- Hanson, K., and V. Oliveira. September 2012. *How Economic Conditions Affect Participation in USDA Nutrition Assistance Programs*, EIB-100, U.S. Department of Agriculture, Economic Research Service. <http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib100.aspx> (accessed May 14, 2014).
- Havens, E.K., K. S. Martin, J. Yan, D. Dauser-Forrest, and A.M. Ferris. October 2012. "Federal Nutrition Program Changes and Healthy Food Availability," *American Journal of Preventive Medicine* 43(4): 419-22. <http://www.sciencedirect.com/science/article/pii/S0749379712004345> (accessed May 14, 2014).
- Hillier, A., J. McLaughlin, C. Cannuscio, M. Chilton, S. Krasny, and A. Karpyn. 2012. "The Impact of WIC Food Package Changes on Access to Healthful Food in 2 Low-Income Urban

- Neighborhoods,” *Journal of Nutrition Education and Behavior* 44(3): 210-16. <http://www.sciencedirect.com/science/article/pii/S1499404611005124> (accessed May 14, 2014).
- Institute of Medicine of the National Academies. 2005. *WIC Food Packages: Time for a Change*, Committee to Review the WIC Food Packages, Food and Nutrition Board. [http://www.nap.edu/openbook.php?record\\_id=11280](http://www.nap.edu/openbook.php?record_id=11280) (accessed May 14, 2014).
- Ishdorj, A., and O. Capps. October 2013. “The Effect of Revised WIC Food Packages on Native American Children,” *American Journal of Agricultural Economics* 95(5): 1266-72. <http://ajae.oxfordjournals.org/content/95/5/1266> (accessed May 14, 2014).
- Jacknowitz, A., and L. Tiehen. June 2009. “Transitions Into and Out of the WIC Program: A Cause for Concern?” *Social Science Review* 83(2): 151-83.
- Jiang, M., E. M. Foster, and C. M. Gibson-Davis. February 2010. “The Effect of WIC on Breastfeeding: A New Look at an Established Relationship,” *Children and Youth Services Review* 32(2): 264-73. <http://www.sciencedirect.com/science/article/pii/S0190740909002497> (accessed May 14, 2014).
- Johnson, P., L. Giannarelli, E. Huber, and D. Betson. March 2014. *National and State-Level Estimates of Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Eligibles and Program Reach, 2011*, Report No. WIC-14-ELIG, U.S. Department of Agriculture, Food and Nutrition Service, Office of Research and Analysis. <http://www.fns.usda.gov/sites/default/files/WICEligibles2011Volume1.pdf> (accessed May 14, 2014).
- Johnson, B., B. Thorn, B. McGill, A. Suchman, M. Mendelson, K.L. Patlan, B. Freeman, R. Gotlieb, and P. Connor. December 2013. *WIC Participant and Program Characteristics 2012, Final Report*, U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support. <http://www.fns.usda.gov/women-infants-and-children-wic-participant-and-program-characteristics-2012> (accessed May 14, 2014).
- Joyce, T., and J. Reeder. August 2014. “Changes in Breastfeeding Among WIC Participants Following Implementation of the New Food Package,” *Maternal and Child Health Journal*.
- Kirlin, J., N. Cole, C. Logan, and P. Kaufman. February 2003. *Assessment of WIC Cost-Containment Practices: Final Report*, E-FAN-03005, U.S. Department of Agriculture, Economic Research Service. <http://www.ers.usda.gov/publications/efan-electronic-publications-from-the-food-assistance-nutrition-research-program/efan03005.aspx> (accessed May 14, 2014).
- Leibtag, E., and A. Kumcu. May 2011. *The WIC Fruit and Vegetable Cash Voucher: Does Regional Price Variation Affect Buying Power?* EIB-75, U.S. Department of Agriculture, Economic Research Service. <http://ers.usda.gov/publications/eib-economic-information-bulletin/eib75.aspx> (accessed May 14, 2014).
- Leonard, R. September 17, 1999. “A Little Bit of Sugar Makes WIC a Big Mess,” *Nutrition Week*.
- Martin, J.A., B.E. Hamilton, M.J.K. Osterman, S.C. Curtin, and T.J. Mathews. December 2013. *Births: Final Data for 2012*, 62(9), National Vital Statistics Reports, National Center for Health Statistics. [http://www.cdc.gov/nchs/data/nvsr/nvsr62/nvsr62\\_09.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr62/nvsr62_09.pdf) (accessed May 14, 2014).



