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# The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): Background, Trends, and Economic Issues, 2024 Edition

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# The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): Background, Trends, and Economic Issues, 2024 Edition

Leslie Hodges, Saied Toossi, Jessica E. Todd, and Cayley Ryan-Claytor

## Abstract

The U.S. Department of Agriculture's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) provides supplemental foods, nutrition education, and referrals to healthcare and other social services to low-income, nutritionally at-risk women, infants, and children up to 5 years of age. About 40 percent of all infants and 22 percent of children 1 to 5 years of age in the United States participate in the program. This report explains how WIC works, examines program trends, and discusses some of the major issues facing the program. The issues include program impacts on diet quality and health, barriers and facilitators of program access, and WIC State agency efforts to contain program costs. This report also outlines changes to WIC in response to the Coronavirus (COVID-19) pandemic and the infant formula supply chain disruptions that occurred in 2022.

**Keywords:** Special Supplemental Nutrition Program for Women, Infants, and Children; WIC; diet and health; economic conditions; infant formula supply chain disruption; program modernizations; Coronavirus, COVID-19 pandemic

## About the Authors

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# The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): Background, Trends, and Economic Issues, 2024 Edition

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## What Is the Issue?

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) provides supplemental foods, nutrition education (including breastfeeding promotion and support), and referrals to healthcare 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 (USDA) Food and Nutrition Service (FNS), WIC had an annual budget of \$6 billion and served more than 6 million people each month in fiscal year (FY) 2022 (Toossi & Jones, 2023). The USDA's Economic Research Service (ERS) periodically reports on research findings relevant to WIC policy and program operations, often following major changes in the program's design. The last edition was published in January 2015. This 2024 edition explains how WIC works, discusses program trends, and summarizes research findings on key economic outcomes and policy issues facing the program, including program impacts on participants' diet quality and health, barriers and facilitators of program access, and State agency efforts to contain program costs. This report also outlines temporary changes to WIC in response to the Coronavirus (COVID-19) pandemic and the infant formula supply chain disruptions that occurred in 2022.



## What Did the Study Find?

WIC has served low-income, nutritionally at-risk women, infants, and children for 50 years. This report focuses on the following:

- **Access to WIC.** WIC operates on fixed annual funding from Congress. Reduced funding could prompt State agencies to adopt additional food cost containment policies, shorten certification periods (when allowed), or use a priority system for enrolling new applicants, all of which could influence an individual's ability to enroll in the program and/or use WIC benefits. Other factors that may influence WIC access include the location and number of local WIC agencies and WIC-authorized vendors in an area, as well as State variation in eligibility rules for means-tested programs that confer eligibility for WIC (e.g., Medicaid).

ERS is a primary source of economic research and analysis from the U.S. Department of Agriculture, providing timely information on economic and policy issues related to agriculture, food, the environment, and rural America.

- **Impact of WIC food package revisions on diet quality and health.** The WIC food packages provide foods to supplement key nutrients. Changes made to the food packages in 2009 aimed to further align the supplements with recommended dietary guidelines and the nutritional needs of breastfeeding participants. At the time, the 2009 food package revisions were the most significant changes to WIC since its inception. Studies found that the revisions were associated with improvements in the dietary quality of WIC households' food purchases, improvements in the dietary quality of foods available in the retail food environment, and reduced prevalence of obesity among children. In 2022, USDA proposed further revisions to the food packages to offer a wider variety of food options while aligning the food packages with the latest nutritional science.
- **Changes during the COVID-19 pandemic.** In response to the rising need for food and nutrition assistance during the pandemic and to support social distancing, USDA allowed temporary changes to WIC operations related to eligibility determination, recertification, and benefits issuance. The American Rescue Plan Act of 2021 provided \$390 million for WIC outreach, innovation, and program modernization, which allowed USDA to extend some of the temporary program changes through FY 2024. Following the temporary changes to program operations and investments in program modernizations, total participation in WIC increased for the first time in more than a decade.
- **Infant formula supply chain disruptions.** Supply chain disruptions due to the COVID-19 pandemic and a recall of some powdered formulas in February 2022 made it difficult for households to find infant formula. USDA issued waivers to WIC State agencies allowing WIC households to return recalled infant formulas and purchase a broader range of formula brands and sizes. Using USDA, FNS monthly data on infant participation in WIC, researchers found the number of WIC infants receiving the fully breastfeeding food package increased following the supply chain disruptions. This analysis provided the U.S. Food and Drug Administration and White House leadership with potential reasons for why production of infant formula had returned to prior-year levels in the fall of 2022, but sales of infant formula remained below prior-year levels.

## How Was the Study Conducted?

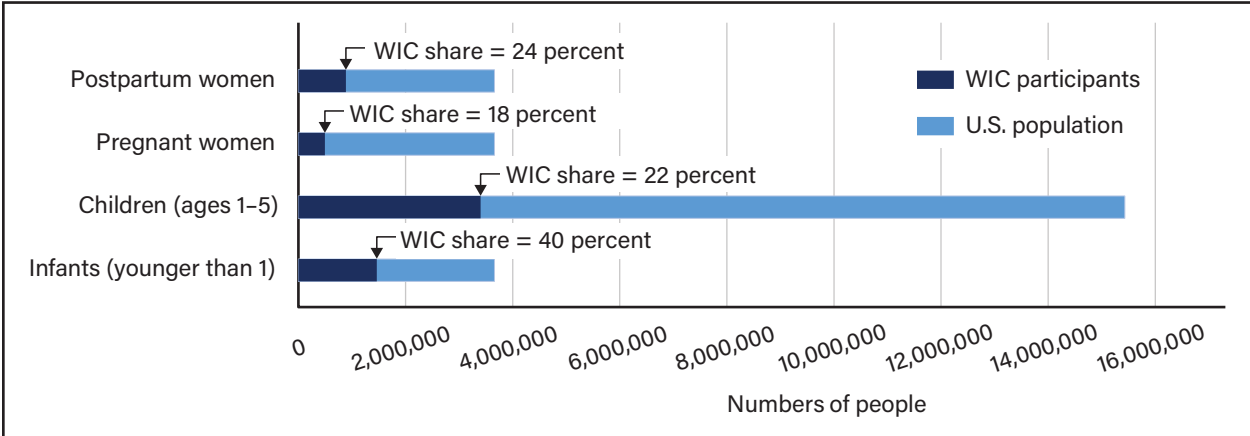
Researchers from USDA, ERS examined WIC's laws and regulations; studied program trends using data from USDA, FNS and other sources; and reviewed numerous WIC-related research publications.

# The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): Background, Trends, and Economic Issues, 2024 Edition

## Introduction

The U.S. Department of Agriculture’s Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) provides supplemental foods, nutrition education (including breastfeeding promotion and support), and referrals to healthcare and other social services to low-income, nutritionally at-risk pregnant and postpartum women, infants, and children up to 5 years of age. The program, which is administered by the U.S. Department of Agriculture’s (USDA) Food and Nutrition Service (FNS), served more than 6 million people per month in fiscal year (FY) 2022 (Toossi & Jones, 2023; USDA, FNS, 2023a). WIC is based on the premise that early intervention during critical times of children’s growth and development can help prevent future medical and developmental problems. WIC serves as an entry point for early nutrition and healthcare intervention for many of the Nation’s infants and children. About 40 percent of all infants in the United States and 22 percent of children 1 to 5 years of age participated in the program each month in FY 2021 (figure 1).<sup>1</sup>

Figure 1  
**Total U.S. population and number of WIC participants, by WIC participant category, 2021**



WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

Note: Postpartum women include both breastfeeding and nonbreastfeeding women. Postpartum breastfeeding women are eligible to receive WIC benefits for up to 1 year after birth, while postpartum nonbreastfeeding women are eligible to receive WIC benefits for up to 6 months after birth. WIC participation is based on monthly averages for FY 2021. The number of children in the United States is based on Current Population Survey data from 2021 (the most recent year available). U.S. births and numbers of children in the United States are calendar year estimates. See the appendix of Oliveira and Frazão (2015, page 81) for information on how the percentages were estimated.

Source: USDA, Economic Research Service using data from USDA, Food and Nutrition Service; U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; and U.S. Department of Commerce, Bureau of the Census.

<sup>1</sup> The most recent data available is from 2021 for all sources used to estimate WIC participants’ shares of U.S. population subgroups. These shares are lower than those reported in the 2015 edition of this report, which estimated that 51 percent of all infants in the United States and 28.4 percent of children 1 to 5 years of age participated in the program each month in FY 2012 (Oliveira & Frazão, 2015). These drops are consistent with estimates from USDA, FNS that shares of infants and children in the U.S. population participating in WIC declined from 47 percent (infants) and 25 percent (children) in 2016 to 43 percent (infants) and 22 percent (children) in 2020 (Gray, Kessler, et al., 2022).



In FY 2022, spending on WIC amounted to \$5.7 billion or about 3 percent of total Federal spending on food and nutrition assistance (Toossi & Jones, 2023; USDA, FNS, 2023a). WIC was the fourth largest food assistance program during the pandemic, following the Supplemental Nutrition Assistance Program (SNAP), the temporary Pandemic Electronic Benefit Transfer (P-EBT) program, and combined spending on the Child Nutrition Programs—which include the National School Lunch Program, the School Breakfast Program, the Child and Adult Care Food Program, and the Summer Food Service Program. Prior to the pandemic, WIC was the third largest food assistance program after SNAP and the Child Nutrition Programs (with annual spending of \$5.1 billion), amounting to 6 percent of total Federal spending on food and nutrition assistance in FY 2019 (Tiehen, 2020).

WIC is a discretionary program and Congress must authorize annual appropriations to support program operations.<sup>2</sup><sup>3</sup> The USDA, ERS periodically reports on research findings relevant to WIC policy and program operations, often following major changes in the program's design. Several recent events affected the program, including the COVID-19 pandemic and infant formula supply chain disruptions. In consideration of these events, this report provides an overview of how WIC works and examines recent program trends. The report then discusses recent USDA, ERS research on key economic outcomes and policy issues related to WIC, including factors affecting access to WIC services, WIC's impacts on diet and health, and WIC's role in the infant formula market. The report concludes with information about USDA, ERS-supported data products to support future WIC research. This report follows previous reports released in 2002 (Oliveira et al.), 2009 (Oliveira & Frazão), and 2015 (Oliveira & Frazão).

## WIC Overview

WIC provides specific foods and other benefits to pregnant and postpartum women, infants, and children up to age 5 who meet certain eligibility requirements.

### Participant Eligibility

WIC operates through Federal, State, and local agencies (see section, "Administration"). Eligibility determinations are made in person by local agencies, either directly or through local service sites or clinics. To qualify for WIC, applicants must meet categorical, residential, and income requirements, and must be at nutritional risk as determined by a health professional such as a physician, nutritionist, dietitian, or nurse (table 1). Federal regulations define nutritional risk according to five criteria (table 2).

---

<sup>2</sup> WIC is funded and authorized through a process called child nutrition reauthorization, a process that allows Congress to make changes to the permanent statutes that authorize the child nutrition programs and WIC (Billings & Aussenberg, 2022). WIC was last authorized by the Healthy, Hunger-Free Kids Act of 2010 for a period of 5 years. Since authorization under the HHFKA expired on September 30, 2015, funding for WIC has been provided through appropriations acts (Billings & Aussenberg, 2022).

<sup>3</sup> Public Law 111–296.

Table 1

**WIC participant eligibility criteria**

Categorical eligibility	Residential eligibility	Income eligibility	Nutritional risk
<ul style="list-style-type: none"> <li>▪ Pregnant women,</li> <li>▪ Nonbreastfeeding women up to 6 months postpartum,</li> <li>▪ Breastfeeding women up to 1 year postpartum,<sup>1</sup></li> <li>▪ Infants up to their first birthday, or</li> <li>▪ Children up to their fifth birthday.</li> </ul>	WIC applicants must reside within the State where they establish eligibility. <sup>2</sup>	<ul style="list-style-type: none"> <li>▪ Household income up to 185 percent of the Federal poverty guidelines.<sup>3</sup></li> <li>▪ Adjunctive income eligibility: Applicants who demonstrate current participation in SNAP, Medicaid, or TANF automatically meet WIC income eligibility criteria.<sup>4</sup></li> </ul>	Applicants must be at nutritional risk as determined by a health professional (such as a physician, nutritionist, dietitian, or nurse).

WIC= Special Supplemental Nutrition Program for Women, Infants, and Children; SNAP = Supplemental Nutrition Assistance Program; TANF = Temporary Assistance for Needy Families.

<sup>1</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 § 246.2).

<sup>2</sup> 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. However, no WIC State agency currently employs this option.

<sup>3</sup> As set each year by the U.S. Department of Health and Human Services (e.g., annual income of \$51,338 for a family of 4 living in the 48 contiguous States as of July 1, 2022; see appendix A).

<sup>4</sup> Title 7, CFR § 246.7. 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. 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.

Source: USDA, Economic Research Service based on information from the Code of Federal Regulations.

Table 2

**Nutritional risk criteria for WIC eligibility**

Federal regulations define nutritional risk according to five criteria
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
Conditions that predispose people to inadequate nutritional patterns or nutritionally related medical conditions, including, but not limited to, homelessness and migrancy

Source: USDA, Economic Research Service based on information from the Code of Federal Regulations.

To determine nutritional risk, applicants must complete a nutrition assessment. As part of this process, the height (or length in the case of infants) and weight of each applicant is measured and a blood test for anemia is administered to everyone except infants under 9 months of age. 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), as well as make referrals to health and social services for followup.<sup>4</sup>

<sup>4</sup> For more on nutrition assessment and nutrition services, see the VENA: Value Enhanced Nutrition Assessment in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); Updated Guidance (USDA, FNS, 2020, November).

## Certification Periods

Once determined eligible, WIC participants are certified for a 6- to 12-month period, referred to as a certification period. At the end of their certification period, participants must have their eligibility for WIC benefits reassessed. Participant category and State agency policies determine the length of the certification period. Pregnant women, for example, are certified for the duration of their pregnancy and up to 6 weeks postpartum before needing to recertify for a different participant category. 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 to continue receiving benefits.

WIC participants are required to be physically present at each certification.<sup>5</sup> Although WIC participants are not required to report income changes during the current certification period, local WIC agencies must reassess a participant's income eligibility if they receive information indicating that the participant's household income has changed and more than 90 days remain before the end of the certification period.<sup>6</sup> For this reason, WIC participants are encouraged by local agency WIC staff to report any changes that may affect their program eligibility during a certification period.

## Participant Benefits

The WIC program provides three types of benefits to participants: a supplemental food package, nutrition education (including breastfeeding counseling), and referrals to healthcare and other services. All benefits are provided to participants free of charge.

### *Supplemental Food Packages*

Food packages are the cornerstone of the program, accounting for about 63 percent of WIC costs in FY 2022 (USDA, FNS, 2023a).<sup>7</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>8</sup> Inadequate intake of such nutrients may result in adverse health consequences.

The current set of seven food packages have been in place since 2009 (table 3).<sup>9</sup> The main changes implemented at that time were to add fruits, vegetables, and whole grains—and to reduce the amount of juice, milk, and cheese. The types and amounts of foods in each package are intended to meet the specific nutrient needs of each participant category. In addition to providing quantity-based food benefits (for example, 1 dozen eggs or 4 gallons of milk), participants receive a fixed-dollar-amount benefit to purchase a variety of fruits and vegetables, known as the cash-value benefit (CVB) or the cash-value voucher.

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<sup>5</sup> Individuals seeking certification or recertification for a program must be physically present to determine eligibility, except in certain cases where a waiver may be granted by the local agency. These waivers include infants or children who were present at the initial certification visit and are receiving ongoing healthcare, infants or children who were present at a certification or recertification determination within the past year and have working parents, and infants under 8 weeks of age who cannot be present for a valid reason but have all necessary certification information provided. The Americans with Disabilities Act and section 794 of title 29 must also be taken into consideration (42 U.S.C. § 1786(d)(3)(C)(i)). Additionally, USDA provided waivers to allow for remote services during the COVID-19 pandemic and continues to offer remote service flexibilities to support outreach, modernization, and innovation efforts.

<sup>6</sup> Title 7, CFR § 246.7.

<sup>7</sup> The remaining 37 percent of program costs were for nutrition education, breastfeeding promotion, client services, and administration.

<sup>8</sup> Title 7, CFR § 246.2.

<sup>9</sup> The interim revisions were published in 2009 (72 Federal Register, Number 234, December 6, 2007, pages 68,966–69,032) and the rules were finalized in 2014 with minimal changes (79 Federal Register, Number 42, March 4, 2014, pages 12,274–12,300).

Table 3

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

Food package category	Participant category	Foods <sup>1</sup>
Food package I	Infants 0-5 months	
	▪ Fully formula-fed	Infant formula
	▪ Partially breastfed	Reduced amount of infant formula (about half that of what fully formula-fed infants receive); mothers receive greater amounts and variety of food, per Food Package V
	▪ Fully breastfed	No foods; mothers receive greater amounts and variety of food, per Food Package VII
Food package II	Infants 6–11 months	
	▪ Fully formula-fed	Infant formula, infant cereal, infant fruits and vegetables <sup>2</sup>
	▪ Partially breastfed	Infant formula (reduced amount compared to fully formula-fed infants), infant cereal, infant fruits and vegetables; mothers receive greater amounts and variety of food, per Food Package V
	▪ Fully breastfed	Infant cereal, infant fruits and vegetables, infant meat; mothers receive greater amounts and variety of food, per Food Package VII
Food package III	Participants with qualifying conditions <sup>3</sup>	With medical documentation: infant formula, exempt infant formula, or WIC-eligible medical foods, plus all the foods in the packages to which they would have been eligible in the absence of their special medical needs
Food package IV	Children 1–5 years	Juice, milk, breakfast cereal, eggs, whole-wheat bread, legumes or peanut butter, and fruits and vegetables via an \$8 cash-value benefit
Food package V	Pregnant and partially breast-feeding women	Juice, milk, breakfast cereal, eggs, whole-wheat bread, legumes and peanut butter, and fruits and vegetables via an \$11 cash-value benefit
Food package VI	Postpartum women (nonbreastfeeding)	Juice, milk, breakfast cereal, eggs, legumes or peanut butter, and fruits and vegetables via an \$11 cash-value benefit
Food package VII	Fully breastfeeding women	Juice, milk, cheese, breakfast cereal, eggs, whole-wheat bread, legumes and peanut butter, canned fish, and fruits and vegetables via an \$11 cash-value benefit

WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>1</sup> States may offer substitutions for some WIC foods; e.g., brown rice for whole-wheat bread or yogurt for part of the milk allowance (79 Federal Register Number 42, March 4, 2014, pages 12,274–12,300).

<sup>2</sup> Infant fruits and vegetables are commercial baby foods and refer to any variety of single ingredient or combinations of single ingredient commercial infant food without added sugars, starches, or salt. The fruit or vegetable must be listed as the first ingredient. See 7 CFR § 246.10(e)(12), table 4.

<sup>3</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 for which they would otherwise be eligible.

Source: USDA, Economic Research Service using information from USDA, Food and Nutrition Service, 2022.

The amount and types of food provided to recipients is determined by Federal regulations and 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>10</sup> WIC State agencies, however, may tailor

<sup>10</sup> See the USDA, FNS website for information on maximum monthly allowances of WIC foods.



an individual's food package 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 adjust WIC foods for administrative convenience and to control costs (e.g., restricting brands, types, and physical forms or specifying minimum package sizes).

USDA, FNS recently published a proposed rule that includes revisions of WIC food packages that “prioritize WIC participants’ supplemental nutrition needs over maintaining cost neutrality.”<sup>11</sup> The proposed changes align the food packages with the latest nutrition science based on recommendations made by the National Academies of Sciences, Engineering, and Medicine (NASEM) in their 2017 review of the WIC food packages and the updated Dietary Guidelines for Americans 2020–25, which included recommendations for infants and children up to 24 months of age for the first time since the 1980s (USDA and U.S. Department of Health and Human Services (DHHS), 2020). Specific proposals include increases in the cash-value benefit for all food packages, greater flexibility in package sizes for whole-grain breads, and more infant formula for the first month for partially breastfeeding infants. While cost neutrality relative to the 2009 packages would not be maintained, USDA, FNS estimates that total food package costs would decline by \$142 million in the first year (FY 2024) relative to the costs in FY 2022 that included temporary increases in the cash-value benefit in response to the COVID-19 pandemic.<sup>12</sup> Thus, even though the larger cash-value benefit amount would increase total costs, other proposals are estimated to decrease total costs.<sup>13 14</sup>

### *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 their health status. Also, help to achieve a positive change in dietary and physical activity habits and prevent nutrition-related problems through the optimal use of supplemental and other nutritious foods. This information 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>15</sup>

Nutrition education may be provided through individual or group counseling sessions, as well as through online education modules, and must be offered to participants or caretakers at a quarterly rate or more frequently. USDA, FNS provides guidance on content and delivery methods that have been proven to be effective, but State agencies have the flexibility to design their own programs (USDA, FNS, 2006). Individuals who do not attend the nutrition education activities are not denied the WIC food package.

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<sup>11</sup> 87 Federal Register, Number 223, November 21, 2022, pages 71,092–71,162.

<sup>12</sup> For more information see section, “Recent Legislative and Regulatory Changes to WIC.”

<sup>13</sup> See table 2 on page 71,134 of 87 Federal Register, Number 223, November 21, 2022, pages 71,092–71,162.

<sup>14</sup> For more information on the WIC food packages, see section, “Impact of the 2009 Food Package Revision on Participant Food Purchases and Diet Quality, Child Obesity, and Breastfeeding.”

<sup>15</sup> Title 7, CFR § 246.11.

## Referrals to Healthcare and Social Services

WIC was designed to serve as an adjunct to good healthcare during critical times of growth and development. Local WIC agencies assist participants in obtaining healthcare and other public benefits (such as immunizations, SNAP, and Medicaid) either through onsite health services or referrals to other agencies. Efforts have been made to strengthen the coordination of services between WIC and programs such as Medicaid, SNAP, and Head Start (e.g., Neuberger & Hall, 2022; USDA, FNS, 2023d; Linehan et al., 2017) to facilitate referrals and make it easier for families to benefit from nutrition and health services. Based on a USDA, FNS study from 2019, 69.6 percent of local agencies are in health departments or medical clinics, 2.4 percent are in social service offices or agencies, and 0.1 percent are in head start offices (Magness et al., 2021).

## Farmers' Market Nutrition Program

In addition to the three main benefits provided through WIC, some States operate the Farmers' Market Nutrition Program (FMNP). The program provides fresh, locally grown fruits and vegetables to WIC participants, and aims to expand the awareness of, use of, and sales at, farmers' markets.<sup>16</sup> During FY 2022, nearly 1.3 million WIC participants received FMNP benefits (USDA, FNS, 2023e). That same year, 14,582 farmers, 2,623 farmers markets, and 2,392 roadside stands were authorized to accept FMNP checks or coupons. Checks and coupons redeemed through the program resulted in more than \$40 million in revenue to farmers during that year (USDA, FNS, 2021b). See Oliveira and Frazão (2015) for more on the FMNP.

# Program Operations

## Administration

WIC operates through Federal, State, and local agencies. At the Federal level, WIC is administered by USDA, FNS. USDA, FNS issues regulations, monitors compliance with existing regulations, provides technical assistance to WIC State agencies, and conducts studies of program health benefits, operations, and compliance.

