



WIC Infant and Toddler Feeding Practices Study-2

Year 9 Final Report Executive Summary

Executive Summary

Introduction

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) "safeguards the health of low-income women, infants, and children up to age 5 by providing supplemental foods, nutrition education, and healthcare referrals" (FNS, n.d.). The WIC Infant and Toddler Feeding Practices Study-2 (WIC ITFPS-2)¹ is a longitudinal study designed to examine changes over time in caregiver feeding practices and the nutrition- and health-related outcomes of children enrolled in WIC around the time of birth. The study began collecting data from prenatal WIC enrollees and postnatal WIC enrollees with a newborn less than 3 months old in fall 2013. Once enrolled in WIC ITFPS-2, study participants did not need to continue participating in WIC to continue with the study. The study followed the same cohort of children until they were 9 years old-that is, 4 years after they were no longer age eligible for WIC services.

By capturing data on children over the first 9 years of life, the study addresses a series of research questions about feeding young children who begin life participating with WIC, the association

Key Findings at Age 9

- Four years after their study children aged out of WIC, 83 percent of caregivers reported using information they learned from WIC to choose foods for their children.
- Compared with caregivers who did not report learning from WIC nutrition education, caregivers who reported learning were—
 - About 3 times more likely to have fruit in their homes
 - About 1.5 times more likely to have dark green vegetables in their homes
 - About 2.5 times more likely to have low- or non-fat milk in their homes
- The average diet quality score for study children was 57, while the average for children ages 9–13 nationally was 52.
- Less than 1 percent of study children met dietary recommendations for consuming vegetables and whole grains, but they consumed more on average than children ages 6–11 nationally.

between WIC services and caregiver feeding practices, and the health- and nutrition-related outcomes of children currently or previously participating with WIC. In the early years of

¹ During the first few years of the study, WIC ITFPS-2 was also known as the Feeding My Baby Study.

WIC ITFPS-2, the study focused on infant and toddler feeding practices, use of WIC services, and children's nutrition- and health-related outcomes. In the later years, the study also examined the associations between the duration of participation in WIC and children's nutrition- and health-related outcomes.²

Analyses in the Year 9 report focus on associations between study children's past participation with WIC and children's dietary outcomes at age 9. In addition to focusing on past participation with WIC, the report highlights associations between current WIC participation (for the caregiver or a non-study child) and dietary outcomes when the study child was age 9. Current participation with WIC may affect household food resources through the supplemental food package, while continuing exposure to nutrition education may affect diet-related choices. Consequently, 9-year-old children in families that continue with WIC for a non-study child or caregiver may have different outcomes than peers who no longer have any exposure to WIC.

This is the final report in a series of reports from WIC ITFPS-2.³ It focuses on findings from when the study children were age 9 to assess the lasting impacts of WIC participation. The report includes findings from prior years of the study to assess outcomes longitudinally. Some findings at years 6 and 9 may be influenced by the COVID-19 pandemic, as national- and State-level pandemic mitigation and recovery efforts were in place during data collection at these ages.

A. Methods

The participants in this study were recruited in person at sampled WIC clinics around the country that were large enough to enroll at least 30 new participants monthly for WIC services. To be eligible to participate in the study, new WIC enrollees had to be at least 16 years old, speak English or Spanish, and be enrolling in WIC for the first time for their current pregnancy or newborn less than 3 months of age. A total of 4,367 study participants were recruited from sampled WIC clinics. Of this group, 3,775 were followed in the study.

² Appendix A, table A.1, offers the list of the research questions that the study answers.

³ Prior reports can be found at Food and Nutrition Services. (2024). *Data & research*. U.S. Department of Agriculture. https://www.fns.usda.gov/data-research?keywords=itfps&sort_bef_combine=created_1_DESC

In the first year of the study child's life, primary caregivers participated in telephone interviews every 2 months to capture rapidly changing feeding practices as infants develop. In the second

WIC ITFPS-2 Year 9 primary research objectives:

- Examining the dietary behaviors and health outcomes of children at age 9, including assessing change longitudinally from when children were eligible for WIC.
- Describing the food security status of children at age 9 and their households, considering food assistance program participation.
- Describing feeding practices of caregivers for their children at age 9.
- Describing the food and healthrelated environment of children at age 9.

year of the study child's life, telephone interviews occurred every 3 months. In the third, fourth, and fifth years, interviews took place every 6 months. There was a yearlong break between the age 5 and age 6 interviews and a 3-year break between the age 6 and age 9 interviews. Depending on the age of the study child when first enrolled in WIC, caregivers participated in up to 19 interviews over the course of a decade, reporting on their feeding practices, WIC service use, children's health behaviors and outcomes, and family sociodemographic characteristics.