- May, A.L., L. Pan, B. Sherry, H.M. Blanck, D. Galuska, K. Dalenius, B. Polhamus, L. Kettel-Khan, and L.M. Grummer-Stawn. August 2013. “Vital Signs: Obesity Among Low-Income, Preschool-Aged Children—United States, 2008-2011,” *Morbidity and Mortality Weekly Report* 62(31): 629-34. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6231a4.htm> (accessed May 14, 2014).
- McAllister, B. October 8, 1998. “Raisin Stakes in Bran Ban,” *The Washington Post*.
- Michigan Department of Community Health. 2013. *Michigan WIC Food Guide*. [http://www.michigan.gov/documents/mdch/Food\\_Guide\\_FINAL\\_English\\_437204\\_7.pdf](http://www.michigan.gov/documents/mdch/Food_Guide_FINAL_English_437204_7.pdf) (accessed May 14, 2014).
- Mieszkowski, K. April 21, 2012. “Gouged by Some Small Groceries, Food Program Cracks Down,” *The New York Times*. [http://www.nytimes.com/2012/04/22/us/wic-caps-california-reimbursements-after-stores-raise-food-prices.html?pagewanted=all&\\_r=0](http://www.nytimes.com/2012/04/22/us/wic-caps-california-reimbursements-after-stores-raise-food-prices.html?pagewanted=all&_r=0) (accessed May 14, 2014).
- National WIC Association. 2012. *2012 NWA WIC Research Needs Assessment*. <http://www.paramountcommunication.com/nwica/2012NWAWICResearchNeedsAssessment.pdf> (accessed May 29, 2014).
- National WIC Association. November 2011. *NWA Position on Functional Ingredients*. <http://www.paramountcommunication.com/nwica/FunctionalIngredients.pdf> (accessed May 14, 2014).
- National WIC Association. January 2014a. “Tell Congress Not to Circumvent the Science of the WIC Food Package,” News and Blog. <https://www.nwica.org/blog/tell-congress-not-to-circumvent-the-science-of-the-wic-food-package> (accessed May 14, 2014).
- National WIC Association. 2014b. *Unpublished Data on NSA funds by Activity, FY 2012*.
- Neuberger, Z. September 2011. *Claim Regarding High WIC Administrative Costs Is False*, Center on Budget and Policy Priorities. <http://www.cbpp.org/cms/index.cfm?fa=view&id=3514> (accessed May 14, 2014).
- Neuberger, Z. June 2010. *WIC Food Package Should Be Based on Science: Foods with New Functional Ingredients Should Be Provided Only If They Deliver Health or Nutritional Benefits*, The Center on Budget and Policy Priorities. <http://www.cbpp.org/cms/?fa=view&id=3201> (accessed May 14, 2014).
- Ogden, C.L., M.D. Carroll, B.K. Kit, and K.M. Flegal. February 2012. “Prevalence of Obesity and Trends in Body Mass Index Among US Children and Adolescents, 1999-2010,” *Journal of the American Medical Association* 307(5): 483-90. <http://jama.jamanetwork.com/article.aspx?articleid=1104932> (accessed May 14, 2014).
- Ogden, C.L., M.D. Carroll, B.K. Kit, and K.M. Flegal. February 2014. “Prevalence of Childhood and Adult Obesity in the United States, 2011-2012,” *Journal of the American Medical Association* 311(8): 806-14. <http://jama.jamanetwork.com/article.aspx?articleid=1832542> (accessed May 14, 2014).
- Oliveira, V., and D. Davis. August 2006. *Recent Trends and Economic Issues in the WIC Infant Formula Rebate Program*, ERR-22, U.S. Department of Agriculture, Economic Research Service. <http://www.ers.usda.gov/publications/err-economic-research-report/err22.aspx> (accessed May 14, 2014).