At the State level, WIC is administered by 89 WIC State agencies operating in all 50 States, the District of Columbia, 33 Indian Tribal Organizations, and 5 territories (American Samoa, Puerto Rico, the Northern Mariana Islands, Guam, and the U.S. Virgin Islands). The 89 WIC State agencies are responsible for program operations within their jurisdictions. They award subgrants to WIC local agencies, compete and award rebate contracts with infant formula manufacturers, and assist local agencies with respect to program operations. WIC State agencies have some latitude in operating their programs within Federal regulatory guidelines. For example, WIC State agencies decide the specific brands, forms, and package sizes to include in their lists of approved WIC foods.

At the local level, about 1,900 WIC local agencies provide services to WIC participants directly or through about 10,000 service sites. These sites include county health departments, hospitals, mobile clinics (vans), community centers, schools, migrant health centers and camps, and Indian health services facilities (USDA, FNS, N.D.). WIC local agencies certify applicants, provide nutrition education (including breastfeeding counseling), make referrals to healthcare and other social services, and distribute WIC food benefits.

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<sup>16</sup> Title 7, CFR § 248.1.

## Funding

WIC is USDA's largest discretionary program and is funded annually by Congressional appropriations. USDA, FNS allocates these funds to WIC State agencies through Federal food grants and nutrition services and administration (NSA) grants.<sup>17</sup> Food grants cover the costs of WIC food benefits. NSA grants cover nonfood costs such as certifying participants; determining nutritional risks; conducting blood tests for anemia; providing outreach and nutrition education services, including breastfeeding promotion and support; providing referrals to health care and social services; issuing food benefits; administering the food benefit delivery system; and paying 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>18</sup> <sup>19</sup> Food and NSA grant amounts are calculated using formulas that consider factors such as the number of infants and children at or below 185 percent of poverty in a State, the size of the State, State salary levels, the number of WIC-eligible persons in the State, and how much food and NSA funding a State received in the prior year.<sup>20</sup>

Because WIC is a discretionary program with a fixed annual budget, funding limits could prevent the program from serving all eligible applicants. In the event of constrained resources, program regulations outline a priority system to ensure that people with the greatest nutritional risk and those who are most likely to benefit from WIC intervention receive program benefits. See 7 CFR § 246.7(e)(4) for the 7-point nutritional risk priority system and Oliveira and Frazão (2015) for more discussion on the priority system.

## Food Benefit Delivery Systems

To provide program participants with supplemental foods, most WIC State agencies use retail food delivery systems.<sup>21</sup> Under retail systems, State agencies issue food instruments (payment methods) to participants who then use them to purchase WIC-approved foods in authorized retail settings. The food instruments specify the types and quantities of supplemental foods that can be redeemed and the dates by which the foods must be obtained. No more than a 3-month supply of food instruments may be issued at any one time to any participant, and each food instrument is valid for a minimum of 30 days.<sup>22</sup>

Historically, food instruments were in the form of checks or paper vouchers. Under the Healthy, Hunger-Free Kids Act of 2010, all WIC agencies were required to implement an electronic benefit transfer (EBT) system for issuing WIC food benefits by 2020. EBT is an electronic system like a debit card transaction that allows a recipient to authorize transfer of their Government benefits to a vendor to pay for purchased products. As of December 2022, virtually all WIC participants were receiving WIC food benefits via EBT.<sup>23</sup>

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<sup>17</sup> Grant amounts are based on funding formulas prescribed in the WIC program regulations (Title 7, CFR § 246.16).

<sup>18</sup> Title 7, CFR § 246.14.

<sup>19</sup> 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. The \$21 is adjusted for inflation starting on October 1, 1996 (and each October 1 thereafter). See Title 7, CFR § 246.14 (c)(1).

<sup>20</sup> Child Nutrition Act of 1966, Section 17, as amended through Public Law 106–580, December 29, 2000. See also National WIC Association (2018) for details on WIC funding.

<sup>21</sup> The other two types of food delivery systems, home delivery and direct distribution, account for less than 2 percent of WIC food benefits distributed (Tiehen & Frazão, 2016). See Oliveira et al. (2015) for more information on home delivery and direct distribution systems.

<sup>22</sup> 7 CFR § 246.12(f)(iii). When interviewed some WIC participants (and/or caretakers of WIC participants) expressed interest in a policy option that would allow unused WIC benefits to rollover to the next month (Duffy et al., 2022; McElrone et al., 2021).

<sup>23</sup> Two Indian Tribal Organizations in the Northeast Region (Indian Township Passamaquoddy Reservation and Pleasant Point Passamaquoddy Reservation) are in the process of converting from paper vouchers to EBT (USDA, FNS, November 2022).

## *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 benefits. WIC State agencies determine how many and what types of vendors to authorize. In FY 2020, about 38,000 WIC vendors were authorized nationwide (USDA, FNS, 2022b). Vendors 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>24</sup> Although WIC authorizes a variety of types of vendors, Tiehen and Frazão (2016) found that 76 percent of WIC retail dollar benefits were redeemed at large stores (super stores, supermarkets, and large grocery stores).

To meet Federal requirements, WIC-authorized vendors must stock at least two varieties of fruits, two varieties of vegetables, and at least one whole-grain cereal.<sup>25</sup> WIC State agencies can establish additional minimum requirements for variety and quantity of stocked WIC foods and may establish different minimums for different types of stores. Vendors are authorized to accept payment for WIC foods for a maximum of 3 years, at which time they must apply for reauthorization.

WIC State agencies do not have to authorize all qualified stores, but they must authorize an appropriate number of stores to ensure adequate participant access to WIC foods; to ensure that the agency is paying the lowest prices for WIC foods; and to ensure that the agency is able to maintain effective oversight of all authorized vendors.<sup>26</sup> To help meet these goals, WIC State agencies create groups of WIC-authorized vendors based on similar characteristics such as store type, geography, number of cash registers, WIC sales volume, gross food sales volume, and square footage of the store (Gleason et al., 2017).<sup>27</sup>

Vendor groups enable State agencies to use average prices of existing vendors to establish competitive price criteria for authorizing new vendors. For example, States may require vendor applicants' prices to be lower than 110 percent of existing vendors' average prices for WIC foods (Kirlin et al., 2003). Vendor groups also enable State agencies to contain costs by establishing maximum allowable reimbursement levels (MARLs) for WIC food packages that are specific to each vendor group. Finally, vendor groups assist State agencies in monitoring WIC-authorized vendors. Without vendor groups it would be difficult for State agencies to distinguish whether differences in food prices of WIC-authorized vendors were due to factors such as store type, geography, and store size or due to vendors intentionally charging higher prices for WIC foods.

## *Cost Containment*

In addition to their efforts to contain food costs via vendor authorizations, some WIC State agencies limit food item selection according to brand, package size, flavors, form, or price (Gleason et al., 2021; Kirlin et al., 2003; Saitone et al., 2021; Thorn et al., 2015). The greatest savings on food costs comes from cost containment for purchases of infant formula, which has been required by Federal law since 1989. Typically, WIC State agencies meet this requirement through a competitive bidding process for a contract with an infant formula manufacturer to be the single supplier of WIC infant formula in the State. Through these contracts, State agencies obtain significant discounts in the form of manufacturer rebates for each can of formula purchased through WIC.<sup>28</sup> The brand of infant formula provided by WIC varies by State, depending on which manufacturer holds the contract.

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<sup>24</sup> WIC-authorized pharmacies are only authorized to redeem special formula.

<sup>25</sup> 7 CFR § 246.12(g)(3)(i).

<sup>26</sup> 7 CFR § 246.12(g)(4).

<sup>27</sup> Federal law requires that one peer group criteria must be a measure of geography, such as metropolitan or other statistical areas that form distinct labor and product markets (7 CFR § 246.12(g)(4)(ii)(A)).

<sup>28</sup> These competitively bid single-supplier contracts are awarded to the manufacturer offering the WIC State agency the lowest net price on an agreed upon unit of infant formula, as determined by the manufacturer's wholesale price minus the rebate.



Rebates are an important component of WIC's cost management. USDA, ERS analysis of data on infant formula contract bids from USDA, FNS (2022d) found the average rebate as a percentage of the wholesale price was 113 percent for new contracts initiated between October 1, 2018, and September 31, 2022.<sup>29 30</sup> This finding means that, on average, manufacturer rebates covered the entire wholesale cost of infant formula plus a portion of the retail markup. In FY 2018, Kline et al. (2020) estimated the infant formula rebates to be an average of \$93.67 per participant per month, which covered nearly two-thirds of total retail costs of monthly food packages for infants (\$138.64 per participant per month).

Some WIC State agencies have optionally instituted rebate systems for other foods (such as infant cereal, infant fruits and vegetables, and infant meats), but their savings are much smaller than for infant formula (Kline et al., 2020).

## Recent Legislative and Regulatory Changes to WIC

Since WIC was made a permanent program in 1975, numerous legislative acts and Federal regulations have shaped the program. The onset of the COVID-19 pandemic led to temporary changes in program operations, beginning in March 2020 and extending 30 days after the end of the nationally declared public health emergency (30 days after May 11, 2023).<sup>31</sup>

Key temporary changes included:

- Participants could enroll or re-enroll in WIC without visiting a clinic in person and could postpone certain medical tests. WIC State agencies were also able to extend the certification period for children receiving Food Package IV for up to 3 months. To further promote social distancing at time of certification, a single staff member at a WIC agency was able to determine program eligibility and issue benefits for the same participant.
- State agencies could issue food benefits (EBT cards or paper checks/vouchers) remotely, so participants did not have to pick up their benefits in person. To facilitate social distancing and accommodate closures, WIC State agencies were also able to issue benefits covering multiple months at one time. Those operating offline EBT systems, which require participants to bring their EBT card to a WIC agency to have their benefits loaded onto their cards, were able to provide up to 4 months of benefits at one time.<sup>32</sup>
- State agencies could substitute certain food package items when availability was limited. Examples include allowing for milk of any fat content and flexibility with package sizes (e.g., different sizes of whole grain breads, cheeses, and juices) regardless of the guidelines set for their food package. State agencies were also able to change the WIC-approved list of items and minimum stocking requirements for WIC-approved vendors as needed.
- State agencies could conduct local agency monitoring reviews, vendor monitoring, and vendor trainings remotely, and could postpone some vendor reauthorization actions by extending existing vendor agreements by 1 year.

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<sup>29</sup> The average is calculated at the contract level for the primary milk-based powder form infant formula (i.e., Enfamil Infant (Mead Johnson), Similac Advance (Abbott), Good Start Gentle Pro (Gerber)). Some contracts are negotiated between groups of WIC State agencies and the manufacturers, referred to as alliances.

<sup>30</sup> This is a 23-percent increase from the average rebate amount of 92 percent of the wholesale price for contracts in effect in February 2013 (Davis & Oliveira, 2015).

<sup>31</sup> Some temporary changes related to WIC vendor authorization and monitoring expired September 30, 2020. For a complete list of temporary changes that were extended through the end of the public health emergency and those that ended on September 30, 2020, see USDA, FNS (2020a).

<sup>32</sup> Those operating home delivery and/or direct distribution models were able to issue 2 months of benefits at one time.

- State agencies operating the Farmers' Market Nutrition Program (FMNP) could extend expiring agreements with authorized farmers, roadside stands, and/or farmers markets by 1 year; could conduct FMNP training remotely; and were afforded greater flexibility in monitoring the program.

In addition to these flexibilities, the American Rescue Plan Act (passed in March 2021) provided WIC State agencies the option to increase the cash-value benefit (CVB) for fruit and vegetable purchases from \$9 per child and \$11 per adult up to an amount less than or equal to \$35 per participant for up to 4 months through September 30, 2021. The Extending Government Funding and Delivering Emergency Assistance Act of 2021 (passed on September 30, 2021) temporarily increased the CVB amounts from \$9 to \$24 for child participants; from \$11 to \$43 for pregnant and postpartum women participants; and from \$11 to \$47 for breastfeeding women participants through December 2021. The Consolidated Appropriations Acts of 2022 and 2023 extended the CVB increase through FY 2022 and FY 2023, respectively, adjusted for inflation.

The American Rescue Plan Act also allotted \$390 million in funding for WIC (available through FY 2024) to support outreach, innovation, and program modernization efforts to increase participation and redemption of benefits and to support certain program flexibilities. The act also gave USDA authority to extend some temporary program changes beyond the end of the public health emergency. As a result, USDA continues to allow State agencies to offer remote service flexibilities to support outreach, modernization, and innovation efforts (USDA, FNS, 2023c).

In response to supply chain disruptions due to the COVID-19 pandemic and a recall of some powdered formulas in February 2022 that made it difficult for households to find infant formula, Congress passed the Access to Baby Formula Act of 2022 (Public Law 117–129). The act aims to strengthen WIC's ability to address emergencies, disasters, and supply chain disruptions and includes a requirement that each infant formula cost containment contract include remedies in the event of an infant formula recall. The act also directs the USDA and the Department of Health and Human Services to develop a memorandum of understanding that allows for coordination and information sharing regarding any supply chain disruptions. The bill gives USDA the authority to waive or modify administrative requirements during emergencies, disasters, and supply chain disruptions; this authority includes modifying monthly allowances for infant formula.

Finally, two proposed rules, when finalized, will make permanent regulatory changes to the WIC program. One rule (published in the Federal Register in November 2022) proposes revisions to the WIC food packages to further align with recommended dietary guidelines.<sup>33</sup> The review and subsequent revisions are in accordance with the Healthy, Hunger-Free Kids Act of 2010 (Public Law 111–296), which requires that food package reviews be conducted no less than every 10 years. The last changes to the WIC food packages were finalized in 2014. The other proposed rule will address regulatory barriers to purchasing WIC foods through online grocery retail channels.<sup>34</sup> See appendix B for a timeline of legislative and regulatory changes to WIC.

## Program Trends

The data used in this section are publicly available. The data can be found in the USDA, FNS, WIC data tables (USDA, FNS, 2023a), as well as in the most recent release of a report in a series regularly issued by USDA, FNS, such as *WIC Participant and Program Characteristics 2020* (Kline et al., 2022) and *National- and State-Level Estimates of the Special Supplemental Nutrition Program for Women, Infants, and Children*

<sup>33</sup> Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): Revisions in the WIC Food Packages, 87 *Federal Register*, Number 223, November 21, 2022, pages 71,090–71,162.

<sup>34</sup> Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): Online Ordering and Transactions and Food Delivery Revisions To Meet the Needs of a Modern, Data-Driven Program, 88 *Federal Register*, Number 36, February 23, 2023, pages 11,516–11,553.

(WIC) *Eligibility and WIC Program Reach in 2020* (Gray, Kessler, et al., 2022). These reports contain additional information on sociodemographic characteristics of WIC participants and the WIC-eligible population that are not covered in this report, such as race and ethnicity and geography.

## Expenditures

After the WIC program's initiation in 1974, nominal (i.e., not adjusted for inflation) Federal expenditures after infant formula rebates (see section, "Cost Containment") increased each year before peaking around \$7 billion between FY 2010 and FY 2012 (figure 2).<sup>35</sup> The most rapid increases in program spending occurred in the first two decades of the program's operation. Then, in the mid-1990s, WIC funding reached levels at which State agencies could serve all eligible participants who applied for benefits<sup>36</sup> and the annual increase in real (inflation-adjusted) expenditures slowed.<sup>37</sup> Following peak spending from FY 2010 to FY 2012, both nominal and real expenditures decreased each year. Nominal expenditures dropped from \$6.8 billion in FY 2012 to \$5 billion by FY 2020. This period of decline ended in FY 2022, when nominal spending rose to \$5.7 billion, a 14-percent increase from FY 2021. The increase in the amount of the cash-value benefit for fruit and vegetable purchases, as well as increased costs associated with the infant formula supply chain disruptions that began in late February 2022 likely contributed to increased spending in FY 2022.

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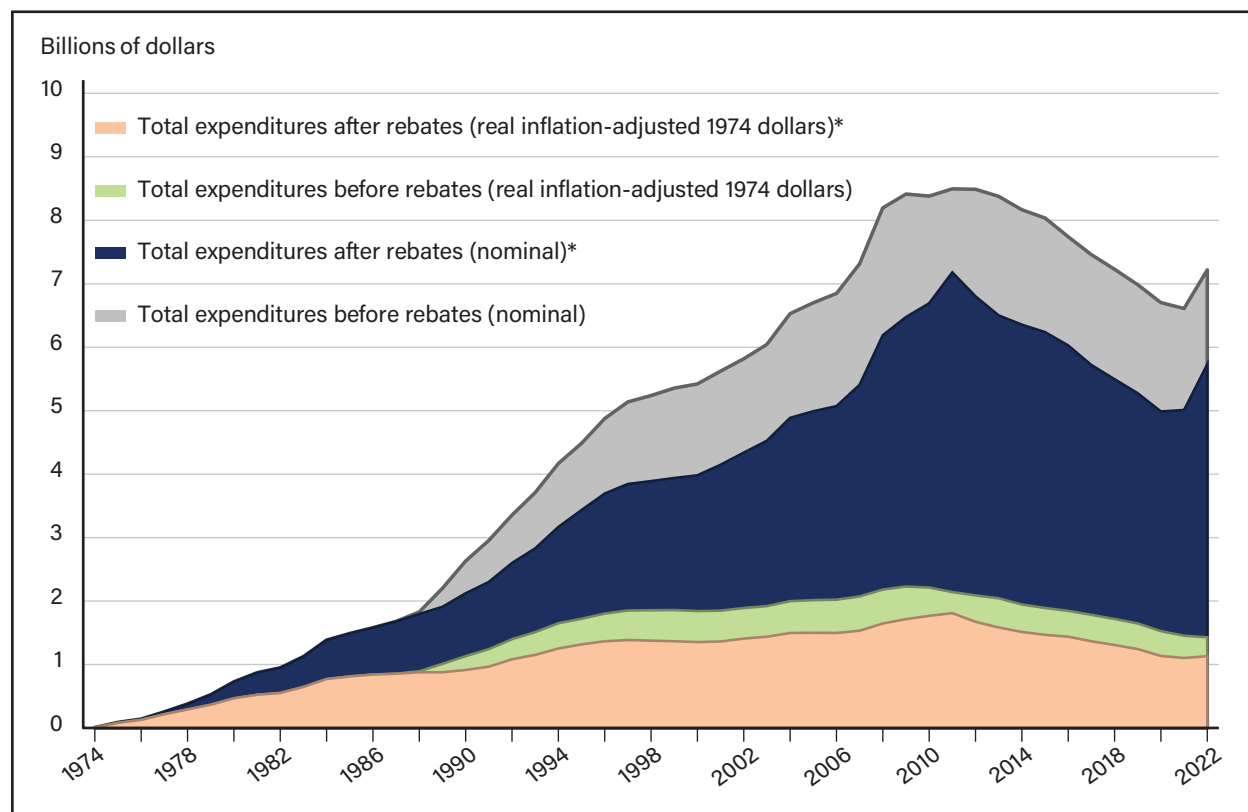
<sup>35</sup> Beginning October 1, 2011, WIC State agencies changed the way they report rebates. The Healthy, Hunger-Free Kids Act of 2010 (Public Law 111–296) requires WIC State agencies to report rebate payments from manufacturers in the month in which the payments are received. Previously, rebates were reported in the month the rebate was earned. During the implementation of this change, fewer rebates were credited to FY 2011 than FY 2010 or FY 2012, resulting in a spike in program costs in FY 2011. Program spending from FY 2010 to FY 2012 averaged \$6.9 billion.

<sup>36</sup> "In the mid- to late 1990s, many observers concluded that the full-funding level of participants had been reached. The reason was because States had some unspent funds for FY 1996 and because coverage rates for the program (the number of participants divided by the number of people estimated to be eligible for the program) were well over 100 percent for infants and pregnant women throughout the late 1990s." (National Research Council (U.S.) Panel to Evaluate the USDA's Methodology for Estimating Eligibility and Participation for the WIC Program, 2003).

<sup>37</sup> From 1985 to 1994, the annual increase in real WIC expenditures was 5.1 percent on average, compared to 1.8 percent on average from 1995 to 2004 and 0.2 percent on average from 2005 to 2014.

Figure 2

**Federal expenditures for WIC before and after infant formula rebates, fiscal years 1974–2022**



WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

\* Beginning October 1, 2011, WIC State agencies changed the way they reported rebates. The Healthy, Hunger-Free Kids Act of 2010 (Public Law 111-296) requires WIC 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. During the implementation of this change, fewer rebates were credited to FY 2011 than FY 2010 or FY 2012, resulting in a spike in program costs in FY 2011.

Note: This figure is based on WIC program data and the October 2022 Program Information Report (Keydata) released by USDA, Food and Nutrition Service in January 2023. Prior year estimates are from various Keydata releases. Real spending in 1974 dollars is calculated using the Consumer Price Index for food at home from the U.S. Department of Labor, Bureau of Labor Statistics.

Source: USDA, Economic Research Service using data from the USDA, Food and Nutrition Service.

Manufacturer rebates on infant formula purchased through WIC are an important component of containing program costs. Once the use of competitive bidding to obtain manufacturer rebates began in the late 1980s, the dollar amount of the rebates in nominal terms increased steadily each year, peaking at \$2 billion in FY 2008. Most of the increase in rebates occurred between FY 1988 and FY 1994, as States agencies’ use of competitive bidding for infant formula rebates gained momentum, after which real dollar amounts for rebates were relatively flat for the following 10 years (figure 2).

In FY 2009 and FY 2010 rebates decreased in both nominal and real terms, leading to a rise in program costs. The drops in rebates can be attributed to increases in wholesale prices of infant formula and reductions in rebate amounts offered by infant formula manufacturers (Oliveira et al., 2010; Oliveira et al., 2013). Rebate amounts increased once again in FY 2013, lowering program costs. The rise in rebates can be attributed to increases in rebate amounts offered by infant formula manufacturers. Rebates in real terms increased by 14 percent between States’ contracts in effect in February 2013 and their previous contracts (Oliveira et al., 2013).

Since 2013, infant formula manufacturers have continued to offer substantial rebates. Among new contracts initiated between 2018 and 2022, the average rebate for the contract holder’s primary brand of milk-based



powder formula was 113 percent of the wholesale price.<sup>38</sup> Yet, even as rebates as a percentage of wholesale prices increased, total rebates received by WIC (in both nominal and real terms) trended downward and remained below the FY 2008 peak. This is likely because the number of infants participating in WIC decreased (see figure 3) and breastfeeding rates among WIC infants increased (Oliveira et al., 2019), resulting in less infant formula purchased through the WIC program.

## Participation

Several factors may influence WIC participation numbers. These factors include policy decisions such as program funding levels, as well as demographic trends, particularly the number of births each year in the United States. Economic conditions also shape the size of the eligible population and decisions to participate among those who are eligible. Individual factors like knowledge of the program, language and transportation barriers, ease in using benefits at the grocery store, and the perceived value of WIC benefits also play a role (Lora et al., 2023).