After nearly a decade of collecting data from the sample, 1,382 study participants responded to the Year 9 interview. The callout box summarizes the Year 9 study objectives. Findings in the report reflect analyses involving a longitudinal cohort of 683 study participants who responded to every interview from baseline in 2013–2014 through

study child age 9 in 2022–2023. Survey responses from these study participants are statistically weighted so that findings represent the study-eligible population.

B. Sociodemographic Characteristics

All families had low incomes at the start of the study, and most study households continued to have low incomes when the study child was age 9. About three of four (79%) reported household incomes at or below 185 percent of the Federal poverty guidelines (the typical income-eligibility criteria for WIC participation), which was about \$51,338 for a family of four in 2022. About one of five households (19%) participated with WIC when the study child was age 9, either for the caregiver or a non-study child. Slightly more than two of five households (43%) received Supplemental Nutrition Assistance Program (SNAP) benefits when the study child was age 9. About four of five households (79%) reported involvement in school or summer meal programs. Federally funded nutrition assistance programs continued to support most families, with 83 percent of households reporting that they participated in at least one of the following programs at Year 9: WIC, SNAP, and school meals. Nonetheless, when the study child was 9 years old, about one of four households reported being food insecure, which is down significantly from about half from when study participants first enrolled in WIC (i.e., at study baseline).



For the first time in this longitudinal study, child food insecurity was assessed when the study children were age 9. Among all study households, about one of seven (15%) reported child food insecurity, which is about 6 percentage points higher than the national average (9%). Though not statistically significant, the magnitude of the difference by household WIC participation status when the study child was age 9 was notable. Among households participating with WIC, 10 percent experienced child insecurity, and among households not participating with WIC, 16 percent experienced child food insecurity.

C. Useful Knowledge Gained From WIC

More than 8 of 10 caregivers (83%) indicated they were using information they learned from WIC to help them make decisions about foods to offer their children when the study child was 9 years old. This finding speaks directly to the enduring power of WIC nutrition education. Among caregivers who indicated that they learned information from WIC, many learned how to choose healthy foods (43%), eat more fruits and vegetables (38%), offer the right amounts of foods (18%), drink/buy fewer sugar-sweetened beverages (SSBs, 10%), and prepare foods (6%).



For caregivers who indicated learning specific information from WIC, the knowledge translated into greater use of food label information on added sugars and purchasing more whole grains when the child was 9 years old—that is, 4 years after the study child was no longer age eligible for WIC. Findings from logistic regression models indicate that information gained from WIC increased the likelihood of having fruit, dark green vegetables, and low- and non-fat milks in the home when the study child was age 9, suggesting that knowledge gained from WIC continues to influence the home food environment as the study child grows older. This finding is consistent with evidence collected by the Agency for Healthcare Research and Quality, indicating that

household participation with WIC is likely associated with purchasing healthy foods (Caulfield et al., 2022).



About two of three (65%) of study families regularly ate family meals together when the study child was 9, which research associates with better dietary outcomes when compared with children who do not eat together as a family (Gillman et al., 2000). In a national sample of households in 2012, only about half of children ages 6–11 ate dinner with their families (Murphey, 2012). About 60 percent of caregivers indicated that their families regularly watched television while eating, which is a 12-percentage-point increase from age 6. Watching television while eating has been associated with less healthy dietary intakes, including increased intakes of SSBs and other sweets (Trofholz et al., 2019).

D. Children's Diet Quality

Though estimated mean levels of intake of fruit, dairy, and protein foods were generally higher for study children at age 9 than mean intakes for a national sample of children ages 6–11 in the United States, less than half of study children met the *Dietary Guidelines for Americans* (DGA, USDA & HHS, 2020) recommended levels of intake for these foods (figure 1). Only 1–2 percent of study children met the DGA recommendations for vegetables and whole grains, though average intake by study children was higher than the national average.