- Oliveira, V., and E. Frazão. April 2009. *The WIC Program: Background, Trends, and Economic Issues, 2009 Edition*, ERR-73, U.S. Department of Agriculture, Economic Research Service. <http://www.ers.usda.gov/publications/err-economic-research-report/err73.aspx> (accessed May 14, 2014).
- Oliveira, V., E. Frazão, and D. Smallwood. August 2011. *The Infant Formula Market: Consequences of a Change in the WIC Contract Brand*, ERR-124, U.S. Department of Agriculture, Economic Research Service. <http://www.ers.usda.gov/publications/err-economic-research-report/err124.aspx> (accessed May 14, 2014).
- Oliveira, V., E. Frazão, and D. Smallwood. February 2010. *Rising Infant Formula Costs to the WIC Program: Recent Trends in Rebates and Wholesale Prices*, ERR-93, U.S. Department of Agriculture, Economic Research Service. <http://www.ers.usda.gov/publications/err-economic-research-report/err93.aspx> (accessed May 14, 2014).
- Oliveira, V., E. Frazão, and D. Smallwood. December 2013. *Trends in Infant Formula Rebate Contracts: Implications for the WIC Program*, EIB-119, U.S. Department of Agriculture, Economic Research Service. <http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib119.aspx> (accessed May 14, 2014).
- Oliveira, V., M. Prell, D. Smallwood, and E. Frazão. June 2004. *WIC and the Retail Price of Infant Formula*, FANRR-39-1, U.S. Department of Agriculture, Economic Research Service. <http://webarchives.cdlib.org/swltx36512/http://www.ers.usda.gov/Publications/FANRR39-1/> (accessed May 14, 2014).
- Oliveira, V., E. Racine, J. Olmsted, and L. Ghelfi. September 2002. *The WIC Program: Background, Trends, and Issues*, FANRR-27, U.S. Department of Agriculture, Economic Research Service. <http://www.ers.usda.gov/publications/fanrr-food-assistance-nutrition-research-program/fanrr27.aspx> (accessed May 14, 2014).
- Randall, B., S. Bartlett, and S. Kennedy. August 1998. *Study of WIC Participant and Program Characteristics, 1996*, FNS 53-3198-3-026, U.S. Department of Agriculture, Food and Nutrition Service. <http://www.fns.usda.gov/sites/default/files/pc96fr.pdf> (accessed April 2014).
- Rhodan, M. January 9, 2014. "The Potato Lobby Wants in on WIC," *TIME*. <http://swampland.time.com/2014/01/09/the-potato-lobby-wants-in-on-wic/> (accessed May 14, 2014).
- Rogers, H. January 2014. "Explanatory Statement Submitted by Mr. Rogers of Kentucky, Chairman of the House Committee on Appropriations Regarding the House Amendment to the Senate Amendment on H.R. 3547, Consolidated Appropriations Act, 2014." <http://www.nist.gov/director/legislation/fy2014/upload/Rules-Committee-First-pages-Conf-Rpt.pdf> (accessed May 2014).
- Sekhobo, J., L. Edmunds, S. Whaley, and M. Koleilat. January 2013. "Obesity Prevalence Among Low-Income, Preschool-Aged Children-New York City and Los Angeles County, 2003-2011," *Morbidity and Mortality Weekly Report* 62(2). <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6202a1.htm> (accessed May 14, 2014).
- Simon, E., and E.B. Leib. June 2011. *Mississippi WIC for the 21st Century*, Harvard Law School Health Law and Policy Clinic and the Harvard Law School Mississippi Delta Project. <http://blogs.law.harvard.edu/foodpolicyinitiative/files/2011/09/WIC-FINAL.pdf> (accessed May 14, 2014).