From the time that the program was initiated in FY 1974 to FY 1997, participation increased annually, driven primarily by increases in the program's budget (figure 3). Expansions of WIC's budget allowed the program to serve more of the eligible population in lower priority categories under the program's priority system, specifically children who did not have existing nutritional-related medical or diet conditions but were considered to be at risk of developing medical and/or dietary problems (Oliveira et al., 2002).<sup>39</sup> The rate of program participation increased noticeably around FY 1989 (by 14.6 percent from the prior year). This rise coincided with States' adoption of competitive bidding processes for infant formula rebates which lowered food costs by about \$3.00 per person, from \$33.28 in FY 1988 to \$30.13 in FY 1989.<sup>40</sup>

The first decline in total participation occurred in FY 1998 and continued by 1 to 2 percent each year through FY 2000. Decreases in program spending of about 2 percent from FY 1998 to FY 2000 may have been a factor in fewer children participating in WIC during this time (Oliveira & Frazão, 2009). The number of children participating decreased by 2 to 3 percent each year, while the numbers of infants and women participating mostly increased. When program funding is limited, infants and pregnant and breastfeeding women have higher priority in WIC (Oliveira & Frazão, 2009).

WIC participation turned upward again in FY 2001 and steadily increased each year—by about 2.8 percent on average from FY 2002 through FY 2009—before reaching a peak of almost 9.2 million participants per month in FY 2010. This historical participation peak coincided with one of the most significant recessionary periods in U.S. history.

The next decline in total participation began in FY 2011 and continued through FY 2021, as the economy recovered from the recession and the United States moved into a period of strong economic growth. Unlike the first period of declining participating (FY 1998 to FY 2000), from FY 2011 to FY 2020 participation declined for all three groups (women, infants, and children). Although economic conditions, including historically low rates of unemployment, likely contributed to these declines, decreases (of about 1.2 percent each year) in the number of births in the United States also contributed (Osterman et al., 2022).<sup>41</sup> In a break from recent years,

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<sup>38</sup> The information is from the authors' analysis of infant formula contract bid data from USDA, FNS (2022d). The wholesale price is the infant formula manufacturer's lowest national wholesale price per unit for a full truckload of infant formula on the date of the bid opening (7 CFR § 246.16(a)).

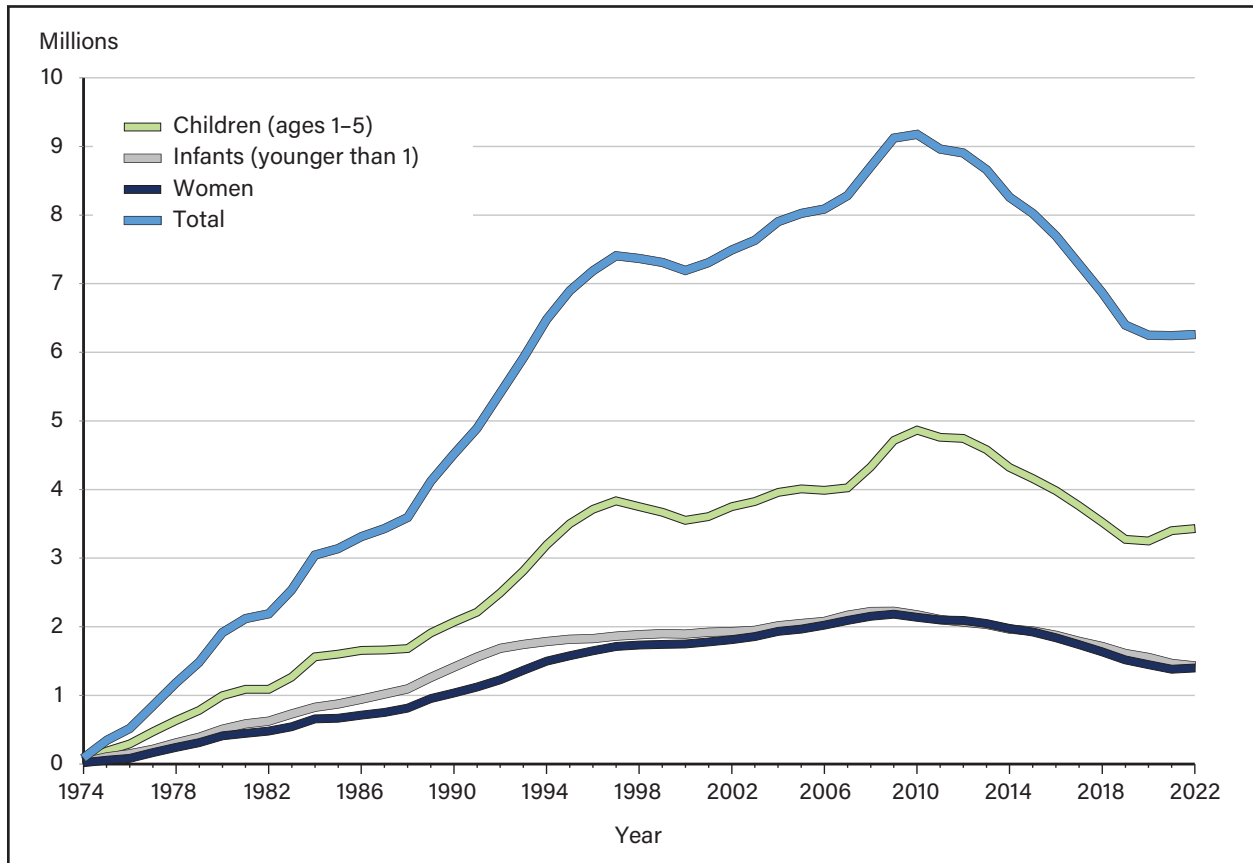
<sup>39</sup> Under the 7-point priority system, pregnant and breastfeeding women and infants have higher priority than children and nonbreastfeeding postpartum women, see 7 CFR § 246.7(e)(4).

<sup>40</sup> This information came from the authors' analysis of food cost per person data from USDA, FNS (2023b).

<sup>41</sup> Economic conditions (unemployment and poverty) are more strongly related to the number of children participating in WIC, while births are more strongly related to the number of infant participants (Oliveira & Frazão, 2015).

however, child participation rose by 4.6 percent in FY 2021. This rise continued into FY 2022 and was accompanied by an increase in women’s participation. These upward trends for both groups led to an increase in overall participation in FY 2022, marking an end to more than a decade of decline.

Figure 3  
Average monthly participation in WIC, fiscal year 1974 to fiscal year 2022



WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

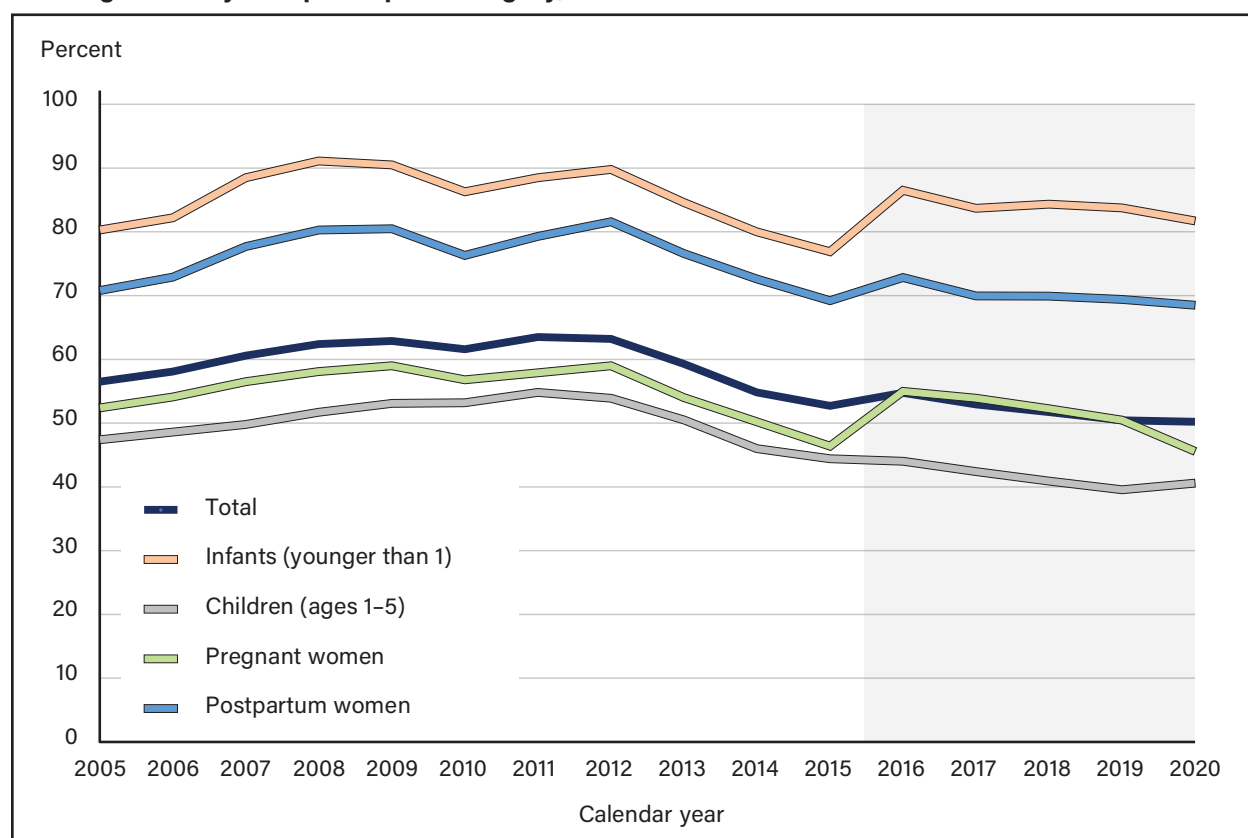
Note: Estimates for fiscal year 2022 are based on preliminary data from the October 2022 Program Information Report (Keydata) released by USDA, Food and Nutrition Service (FNS) in January 2023. Prior year estimates are from various Keydata releases.

Source: USDA, Economic Research Service using data from USDA, Food and Nutrition Service.

## Coverage Rates

The number of WIC participants depends on the size of the eligible population and the share that applies for and receives WIC benefits, referred to as the coverage rate. Although the program’s current funding is sufficient to serve all eligible people seeking to enroll in WIC, many eligible people do not participate (figure 4). The latest estimates of program coverage show that in an average month in 2020, WIC served an estimated 50.2 percent of those eligible for the program (Gray, Kessler, et al., 2022). Coverage rates varied substantially across participant category; the rates were highest for infants (81.7 percent) and lowest for children 1 to 5 years of age (40.6 percent) in 2020 (Gray, Kessler, et al., 2022).

Figure 4  
**Coverage rates by WIC participant category, 2005 to 2020**



WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

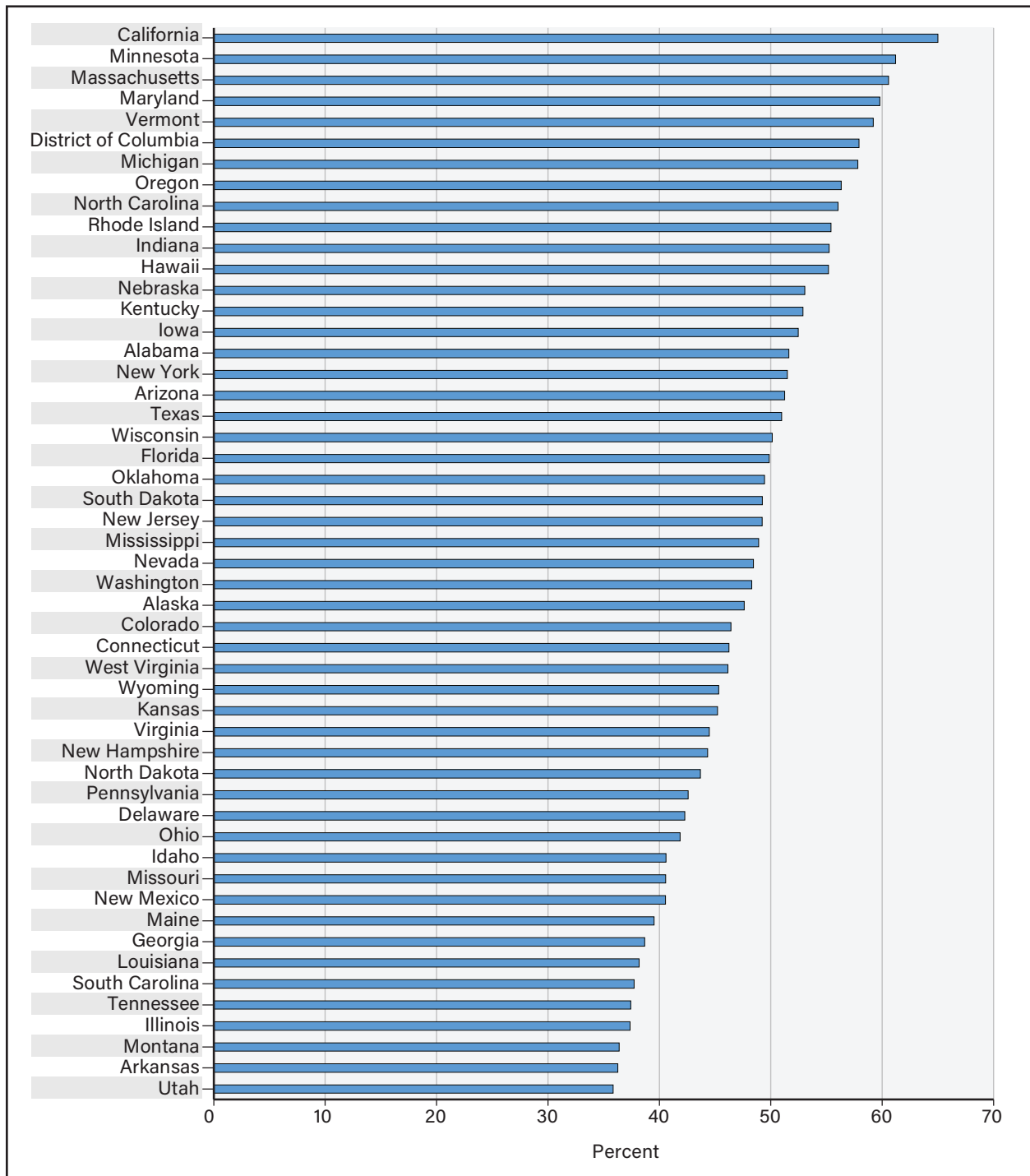
Note: The coverage rate is the share of the eligible population that participates in WIC. The postpartum women category includes breastfeeding women and nonbreastfeeding women. Estimates from 2016 through 2020, shaded in the figure, use an updated methodology and are not directly comparable to estimates from 2005 through 2015.

Source: USDA, Economic Research Service based on data from Gray, Balch, et al. (2022) and Gray, Kessler, et al. (2022).

The number of exits from WIC before children reach age 5 remains a concern as this limits the program’s ability to support the nutrition and health of preschoolers (The White House, 2022). A recent systematic review found that several individual and interpersonal factors influenced participants’ early exits from WIC (Lora et al., 2023). These factors included: having higher socioeconomic status; having a higher likelihood of formula feeding (low intention to breastfeed, never breastfeeding, or breastfeeding less than 6 months); having shorter prenatal participation in WIC; administrative barriers; confusion about program eligibility; feelings of stigma and embarrassment at the store checkout lines; dissatisfaction with insufficient fruits and vegetables benefits (prior to the temporary cash-value benefit increase during the pandemic); and personal (e.g., transportation) and family challenges (Lora et al., 2023).

Coverage rates also differ by State (figure 5). Among the 50 States and the District of Columbia, California (65 percent) and Minnesota (61.2 percent) had the highest coverage rates in 2020. Half of States had coverage rates at or below 48.4 percent, and nine States (Utah, Arkansas, Montana, Illinois, Tennessee, South Carolina, Louisiana, Georgia, and Maine) had coverage rates below 40 percent. In terms of coverage rates for specific participant groups, Utah (55.2) and Maine (55.9) had the lowest coverage rates of infants, while Arkansas (23.5) and Louisiana (23.6) had the lowest coverage rates of children ages 1 to 5 (Gray, Kessler, et al., 2022).

Figure 5  
**WIC coverage rates by State, 2020**



WIC= Special Supplemental Nutrition Program for Women, Infants, and Children.

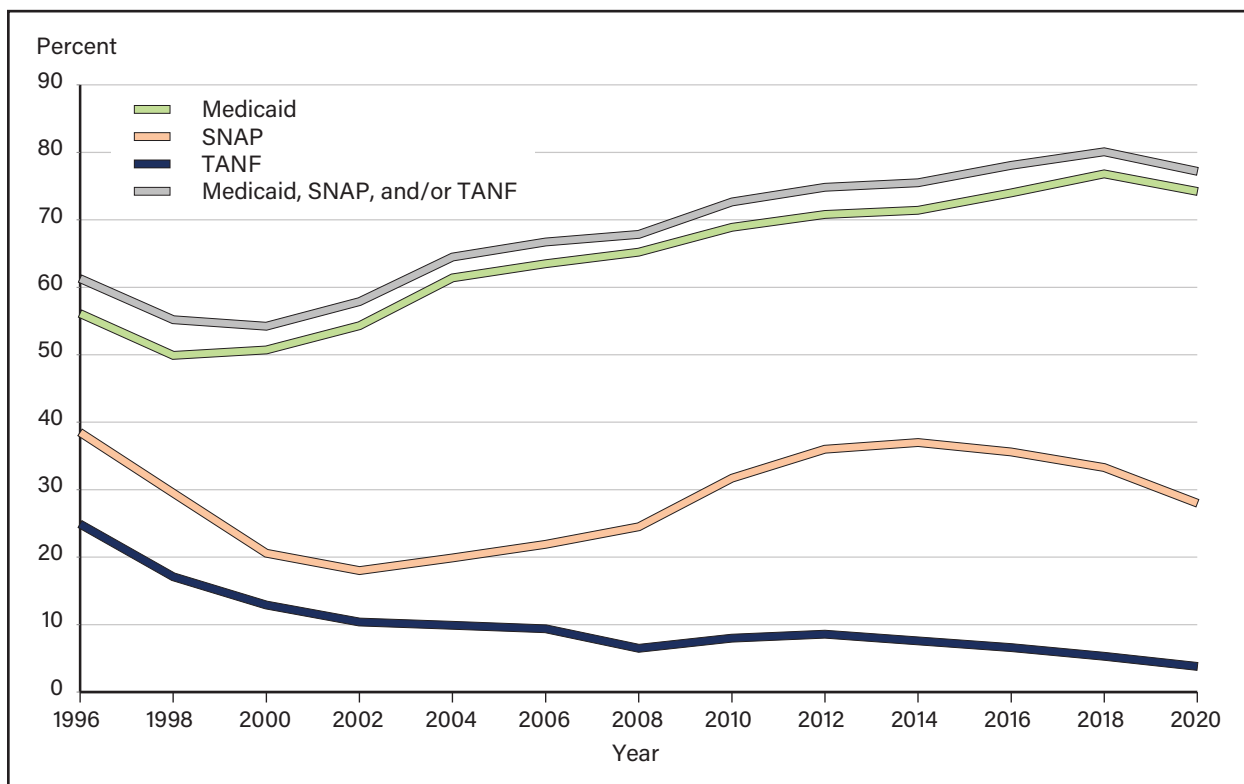
Source: USDA, Economic Research Service based on data from Gray, Kessler, et al. (2022).

## Participation in Other Programs

WIC applicants are adjunctively income eligible for WIC if they participate in other means-tested assistance programs such as Medicaid, SNAP, or Temporary Assistance for Needy Families (TANF). Among those participating in WIC in April 2020, 77.2 percent reported participating in Medicaid, SNAP, or TANF at the time of certification (figure 6), a 4-percent decrease from 2018 (Kline et al., 2022).

Most WIC participants reported participating in Medicaid at the time of certification; 74.2 percent in 2020, down from 76.8 percent in 2018. Approximately 28 percent reported participating in SNAP at the time of certification, down from 33.3 percent in 2018.<sup>42</sup> While Medicaid and SNAP continue to have a wide reach, the size and scope of TANF has decreased significantly since its creation in the mid-1990s (DHHS, 2018). TANF participation at WIC certification was 3.8 percent in 2020, down from 5.3 percent in 2018.

Figure 6  
**Percent of WIC enrollees reporting participation in other programs at certification, 1996–2020**



WIC = Special Supplemental Nutrition Program for Women, Infants, and Children; SNAP = Supplemental Nutrition Assistance Program; TANF = Temporary Assistance for Needy Families.

Note: SNAP and TANF values may underestimate participation in these programs at WIC certification because, if an individual reports participating in Medicaid at the time of certification (which confers adjunctive income eligibility to WIC), WIC clinics may not always record participation in SNAP or other programs (Kline et al., 2022).

Source: USDA, Economic Research Service based on data from Kline et al. (2022).

## Poverty Status

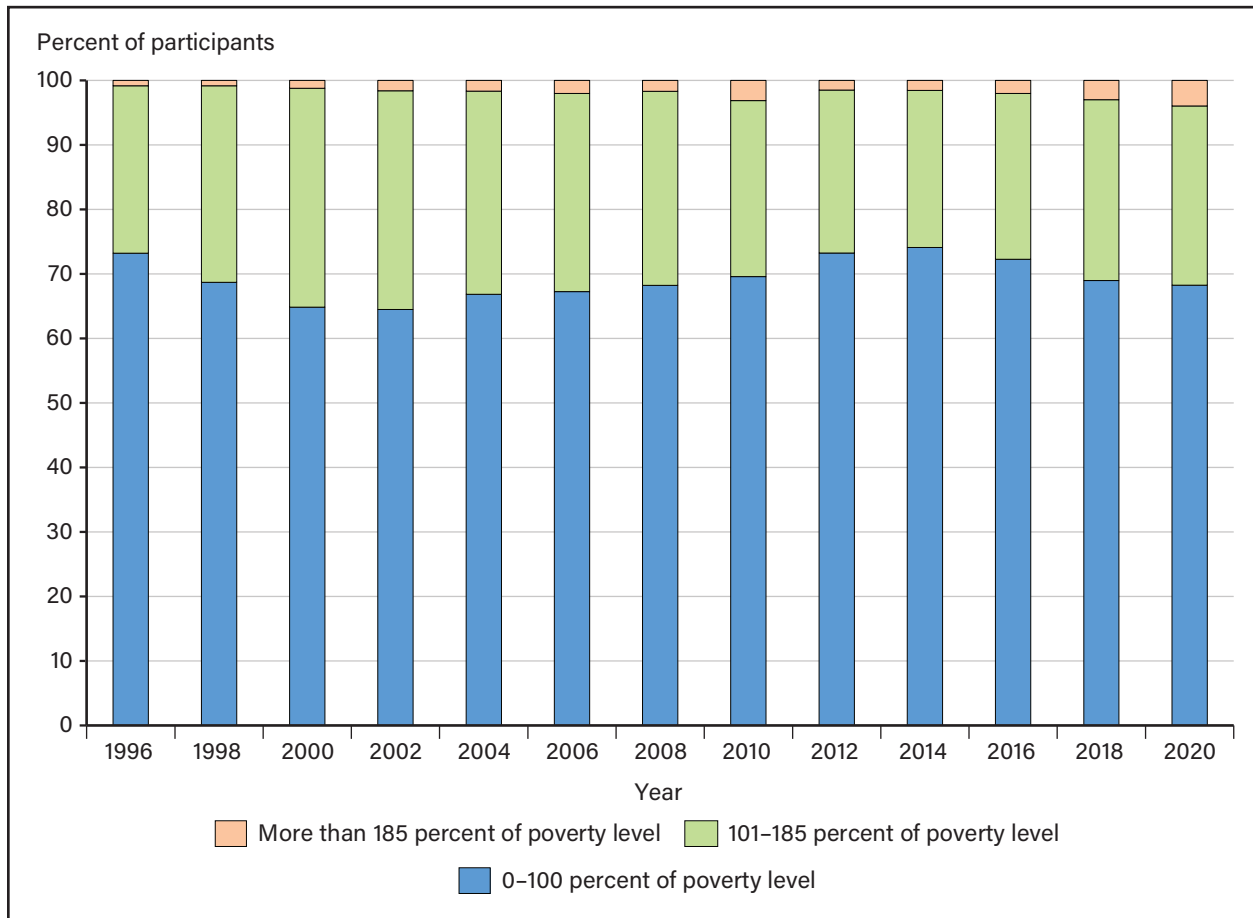
Among households participating in WIC in April 2020 and reporting any income, 68.2 percent lived in households with incomes at or below the Federal poverty level, which was \$26,000 for a household of four in 2020 (figure 7; Office of the Assistant Secretary for Planning and Evaluation, 2020). This number was down from 2014, when the share of WIC households with incomes at or below the poverty level peaked at 74.1

<sup>42</sup> The WIC Participant and Program Characteristics report may underreport SNAP participation because the data capture participation only at the time of certification, and some WIC participants may enroll in SNAP after enrolling in WIC (Kline et al., 2022). Additionally, if an individual reports participating in Medicaid at the time of certification (which confers adjunctive income eligibility to WIC), WIC clinics may not always record participation in SNAP or other programs (Kline et al., 2022). The National Survey of WIC Participants III (Magness et al., 2021) noted that 50 percent of WIC participants reported participating in SNAP in 2019. The 50-percent estimate includes those who may have enrolled in SNAP after certifying for WIC and could also be influenced by misreporting.



percent.<sup>43</sup> Four percent of households reported incomes greater than 185 percent of the Federal poverty level, up from 3 percent of households in 2018. The presence of WIC participants with reported incomes above the income threshold for WIC eligibility may be attributed to adjunctive income eligibility through Medicaid or SNAP. These programs provide benefits to households with incomes greater than 185 percent of the Federal poverty level in some States.<sup>44</sup>

Figure 7  
**Distribution of WIC participants by percent of poverty level, 1996–2020**



WIC= Special Supplemental Nutrition Program for Women, Infants, and Children.