Note: This figure was inspired by figures in the Dietary Guidelines for Americans (USDA & HHS, 2020).

cup eq./day = cup equivalent per day; oz = ounce; oz eq./day = ounce equivalent per day

^a Specific recommendations reflect energy intake and sex of child.

^b Usual intake estimates.

^c Estimates based on 1 day of recall from the National Health and Nutrition Examination Survey, 2017-2018 (Bowman & Clemens, 2022).

Healthy Eating Index-2020 (HEI-2020, Shams-White et al., 2023) scores described study children's overall diet quality relative to the DGA recommendations. On a scale of 0 to 100, with 100 meaning perfect alignment to the DGA recommendations, the average HEI-2020 total score for study children was 57 (figure 2). Though this finding means there is room for improvement, this average score is higher than the average from a nationally representative sample of children ages 9–13 (52). At age 9, study children consumed more plain drinking water on average than a nationally representative sample of children (23 fluid ounces [fl. oz] vs. 20 fl. oz, respectively), which represents an improvement from earlier years of the study. Despite this improvement, the quality of study children's diets declined over the course of the study based on HEI-2020 scores, which is consistent with a decline in overall diet quality found nationally (USDA & HHS, 2020).



Figure 2. Average Healthy Eating Index-2020 scores, ages 2 to 9

Note: This figure was inspired by figure 1-4 in the *Dietary Guidelines for Americans* (USDA & HHS, 2020). HEI = Healthy Eating Index-2020

Previous WIC ITFPS-2 research found a positive association between the duration of WIC participation and children's diet quality at ages 2, 3, 5, and 6. This study did not identify an association at age 9. However, this Year 9 report used a different longitudinal cohort than prior research, one that only included participants who responded to all study interviews through age 9. This cohort is smaller than the longitudinal cohort used in previous study reports, which may have contributed to the inability to find statistically significant associations. However, also likely is that, as study children grew older, parental control over dietary intake decreased. Social factors and additional food environments affecting diet at age 9 (e.g., school food environments, marketing, friends, afterschool activities) may counteract the effects of WIC on very young children, making it difficult to identify these effects on diet at age 9.

Focusing on nutrients of public health concern, intakes of potassium and vitamin D tended to be higher compared with a nationally representative sample of children ages 9–13. However, about 82 percent of study children had inadequate intake of vitamin D. Study children's median usual intake of fiber was



also well below recommended levels, though higher than the median intake from a nationally representative sample of children ages 9–13. Practically all study children exceeded the recommended limit for sodium, 87 percent of study children did not meet the DGA recommendation for saturated fat, and 55 percent of study children did not meet the DGA recommendation for added sugars.

E. Conclusions

The findings in this report indicate that WIC participation had a lasting impact on the behavior of WIC participants. The knowledge that caregivers gained from WIC nutrition education continued to influence food-related behaviors 4 years after the study children aged out of the program. The diet quality of the typical study child at age 9 was at least as good as that of the typical child in the United States, which is notable because most study children lived in households with low incomes; these households often face challenges to diet quality and food security. Though almost all study children failed to meet the DGA recommendations for vegetables and whole grains at age 9, they consumed more on average than children ages 6–11 nationally. Similar to children nationally, the study children's average diet quality score at age 9 indicated there is room for improvement. Focusing on nutrients of public health concern, 82 percent of study children had inadequate intake of vitamin D at age 9, but intake of sodium and saturated fats was excessive for most children when compared with recommendations. These findings are consistent with those from previous years of the study and with children nationally.

Taken together, findings from the longitudinal WIC ITFPS-2 indicate that WIC not only affects children and caregivers while they are enrolled in the program but has a lasting positive impact on caregiver food-related behaviors, foods available at home, and the diet quality of children long after they are no longer age eligible for the program. However, similar to children nationally, the diets of children in families with low incomes could be improved. Ongoing efforts are needed to help children and their families adopt and maintain a healthier lifestyle to optimize diet-related outcomes and prevent childhood chronic diseases.

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