- Spaulding, C., P. Murano, A. Girimaji, K. Paulhill, and Y. Li. February 2014. *Using the National Food and Nutrition Survey (NATFAN) to Examine WIC Participant Food Choices and Intakes Before and After Changes in the Food Benefit*, Contractor and Cooperator Report No. 82, U.S. Department of Agriculture, Economic Research Service. <https://archive.org/details/CAT31285287> (accessed September 2014).
- U.S. Census Bureau. 2012. *Table 1. Population by Age and Sex*, Current Population Survey, Annual Social and Economic Supplement. <http://www.census.gov/population/age/data/2012comp.html> (accessed May 14, 2014).
- U.S. Department of Agriculture, Food and Nutrition Service. May 1991a. *Cost-Effectiveness of Infant Formula Rebate Systems in the Special Supplemental Food Program for Women, Infants, and Children (WIC)*.
- U.S. Department of Agriculture, Food and Nutrition Service. July 2013c. *FNS WIC Research Update*, Presentation by Jay Hirschman and Melissa Abelev for the National Advisory Council for Maternal, Infant and Fetal Nutrition. <http://www.fns.usda.gov/sites/default/files/FY13ResearchStudiesPresentation.pdf> (accessed August 7, 2014).
- U.S. Department of Agriculture, Food and Nutrition Service. February 2012. *Food and Nutrition Service, Research and Evaluation Plan-Fiscal Year 2012*. [http://www.fns.usda.gov/sites/default/files/2012RandE\\_0.pdf](http://www.fns.usda.gov/sites/default/files/2012RandE_0.pdf) (accessed August 5, 2014).
- U.S. Department of Agriculture, Food and Nutrition Service. December 1991b. *Report to Congress on Cereals Containing Fruit in the WIC Supplemental Food Packages*.
- U.S. Department of Agriculture, Food and Nutrition Service. July 2014a. *Broad-Based Categorical Eligibility*.
- U.S. Department of Agriculture, Food and Nutrition Service. 2014c. *Program Data, WIC Program, National Level Annual Summary*. <http://www.fns.usda.gov/pd/wic-program> (accessed May 15, 2014).
- U.S. Department of Agriculture, Food and Nutrition Service. 2014b. *Program Data, WIC Program, Monthly Data—State Level Participation by Category and Program Costs*. <http://www.fns.usda.gov/pd/wic-program> (accessed May 15, 2014).
- U.S. Department of Agriculture, Food and Nutrition Service. December 2013d. *Program Information Report (Keydata), September 2013*. <http://www.fns.usda.gov/sites/default/files/September%202013%20data.pdf> (accessed May 15, 2014).
- U.S. Department of Agriculture, Food and Nutrition Service. Various years. *Program Information Report (Keydata)*. <http://www.fns.usda.gov/data-and-statistics> (accessed May 15, 2014).
- U.S. Department of Agriculture, Food and Nutrition Service. September 2013b. *Farmers' Market Nutrition Program Participating State Agencies*. <http://www.fns.usda.gov/wic/Contacts/farm.HTM> (accessed May 15, 2014).
- U.S. Department of Agriculture, Food and Nutrition Service. July 2013e. *WIC Farmers' Market Nutrition Program*, Fact Sheet.