Note: Percentages are based on WIC participants reporting income. Kline et al. (2022) note a change in data cleaning processes beginning with the 2018 WIC Participant and Program Characteristics report, and they recommend caution in comparing income distributions of WIC participants in 2018 and 2020 to prior years.

Source: USDA, Economic Research Service based on WIC State agency data reported in Kline et al. (2022).

<sup>43</sup> Prior USDA, ERS research has shown that WIC participation is sensitive to changes in economic conditions, such as increases in unemployment and increases in poverty (Oliveira & Frazão, 2015; Hanson & Oliveira, 2012).

<sup>44</sup> Since adjunctive eligibility was established by Public Law 101-147 in 1989, eligibility for Medicaid or SNAP in some States was expanded to people with incomes greater than 185 percent of the poverty level.

## Factors Affecting Access to WIC Services

Several factors may contribute to differences in access to the WIC program across participants in different States and across localities within the same State. These factors include food costs, access to food retailers, and differences in how WIC is administered by State and local agencies.

### Food Costs

High food prices could affect participant access to WIC by limiting the number of participants that State agencies can serve on their fixed budgets. The program mainly provides quantity-based food benefits delivered through retail purchases (i.e., electronic benefits to purchase 1 dozen eggs or 4 gallons of milk), rather than a fixed-dollar amount to purchase WIC foods, so the total cost of WIC food benefits fluctuates with retail food prices. One contributing factor to differences in WIC food costs across States and across localities within States may be retail market concentration, a measure of the number of firms operating in a market and their respective influence. Food retail markets with many retailers tend to be less concentrated and highly competitive, making it difficult for any single retailer to raise prices. Conversely, markets with few retailers tend to be more concentrated, making food prices higher as a result.

Some evidence that food retail market concentration and competitiveness may matter for WIC food costs is summarized in a USDA, ERS report on WIC food costs in the Greater Los Angeles area (McLaughlin et al., 2021). One study summarized in the report found a positive association between market concentration and WIC food costs among small and medium sized vendors (those with up to four cash registers, or five or six cash registers, respectively) and no relationship among large vendors (those with seven or more cash registers). The study also found that the presence of a large vendor may lower prices charged by small- and medium-sized vendors. Another study summarized in the same report found that larger vendors offered WIC foods at a much lower price to participants than did smaller vendors. This means that State agencies whose vendor populations include a larger number of small- and medium-sized vendors may have higher food costs compared to those whose vendor populations include fewer small- and medium-sized vendors.

Differences in food costs across States can also limit the amounts of fruits and vegetables that WIC participants can purchase with the cash-value benefit, a fixed dollar amount for the purchase of fruits and vegetables that a participant is issued each month. Unlike other WIC food benefits, the quantity of fruits and vegetables that can be purchased with the cash-value benefit may differ based on prices where the participants live, as well as the mix of items chosen.<sup>45</sup> Participants in geographic areas with higher prices for fruits and vegetables may be able to purchase fewer of them with the cash-value benefit, as compared to those in geographic areas with lower prices. Given that the cash-value benefit was introduced to help increase fruit and vegetable consumption among WIC participants and promote their well-being, variation in fruit and vegetable prices across the country may undercut the cash-value benefit's effectiveness for participants in higher priced market areas.

USDA, ERS research has found substantial variation in the cost of fruits and vegetables across and within States, concluding that WIC participants in higher cost areas cannot purchase as many fruits and vegetables with the cash-value benefit as those in lower priced areas. For example, one study found that 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 the voucher could buy 15 percent fewer tomatoes and 11 percent fewer apples in the most expensive market (Leibtag & Kumcu, 2011). Another study found

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<sup>45</sup> The types of fruits and vegetables that can be purchased with the cash-value benefit also vary across States. For example, some States allow canned and frozen fruits and vegetables to be purchased with the cash-value benefit, while other States do not. Differences in prices across types of fruits and vegetables can also affect the amount that can be purchased using the cash-value benefit.

that WIC participants in the highest cost metropolitan statistical areas can buy fewer fruits and vegetables with their cash-value benefit, as compared to participants in the lowest cost metropolitan statistical areas receiving the same benefit (Çakir et al., 2018).

The cash-value benefit was temporarily increased through the American Rescue Plan Act of 2021 (Public Law 117–2) and then through subsequent legislation to provide about half of the recommended daily amounts of fruits and vegetables. The benefit was raised to \$25 for children 1-5 years old, \$44 for pregnant and postpartum participants, and \$49 for breastfeeding participants in FY 2023.

## Food Access

Food access may also be affected by the number of WIC-authorized vendors operating in a market. WIC benefits can only be used at retail locations such as supermarkets and grocery stores that have been approved by the WIC State agency. Tiehen and Frazão (2016) found that 77 percent of WIC benefits were redeemed at large stores (super stores, supermarkets, and large grocery stores). However, they also found differences by State in the distribution of WIC benefit redemptions across vendor types. In California, where participants may have access to WIC foods at smaller WIC-only (or A50) stores,<sup>46</sup> only 50 percent of WIC benefits were redeemed at large stores, compared to 99 percent in Nevada.

WIC participants' access to WIC-authorized vendors and to other food stores may also differ by race and ethnicity.<sup>47</sup> Two USDA, ERS reports examining access to food retailers in 2015 and 2019 across population subgroups found that racial minorities tend to live closer to food retailers than their white counterparts except for Native Americans, who tend to live farther away. Overall, Hispanics also tend to live closer to food retailers than non-Hispanics (Rhone et al., 2019; Rhone et al., 2022).

These differences may reflect rural and urban differences in the distribution of racial and ethnic groups, as individuals in urban areas tend to live closer to food retailers than those in rural areas. They may also reflect differences in vehicle ownership rates or socioeconomic status across groups. Nationally, those from households with incomes below 200 percent of the Federal poverty level live closer to food retailers relative to those above (e.g., wealthier individuals may not need to live as close to a food retailer because they can afford the transportation or delivery costs), as do those who do not own their own vehicles relative to those who do (Rhone et al., 2019; Rhone et al., 2022).

Distances individuals must travel to food retailers are less pronounced across racial groups in urban areas, though Hispanics and those from lower income households tend to live closer to food retailers than their non-Hispanic and higher income counterparts. While distances to food retailers are greater for all groups in rural areas (compared to their urban counterparts), racial minorities and Hispanics living in rural areas tend to live closer to food retailers than their White and non-Hispanic counterparts. Native Americans, however, tend to live the farthest away. Those living in rural areas who do not own a vehicle also tend to live closer to food stores, while individuals from lower income households tend to live about as far from food retailers as their higher income counterparts (Rhone et al., 2019).

A USDA, ERS report using USDA's Food Acquisition and Purchase Survey (FoodAPS) data suggests that vehicle access may play a role in food access for some WIC participants. Among WIC participants, 86

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<sup>46</sup> A50 stores are a special class of vendors defined by Federal regulations as those that derive more than 50 percent of their food sales from WIC transactions and do not exist independently from the WIC program (McLaughlin et al., 2021).

<sup>47</sup> In terms of the racial composition of WIC participants, 59.5 percent of WIC participants were White, 22.3 percent were Black, 6.8 percent were American Indian, 3.6 percent were Asian, and 0.8 percent were Pacific Islander in 2020 (Kline et al., 2022, page v). In terms of the ethnic composition of WIC participants, 40.7 percent of participants were reported as Hispanic/Latino in 2020 (Kline et al., 2022, page v).

percent reported using their own vehicle to do their grocery shopping.<sup>48</sup> Comparatively, 98 percent of higher income households reported using their own vehicle for grocery shopping. WIC participants also reported having access to more than one food retailer, conducting most of their shopping at food retailers farther away than the one closest to them, and shopping at supermarkets or supercenters at the same rate as nonparticipating households (Ver Ploeg et al., 2015). While access may vary across States (and localities within States), other research co-authored by the USDA, ERS staff corroborated these findings using data from the Greater Los Angeles area. They found that food access was not a meaningful barrier for WIC participants in that locale (McLaughlin et al., 2021; McLaughlin & Martinez, 2021).

WIC State agencies authorize vendors based on Federal guidelines<sup>49</sup> and their own sets of criteria like store hours of operation, store days of operation, number of registers (above Federal requirements), and minimum square footage (Landry et al., 2021). State agencies routinely conduct vendor assessments to help ensure that the agency has authorized the appropriate number and distribution of vendors to support participants' access to supplemental foods. However, State agency efforts to ensure sufficient participant access to WIC-authorized vendors within a State do not ensure that WIC participants with similar traits living in different States have the same access to WIC-authorized vendors. Rather, Landry et al. (2021) found that vendor-authorization criteria differ across States without any clear pattern and noted that WIC participants residing in States with stricter vendor-authorization criteria may face more difficulties accessing vendors than participants in States with less strict criteria (Landry et al., 2021).

Moreover, in a USDA, FNS survey of 380 former WIC participants in three States who had stopped buying WIC foods in 2018, 51.3 percent reported stopping because of “negative shopping or retailer experiences.” Among this group, 15.4 percent indicated a lack of conveniently located stores as a motivation (Gleason et al., 2021). USDA is working to expand access to WIC foods by allowing States to work with vendors to develop online shopping options for WIC participants (see box, “Online Ordering”).

## Online Ordering

Online grocery shopping has been a growing trend for U.S. consumers and the COVID-19 pandemic significantly increased its adoption. FMI, The Food Industry Association, reported that in 2022 more than two-thirds of shoppers said they shopped for groceries online “at least occasionally” and 15 percent said they shopped for groceries online “almost every time” (FMI, The Food Industry Association, 2022).

WIC participants have expressed a desire to be able to use their benefits for online grocery purchases. In a survey of more than 20,000 WIC participants across 12 WIC State agencies (conducted by the National WIC Association in the spring of 2021), more than two-thirds of participants said they would like to purchase WIC foods by ordering online and using curbside or in-store pickup (Ritchie et al., 2021). Additionally, more than half reported lack of access to online shopping as a reason for not redeeming all of their WIC food benefits in the prior 6 months (Ritchie et al., 2021). At the time of the survey, the need for social distancing due to the COVID-19 pandemic may have increased the demand for online ordering options and contributed to difficulties with redeeming benefits among WIC participants.

Currently, Federal regulations require WIC participants to redeem their benefits in the presence of a cashier (7 CFR § 246.12). However, the American Rescue Plan of 2021 provided USDA with waiver authority to carry

continued on next page ►

<sup>48</sup> An additional 7 percent of WIC participants report using someone else's car to do their grocery shopping (Ver Ploeg et al., 2015).

<sup>49</sup> 7 CFR § 246.12(g).

## Online Ordering—continued

out WIC modernization efforts. Under this authority, USDA, FNS has issued waivers to support online shopping efforts including waiving the requirement that benefits be redeemed in the presence of a cashier. USDA, FNS has also proposed a rule revision to allow WIC participants to redeem WIC benefits online.<sup>50</sup> This revision is supported by findings from USDA, FNS which, in cooperation with the Gretchen Swanson Center for Nutrition, provided subgrants to State agencies to pilot WIC online ordering projects (Gretchen Swanson Center for Nutrition, 2022).

Some State agencies have also piloted online ordering projects that do not require changes to existing regulations by using a “click and collect” approach. Under this model, WIC participants use a grocery shopping application to order their WIC foods, but they pick the foods up at the store or curbside to redeem their benefits in the presence of a cashier (Zhang et al., 2022; Zimmer et al., 2021).

Zhang et al. (2022) analyzed the shopping patterns of WIC participants in Oklahoma who had access to a “click and collect” online ordering option. The authors found that 40 percent of participants who used the online shopping option did so only once. Zimmer et al. (2021) assessed a similar approach to WIC benefit redemption online in Tennessee. Although all participants in the pilot were able to successfully order benefits online and pick them up in person, several issues emerged. The issues included difficulty identifying WIC items on the grocery store website and having to look through long lists after searching for an item to identify a WIC-approved product (Zimmer et al., 2021). Participants also expressed positive and negative opinions about the fee required to use the online option. Some participants felt the fee was worth it if it meant they did not have to get their children out of the car and go into the store for their groceries, while others felt that it cut into their already limited food budgets (Zimmer et al., 2021). Data from the Household Pulse Survey indicate that some WIC participants shopped online to find infant formula during the 2022 supply chain disruptions when it became difficult for some households to find infant formula at their usual store (see box, “Experiences of the Infant Formula Shortage Among WIC Households: Evidence From the Household Pulse Survey”).

## State and Local Policies

WIC State agencies are responsible for setting certain program rules, including the number of vendors authorized to accept WIC benefits and certain certification policies and procedures. Differences in how States administer WIC can therefore contribute to differences in the WIC participant experience across States, and to differences in rates of participation among eligible individuals across States (see figure 5).

Additionally, WIC funding is set by Congress and renewed annually. Since the mid-1990s, Congress has provided sufficient funding for all eligible individuals to participate in WIC if the individuals choose to do so. If Congress were to provide less funding, WIC State agencies would need to take additional measures to manage program costs which could affect program access. These measures could include implementing new or additional food cost-containment policies, shortening certification periods when allowed, or using a priority system for enrolling new applicants into the program.

## Food Costs and Food Access

Policies set by State WIC agencies can help keep WIC food costs low and improve access to WIC-authorized vendors among program participants. Federal regulations set the minimum requirements and specifications of the food packages, including the maximum monthly allowance for each type of food, as well as allowable food substitutions. However, State agencies also play a role in determining the composition of WIC food packages. State agencies determine whether to implement the following:

<sup>50</sup> 88 FR 11516 (February 23, 2023) (to be codified at 7 CFR § 246).



- Incorporate food substitutions allowed under Federal law into their food packages, such as allowing participants to purchase yogurt instead of milk.
- Limit container or package sizes to take advantage of lower per-unit prices.
- Allow participants to purchase processed fruits and vegetables with the cash-value benefit.
- Allow participants to substitute fresh fruits and vegetables for jarred infant foods.
- Place limitations on the brands of foods (e.g., least expensive or store brand restrictions) that can be purchased with WIC food benefits to ensure competitive pricing for WIC foods.

A USDA, FNS survey of 70 State agencies conducted in 2017 and 2018 found that 38.6 percent had implemented a least expensive brand restriction, 24.3 percent had implemented a store brand restriction, and all had implemented at least one container size, or substitution restriction (Gleason et al., 2021). State agencies can also impose ceilings on the amounts the agencies will reimburse vendors for foods purchased using WIC benefits. Doing so was found to drive down costs in the Greater Los Angeles area (McLaughlin et al., 2021).

State agencies determine the full set of criteria they use to authorize WIC vendors and have the option to authorize “above-50-percent” (A50) stores that derive more than 50 percent of their food sales from WIC transactions. Such stores typically cater exclusively to WIC participants and tend to be located close to where participants live, thereby improving access to WIC foods.<sup>51</sup> USDA, ERS researchers conducted a simulation under the hypothetical that A50 stores did not exist, to assess how these stores might affect access to WIC authorized retailers for WIC participants. Using data from the Greater Los Angeles area, the study estimated that if A50 stores did not exist, access to a WIC authorized retailer would have increased by 1 mile or more for 45 percent of participants who conducted most of their WIC shopping at such stores. For 21 percent of the A50 shoppers, travel distances would have increased by 2 miles or more (McLaughlin, 2019). The number of A50 stores operating nationally has been declining, however. In 2008, 1,401 A50 stores operated, falling to 973 stores in 2018. The attrition was due to fewer State agencies authorizing any type of A50 stores. Of the 973 A50 stores operating in the United States and its territories in 2018, most were in California (493) and Texas (103) (McLaughlin & Martinez, 2021).

### *Flexibility in Eligibility Determination*

To participate in WIC, applicants must meet income-eligibility requirements in addition to categorical, residential, and nutritional-risk requirements. State agencies have some discretion to determine WIC eligibility, meaning a person who is eligible to participate in the program in one geographic area may be ineligible in another.

Federal regulations regarding WIC eligibility define family as “a group of related or nonrelated individuals who are living together as one economic unit.”<sup>52</sup> This regulation gives State agencies discretion over 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). For example, in 2019, 56.1 percent of WIC State agencies provided their local WIC agencies with no guidance to determine what constitutes an economic unit. Of those State agencies that provided guidance, 44.4 percent considered those that share goods, services, and food (in addition to income as a single unit), while the remainder offered other sets of

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<sup>51</sup> An advantage of A50 stores is that the stores stock primarily WIC foods and employ cashiers knowledgeable about the program and WIC transactions (McLaughlin, 2019). However, a disadvantage of such stores is that they lack the variety of non-WIC foods and other features available in stores that do not exclusively cater to WIC participants (McLaughlin et al., 2021).

<sup>52</sup> Title 7, CFR § 246.2.

guidelines (Magness et al., 2021). Because Federal poverty guidelines vary by family size, the number of people determined to be in a family (and the income of each family member) can affect their WIC eligibility.

Federal regulations include a long—but not exhaustive—list of income sources that must be included and excluded to determine the applicant’s income.<sup>53</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 eligibility for WIC. For example, in 2019 83 percent of State agencies excluded military housing allowances for off-base housing, while 68 percent excluded Overseas Housing Allowance and 64 percent excluded Family Separation Housing (Magness et al., 2021).

Additionally, 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 the 1989 legislation, some States have expanded eligibility for these programs to include individuals with household incomes above the WIC eligibility threshold. As of January 2022, 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 (41 States) and infants (38 States) (table 4). In addition to Medicaid, SNAP, and TANF, 63 percent of WIC State agencies also confer automatic income eligibility for people enrolled in other Federal or State-administered programs (Magness et al., 2021).

Table 4  
**Number of States with Medicaid income eligibility higher than 185 percent of the Federal poverty guidelines**

Participant category	Number of States (including the District of Columbia) as of January 2022
Infants (younger than 1)	38
Pregnant women	41
Postpartum women	1
Children (ages 1–5)	24

Source: USDA, Economic Research Service based on data from Kaiser Family Foundation, 2022.

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. In 2020, more than three-quarters (77 percent) of WIC participants reported receiving benefits from at least one of the public assistance programs that made them adjunctively income eligible for WIC (see figure 6). However, only 3.5 percent had incomes greater than 185 percent of the Federal poverty guidelines (Kline et al., 2022; see figure 7).

### *Program Access and Certification Processes*

State agencies differ in the number of local agencies, clinics, and sites providing WIC services to prospective and current participants. The number and location of local service providers can restrict access to WIC and its benefits. One study (using data from Texas from 2005 through 2009) found that access to WIC clinics increased take-up of the program’s food benefits. The study also found that access to WIC clinics increased weight gain during pregnancy, increased infant birth weight, and increased the likelihood of breastfeeding

<sup>53</sup> Title 7, CFR § 246.7(d)(2)(ii).

among mothers with a high school education or less (Rossin-Slater, 2013). In 2019, the median number of local WIC agencies per State agency was 13 and ranged from zero to 118 (Magness et al., 2021).<sup>54</sup> In the same year, the median number of local WIC clinics and sites was 37 and ranged from 0 to 572 (Magness et al., 2021).

The types of documentation accepted by local WIC agencies for certification also vary across States and can affect access to the program's benefits. The range of documents accepted for certification can influence the eligible applicants' ability to enroll in the program. In 2019, 90 percent or more of all local WIC agencies accepted a driver's license (or some other State issued identification), birth certificates, crib cards, hospital discharge papers, hospital identification bracelets, military identification, or passport or immigration records for verification of an applicant's identity. However, fewer WIC agencies accepted other forms of identification including photo identification (e.g., work or school identification) (86.2 percent), immunization records (85.5 percent), foster placement letters (79.7 percent), Social Security cards (78.3 percent), or Medicaid cards (72.8 percent). The types of documents accepted for verification of an applicant's residency can also vary. In 2019, an average of 6.8 percent of applicants and 6.2 percent of new applicants were denied across local WIC agencies because of a lack of documentation provided for residency or identity, respectively (Magness et al., 2021). USDA, FNS issued new guidance in May 2023 allowing State and local WIC agencies to use electronic documents in the certification process and/or the use of one type of document as proof for multiple certification components (USDA, FNS, 2023a).

Local WIC agencies also have the option to perform certifications remotely or at alternative sites such as mobile units or offsite clinics at hospitals, schools, or other locations. Only half of local WIC agencies offered certification services at alternative sites. Other factors that vary across local WIC agencies, such as certification caseloads and staffing, may also influence WIC coverage rates (Magness et al., 2021).

## Revisiting the Impacts of the 2009 Food Package Revisions on Participant Food Purchases and Diet Quality, Child Obesity, and Breastfeeding

Understanding whether and how the receipt of WIC benefits leads to improvements in outcomes among participants helps policymakers and program administrators measure the value of the program and understand how to further refine WIC so that the program is better able to meet its objectives. One way that the impact of a program can be estimated is by observing how outcomes change when components of the program are modified. Revisions to the WIC food packages in 2009 (which included the addition of fruits, vegetables, and whole grains, and reduced the amount of juice, milk, and cheese) presented such an opportunity to learn more about the impacts of these benefits.

