

# Predictors of WIC Participation Through 2 Years of Age

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## ABSTRACT

**Objective:** To examine factors associated with *Special Supplemental Nutrition Program for Women, Infants, and Children* (WIC) participation through 2 years of age.

**Design:** Longitudinal data from the WIC Infant and Toddler Feeding Practices Study-2.

**Setting:** Eighty WIC sites.

**Participants:** The WIC Infant and Toddler Feeding Practices Study-2 participants interviewed through 2 years of age (n = 1,250).

**Main Outcome Measure:** WIC participation through 2 years of age.

**Analysis:** Multivariate logistic regression and odds ratios.

**Results:** Infants in households with incomes  $\leq$  100% of the federal poverty level (FPL) were more than twice as likely as those with incomes above 100% FPL to continue WIC participation through 2 years (odds ratio = 2.22; 95% confidence interval [CI], 1.34–3.66). The odds of WIC participation through 2 years were 2.84 times higher for infants fully breastfed for 6 months or longer compared with infants breastfed for less than 6 months (95% CI, 1.43–5.66). Infants in households in which caregivers reported they made a change in how they fed their family on the basis of something they learned from WIC had 2.60 higher odds of continued WIC participation than infants in households in which caregivers did not report making a change (95% CI, 1.67–4.07).

**Conclusions and Implications:** In addition to lower household income, longer breastfeeding duration and application of WIC nutrition education are important predictors of WIC participation through 2 years of age.

**Key Words:** WIC, program retention, low-income, breastfeeding (*J Nutr Educ Behav.* 2019;000:1–8.)

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## INTRODUCTION

Permanently established in 1974, the *Special Supplemental Nutrition Program for Women, Infants, and Children* (WIC) provides supplemental foods, nutrition education, breastfeeding support, and referrals to health care and social service programs to low-income pregnant and postpartum women and children up to 5 years old. To be eligible for WIC, participants must meet specific criteria for income (the WIC income eligibility threshold is  $\leq$  185%

federal poverty level [FPL]) and nutritional risk. WIC serves almost half of all infants in the US and one quarter of children aged 1–5 years, providing a critical nutrition safety net to approximately 7 million American women and children annually.<sup>1</sup>

According to data collected for the biennial WIC Participant and Program Characteristics Report (2016),<sup>2</sup> children's participation declines steadily with age; whereas 23.3% of total WIC participants are infants, only 19.9% are 1 year old, and 13.8% are

2 years old. Similarly, an Economic Research Service report found that of the families participating in WIC nationally within the first year of their infant's life, only 77% remained in the program after the infant turned 1 year old.<sup>3</sup> On the basis of these data, it appears that turning 1 year old, a time when WIC eligibility determination (recertification) is again required and the WIC food package for the infant changes to a food package for a young child, is associated with a substantial drop-off in WIC participation. Although this pattern of declining participation around the time of the infant's first birthday is not new, very few studies have examined factors associated with WIC program participation beyond infancy. Given that WIC is among the most important nutritional safety nets for children before their entry into school, it is critical to understand factors associated with program continuation such that all children who remain eligible for WIC continue to receive the nutrient-dense foods, nutrition education, and extensive referrals to health and social services that are offered by the program.

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The few published articles on why families exit the WIC program suggest that reasons vary. Although some reasons for leaving the program are due to ineligibility (ie, participant's household income no longer meets the income eligibility criteria), other reasons are not. In the earliest studies published on this topic, logistical barriers, such as job conflicts, transportation problems, waiting too long at WIC appointments, and difficulties in bringing the infant or child to recertify, were identified as primary barriers to program continuation.<sup>4,5</sup> A study by Jacknowitz et al<sup>3</sup> examined WIC retention using data collected from the Early Childhood Longitudinal Study–Birth Cohort (ECLS-B), a nationally representative longitudinal dataset of children born in 2001. Jacknowitz et al<sup>3</sup> reported that households in which the mother never breastfed or breastfed for less than 6 months were less likely to remain on WIC through age 2 years old than households in which the mother breastfed for 6 months or longer.<sup>3,6</sup> The study also found that households with higher incomes, and households in which mothers were more educated and were employed after the child's birth, were less likely to continue participating in WIC at child age 2, even when the household remained income eligible for the program.