- U.S. Department of Agriculture, Food and Nutrition Service. April 2013f. *WIC Policy Memorandum #2013-3: Income Eligibility Guidance*. <http://origin.www.fns.usda.gov/wic/policyandguidance/wicpolicymemos/2013-3-IncomeEligibilityGuidance.pdf> (accessed May 15, 2014).
- U.S. Department of Agriculture, Food and Nutrition Service. November 2013a. *About WIC: WIC at a Glance*. <http://www.fns.usda.gov/wic/about-wic-wic-glance> (accessed March 28, 2014).
- U.S. Department of Agriculture, Food and Nutrition Service. March 2014e. *WIC Final Policy Memorandum: #2014-4 Publication of New WIC Income Eligibility Guidelines*. [http://origin.drupal.fns.usda.gov/sites/default/files/WPM\\_2014-4-PublicationofthenewWICIEGs.pdf](http://origin.drupal.fns.usda.gov/sites/default/files/WPM_2014-4-PublicationofthenewWICIEGs.pdf) (accessed May 15, 2014).
- U.S. Department of Agriculture, Office of the Secretary. 2014. *2014 USDA Budget Explanatory Notes for Committee on Appropriations*. <http://www.obpa.usda.gov/exnotes/FY2014/30fns2014notes.pdf> (accessed May 15, 2014).
- U.S. Department of Agriculture, Food and Nutrition Service. November 2014f. *WIC State Agency EBT Detail Status Report*. <http://www.fns.usda.gov/sites/default/files/wic/WIC-detailbtstatusreport.pdf> (accessed December 2014).
- U.S. Department of Agriculture, Food and Nutrition Service. August 2014g. *Women, Infants, and Children (WIC): WIC Food Packages*. <http://www.fns.usda.gov/wic/wic-food-packages> (accessed August 2014).
- U.S. Department of Agriculture, Food and Nutrition Service. August 2014d. *Supplemental Nutrition Assistance Program Participation and Costs*. <http://www.fns.usda.gov/sites/default/files/pd/SNAPsummary.pdf> (accessed August 2014).
- U.S. Department of Health and Human Services, U.S. Food and Drug Administration. December 2012. "Questions & Answers for Consumers Concerning Infant Formula." <http://www.fda.gov/Food/FoodborneIllnessContaminants/PeopleAtRisk/ucm108079.htm> (accessed December 27, 2012).
- U.S. Department of Labor, Bureau of Labor Statistics. 2014a. *Consumer Price Index, CPI Databases*. <http://www.bls.gov/cpi/data.htm> (accessed September 2014).
- U.S. Department of Labor, Bureau of Labor Statistics. 2014b. *Employment Status of the Civilian Noninstitutional Population, 1940s to Date*. <http://www.bls.gov/cps/cpsaat01.pdf> (accessed September 2014).
- U.S. General Accounting Office. April 1992. *Early Intervention: Federal Investments Like WIC Can Produce Savings*, GAO/HRD-92-18. <http://www.gao.gov/assets/160/151746.pdf> (accessed May 14, 2014).
- U.S. General Accounting Office. September 1985. *Need to Foster Optimal Use of Resources in the Special Supplemental Food Program for Women, Infants, and Children (WIC)*, GAO/RCED-85-105. <http://www.gao.gov/assets/150/143564.pdf> (accessed May 14, 2014).
- U.S. Government Accountability Office. February 2006. *BREASTFEEDING: Some Strategies Used to Market Infant Formula May Discourage Breastfeeding; State Contracts Should Better*

*Protect Against Misuse of WIC Name*, GAO-06-282. <http://www.gao.gov/assets/250/249027.pdf> (accessed May 14, 2014).

U.S. Government Accountability Office. February 2013. *WIC Program: Improved Oversight of Income Eligibility Determination Needed*, Report to Congressional Requestors, GAO-13-290. <http://www.gao.gov/assets/660/652480.pdf> (accessed May 14, 2014).

Vericker, T., K. Fortuny, K. Finegold, and S.B. Ozdemir. October 2010. *Effects of Immigration on WIC and NSLP Caseloads*, Contractor and Cooperator Report No. 63, U.S. Department of Agriculture, Economic Research Service. <http://naldc.nal.usda.gov/naldc/download.xhtml?id=45317&content=PDF> (accessed May 14, 2014).

Vericker, T., C. Zhen, and S. Karns. August 2013. *Fiscal Year 2010 WIC Food Cost Report*, WIC-13-FCOST, U.S. Department of Agriculture, Food and Nutrition Service. [http://www.fns.usda.gov/sites/default/files/WICFoodCost2010\\_0.pdf](http://www.fns.usda.gov/sites/default/files/WICFoodCost2010_0.pdf) (accessed May 14, 2014).

Ver Ploeg, M. December 2009. “Do Benefits of U.S. Food Assistance Programs for Children Spillover to Older Children in the Same Household?,” *Journal of Family and Economic Issues* 30(4): 412-27. <http://link.springer.com/article/10.1007%2Fs10834-009-9164-9> (accessed May 14, 2014).

Whaley, S.E., M. Koleilat, M. Whaley, J. Gomez, K. Meehan, and K. Saluja. December 2012a. “Impact of Policy Changes on Infant Feeding Decisions Among Low-Income Women Participating in the Special Supplemental Nutrition Program for Women, Infants, and Children,” *American Journal of Public Health* 102(12): 2269-73. <http://ajph.aphapublications.org/doi/full/10.2105/AJPH.2012.300770> (accessed September 2014).