The last edition of this report, *The WIC Program: Background, Trends, and Economic Issues, 2015 Edition* (Oliveira & Frazão, 2015), summarized research on the impacts of the 2009 food package revisions through 2014. The research generally compared the initial period following the implementation of the 2009 package to the period just before the package revision and found that the changes positively affected food purchases and food consumption. Specifically, WIC participants were found to purchase more whole-grain products, fruits and vegetables, and reduced-fat milk after the food package revision in 2009 (Andreyeva et al., 2013; Andreyeva et al., 2014; Andreyeva & Luedicke, 2013; Andreyeva & Luedicke, 2014). Other studies found increases among WIC participants in the consumption of lower fat milk and whole grains and decreases in consumption of whole milk and refined grains (Spaulding et al., 2014; Ishdorj & Capps, 2013; Whaley et al., 2012).

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<sup>54</sup> Some WIC State agencies do not have local offices that report to them.

Research has continued to explore the effects of the 2009 food package revision, as more data have become available, and as food manufacturers and retailers have had time to adjust to the revisions. These studies (using more recent data) further confirmed that WIC participants purchased and consumed more whole-grain bread than similar nonparticipant income-eligible households after the 2009 revisions (Stewart et al., 2019; Oh et al., 2016). Focusing on children 1 to 4 years old, Fryar et al. (2023) found a decline in the share of children participating in WIC who consumed whole grains between 2005–06 and 2017–18 but an increase the total quantity of whole grains consumed. Increases in consumption were even larger among income-eligible children who did not participate in WIC, which may be due to the spillover effects of increased availability of whole-grain bread on store shelves.

The choice to authorize the purchase of whole-grain bread in 16-ounce packages may have limited the availability of this item when it was first added. Some participants may have wanted to redeem the benefit but were unable to find the item at their usual store. Using store-level sales data, Stewart et al. (2019) found that a 16-ounce package was a relatively uncommon package size for whole-grain bread in 2009, comprising only 8 percent of all packages sold. Instead, most whole-grain bread was purchased in larger 20- or 24-ounce packages. Since then, the 16-ounce bread package has become more common (17 percent of all packages in 2015), indicating that food manufacturers worked to meet the increased demand for the smaller package size. Nevertheless, Stewart et al. (2019) found that the 16-ounce package cost more per pound (\$2.76) in 2015 than both a 20-ounce package (\$2.08 per pound) and a 24-ounce package (\$1.90 per pound), on average. In fact, the 16-ounce package cost more overall than the 20-ounce package, on average (\$2.76 compared to \$2.60). Thus, program costs could likely be lowered if WIC participants obtained whole-grain bread in larger, lower cost packages.

The 2022 proposed revisions to the WIC food packages include allowing for 20- and 24-ounce packages of whole-grain bread, which is expected to increase options available to participants and vendors, as these package sizes are still more common than 16-ounce packages.<sup>55</sup> The aim of this change is to make it easier for WIC participants to redeem the benefit and will likely lead to increased whole-grain intake among the participants, which still falls below the intake recommended in the Dietary Guidelines for Americans (Gleason et al., 2021). The decrease in expected unit-costs from the changes to the whole-grain bread benefits (along with other changes to the grain benefits across all packages) are expected to result in an overall decrease in the cost of providing whole grains, while also increasing redemption rates.

In another study, Stewart et al. (2019) found that, unlike with whole-grain bread, WIC-participating households did not purchase more whole-grain cereals than their nonparticipating counterparts. Moreover, participants were less likely to purchase whole-grain cereal when not using their WIC benefits (when using their other resources). The 2022 proposed food package revision calls for requiring all breakfast cereals to have a whole grain listed as the first ingredient; NASEM (2017) estimated that this change will reduce redemption rates by about 5 percentage points, leading to a decrease in the cost of the breakfast cereal component of the food packages. However, it is expected that the change will increase whole-grain cereal purchases among WIC-participating households and ultimately consumption of whole grains.

Recent research also found that WIC-participating children (1 to 4 years of age) were more likely to drink milk of the type appropriate for their age (whole milk for children ages 1 to 2 years and low-fat milk for children ages 2 to 4 years) than income-eligible nonparticipating children (Guthrie et al., 2018; Fryar et al., 2023). Another study found that a larger share of WIC-participating children aged 2 to 4 years met the saturated fat target of less than 10 percent of calories in 2016, as compared to 2008 (Guthrie et al., 2020). The study authors attribute this finding in part to the larger share of children who consumed low-fat milk following the implementation of the 2009 food packages. The 2022 proposed food package revisions would

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<sup>55</sup> Page 71,141 of 87 *Federal Register*, Number 223, November 21, 2022, pages 71,090–71,162.

lower the amount of milk prescribed to participants to better align the amounts provided to be a supplement to intake and would eliminate all flavored milk (which contain added sugars). The proposed revisions also increase the amount of yogurt that can be substituted for milk and add lactose-free milk and milk substitutions, which is expected to increase the redemption rate for milk benefits and increase intake of key nutrients contained in dairy products and their substitutes.

Fryar et al. (2023) compared the share of WIC participant children ages 1 to 4 who consumed fruits and vegetables on a given day to that among income-eligible nonparticipant children of the same age between 2005 and 2018. They found no change among WIC participant children, but a decrease among income-eligible nonparticipant children, which suggests that WIC may have prevented a decline in fruit and vegetable consumption among children.

Guthrie et al. (2020) also compared vegetable consumption among WIC-participating infants in 2008 and 2016. They found that a larger share consumed vegetables each day in 2016 compared to 2008 (74 percent versus 59 percent, respectively), which is likely because WIC began including infant fruits and vegetables in the food package in 2009. The 2022 proposed food package revisions call for lower amounts of infant fruits, vegetables, and meat for fully breastfed infants as the 2009 package amounts exceed recommended intake. The revisions also allow for greater numbers of younger infants (those 6 months and older instead of 9 months and older) to substitute a cash-value benefit for half or all the jarred infant foods in their package at a higher rate than in the 2009 package provisions (\$10 for half of jarred infant foods and \$20 for all the jarred baby fruits and vegetables). The proposed flexibility for infant fruits and vegetables, and the fact that many WIC participants reported high satisfaction with the increased CVB amounts offered during the COVID-19 pandemic, could lead to improved intake and variety of fruits and vegetables among WIC infants.

Despite the small improvements in consumption of whole grains, fruits, and vegetables, and lower fat intake following the implementation of the 2009 food packages, not all studies found evidence that the overall diet quality of WIC-participating children improved as a result. Tester et al. (2016) compared the diet quality as measured by the 2010 Healthy Eating Index (HEI–2010) of WIC-participating and income-eligible nonparticipating children aged 2 to 4 years old before (2003–2008) and after (2011–2012) the food package revision, using data from the National Health and Nutrition Examination Survey (NHANES). They found that the improvement in diet quality among WIC-participating children was greater than what was observed for income-eligible nonparticipants over the period. Li et al. (2022) did a similar comparison but used different periods before the 2009 food package implementation (2005 to 2008) and after (2011 to 2016) and used the 2015 Healthy Eating Index to measure diet quality. In contrast to Tester et al. (2016), Li et al. (2022) found that WIC-participating children continued to have higher diet quality after the 2009 food packages were implemented, compared to income-eligible nonparticipating children, but found no additional improvement in diet quality among WIC participants following the food package revision. Daepp et al. (2019) found that the rising rates of obesity among WIC-participating children aged 2 to 4 years (between 2000 and 2008) began to reverse course following implementation of the 2009 food package through 2014, even after accounting for changes in participant characteristics over time. Sanjeevi and Freeland-Graves (2022) found lower rates of anemia among WIC-participating children aged 2 to 5 years following the 2009 food package implementation. This finding lends further support that the increased focus on foods high in iron (e.g., fruits, whole grains, dark green vegetables, and beans) in the 2009 food package improved iron intake among children.

When considering whether and how WIC can influence food choices and overall diet quality, it is important to note that WIC only supplements food needs. WIC-participating households use other resources for most of their food needs (NASEM, 2017). Therefore, WIC is only one factor affecting the diet quality of participants. Most participants do not redeem their full food package benefit (Li et al., 2021; NASEM, 2017; Phillips et al., 2014). The cash-value benefit redemption rate was estimated to be 72 percent in 2020, based



on data from 48 State agencies.<sup>56</sup> Initially, the cash-value benefit could not be combined with other forms of payment (SNAP or cash). Participants reported finding it difficult to know how much the fruits and vegetables they selected would cost and experienced challenges during checkout with redeeming the cash-value benefit (Gleason & Pooler, 2011).

The NASEM report recommended that large increases to the cash-value benefit would promote increased consumption of fruits and vegetables to better align with USDA dietary guidelines and would do so in a culturally flexible and sensitive way. Au et al. (2021) found that more than half (56 percent) of WIC participants in California thought the \$9 per month cash-value benefit they received was not enough. The cash-value benefit was temporarily increased through the American Rescue Plan Act of 2021 (Public Law 117–2) and then through subsequent legislation to the levels NASEM recommended. The increase was set to provide about half of the recommended daily amounts of fruits and vegetables—to \$25 for children 1-5 years old, \$44 for pregnant and postpartum participants, and \$49 for breastfeeding participants in FY 2023 (see section, “Recent Legislative and Regulatory Changes to WIC”). Several studies found that participants value this part of the food package and thought the temporarily increased values were the right amount to help supplement fruit and vegetable purchases, while the prepandemic lower amounts were not enough (e.g., Martinez et al., 2022; Ritchie et al., 2022). Future research can explore whether WIC participants increased their purchase and consumption of fruits and vegetables in response to receiving a larger cash-value benefit during the pandemic or whether the increased benefit simply freed up more resources for other food or nonfood spending. The USDA Food and Nutrition Service is studying redemptions of the cash-value benefit before and during the period when benefits were temporarily increased to see whether redemption rates increased and whether any participant or policy factors contributed to redemption rates (USDA, FNS, 2022a).

While the components of the WIC food packages are key elements in WIC’s overall impact on diet quality and health, the nutrition education offered by the program complements the food packages. Using data from the *WIC Infant and Toddler Feed Practices Study 2*, Borger et al. (2020) found that long-term child participants (children who were enrolled in WIC between July and November 2013 and were participating at 42 months old) had a higher diet quality, as measured by the HEI–2015, than children who stopped participating in WIC after a year. The parents and caregivers of these long-term WIC participants reported that the nutrition information they received through the program was just as important as the food benefits (Borger et al., 2020).

To increase breastfeeding support, in 2009 WIC started offering three types of food packages to mothers and their infants based on whether the infant was fully breastfed, partially breastfed, or fully formula fed.<sup>57</sup> Li et al. (2019) and Zhang et al. (2021) studied the effects of the 2009 WIC package revision on breastfeeding rates, using two different data sources collected during 2005–14. Zhang et al. (2021) found that after the revision, WIC positively increased the probability that a child was ever breastfed among Hispanic children, but not among all children or any other group. Li et al. (2019) found that prior to the revision, WIC-participating children were less likely to have ever breastfed and to be breastfed at 6 months than nonparticipating income-eligible children but that the 2009 revision eliminated the gap in the rate of children ever breastfed.

A USDA, ERS-funded study examined trends in breastfeeding initiation by prenatal WIC participation status and race/ethnicity following the 2009 food package revisions (Thoma et al., 2023). The study used

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<sup>56</sup> 87 Federal Register, Number 223, November 21, 2022, pages 71,092–71,162.

<sup>57</sup> Breastfeeding support also includes making breastfeeding aids available to caretakers of WIC infants who meet State and local agency criteria (USDA, FNS, July 2016). A 2015 FNS report found that breast pumps were the most common breastfeeding aid, and the pumps were available at nearly all agencies that provide direct services to participants (Forrestal et al., 2015).

birth certificate data for 24 States, which allowed the authors to identify a mother’s eligibility for WIC based on information about Medicaid coverage included in the birth record. A mother’s self-reported participation in WIC was also included in the birth certificate data, as was breastfeeding initiation, determined from the item, “Is the infant being breastfed at discharge?” Moreover, due to the large sample size, the authors were able to assess trends in breastfeeding initiation by WIC participation status for lesser studied population groups (including American Indian/Alaska Natives and Asian/Pacific Islanders).

Thoma et al. (2023) found that from 2009 to 2017, breastfeeding initiation increased for WIC participants<sup>58</sup> and for WIC-eligible nonparticipants,<sup>59</sup> with a slightly higher increase in breastfeeding initiation among WIC participants. Gaps in breastfeeding initiation still existed between WIC participants and eligible non-WIC participants in 2017. However, the size of the gaps had narrowed considerably for the Non-Hispanic Asian/Pacific Islander and American Indian/Alaska Native groups due to a rapid increase in breastfeeding initiation among WIC participants in these groups.

The comment period on the 2022 proposed revisions to the WIC food packages<sup>60</sup> closed on February 21, 2023. Changes made to the food packages could offer additional opportunities to understand how food supplements can affect the diet quality and health of WIC participants.

## **WIC’s Relationship to Diet and Health**

In April 2022, the Agency for Healthcare Research and Quality published a systematic review synthesizing advancements in WIC research from January 2009 to September 2021 (Caulfield et al., 2022). The included body of literature featured 82 quantitative observational studies and 16 qualitative studies, with 49 studies comparing outcomes of WIC participants with WIC-eligible nonparticipants.

The report found associations between WIC participation by various groups (mothers, infants, and children) and health, development, and nutrition outcomes within those groups as follows:

- WIC prenatal participation was associated with lower risk of preterm delivery, low birth weight, and infant mortality. Prenatal participation was also associated with better maternal diet quality, lower risk of inadequate gestational weight gain, and lower alcohol use in pregnancy (though the strength of evidence for these findings was weaker).
- Maternal WIC participation was associated with increased child preventive care, increased rate of immunizations, and higher cognitive scores for children. Maternal WIC participation was not associated with breastfeeding initiation.
- Child WIC participation was associated with better diet quality generally and specifically with greater intakes of 100 percent fruit juice, whole grain cereals, and age-appropriate milk.
- Household WIC participation was associated with greater purchasing of healthy food groups.
- The evidence was insufficient for other outcomes related to maternal health and child growth. The evidence generally was insufficient on how WIC participation affects outcomes across subgroups.

continued on next page ►

<sup>58</sup> WIC participants are defined as mothers who reported participation in WIC at the time of the birth and whose births were covered by Medicaid.

<sup>59</sup> WIC-eligible nonparticipants are defined as mothers who did not report participation in WIC at the time of birth and whose births were covered by Medicaid.

<sup>60</sup> 87 Federal Register, Number 223, November 21, 2022, pages 71,092–71,162.

## WIC's Relationship to Diet and Health—continued

Overall, the systematic review of the past decade of literature published on the topic of WIC's relationship to health and nutrition suggests that WIC participation is associated with purchasing healthier foods, improved diets for pregnant women and their children, improved birth outcomes, and better child cognitive development. The report concludes that more studies of WIC that use research designs that allow for causal inference are needed to investigate the effects of WIC on maternal health outcomes, as well as child growth and development.

## The Economic Impacts of Increased Breastfeeding in WIC

WIC recognizes and promotes breastfeeding as the optimal source of nutrition for infants. However, (historically) WIC participants have had lower breastfeeding rates than nonparticipants, including those who are eligible to participate but do not enroll in WIC (DHHS, Centers for Disease Control and Prevention (CDC), 2023). For example, the most recent data on breastfeeding from the National Immunization Survey indicate that among children born in 2020, 43 percent of those participating in WIC were estimated to be breastfeeding at 6 months, compared to 62 percent of infants who were eligible for WIC but did not participate and 72 percent of infants not eligible to participate in WIC (CDC, 2023).<sup>61</sup>

In addition to breastfeeding support, WIC provides iron-fortified infant formula to nonbreastfeeding infants to help ensure that they receive adequate nutrition. Offering formula at no cost to participants lowers the economic costs associated with the decision to formula feed, and, as a result, may influence a participant's breastfeeding choice. However, women who already plan on feeding their baby infant formula may be more likely to enroll in the WIC program. WIC enrollees tend to have characteristics associated with lower rates of breastfeeding. These include being younger, less likely to be married, smokers, less educated, and lower income than eligible women who do not enroll in the program (Tiehen & Jackowitz, 2010). Thus, lower breastfeeding rates among WIC participants (relative to WIC-eligible nonparticipants) may be due to differences in the characteristics of those who choose to participate in WIC and those who do not, rather than an adverse effect of the program on breastfeeding.

In response to a Congressional directive, USDA, ERS researchers estimated the economic impacts of an increase in breastfeeding rates for WIC infants to medically recommended levels—defined as 90 percent of infants breastfeeding for 12 months and receiving no infant formula during that time (Oliveira et al., 2019).<sup>62</sup> The researchers estimated that if WIC breastfeeding rates had increased from 2016 levels (which were 45 percent at 6 months of age and 25 percent at 12 months of age) to medically recommended levels, holding the infant caseload constant, almost 646,000 additional mothers would have participated in WIC each month—an 8-percent increase in the total average monthly number of women, infants, and children participating in WIC in 2016. This increase was estimated to occur because postpartum breastfeeding women are eligible for WIC benefits for 12 months after birth, while postpartum nonbreastfeeding women are eligible for 6 months after birth. Since infants in WIC can participate for their entire first year, the number of infants participating per month was unaffected.

<sup>61</sup> Breastfeeding at 6 months refers to any breastfeeding. The Dietary Guidelines for Americans 2020–2025 recommend exclusive breastfeeding (feeding of human milk and no other solids, water, or other liquids) through the first 6 months of life. Among infants born in 2019, rates of exclusive breastfeeding through 6 months were 17.8 percent for those receiving WIC benefits and 29.6 percent for those eligible but not participating in WIC (CDC, 2022).

<sup>62</sup> The 90-percent level takes the medically recommended level of universal breastfeeding and assumes that 10 percent of mothers participating in WIC are unable to breastfeed.

The same study also estimated that the increase in breastfeeding would result in a \$252.4 million increase in WIC program costs. If breastfeeding rates increased from 2016 levels to medically recommended levels, food package costs for infants would decrease by an estimated \$546.7 million, due to a reduction in costs of infant formula.<sup>63</sup> At the same time, because of the increase in the number of participating postpartum women resulting from increased breastfeeding rates, food package costs for pregnant and postpartum women would increase by an estimated \$512.9 million. The net change in total food package costs would be a decline of \$33.8 million. However, nutrition services and administration costs would increase by \$286.2 million, due to increased costs associated with breastfeeding promotion and support.

The economic impacts of increased breastfeeding rates in WIC extend beyond increases in program participation and program costs. To estimate cost savings associated with increased rates of breastfeeding in WIC, Oliveira et al. (2019) modified a Breastfeeding Savings Calculator developed by the U.S. Breastfeeding Committee to incorporate data on the number of infants in WIC, their breastfeeding rates, and the target rate. They estimated that if mothers in WIC households were to increase breastfeeding rates from their 2016 levels to medically recommended levels, health-related cost savings would total about \$9.1 billion. Projected reductions in maternal diseases (including breast cancer, type 2 diabetes, and myocardial infarction) accounted for \$5.0 billion, or 55 percent of the total \$9.1 billion health-related cost savings. Projected reductions in pediatric conditions (including sudden infant death syndrome and gastrointestinal illness) accounted for \$4.1 billion (or 45 percent) of total cost savings.

In sum, USDA, ERS researchers found that higher WIC breastfeeding rates would raise WIC program costs but would result in significant healthcare cost savings and health benefits for women and infants participating in WIC.

## WIC and the Infant Formula Market

WIC provides iron-fortified infant formula to caretakers of low-income and nutritionally at-risk infants to ensure that the infants receive adequate nutrition, consistent with the Dietary Guidelines for Americans 2020–25 recommendations to “feed infants iron-fortified infant formula during the first year of life when human milk is unavailable,” (USDA & DHHS, 2020). More than half of infant formula in the United States is consumed by WIC participants.<sup>64</sup>

When the WIC program was piloted in the early 1970s and then expanded nationwide, infant formula was seen as a critical tool for addressing hunger and malnutrition in the United States.<sup>65</sup> In prior decades, feeding infants evaporated milk and/or cow’s milk were the most common breastfeeding alternatives (Schwartz et al., 1992; Schuman, 2003), with infants in low-income families more likely to be fed evaporated milk (Fomon,

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<sup>63</sup> The study did not consider what the impacts of an increase in breastfeeding in WIC would mean in terms of the infant formula market and infant formula rebates. A decrease in infant formula usage could reduce the size of the infant formula rebates that manufacturers provide to WIC and, therefore, increase costs to WIC.

<sup>64</sup> The share of formula in the United States that is consumed by WIC infants ages 0 to 12 months is estimated to have been about 56 percent in 2018, compared to 58 percent in 2005 (Hodges, 2022a).

<sup>65</sup> In 1968, the CBS television network released the documentary report “Hunger in America,” which increased attention to child and infant malnutrition in the United States. The increased attention spurred the creation of the Child Nutrition Act of 1972 and the subsequent development of the WIC program and its permanent establishment in 1975.

1975).<sup>66</sup> By the mid-1970s, commercial formula accounted for about three-quarters of the products fed to infants, with enrollment in the WIC program contributing to an increase in the number of infants fed commercial iron-fortified formulas (Fomon, 1987; Fomon, 2001).

However, as WIC enrollment continued to grow in the 1980s (see figure 3), so did the costs of infant formula (Betson, 2009). Rising infant formula costs eventually led to the Federal requirement that WIC State agencies use cost-containment strategies—mainly competitive bidding for manufacturer rebates on infant formula—to reduce costs (see section, “Program Operations: Cost Containment”).<sup>67</sup> Infant formula rebate contracts procured by States have been successful at reducing program costs. In FY 2021, rebates totaled \$1.6 billion and supported about one-quarter (25.5 percent) of all participants (Hodges, 2022b).

USDA, ERS regularly conducts research on the economic consequences of WIC’s provision of infant formula and WIC State agencies’ operations of competitive bidding processes for infant formula rebates. The research includes examining how WIC’s presence in the infant formula market affects competition and concentration among infant formula manufacturers. The research also reports on trends in infant formula prices, with a focus on costs and cost-savings to the WIC program, as well as costs to non-WIC infant formula consumers.

## Infant Formula Market Competition and Concentration

Since the mid-1990s, three formula manufacturers—Abbott, Mead Johnson (owned by Reckitt), and Gerber (owned by Nestle Global)—have bid for WIC infant formula contracts (USDA, FNS, 2022d). Most State agencies enter contracts with a single manufacturer for both milk-based and soy-based infant formulas. However, State agencies serving more than 100,000 infants per month (on average) may solicit separate bids for milk and soy-based formulas.<sup>68</sup>

For contracts for milk-based formula in effect in December 2022, Abbott held the WIC infant formula contract in 32 States and the District of Columbia, Gerber held the contract in 6 States, and Mead Johnson held the contract in 12 States (USDA, FNS, 2022d). As a result, 45 percent of WIC infants who were formula fed (either partially or fully) lived in States with Abbott contracts, 44 percent in States with Mead Johnson contracts, and 11 percent in States with Gerber contracts.<sup>69</sup>

The operation of infant formula rebate programs by WIC State agencies creates a “winner-takes-most” market, where the manufacturer holding the WIC contract in a State receives the largest share of infant formula sales in that State (Oliveira, 2011). Holding the WIC contract not only determines market shares of purchases of WIC-size formulas (typically 12- to 16-ounce containers of powdered formula), it also “spills over” to market shares of non-WIC size formulas (for example, greater than 16-ounce containers of powdered formula). Analyzing infant formula sales data from 2004–2009, USDA, ERS researchers found that among the 30 States where there was a change in contract brand, the new contract holder’s shares of sales of WIC-size powder formula purchases increased by an average of 83 percent, while the former contract holder’s share of sales decreased by a similar magnitude (Oliveira et al., 2011). Moreover, the new contract holder’s share of sales of non-WIC-size powder formula purchases increased by an average of 18 percent, while the former contract holder’s share of sales decreased by 19 percent (Oliveira et al., 2011).

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<sup>66</sup> Fomon and Anderson (1972) reported that among households in the Nationwide 1965–66 Survey of Diets of Men, Women, and Children, an estimated 56 percent of infants (under age 1) in households with incomes less than \$4,000 were fed whole milk and 30 percent were fed evaporated milk, whereas in households in incomes at or above \$4,000, 71 percent of infants were fed whole milk and 10 percent were fed evaporated milk.

<sup>67</sup> There was also a shift toward breastfeeding promotion and breastfeeding support through the WIC program, beginning in the late 1980s and early 1990s (Oliveira & Prell, 2004).

<sup>68</sup> 7 CFR § 246.16a(c)(2)(i).

<sup>69</sup> Authors’ calculations are based on publicly available State-level monthly program participation data from USDA, FNS (January 2023).



These findings help to explain why infant formula manufacturers compete for contracts and offer such large rebates to the win the contracts. A WIC contract assures large-volume sales to the manufacturer, of both the contract-size products (92 percent of sales on average) and the more profitable (not subject to rebate) noncontract size products (51 percent of sales on average; Oliveira et al., 2011).

These findings also highlight factors manufacturers must consider when bidding for infant formula contracts. To successfully bid on a WIC infant formula contract, a manufacturer must produce enough product to serve the number of formula-fed WIC infants in the State and (at the same time) be able to offer substantial rebates on the sales of those products. Moreover, WIC-authorized vendors are likely to give more shelf space to contract-brand products because of State agency stocking requirements and demand from WIC consumers (Oliveira et al., 2011). This means that manufacturers of noncontract brand formulas compete for sales to non-WIC consumers in a market in which the WIC contract brand has greater visibility. Additionally, having the status as the WIC contract brand might also lead both WIC and non-WIC consumers to perceive that the contract brand is of higher quality (Oliveira et al., 2011), which could decrease competitiveness of non-WIC brand products.

Other factors, such as regulation of infant formula by the U.S. Food and Drug Administration (FDA) and import restrictions on infant formula manufactured outside of the United States, likely contribute to concentration in the U.S. infant formula market (FDA, 2023a).<sup>70</sup> These non-WIC factors may help to explain why the infant formula market exhibited concentration before the adoption of rebate contracts. In 1987, the year of the first rebate contract and 2 years before Federal law required that State agencies use cost containment systems, three manufacturers accounted for 99 percent of sales of infant formula (figure 8).<sup>71</sup> In 2022, these three manufacturers accounted for 83 percent of sales of infant formula in the United States (FDA, 2023a). Based on Herfindahl-Hirschman Index (HHI)—a tool for measuring market concentration used by the U.S. Department of Justice and the Federal Trade Commission (2010)—the infant formula market was more concentrated in 1987 (HHI=4,332) than it was in 2022 (HHI=2,972), though both index numbers indicate “highly concentrated” markets.<sup>72</sup>

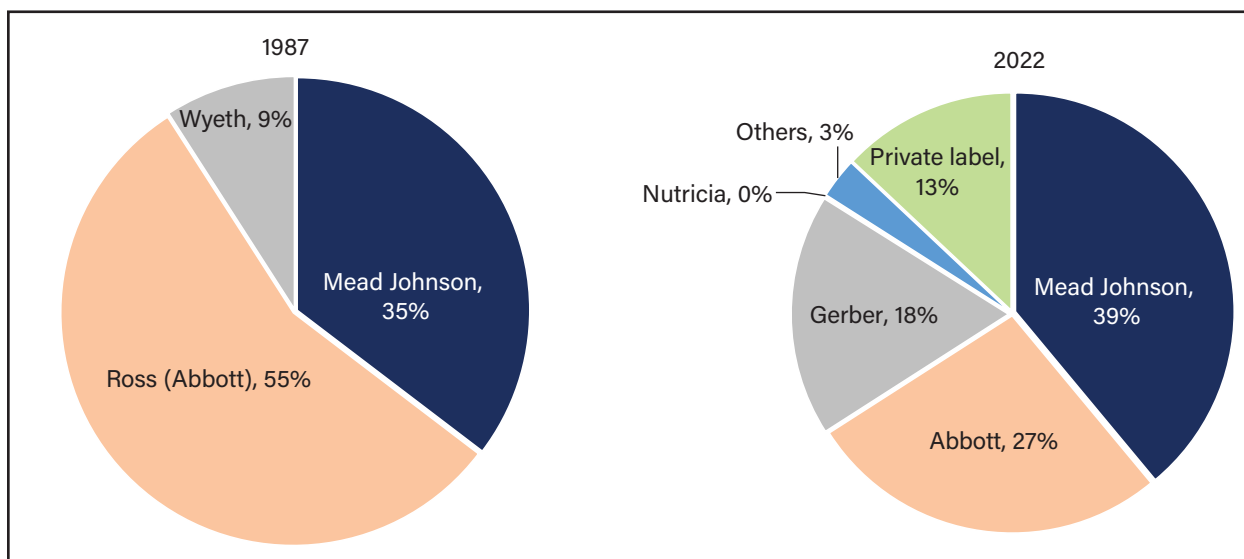
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<sup>70</sup> The FDA is allowing manufacturers of infant formula products that were imported to the United States during the supply chain disruptions to take steps to remain in the U.S. market (FDA, 2023b).

<sup>71</sup> 1987 is the year after Tennessee became the first State to adopt a single-source infant formula rebate contract.

<sup>72</sup> The HHI score is found by squaring the market share of each firm and summing the squared shares. For a pure monopoly with a market share of 100 percent, the HHI takes on a maximum value of 10,000 (100\*100). The DOJ and FTC (2010) consider HHI scores below 1,500 to be “unconcentrated markets,” scores of 1,500 to 2,500 to be “moderately concentrated markets,” and scores above 2,500 to be “highly concentrated.”

Figure 8  
**Infant formula manufacturers' market shares, 1987 and 2022**



Note: Percentages are rounded to the nearest integer. The year 1987 is 1 year after Tennessee became the first State to adopt a single-source infant formula rebate contract and 2 years before Congress mandated such a program (or a program that yields equivalent cost savings) for all States.

Source: USDA, Economic Research Service based on data from Oliveira et al. (2004) and U.S. Food and Drug Administration (2023a).

## The Costs of Infant Formula to WIC

The costs of infant formula to WIC are determined by net wholesale price (wholesale price minus the rebate amount) and retail markup.<sup>73</sup> Prior USDA, ERS research examining trends in infant formula prices found that in the 1980s and 1990s, the wholesale prices of infant formula (particularly formula manufactured by Mead Johnson and Abbott) outpaced inflation (Oliveira et al., 2010). These large price increases were likely influenced by expansions of the WIC program, which shifted the composition of the infant formula market to one mainly comprised of consumers who were less sensitive to infant formula prices and made it profit maximizing for manufacturers to increase their prices (Prell, 2004).<sup>74</sup> However, once the WIC program became fully funded and increases in participation leveled off, wholesale prices have generally kept pace with inflation, except when a product change occurred such as the addition of formulas supplemented with fatty acids docosahexaenoic acid (DHA) and arachidonic acid (ARA) in the late 2000s, which led to increases in wholesale prices that outpaced inflation (Oliveira et al., 2010).<sup>75</sup>

Changes in the wholesale price of infant formula do not affect the net wholesale price paid by the WIC program while an infant formula contract is in effect because rebates adjust cent for cent to changes in whole-

<sup>73</sup> The listed wholesale prices of infant formula are set at the national level by manufacturers and differ only by volume, with larger volume purchases receiving a discount (Oliveira et al., 2010).

<sup>74</sup> Prell (2004) noted the price difference can be explained in terms of a compositional change in the segment of the market that is paying for infant formula out of pocket or in terms of a compositional change in the overall market. In the former case, removing low-income consumers from the segment of the market that is paying for infant formula out of pocket shifts the composition of the out-of-pocket segment toward higher income households that are less price sensitive. In the latter case, providing free infant formula creates a market in which there are relatively fewer price-sensitive out-of-pocket households and relatively more price-insensitive WIC households.

<sup>75</sup> According to the FDA, 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" (FDA, 2023c).

sale prices over the life of the contract (Oliveira et al., 2010). However, increases in wholesale prices may result in WIC paying more for infant formula when a new contract is negotiated. Oliveira et al. (2010) found that three-quarters of increases in real (inflation-adjusted) net wholesale prices between States' previous and current contracts were explained by increases in real wholesale prices.

In addition to changes in wholesale prices, changes in rebate amounts offered by manufacturers also affect the net wholesale price paid by the WIC program when there is a contract change. Manufacturers likely compete for WIC contracts because winning the contract results in increased sales of their products to non-WIC consumers. Manufacturers may offer higher, more competitive rebates in a market with fewer WIC consumers, since there will be more non-WIC consumers who pay the full price of infant formula to buy their products.

USDA, ERS analyses of infant formula contract bid data from USDA, FNS (2022d) indicate that rebate amounts in terms of the percentage discount (rebates as a percentage of wholesale prices) have increased in recent years. The percentage discount on the wholesale price of infant formula averaged 92 percent for contracts in effect in February 2013,<sup>76</sup> compared to 113 percent for contracts initiated between 2018 and 2022.<sup>77</sup> The increases may be explained by decreases in the number of infants participating in WIC as a share of the total population. An estimated 51 percent of infants in the United States participated in WIC in 2012 (Oliveira & Frazão, 2015) compared to 45 percent in 2018 and 43 percent in 2020 (Gray, Kessler, et al., 2022).

Although WIC saves on program costs by requiring States to operate cost containment systems, non-WIC consumers pay more for infant formula. In terms of manufacturers, Betson (2009) estimated that wholesale prices are double what the prices would be if the WIC program did not provide infant formula. In terms of retailers, Oliveira et al. (2004) found that the retail price for a given manufacturer brand of infant formula at a set wholesale price is higher when the manufacturer holds the WIC contract. Oliveira et al. (2004) also found that when the number of WIC formula-fed infants in a State increases relative to the number of non-WIC formula-fed infants, retail prices of both the WIC and the non-WIC contract brands of formula increase.

## Infant Formula Supply Chain Disruptions

Public interest in understanding the economic implications of WIC and the competitive bidding processes for infant formula rebate programs operated by WIC State agencies increased following infant formula supply chain disruptions in the spring and summer of 2022. On February 17, 2022, Abbott, a manufacturer of infant formula, announced a voluntary recall of some powder formulas—including Similac, Alimentum, and EleCare—manufactured in a facility in Sturgis, Michigan, and a temporary closure of the facility.<sup>78</sup> The recall compounded existing supply chain issues that were affecting the market in the wake of the COVID-19 pandemic (FDA, 2023a).

Following the recall, USDA provided flexibilities to WIC State agencies, as allowed under the Stafford Act (42 USC § 5121–5207), to address the infant formula shortages (USDA, FNS, 2023c). These flexibilities included the option for State agencies to allow WIC participants to receive a different brand of formula without a doctor's note (adopted by 74 agencies), as well as to allow formula-fed infant participants to receive alternate container sizes—including those that are larger than usual—and different forms of formula (liquid

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<sup>76</sup> See Davis and Oliveira, 2015.

<sup>77</sup> Authors' calculations are based on infant formula contract bid data from USDA, FNS (2022d).

<sup>78</sup> The recall was in response to the evidence of *Cronobacter sakazakii*, a bacterium that can live in dry foods such as powdered infant formula, at the plant. *Cronobacter* infections, which are rare, can cause sepsis or meningitis in newborns (CDC, 2022).

concentrate or ready to feed).<sup>79</sup> The flexibilities also gave State agencies the authority to allow WIC participants to exchange recalled formula purchased with WIC benefits; 80 State agencies adopted this waiver (USDA, FNS, 2023c).<sup>80</sup>

As supply chain disruptions continued into summer 2022, USDA provided an additional waiver to allow WIC State agencies to authorize and issue certain imported infant formulas; 70 State agencies adopted this waiver (USDA, FNS, 2023c). Without this waiver, WIC regulations require that infant formula issued by WIC be from manufacturers registered with the FDA.<sup>81</sup>

In addition to waivers issued by USDA, Congress passed the Access to Baby Formula Act of 2022 (Public Law 117–129). The act aimed to strengthen WIC’s ability to respond to emergencies, disasters, and supply chain disruptions. The act included a requirement that each infant formula cost containment contract include remedies in the event of an infant formula recall. The act also gives USDA the authority to waive or modify administrative requirements during emergencies, disasters, and supply chain disruptions; this authority includes modifying monthly allowances for infant formula (see section, “Recent Legislative and Regulatory Changes to WIC”).

USDA, ERS research related to the supply chain disruptions included development and analysis of questions on infant formula supply chain disruptions in the U.S. Department of Commerce, Bureau of the Census’s Household Pulse Survey. The research was focused on better understanding WIC participants’ experiences during the shortage (see box, “Experiences of the Infant Formula Shortage Amount Among WIC Households”). USDA, ERS also analyzed data on monthly infant participation in WIC to better understand why stocks of infant formula had returned to prior-year levels in fall of 2022, but sales of infant formula remained below prior-year levels (see box, “Breastfeeding Behaviors in Response to the Supply Chain Disruptions”).

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<sup>79</sup>A total of 83 agencies applied for and received the waiver for infants receiving food packages I and II, and 43 agencies applied for and received the waiver for infants receiving food package III. Food package I is for healthy infants 1 through 5 months old; food package II is for healthy infants 6 through 11 months old. Food package III is for women, infants, and child participants who have qualifying medical conditions.

<sup>80</sup> Under Federal regulations (7 CFR § 246.12(h)(3)(ii)), vendors are not allowed to accept exchanges for foods purchased with WIC food benefits.

<sup>81</sup> 42 USC § 1786(f)(15)(A), 42 USC § 1786 (b)(8)(ix)(II), 7 CFR § 246.10(g), and 7 CFR § 246.12(g)(10).

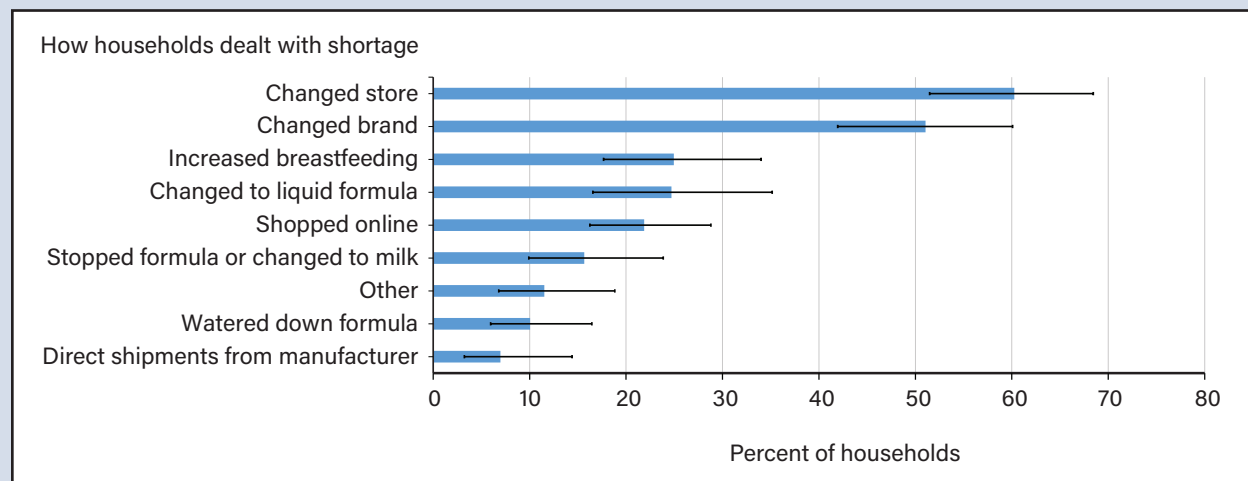
## Experiences of the Infant Formula Shortage Among WIC households: Evidence From the Household Pulse Survey

Data from the Household Pulse Survey (HPS) provide information on how WIC households were affected by the infant formula shortage beginning in February 2022. In response to the onset of the COVID-19 pandemic, the Census Bureau, in partnership with USDA and other Federal agencies, designed and fielded the HPS to track the experiences of households to help inform policy making in near real-time. The survey began in April 2020 and was initially conducted on a weekly basis. Beginning in September 2020, the survey was conducted on a bi-weekly basis. In September 2022, the HPS began collecting information about household experiences obtaining infant formula and about whether households had used WIC benefits in the past 7 days. Combined responses from three iterations of the HPS between September 14, 2022 and November 14, 2022 provide insights on how WIC households dealt with the infant formula shortage.<sup>1</sup>

Overall, 1.5 percent of all households reported using WIC benefits in the past 7 days. Among the WIC households, 28.5 percent had an infant; of these households, about 65.0 percent reported having trouble getting infant formula over the past year. Households with infants that reported having trouble getting infant formula were asked how they dealt with the shortage; they could select multiple response options from a list. About 60.3 percent of the households reported shopping for formula at a different store than they typically would. Over half reported changing the brand of formula the household purchased. About a quarter of the households reported increasing breastfeeding and changing from powdered to liquid formula. Smaller shares of households reported shopping online for formula, getting direct shipments from a formula manufacturer, substituting other sources of nourishment for formula, watering down formula, or dealing with the shortage some other way.

Figure 9

### Share of WIC households with infants affected by the infant formula shortage by how the households dealt with the shortage



Note: This figure presents the share of households reporting using WIC benefits in the past 7 days that included an infant and reported being affected by the infant formula shortage by how the households dealt with the shortage. Respondents could report multiple coping strategies. Black lines indicate 95-percent confidence intervals. The confidence intervals represent a range of values, which are likely to include the actual rates for these groups in the population.

Source: USDA, Economic Research Service analysis of data obtained from the Household Pulse Survey public-use files from weeks 49, 50, and 51 (September 14, 2022, through November 14, 2022).

<sup>1</sup> The Household Pulse Survey is an online survey administered via email or text message to about 1 million sampled housing units in the United States. Response rates vary with each survey and are typically less than 10 percent. All estimates are weighted to be nationally representative of households in the United States. For more information, see the U.S. Department of Commerce, Census Bureau's webpage "Household Pulse Survey Technical Documentation."

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## **Experiences of the Infant Formula Shortage Among WIC households: Evidence From the Household Pulse Survey—continued**

The behavioral responses to the infant formula shortage have implications for WIC policy. For example, USDA issued waivers allowing for participants to use WIC benefits to purchase noncontract brands of infant formula. Although WIC households in the sample were not asked whether they used their WIC benefits to purchase infant formula, many reported switching brands, suggesting that the households might have been taking advantage of the waivers. Additionally, USDA has proposed regulatory changes to allow for online ordering with WIC benefits (see 88 FR 11,516; February 23, 2023). Findings from the HPS indicate that WIC participants in the sample reported using online channels to obtain infant formula even though they presumably were not able to use their WIC benefits for the purchases.

Some limitations exist to using the HPS to study the WIC participation of households with infants. Not all WIC households use their benefits every week, so asking respondents whether their household used their benefits in the past 7 days captures only some WIC participants. Additionally, WIC households and households with infants comprise a small share of all households in the United States. Therefore, the number of respondents in any given week of the HPS reporting that their household used WIC benefits over the past 7 days (or includes an infant) constitutes a small share of all survey respondents. Even after combining three iterations of the survey, the sample sizes may not be sufficient to provide accurate inferences about the experiences of WIC households with infants.

## **Breastfeeding Behaviors in Response to the Supply Chain Disruptions: Evidence From WIC Administrative Data**

As stocks of infant formula were returning to prerecall levels in fall of 2022, sales of infant formula remained below prerecall levels (FDA, 2023a). National-level monthly WIC participation data can provide insights into how changes in infant feeding behaviors may have translated into lower sales of infant formula following the supply chain disruptions. About 40 percent of infants in the United States participate in WIC. So, conclusions from the WIC data can be drawn for a sizeable share of the population, but they cannot be generalized to all mothers with infants.

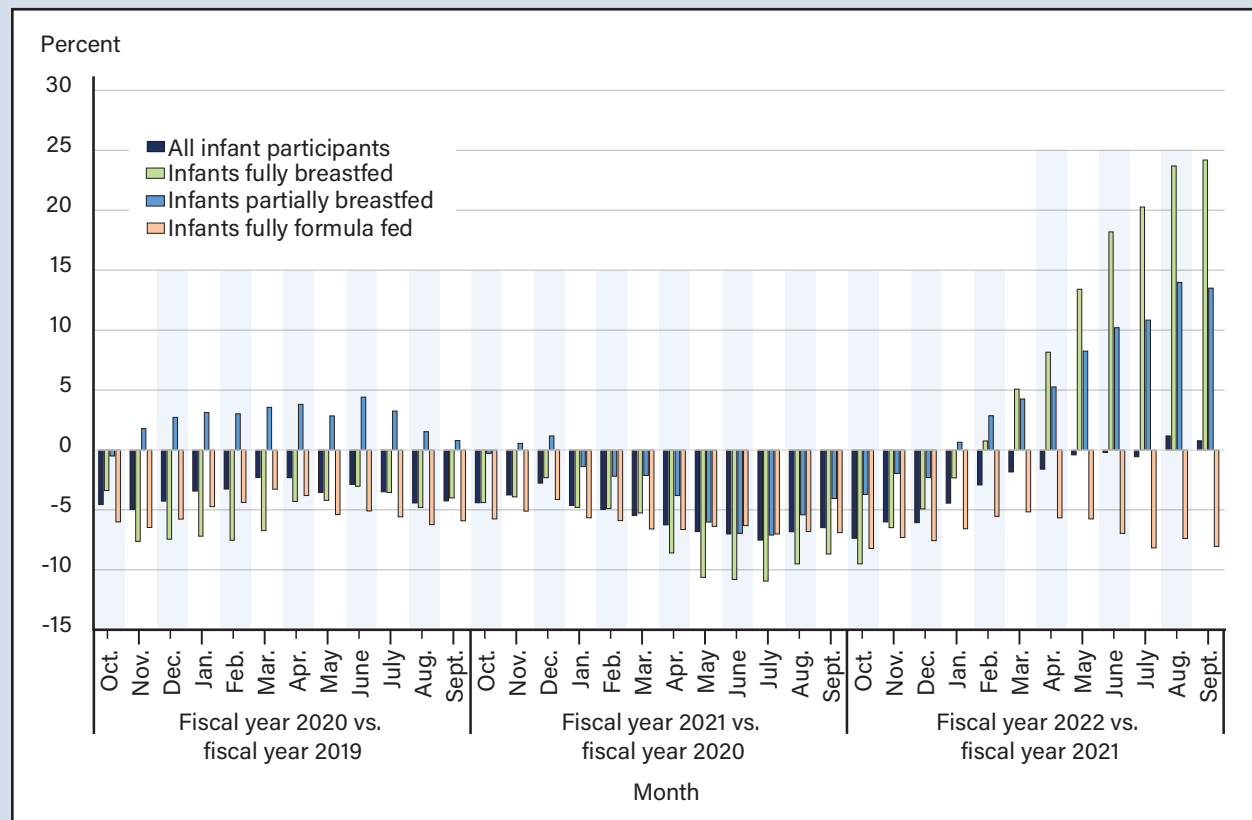
The food benefits that WIC infants and their mothers receive depend on the age of the infant and whether the infant is fully breastfed, partially breastfed, or fully formula fed. Fully breastfed infants are certified to receive WIC benefits but are not issued food benefits through the first 5 months of life because they are assumed to be exclusively breastfed. Partially breastfed infants receive some formula from WIC after their first month of life, but the amount is limited to support breastfeeding.