Whaley, S.E., L.D. Ritchie, P. Spector, and J. Gomez. May-June 2012b. “Revised WIC Food Package Improves Diets of WIC Families,” *Journal of Nutrition Education and Behavior* 44(3): 204-9. <http://www.sciencedirect.com/science/article/pii/S1499404611005744> (accessed September 8, 2014).

Whaley, S.E., M. Koleilat, and L. Jiang. May 2012c. “WIC Infant Food Package Issuance Data are a Valid Measure of Infant Feeding Practices,” *Journal of Human Lactation* 28(2): 134-8.

Wilde, P., A. Wolf, M. Fernandez, and A. Collins. December 2011. *Evaluation of the Birth Month Breastfeeding Changes to the WIC Food Packages*, WIC-12-BF, U.S. Department of Agriculture, Food and Nutrition Service, Special Nutrition Programs. <http://www.fns.usda.gov/sites/default/files/BirthMonth.pdf> (accessed May 14, 2014).

Wilde, P., A. Wolf, M. Fernandes, and A. Collins. September 2012. “Food-Package Assignments and Breastfeeding Initiation Before and After a Change in the Special Supplemental Nutrition Program for Women, Infants, and Children,” *The American Journal of Clinical Nutrition* 96(3). <http://ajcn.nutrition.org/content/early/2012/07/25/ajcn.112.037622.full.pdf+html> (accessed May 14, 2014).

Woodward, J., and D. Ribar. June 2012. “Is Individually-Targeted Food Assistance Shared among Family Members?,” *Food and Nutrition Sciences* 3(6): 747-59. [http://file.scirp.org/Html/6-2700398\\_19916.htm](http://file.scirp.org/Html/6-2700398_19916.htm) (accessed October 2014).



Yip, R., N.J. Binkin, L. Fleshood, and F. Trowbridge. September 1987. "Declining Prevalence of Anemia Among Low-Income Children in the United States," *Journal of the American Medical Association* 258(12): 1619-23.

Zenk, S.N., A. Odoms-Young, L.M. Powell, R.T. Campbell, D. Block, N. Chavez, R.C. Krauss, S. Strode, and J. Armbruster. October 2012. "Fruit and Vegetable Availability and Selection. Federal Food Package Revisions, 2009," *American Journal of Preventive Medicine* 43(4): 423-28. <http://www.sciencedirect.com/science/article/pii/S0749379712004515> (accessed May 15, 2014).

## Appendix: Methodology for Estimating WIC Participants as a Percent of U.S. Population Subgroups

Figure 1 illustrates the percentage of various U.S. population subgroups estimated to participate in WIC. A number of calculations were required to develop the estimates (estimates exclude territories).

### Infants

The percentage of infants participating in the program was estimated by dividing the average monthly number of infants participating in WIC in calendar 2012 (2,015,664 from USDA-FNS, 2014b) by the estimated number of births in the United States in 2012 (3,952,841 from Martin et al., 2013).

### Children

The percentage of children participating in the program was estimated by dividing the average monthly number of children participating in WIC in calendar 2012 (4,587,126 from USDA-FNS, 2014b) by the estimated number of children under age 5 as of July, 1, 2012 (16,157,159) after subtracting the number of infants born in the United States in 2012 (3,952,841 from Martin et al., 2013) from the total number of children under 5 years of age (20,110,000 from U.S. Census Bureau, 2012).

### Pregnant women

The percentage of pregnant women participating in the program was estimated by multiplying the average number of pregnant women participating in WIC in calendar 2012 (861,989 from USDA-FNS, 2014b) and dividing it by the number of births in 2012 (3,952,841 from Martin et al., 2013) times 0.75 (since women are pregnant for 9 months).

### Postpartum women

The percentage of postpartum women participating in the program was estimated by summing the average number of breastfeeding women participating in WIC in calendar 2012 (581,588 from USDA-FNS, 2014b) and the average number of postpartum women in WIC in 2012 (600,294 from USDA-FNS, 2014b) and dividing it by the number of births in 2012 (3,952,841 from Martin et al., 2013), which served as the proxy for the number of postpartum women in 2012. Note that the denominator consists of all postpartum women (up to 1 year after birth) in the United States, while the numerator consists of all breastfeeding women (up to 1 year after birth) in WIC and all postpartum women in WIC (up to 6 months after birth).