The WIC participation data show a steady increase in the number of breastfed infants that correspond with the timing of the infant formula supply chain disruptions (beginning in February 2022 and continuing through September 2022). Overall, WIC infant participation was declining leading up to the supply chain disruptions (October 2019–January 2022), which is consistent with trends in the U.S. economy and trends in U.S. births. However, the trends for the fully and partially breastfeeding groups began to reverse course in January and February 2022 (around the time that the infant formula supply chain disruptions began). In March 2022, 4 percent more partially breastfeeding infants and 5 percent more fully breastfeeding infants participated in WIC compared to March 2021. By September 2022, 14 percent more partially breastfeeding infants and 24 percent more fully breastfeeding infants participated in WIC compared to September 2021. In contrast, compared to the same month in the prior year, there were 5 percent fewer fully formula fed infants in March 2022 and 8 percent fewer fully formula fed infants in September 2022.

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## Breastfeeding Behaviors in Response to the Supply Chain Disruptions: Evidence From WIC Administrative Data—continued

Figure 10  
**Year-over-year percentage change in numbers of WIC infant participants, October 2019–September 2022**



WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

Note: Fully breastfed infants are certified to receive WIC benefits but are not issued food benefits through the first 5 months because the infants are assumed to be exclusively breastfed. Partially breastfed infants receive some formula from WIC after the first month. This figure is based on preliminary data from WIC Monthly Data, State Level Participation by Category and Program Costs released by USDA, Food and Nutrition Service (FNS) in December 2022.

Source: USDA, Economic Research Service using data from USDA, Food and Nutrition Service.

## USDA, ERS Investments in WIC Research

Studying WIC and its participants can be difficult. The population served by the program is relatively small and many of the program’s objectives are focused on diet quality and health outcomes, which can be difficult to measure. Additionally, eligible individuals cannot be excluded from receiving WIC services for research purposes, so random assignment studies of the program are not feasible (Caulfield et al., 2022).

USDA, ERS has developed many data products alone and in collaboration with other Federal agencies to enhance USDA’s and the public’s ability to study WIC. The data products can be used to provide context about program trends; analyze other issues relevant to the program’s operations or target population, such as the food purchasing behaviors of households; and, in some cases, estimate program impacts using robust

non-experimental and quasi-experimental research designs that account for differences in the characteristics of those who choose to participate in WIC and those who do not (i.e., selection bias). Several of the data resources were developed or expanded to address new issues or concerns arising from the COVID-19 pandemic and the 2022 infant formula supply chain disruptions. A brief description of USDA, ERS datasets is available in appendix C. Some notable WIC research contributions using USDA, ERS data investments include:

- **The National Food Acquisition and Purchase Survey (FoodAPS).** USDA, ERS researchers have used FoodAPS to explore the dietary quality of food purchases of low-income households (Gregory et al., 2019); examine the dietary impact of adding whole-grain bread to WIC food packages (Stewart et al., 2019); analyze WIC household food purchases of cold cereal (Dong et al., 2016); and study WIC participants' food shopping behaviors and access/use of different types of grocery stores (Ver Ploeg et al., 2015). Other researchers outside of USDA, ERS have also used FoodAPS. The NASEM 2017 review of the WIC food packages used FoodAPS data to compare WIC household expenditures on all food, food at home, and food away from home to WIC-eligible nonparticipant households and WIC-ineligible households. The review also looked at WIC households' purchases within specific food categories (NASEM, 2017). Fang et al. (2019) compared the nutritional quality of food purchases made by WIC participants who did and did not use their WIC benefits during a shopping trip. They found that the nutritional quality of food purchases was higher when WIC participants redeemed their WIC benefits.
- **Household Pulse Survey (HPS).** USDA, ERS researchers used the HPS to provide insights on the share of WIC households with infants that reported being affected by the infant formula shortage and how the households dealt with the shortage (see box, "Experiences of the Infant Formula Shortage Among WIC Households").
- **Scanner data.** USDA, ERS has leveraged scanner data composed of retail-based sales and household-based purchases to conduct indepth analysis of sales of infant formula and other WIC foods. By examining sales trends, USDA, ERS researchers found that:
  - The manufacturer holding the WIC infant formula contract in a State also receives a significant share of non-WIC infant formula sales (Oliveira, 2011; Oliveira et al., 2011; Oliveira et al., 2010).
  - Manufacturers worked to meet the increased demand for smaller package sizes (16-ounce) of whole grain bread following WIC food package revisions in 2009.
  - The 20 most commonly purchased fruit and vegetables cost 30–70 percent more in the highest priced market areas in the United States, indicating that WIC participants in higher cost-of-living areas might be able to purchase fewer fruits and vegetables than WIC participants in lower cost-of-living areas (Leibtag & Kumcu, 2011).
- **WIC State agency administrative data.** USDA, ERS has expanded opportunities for researchers to access proprietary and restricted data. The Food and Health Research Using the Consumer Food Data System 2022 grant program (a joint project between USDA, ERS, the Robert Wood Johnson Foundation, and Mathematica Policy Research) recently awarded funding to researchers from diverse academic disciplines and institutions to conduct policy-relevant research on food policy, food retail markets, consumer behaviors related to food purchases, and diet. One of the funded projects will use WIC State agency administrative data to explore factors related to child access to the WIC program.

## Looking Ahead

WIC has evolved over time as a result of policy and program changes that were driven, in part, by research on participants' experiences, program implementation, and program effects. External factors that affect WIC changes include the number of births in the United States, economic conditions, and public health emergencies. USDA, ERS has conducted research on the WIC program and its operations to inform and enhance public and private decision making at critical moments in the program's evolution, including research on:

- How investments in WIC feed back into the local economy, particularly the farm sector (Hanson & Oliveira, 2009).
- How geographic differences in the costs of fruit and vegetables influence the amounts of fruits and vegetables that WIC participants are able to purchase with the cash-value benefit (Leibtag & Kumcu, 2011).
- How increases in the number of fully breastfed WIC infants could result in cost savings to other Federal programs like Medicaid (Oliveira et al., 2019).
- How the presence of certain types of WIC-authorized vendors (smaller grocers and those who derive more than 50 percent of their food sales from WIC transactions) can improve WIC participants' access to WIC foods (McLaughlin et al., 2021).
- How State agencies use of cost-containment policies reduce program food costs (Davis & Oliveira, 2015; Oliveira et al., 2013; Stewart et al., 2019a; Stewart et al., 2019b).
- How WIC foods improve the diets of WIC and non-WIC household members (Ver Ploeg, 2009).

The proposed changes to the WIC food packages (November 2022) and to allow online ordering with WIC benefits (May 2023) are two recent inflection points in the program's evolution. As USDA, FNS finalizes and WIC State agencies implement changes to the WIC food packages, opportunities will exist to study how participant households respond to the changes in their food benefits and to learn whether the changes result in their intended dietary improvements, such as increased consumption of fruits and vegetables. Opportunities may arise to use USDA, ERS data products (such as the Monthly Food-at-Home Price Database) to update research on geographic differences in the amounts of fruits and vegetables that participants can purchase using the WIC cash-value benefit.

In addition to the recent proposed changes to Federal regulations, USDA, FNS is distributing American Rescue Plan Act funds to WIC State agencies to initiate or continue improvements to the program. These include efforts to improve the participant experience by prioritizing outreach, improving the shopping experience, investing in the WIC workforce, and modernizing WIC technologies and service delivery (USDA, FNS, 2023h). Research using WIC State agency administrative data can provide information to study some of the programmatic implications of these investments, such as changes in rates of participation and retention.

Moreover, the Federal response to the infant formula supply chain disruption of 2022 could have implications for WIC and non-WIC consumers. The response included Congressional action related to WIC's infant formula rebate program (Public Law 117–129), policy changes to allow infant formula products that were imported to the United States and sold during the supply chain disruptions to remain in the U.S. market (FDA, 2023b), and new Federal collaborations (see section, "WIC and the Infant Formula Market"). Research using retail scanner data and household survey data (FoodAPS-2) can provide information to study the economic implications of these changes, as well as changes that arise in the future.

## References

- Andreyeva, T., & Luedicke, J. (2013). Federal food package revisions: Effects on purchases of whole-grain products. *American Journal of Preventive Medicine*, 45(4), 422–429.
- Andreyeva, T., & Luedicke, J. (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., Luedicke, J., Henderson, K.E., & Schwartz, M.B. (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), 622–630.
- Andreyeva, T., Luedicke, J., Tripp, A.S., & Henderson, K.E. (2013). Effects of reduced juice allowances in food packages for the Women, Infants, and Children Program. *Pediatrics*, 131(5), 919–927.
- Au, L.E., Ritchie, L.D., Tsai, M., Randel-Schreiber, H.R., Martinez, C., Gradziel, P.H., Sabatier, S.M., & Whaley, S.E. (2021). Alignment of California WIC participant preferences with proposed WIC food package recommendations. *Journal of Nutrition Education and Behavior*, 53(1), 60–61.
- Betson, D. (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.
- Billings, K.C., & Aussenberg, R.A. (2022). Child nutrition reauthorization (CNR): An overview. *In Focus* (No. 10,266). Library of Congress, Congressional Research Service.
- Borger, C., Zimmerman, T., Vericker, T., DeMatteis, J., Gollapudi, B., Whaley, S., Ritchie, L., Au, L., Sallack, L., & May, L. (2020). *WIC infant and toddler feeding practices study—2: Fourth year report* (Contract No. AG-3,198-B-11-0020). U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support. Prepared by Westat, Rockville, MD.
- Çakir, M., Beatty, T.K.M., Boland, M.A., Park, T.A., Snyder, S., & Wang, Y. (2018). Spatial and temporal variation in the value of the Women, Infants, and Children program's fruit and vegetable voucher. *American Journal of Agricultural Economics*, 100(3), 691–706.
- Caulfield, L.E., Bennett, W.L., Gross, S.M., Hurley, K.M., Ogunwole, S.M., Venkataramani, M., Lerman, J.L., Zhang, A., Sharma, R., & Bass, E.B. (2022). *Maternal and child outcomes associated with the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)* (Comparative Effectiveness Review No. 253). U.S. Department of Health & Human Services, Agency for Healthcare Research and Quality.
- Daepf, M.I.G., Gortmaker, S.L., Wang, Y.C., Long, M.W., & Kenney, E.L. (2019). WIC food package changes: Trends in childhood obesity prevalence. *Pediatrics*, 143(5), e20,182,841.
- Davis, D.E., & Oliveira, V.J. (2015). *Manufacturers' bids for WIC infant formula rebate contracts, 2003–2013* (Economic Information Bulletin No. 142). U.S. Department of Agriculture, Economic Research Service.
- Duffy, E.W., Vest, D.A., Davis, C.R., Hall, M.G., De Marco, M., Shu Wen N., & Taillie, L.S. (2022). I think that's the most beneficial change that WIC has made in a really long time: Perceptions and awareness of an increase in the WIC cash value benefit. *International Journal of Environmental Research and Public Health*, 19(14), 8,671.



- Fang, D., Thomsen, M.R., Nayga, R.M., Jr., & Novotny, A.M. (2019). WIC participation and relative quality of household food purchases: Evidence from FoodAPS. *Southern Economic Journal*, 86, 83–105.
- FMI, The Food Industry Association. (2022). *U.S. grocery shopper trends 2022: Shopper landscape*.
- Fomon, S.J. (1975). What are infants fed in the United States? *Pediatrics*, 56(3), 350–354.
- Fomon, S.J. (1987). Reflections on infant feeding in the 1970s and 1980s. *The American Journal of Clinical Nutrition*, 46(1), 171–182.
- Fomon, S.J. (2001). Infant feeding in the 20th century: Formula and beikost. *The Journal of Nutrition*, 131(2), 409S–420S.
- Fomon, S.J., & Anderson, T.A. (eds). (1972). *Practices of low-income families in feeding infants and small children: With particular attention to cultural subgroups*. Proceedings of a National Workshop, Airlie Conference Center, Warrenton, Va. U.S. Department of Health, Education, and Welfare, Public Health Service, Health Services and Mental Health Administration, Maternal and Child Health Service.
- Forrestal S., Briefel R., & Mabli, J. (2015). *WIC breastfeeding policy inventory*. Prepared by Mathematica Policy Research for the U.S. Department of Agriculture, Food and Nutrition Service.
- Fryar, C.D., Wambogo, E.A., Scanlon, K.S., Terry, A.L., & Ogden, C.L. (2023). Trends in food consumption among children aged 1–4 years by participation in the Special Supplemental Nutrition Program for Women, Infants, and Children, United States, 2005–2018. *The Journal of Nutrition*, 153(3), 839–847.
- Gleason, S., Hansen, D., & Wakar, B. (2021). *Indicators of diet quality, nutrition, and health for Americans by program participation status, 2011–2016: WIC report* (Contract No. GS-10F-0136X). U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support. Prepared by Insight Policy Research, Alexandria, VA.
- Gleason, S., & Pooler, J. (2011). *The effects of changes in WIC food packages on redemptions* (Food Assistance and Nutrition Program Agreement 59–500–8–0108a). U.S. Department of Agriculture, Economic Research Service.
- Gleason, S., Wilkin, M., Kaufman, P., Sallack, L., & Burger, A. (2017). *WIC peer group study: Final report and State agency guidelines* (Contract No. AG-3,198-D-13-0071). U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support. Prepared by Altarum Institute, Portland, ME.
- Gleason, S., Wroblewska, K., Trippe, C., Kline, N., Meyers, M.K., Breck, A., Marr, J., & Bellows, D. (2021). *WIC food cost-containment practices study: Final report* (Contract No. AG-3,198-C-15-0022/ AG-3,198-D-15-0135). U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support. Prepared by Insight Policy Research, Alexandria, VA.
- Gray, K., Balch-Crystal, E., Giannarelli, L., & Johnson, P. (2022). *National- and State-level estimates of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) eligibility and WIC program reach in 2019* (Contract No. AG-3,198-D-16-0095). U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support. Prepared by Insight Policy Research, Alexandria, VA.
- Gray, K., Kessler, C., Rozen, J., Bryant, A., Griffiths, R., & Wakar, B. (2022). *National- and State-level estimates of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) eligibility and WIC program reach in 2020 (Online Graphics Only)* (Contract No. 12,319,821F0054). U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support. Prepared by Insight Policy Research, Alexandria, VA.

- Gregory, C.A., Mancino, L., & Coleman-Jensen, A. (2019). *Food security and food purchase quality among low-income households: Findings from the National Household Food Acquisition and Purchase Survey (FoodAPS)* (Economic Research Report No. 269). U.S. Department of Agriculture, Economic Research Service.
- Gretchen Swanson Center for Nutrition. (2022). *WIC online ordering grant*.
- Guthrie, J.F., Anater, A.S., Hampton, J.C., Catellier, D.J., Eldridge, A.L., Johnson, W.L., & Quann, E.E. (2020). The Special Supplemental Nutrition Program for Women, Infants, and Children is associated with several changes in nutrient intakes and food consumption patterns of participating infants and young children, 2008 compared with 2016. *Journal of Nutrition*, 150, 2,985–2,993.
- Guthrie, J.F., Catellier, D.J., Jacquier, E.F., Eldridge, A.L., Johnson, W.L., Lutes, A.C., Anater, A.S., & Quann, E.E. (2018). WIC and non-WIC infants and children differ in usage of some WIC-provided foods. *Journal of Nutrition*, 148, 1,547S–1,556S.
- Hanson, K. & Oliveira, V. (2012). *How economic conditions affect participation in USDA nutrition assistance programs* (Economic Information Bulletin No. 100). U.S. Department of Agriculture, Economic Research Service.
- Hanson, K., & Oliveira, V. (2009). *Economic linkages between the WIC program and the farm sector* (Economic Brief No. 12). U.S. Department of Agriculture, Economic Research Service.
- Hodges, L. (2022a). *Infants in USDA's WIC program consumed an estimated 56 percent of U.S. infant formula in 2018* (Chart of Note). U.S. Department of Agriculture, Economic Research Service.
- Hodges, L. (2022b). *WIC program* (topic page). U.S. Department of Agriculture, Economic Research Service.
- Ishdorj, A., & Capps, O. (2013). The effect of revised WIC food packages on Native American children. *American Journal of Agricultural Economics*, 95(5), 1,266–1,272.
- Kaiser Family Foundation. (2023). *Medicaid and CHIP income eligibility limits for pregnant women as a percent of the Federal poverty level*.
- Kirlin, J., Cole, N., & Kaufman, P. (2003). *Assessment of WIC cost-containment practices: An interim report to Congress* (electronic publications from the Food Assistance & Nutrition Research Program No. EFAN-01-005). U.S. Department of Agriculture, Economic Research Service.
- Kline, N., Meyers, M.K., & Marr, J. (2020). *WIC participant and program characteristics 2018 food packages and costs report* (Contract No. AG-3,198-K-15-0048). U.S. Department of Agriculture, Food and Nutrition Service. Prepared by Insight Policy Research, Alexandria, VA.
- Kline, N., Zvavitch, P., Wroblewska, K., Worden, M., Mwombela, B., & Thorn, B. (2022). *WIC participant and program characteristics 2020* (Contract No. AG-3,198-B-15-0004). U.S. Department of Agriculture, Food and Nutrition Service. Prepared by Insight Policy Research, Alexandria, VA.
- Leibtag, E., & Kumcu, A. (2011). *The WIC fruit and vegetable cash voucher: Does regional price variation affect buying power?* (Economic Information Bulletin No. 75) U.S. Department of Agriculture, Economic Research Service.
- Li, K., Wen, M., Reynolds, M., & Zhang, Q. (2019). WIC participation and breastfeeding after the 2009 WIC revision: A propensity score approach. *International Journal of Environmental Research and Public Health*, 16(15).

- Li, K., Fan, J.X., Wen, M., & Zhang, Q. (2022). WIC participation and dietary quality among U.S. children: Impact of the 2009 food package revision. *Journal of Hunger & Environmental Nutrition*, 17(4), 445–59.
- Li, X., McLaughlin, P.W., Saitone, T.L., & Sexton, R.J. (2021). The magnitude and determinants of partial redemptions of food benefits in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). *American Journal of Health Promotion*, 35(6), 775–783.
- Linehan, A., Christina, S., Kriviski, D.M., and Long, C. (2017). *Memorandum of Understanding (MOU) to establish a collaborative relationship between the Office of Head Start (OHS), Office of Child Care (OCC), Supplemental Nutrition and Safety Programs (SNAS), and Child Nutrition Programs (CNP) at the Federal level*. U.S. Department of Health and Human Services, Administration for Children and Families, Office of Health Start and Office of Child Care, and U.S. Department of Agriculture, Food and Nutrition Service, Supplemental Nutrition and Safety Programs and Child Nutrition Programs.
- Lora, K.R., Hodges, L., Ryan, C., Ver Ploeg, M., & Guthrie, J. (2023). Factors that influence children’s exits from the Special Supplemental Nutrition Program for Women, Infants, and Children: A systematic review. *Nutrients*, 15(3), 766.
- Magness, A., Williams, K., Gordon, E., Morrissey, N., Papa, F., Garza, A., Okyere, D., Nisar, H., Bajowski, F., & Singer, B. (2021). *Third national survey of WIC participants (NSWP-III): Brief reports 1–10* (Contract No. AG-3,198-K 15-0077). U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support. Prepared by Capital Consulting Corporation and 2M Research Services, Alexandria, VA.
- Martinez, C.E., Ritchie, L.D., Lee, D.L., Tsai, M.M., Anderson, C.E., & Whaley, S.E. (2022). California WIC participants report favorable impacts of the COVID-related increase to the WIC cash value benefit. *International Journal of Environmental Research and Public Health*, 19(17), 10,604.
- McElrone, M., Zimmer, M.C., & Steeves, E.T.A. (2021). A qualitative exploration of predominantly white non-Hispanic Tennessee WIC participants’ food retail and WIC clinic experiences during COVID-19. *Journal of the Academy of Nutrition and Dietetics*, 121(8), 1,454–1,462.
- McLaughlin, P.W. (2019). Specialized stores serving WIC customers in California improve food access without raising food costs. *Amber Waves*. U.S. Department of Agriculture, Economic Research Service.
- McLaughlin, P.W., Saksena, M., Saitone, T.L., Ma, M., Volpe, R., Wu, Q., & Sexton, R.J. (2021). *Cost containment and participant access in USDA’s Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): Evidence from the Greater Los Angeles, CA Area* (Economic Research Report No. 283). U.S. Department of Agriculture, Economic Research Service.
- McLaughlin, P.W., & Martinez, S. (2021). Specialized stores serving participants in USDA’s Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) can reduce program food costs and increase food store access. *Amber Waves*. U.S. Department of Agriculture, Economic Research Service.
- National Academies of Sciences, Engineering, and Medicine. (2017). *Review of WIC food packages: Improving balance and choice: Final report*. Washington, DC: The National Academies Press.
- National Research Council (U.S.) Panel to Evaluate the USDA’s Methodology for Estimating Eligibility and Participation for the WIC Program. (2003). Overview of WIC and the current estimation methodology. In Ver Ploeg, M., & Betson, D.M., (Eds.). *Estimating eligibility and participation for the WIC program: Final report*. Washington, DC: The National Academies Press.

- National WIC Association (NWA). (2018). *WIC funding basics*.
- Neuberger, Z., & Hall, L. (2022). *WIC coordination with Medicaid and SNAP: More State WIC programs collaborating with other major programs to reach additional eligible low-income families with young children*. Washington, DC: Center on Budget and Policy Priorities.
- Office of the Assistant Secretary for Planning and Evaluation (ASPE). (2020). *2020 Poverty Guidelines*. U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation.
- Oh, M., Jensen, H.H., & Rahkovsky, I. (2016). Did revisions to the WIC program affect household expenditures on whole grains? *Applied Economic Perspectives and Policy*, 38(4), 578–598.
- Oliveira, V. (2011). Winner takes (almost) all: How WIC affects the infant formula market. *Amber Waves*. U.S. Department of Agriculture, Economic Research Service.
- Oliveira, V., & Davis, D. (2006). *Recent trends and economic issues in the WIC infant formula rebate program* (Economic Research Report No. 22). U.S. Department of Agriculture, Economic Research Service.
- Oliveira, V., & Frazão, E. (2009). *The WIC program: Background, trends, and economic issues, 2009 edition* (Economic Research Report No. 73). U.S. Department of Agriculture, Economic Research Service.
- Oliveira, V., Frazão, E., & Smallwood, D. (2011). *The infant formula market: Consequences of a change in the WIC contract brand* (Economic Research Report No. 124). U.S. Department of Agriculture, Economic Research Service.
- Oliveira, V., Frazão, E., & Smallwood, D. (2010). *Rising infant formula costs to the WIC program: Recent trends in rebates and wholesale prices* (Economic Research Report No. 93). U.S. Department of Agriculture, Economic Research Service.
- Oliveira, V., Frazão, E., & Smallwood, D. (2013). *Trends in infant formula rebate contracts: Implications for the WIC Program* (Economic Information Bulletin No. 119). U.S. Department of Agriculture, Economic Research Service.
- Oliveira, V., Prell, M., Smallwood, D., & Frazão, E. (2004). *WIC and the retail price of infant formula* (Food Assistance & Nutrition Research Program No. FANRR-39-1). U.S. Department of Agriculture, Economic Research Service.
- Oliveira, V., Racine, E., Olmsted, J., & Ghelfi, L. (2002). *The WIC program: Background, trends, and issues* (Food Assistance & Nutrition Research Program No. FANRR-27). U.S. Department of Agriculture, Economic Research Service.
- Oliveira, V., & Frazão, E. (2015). *The WIC program: Background, trends, and economic issues, 2015 edition* (Economic Information Bulletin No. 134). U.S. Department of Agriculture, Economic Research Service, Washington, DC.
- Oliveira, V., & Prell, M. (2004). Sharing the economic burden: Who pays for WIC's infant formula? *Amber Waves*. U.S. Department of Agriculture, Economic Research Service.
- Oliveira, V.J., Prell, M.A., & Cheng, X. (2019). *The economic impacts of breastfeeding: A focus on USDA's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)* (Economic Research Report No. 261). U.S. Department of Agriculture, Economic Research Service.



- Osterman, M.J.K., Hamilton, B.E., Martin, J.A., Driscoll, A.K., & Valenzuela, C.P. (2022). *Births: Final data for 2020* (National Vital Statistics Report). U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.
- Phillips, D., Bell, L., Morgan, R., & Pooler, J. (2014). *Transition to EBT in WIC: Review of impact and examination of participant redemption patterns: Final report* (Cooperative Agreement No. 59 5000-1-0032). U.S. Department of Agriculture, Economic Research Service. Prepared by Altarum Institute, Portland, ME.
- Prell, M. (2004). *An economic model of WIC, the Infant Formula Rebate program, and the retail price of infant formula* (Food Assistance and Nutrition Research Report No. 39–2). U.S. Department of Agriculture, Economic Research Service.
- Rhone, A., Ver Ploeg, M., Williams, R., & Breneman, V. (2019). *Understanding low-income and low-access census tracts across the nation: Subnational and subpopulation estimates of access to healthy food* (Economic Information Bulletin No. 209). U.S. Department of Agriculture, Economic Research Service.
- Rhone, A., Williams, R., & Dicken, C. (2022). *Low-income and low food store-access census tracts, 2015–19* (Economic Information Bulletin No. 236). U.S. Department of Agriculture, Economic Research Service.
- Ritchie, L., Lee, D., Sallack, L., Chauvenet, C., Machell, G., Kim, L., Song, L., & Whaley, S.E. (2021). *Multi-state WIC participant satisfaction survey: Learning from program adaptation during COVID*. Washington, DC: The National WIC Association.
- Ritchie L., Lee, D., Felix, C., Sallack, L., Chauvenet, C., Machell, G., & Whaley, S.E. (2022). *Multi-state WIC participant survey: Cash value benefit increase during COVID*. The National WIC Association and the Nutrition Policy Institute at the University of California Division of Agriculture and Natural Resources.
- Rossin-Slater, M. (2013). WIC in your neighborhood: New evidence on the impacts of geographic access to clinics. *Journal of Public Economics*, 102, 51–69.
- Saitone, T.L., Li, X., McLaughlin, P.W., & Sexton, R.J. (2021). *Cost implications of participant product selection in USDA's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)* (Economic Research Report No. 299). U.S. Department of Agriculture, Economic Research Service.
- Sanjeevi, N. & Freeland-Graves, J.H. (2022). The Special Supplemental Nutrition Program for Women, Infants, and Children food package revisions and anemia in children aged 2–5 years. *The American Journal of Clinical Nutrition*, 116(4), 1,030–1,037.
- Schuman, A.J. (2003). A concise history of infant formula (twists and turns included). *Contemporary Pediatrics*, 20(2), 91–98.
- Schwartz, J.B., Guilkey, D.K., Akin, J.S., & Popkin, B.M. (1992). *The WIC breastfeeding report: The relationship of WIC program participation to the initiation and duration of breastfeeding*. U.S. Department of Agriculture, Food and Nutrition Service, Office of Analysis and Evaluation.
- Spaulding, C., Murano, P., Girimaji, A., Paulhill, K., & Li, Y. (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.



- Stewart, H., Hyman, J., McLaughlin, P.W., & Dong, D. (2019a). *USDA Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): A new look at key questions 10 years after USDA added whole-grain bread to WIC food packages in 2009* (Economic Research Report No. 268). U.S. Department of Agriculture, Economic Research Service.
- Stewart, H., McLaughlin, P.W., Dong, D., & Frazão, E. (2019b). WIC households' bread and cold cereal purchases: When they use benefits versus paying out of pocket. *American Journal of Health Promotion*, 33(1), 79–86.
- Tester, J.M., Leung, C.W., & Crawford, P.B. (2016). Revised WIC food package and children's diet quality. *Pediatrics*, 137(5), e2,0153,557.
- The White House. (2022). *Biden-Harris administration national strategy on hunger, nutrition, health*.
- Thoma, M.E., De Silva, D.A., Kim, J., Hodges, L., & Guthrie, J. (2023). Breastfeeding initiation trends by Special Supplemental Nutrition Program for Women, Infants, and Children participation and race/ethnicity among Medicaid births. *Journal of Nutrition Education and Behavior*, 55(3),170–181.
- Thorn, B., Huret, N., Bellows, D., Ayo, E., Myers, R., & Wilcox-Cook, E. (2015). *WIC food packages policy options study II* (Contract No. AG-3,198-C-14-0027). U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support. Prepared by Insight Policy Research, Arlington, VA.
- Tiehen, L. (2020). *The food assistance landscape: Fiscal year 2019 annual report* (Economic Information Bulletin No. 218). U.S. Department of Agriculture, Economic Research Service.
- Tiehen, L., & Jackowitz, A. (2010). *WIC participation patterns: An investigation of delayed entry & early exit* (Economic Research Report No. 109). U.S. Department of Agriculture, Economic Research Service.
- Tiehen, L., & Frazão, E. (2016). *Where do WIC participants redeem their food benefits? An analysis of WIC food dollar redemption patterns by store type* (Economic Information Bulletin No.152). U.S. Department of Agriculture, Economic Research Service.
- Toossi, S. & Jones, J.W. (2023). *The food and nutrition assistance landscape: Fiscal year 2022 annual report* (Economic Information Bulletin No. 255). U.S. Department of Agriculture, Economic Research Service.
- U.S. Department of Agriculture, Food and Nutrition Service. (ND). *Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)*.
- U.S. Department of Agriculture, Food and Nutrition Service. (2006). *WIC program nutrition education guidance*.
- U.S. Department of Agriculture, Food and Nutrition Service. (2016). *Special Supplemental Nutrition Program for Women, Infants and Children (WIC) breastfeeding policy and guidance*.
- U.S. Department of Agriculture, Food and Nutrition Service. (2020a). *Extensions for certain USDA FNS-approved COVID-19 waivers* (WIC Policy Memorandum #2,020-6).
- U.S. Department of Agriculture, Food and Nutrition Service. (2020b). *VENA: Value enhanced nutrition assessment in the Special Supplemental Nutrition Program for Women, Infant, and Children (WIC); updated guidance*.
- U.S. Department of Agriculture, Food and Nutrition Service. (2022a). *Food and Nutrition Service research and evaluation plan fiscal year 2022*.
- U.S. Department of Agriculture, Food and Nutrition Service. (2022b). *WIC authorized vendors: Data and maps*.

- U.S. Department of Agriculture, Food and Nutrition Service. (2022c). *WIC EBT activities*.
- U.S. Department of Agriculture, Food and Nutrition Service. (2022d). *Infant formula rebate contract bid data*.
- U.S. Department of Agriculture, Food and Nutrition Service. (2023e). *WIC Farmers' Market Nutrition Program, fact sheet*.
- U.S. Department of Agriculture, Food and Nutrition Service. (2023a). October 2022 program information report (Keydata), U.S. Department of Agriculture, Food and Nutrition Service.
- U.S. Department of Agriculture, Food and Nutrition Service. (2023b). *WIC data tables* (accessed on October 6, 2023).
- U.S. Department of Agriculture, Food and Nutrition Service. (2023c). *Imported infant formula and flexibilities in the WIC program*.
- U.S. Department of Agriculture, Food and Nutrition Service. (2023d). Data sharing to improve outreach and streamline certification in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (WIC policy memorandum #2023–5).
- U.S. Department of Agriculture, Food and Nutrition Service (2023e). *WIC Farmers' Market Nutrition Program*.
- U.S. Department of Agriculture, Food and Nutrition Service. (2023f). *WIC FMNP profiles—grants and participation*.
- U.S. Department of Agriculture, Food and Nutrition Service. (2023g). *WIC modernization*.
- U.S. Department of Agriculture, Food and Nutrition Service. (2023h). *Streamlining certification documentation guidance* (WIC policy memo #2023–6).
- U.S. Department of Agriculture and U.S. Department of Health and Human Services. (2020). *Dietary Guidelines for Americans, 2020–2025*. 9th edition.
- U.S. Department of Health and Human Services. (2018). *Temporary assistance for needy families: 12<sup>th</sup> report to Congress, fiscal years 2014 and 2015*. U.S. Department of Health and Human Services, Administration for Children and Families, Office of Family Assistance.
- U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (2022). *Cronobacter infection and infants*.
- U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (2023). Rates of any and exclusive breastfeeding by socio-demographics among children born in 2020, in *Results: Breastfeeding rates, national immunization survey—child (NIS-Child). 2013–2020*.
- U.S. Department of Justice and the Federal Trade Commission. (2010). *Horizontal merger guidelines*.
- U.S. Food and Drug Administration. (2023a). *The U.S. Food and Drug Administration's immediate national strategy to increase the resiliency of the U.S. infant formula market*.
- U.S. Food and Drug Administration. (2023b). *Enforcement discretion to manufacturers to increase infant formula supplies*.
- U.S. Food and Drug Administration. (2023c). *Questions & answers for consumers concerning infant formula*.

- U.S. Government Accountability Office. (2013). *WIC program: Improved oversight of income eligibility determination needed* (report to Congressional requestors, GAO-13-290).
- Ver Ploeg, M., Mancino, L., Todd, J.E., Clay, D.M., & Scharadin, B. (2015). *Where do Americans usually shop for food and how do they travel to get there? Initial findings from the National Household Food Acquisition and Purchase Survey* (Economic Information Bulletin No. 138). U.S. Department of Agriculture, Economic Research Service.
- Ver Ploeg, M. (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), 412–427.
- Whaley, S.E., Ritchie, L.D., Spector, P., & Gomez, J. (2012). Revised WIC food package improves diets of WIC families. *Journal of Nutrition Education and Behavior*, 44(3), 204–209.
- Zhang, Q., Chen, C., Xue, H., Park, K., & Wang, Y. (2021). Revisiting the relationship between WIC participation and breastfeeding among low-income children in the U.S. after the 2009 WIC Food package revision. *Food Policy*, 101, 102,089.
- Zhang, Q., Park, K., Zhang, J., & Tang, C. (2022). The online ordering behaviors among participants in the Oklahoma Women, Infants, and Children Program: A cross-sectional analysis. *International Journal of Environmental Research and Public Health*, 19(3), 1,805.
- Zimmer, M., McElrone, M., Steeves, E.T.A. (2021). Feasibility and acceptability of a “click & collect” WIC online ordering pilot. *Journal of the Academy of Nutrition and Dietetics*, 121(12), 2,464–2,474.

## Appendix A

Table A.1

**WIC income eligibility guidelines for the 48 contiguous States, Alaska, and Hawaii (effective July 1, 2022 to June 30, 2023)**

Family size	48 contiguous States	Alaska	Hawaii
Number of people	Annual income (U.S. dollars)		
1	25,142	31,432	28,916
2	33,874	42,347	38,961
3	42,606	53,262	49,007
4	51,338	64,177	59,052
5	60,070	75,092	69,098
6	68,802	86,007	79,143
7	77,534	96,922	89,189
8	86,266	107,837	99,234
For each additional member, add:	+8,732	+10,915	+10,046

Note: WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

Source: USDA, Economic Research Service based on data from USDA, Food and Nutrition Service, 2022.

## Appendix B

Table B.1

### WIC legislative, regulatory, and policy timeline

1972	Federal legislation created the Special Supplemental Food Program for Women, Infants, and Children (WIC) as a 2-year pilot project (Public Law 92-433).
1974	The first WIC site officially opened in Pineville, Kentucky.
1975	Federal legislation established WIC as a permanent national health and nutrition program (Public Law 94-105).
1978	The Federal Child Nutrition Amendments of 1978 (Public Law 95-627) established a national income standard for program eligibility, based on income standards prescribed for reduced-price school lunches. 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 the Federal poverty guidelines.
1986	Tennessee became the first State to implement an infant formula rebate program.
1988	The Hunger Prevention Act of 1988 (Public Law 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 (Public Law 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 (Public Law 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 to encourage breastfeeding among WIC mothers (73 Federal Register, Number 229, November 27, 1992, pages 56,231-56,241).
1994	The Healthy Meals for Healthy Americans Act of 1994 (Public Law 103-448) changed the name of the program from the Special Supplemental Food Program for Women, Infants, and Children 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.
1998	The William F. Goodling Child Nutrition Reauthorization Act of 1998 (Public Law 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.
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 benefit 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. The rule also aimed to promote breastfeeding by establishing three feeding options within each of the infant food packages (fully breastfeeding, partially breastfeeding, and fully formula feeding) by reducing the amount of formula provided to partially breastfeeding infants, and by increasing the amounts of foods provided to fully breastfeeding mothers.
2009	All WIC State agencies were required to implement the new WIC food packages by October 1.

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Table B.1

**WIC legislative, regulatory, and policy timeline—continued**

2010	The Healthy, Hunger-Free Kids Act of 2010 (Public Law 111-296) required that food package reviews be conducted no less than every 10 years and required all States to implement an Electronic Benefit Transfer (EBT) system for WIC by 2020.
2014	The 2009 revisions to the WIC food packages were finalized. The final rule allowed for yogurt as a partial substitute for milk and more whole grain and fish options for women and children as well as additional fruits and vegetables for children.
2020	The Families First Coronavirus Response Act of 2020 (Public Law 116-127) allowed USDA, FNS to issue waivers of certain regulatory requirements to WIC States agencies for them to continue to serve WIC participants during the COVID-19 pandemic.
2021	The American Rescue Plan Act of 2021 (Public Law 117-2) allowed WIC agencies to temporarily increase the cash-value benefit amounts for fruit and vegetable purchases from \$9 per child and \$11 per adult up to \$35 per participant; and provided \$390 million for WIC outreach, innovation, and program modernization through FY 2024.
	The Extending Government Funding and Delivering Emergency Assistance Act of 2021 (Public Law 117-43) temporarily increased WIC cash-value benefit amounts to \$24 (child participants), \$43 (pregnant and postpartum women), and \$47 (breastfeeding women) in all States for the first quarter of FY 2022 (October through December 2021).
2022	The Further Extending Government Funding Act of 2022 (Public Law 117-70) temporarily increased WIC cash-value benefit amounts from \$9 to \$24 for children, from \$11 to \$43 for pregnant and postpartum women, and from \$11 to \$47 for breastfeeding women in all States for the second quarter of FY 2022 (January through March 2022).
	The Consolidated Appropriations Act, 2022 (Public Law 117-103) extended the temporary cash-value benefit increase through the end of FY 2022.
	The Access to Baby Formula Act of 2022 (Public Law 117-129) strengthened WIC's ability to respond to emergencies, disasters, and supply chain disruptions.  USDA, FNS proposes a rule to revise WIC food packages to align with the latest nutrition science, including the Dietary Guidelines for Americans (2020-25) and recommendations set forth by the National Academies of Sciences, Engineering, and Medicine.
2023	The Consolidated Appropriations Act, 2023 (Public Law 117-328), passed in December 2022, extended the temporary increases in the cash-value benefit through the end of FY 2023.
	USDA, FNS proposes a rule to remove barriers to online ordering and internet-based transactions in WIC.

Source: USDA, Economic Research Service based on information provided in Public Law and Code of Federal Regulations.

## Appendix C

### USDA, ERS-Supported Data Resources

Many USDA, ERS-supported data resources are available to study WIC (table C.1). Some resources are available to the public, while access to others is restricted. Restricted-use data are restricted when they contain information that may be used alone or in conjunction with other data to identify individuals, households, or retailers, and may only be accessed with USDA’s authorization—and/or the authorization of its partner agencies—and only under certain conditions. Publicly available data are accessible online through USDA, ERS or another Federal agency’s website and do not contain personally identifiable information or are often aggregated such that individuals, households, or retailers cannot be identified. Some datasets may have a restricted-use version with additional information, such as granular data on the location of households or retailers (e.g., census tract or census block group), and a public-use version with a comparatively less detailed set of information (e.g., State instead of census tract or block group).

Additionally, USDA, ERS provides several resources, known as “crosswalks,” that allow researchers to link one dataset to another, thereby expanding the set of information available (table C.2). For example, some crosswalks allow researchers to link retail scanner data on household food purchases to data measuring the healthfulness of those purchases. Additional information on these datasets—such as data collection procedures, representativeness of samples, years for which data are available, and types of information included—can be found on USDA, ERS’s webpage.

Table C.1  
Description of USDA, Economic Research Service datasets

Name	Are data restricted or public?	Years available	Description	Data specific to WIC
National Household Food Acquisition and Purchase Survey *	Restricted and public use versions	2012	Contains data about foods purchased or otherwise acquired for consumption at home and away from home, including foods acquired through food and nutrition assistance programs.	WIC participation
Food Security Supplement	Restricted and public use versions	1995–2022	Contains national and State-level statistics on food security, food expenditures, and use of food and nutrition assistance programs as a supplement to the Census Bureau’s Current Population Survey.	WIC participation
Household Pulse Survey	Restricted and public use versions	2020–22	Contains data on how education, employment, food security, health, housing, Social Security benefits, household spending, stimulus payments, and transportation have been affected by the COVID-19 pandemic. The survey is developed in partnership with the U.S. Department of Commerce, Bureau of the Census and other Federal agencies.	WIC participation
Eating and Health Module	Restricted and public use versions	2006–08, 2014–16	Contains information on the amounts of time people spend doing various activities, including eating/drinking and meal preparation (among others). Information was collected in partnership with the U.S. Department of Commerce, Bureau of the Census and the Bureau of Labor Statistics as part of the American Time Use Survey.	WIC participation

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Table C.1

**Description of USDA, Economic Research Service datasets—continued**

Name	Are data restricted or public?	Years available	Description	Data specific to WIC
Circana OmniMarket Core Outlets (previously known as Infoscan)	Restricted	2008–2020	Contains weekly point-of-sale data on the dollar value and quantity sold of individual food items, and their characteristics, by food retailers.	None
Circana Consumer Network	Restricted	2008–20	Contains household-recorded data on food retailers and food purchases.	WIC participation
Circana Weekly Retail and Monthly Household COVID-19 Response Data	Restricted	2019–22	Contains information on weekly food retail sales and monthly household food purchases at the product level.	None
Monthly Food-at-Home Price Database	Restricted	2016–18	Contains indices that allow users to track changes in prices over time by food product category and geography.	None
NielsenIQ TDLinx	Restricted	2004–20	Contains information on individual store characteristics for various types of food retailers.	WIC authorized retailers
WIC State Agency Administrative Data	Restricted	Varies by State	Individual level administrative data are provided by Colorado, Connecticut, Illinois, Kansas, Maine, Montana, and South Dakota.	WIC participation and benefits
Food Access Research Atlas	Public	2015, 2019	Contains information on food choices, health and well-being, and other characteristics for all communities in the United States.	None
Food Environment Atlas	Public	Varies by indicator	This mapping tool contains more than 275 indicators that help determine and reflect a community's access to affordable, healthy food.	County-level WIC participation and benefits; county-level count of WIC authorized retailers
Food Availability Data System	Public	Varies by product	Includes three data series on food and nutrient availability for consumption: food availability data, loss-adjusted food availability data, and nutrient availability data.	None
Flexible Consumer Behavior Survey	Public	2007–20	Contains information on consumers' knowledge, attitudes, and beliefs about nutrition and food choices as a supplement to the Centers for Disease Control's National Health and Nutrition Examination Survey.	WIC participation
Food Expenditures Series	Public	1997–2022	Tracks food expenditures at food retailers, restaurants, school cafeterias, hotels and motels, and recreational places, among others; tracks food expenditures by Federal, State, and local governments, including food purchased as part of food and nutrition assistance programs.	None

Note: Data are restricted when they contain information that may be used alone or in conjunction with other data to identify individuals, households, or retailers, and may only be accessed with USDA's authorization—and/or the authorization of its partner agencies—and only under certain conditions. Publicly available data are accessible online through USDA, ERS or another Federal agency's website and do not contain personally identifiable information or are aggregated such that individuals, households, or retailers cannot be identified. Some datasets may have a restricted-use version with additional information, such as granular data on the location of households or retailers, and a public-use version with a comparatively less detailed set of information.

\* A second National Household Food Acquisition and Purchase Survey, known as FoodAPS-2, is in the planning stages and is expected to include a larger number of WIC households. This larger sample would provide more information on WIC households and would allow for more accurate estimates and inferences.

Source: USDA, Economic Research Service.

Table C.2

**Description of USDA, Economic Research Service Resources allowing for Linkages Across Datasets**

Name	Are resources restricted or public?	Years available	Description
Purchase to Plate Crosswalk	Restricted	2011–2018	Links Healthy Eating Index (HEI) scores to both retail and household scanner data.
Purchase to Plate Price Tool	Restricted	2011–2018	Links estimates for food prices for foods included in the Centers for Disease Control’s National Health and Nutrition Examination Survey (NHANES) to retail scanner data.
Purchase to Plate Ingredient Tool	Restricted	2015–2018	Links price estimates for ingredients in NHANES foods to retail scanner data.
Rural-Urban Continuum Codes	Public	2010	A classification scheme that distinguishes metropolitan counties by the population size of their metropolitan area, and nonmetropolitan counties by degree of urbanization and adjacency to a metropolitan area.
Rural-Urban Commuting Area Codes	Public	2010	A classification scheme that distinguishes census tracts by their urbanicity using measures of population density, urbanization, and daily commuting.

Note: Data are restricted when they contain information that may be used alone or in conjunction with other data to identify individuals, households, or retailers, and may only be accessed with USDA’s authorization—and/or the authorization of its partner agencies—and only under certain conditions. Publicly available data are accessible online through USDA, ERS or another Federal agency’s website and do not contain personally identifiable information or are aggregated such that individuals, households, or retailers cannot be identified. Some datasets may have a restricted-use version with additional information, such as granular data on the location of households or retailers, and a public-use version with a comparatively less detailed set of information.

Source: USDA, Economic Research Service.