In addition, Whaley et al<sup>7</sup> recently identified several distinct predictors of WIC program retention into the second year using data from a predominantly Hispanic sample of 9,632 children in Southern California. Similar to findings from Jacknowitz et al,<sup>3,6</sup> breastfeeding behavior emerged as a strong predictor of continued participation in WIC after the child's first birthday. Fully breastfed infants were 3 times more likely, and partially breastfed infants were 2 times more likely, to recertify in WIC at age 1 than fully formula-fed infants. Other factors independently associated with continued participation at age 1-year-old included household income  $\leq$  100% FPL, Medicaid participation, prenatal participation in WIC, consistent use and redemption of WIC benefits, more than 1 family member on WIC, and access to WIC nutrition education through an online format (compared

with when education was delivered exclusively in person at WIC clinic visits).

Recognizing the critical nutrition safety net provided by WIC, the US Department of Agriculture (USDA) has funded several state-level projects to characterize reasons for program discontinuation, as well as to identify strategies to enhance retention of eligible participants.<sup>8</sup> Many of these strategies (eg, partnering with Head Start and other child care and health care organizations, improving outreach and marketing efforts) were highlighted in a 2014 USDA report.<sup>9</sup> Furthermore, USDA funded the WIC Infant and Toddler Feeding Practices Study-2 (WIC ITFPS-2), a longitudinal study examining the feeding practices and nutrition and health outcomes of a large national sample of children enrolled in WIC during early infancy.<sup>10</sup> Because the children in WIC ITFPS-2 are followed regardless of continued participation in WIC, data from this study have the unique capacity to address concerns about participants who no longer participate in the program. Furthermore, WIC ITFPS-2 offers an opportunity to specifically examine those who leave WIC because of reasons not associated with perceived income ineligibility. The goal of this study is to identify predictors of continued WIC participation through 2 years of age in a national sample of children participating in the WIC ITFPS-2.

## METHODS

### Study Sample

*The WIC ITFPS-2: Second Year Report*<sup>10</sup> describes the study's survey design, data collection, and methods. This section summarizes salient points. Study mothers were recruited in person when they enrolled in WIC (either prenatally or before their infant was 2.5 months old). All data collection was completed by telephone interview, starting prenatally (when able) and at 1 and/or 3 months, 5, 7, 9, 11, 13, 15, 18, and 24 months. Mothers had to be at least 16 years old, able to complete interviews in English or Spanish and enrolling in WIC for the first time for that pregnancy or infant. Recruitment occurred in 80 WIC sites across

27 states and territories nationwide during the summer and fall of 2013. Participating WIC sites were selected among larger WIC sites, defined as those enrolling at least 30 eligible WIC participants per month, using a stratified 2-stage sampling approach. The Westat Institutional Review Board approved the national study under expedited authority; state health department and local hospital Institutional Review Boards approved local study activities as needed. All participants provided written informed consent at the time of study enrollment.

The WIC ITFPS-2 main analysis sample (unweighted  $n = 3,777$ ), the primary sample used for reports in WIC ITFPS-2, comprises those participants who answered either or both the 1- or 3-month interview. The current study used a subset of the sample that completed all subsequent interviews through 24 months (unweighted  $n = 1,349$ ) to ensure complete longitudinal information on study children. This subset of data is weighted to represent the national population of study-eligible infants enrolled at larger WIC sites for the first time during the 20-week recruitment period in 2013, and all analyses were conducted using weighted data.

To weight the WIC ITFPS-2 sample up to the eligible population, a base weight was calculated for each participant to account for the probability of selection into the study of the WIC site at which she was recruited. Another element of the base weight accounted for the probability of her individual selection during participant sampling at that site. A series of adjustments were applied to the base weights to account first for women who did not respond to screening, then for those who were screened but did not complete enrollment or consent. Weights were further adjusted to account for exclusion from the longitudinal subsample because of interview nonresponse (yielding the 24-month longitudinal weight). Sensitivity analysis indicated that the nonresponse adjustment implemented with the 24-month longitudinal weight should adequately account for any differences between participants who were included in the longitudinal sample and those who were not, and adjust the sample back to the characteristics

of the original population of study-eligible infants. Baseline variables included in the series of nonresponse adjustments were: WIC service site, maternal age at child's birth, timing of WIC enrollment (first trimester, second trimester, third trimester, postnatal), mother's weight category (overweight, obese, other), mother's Hispanic origin, mother's race, poverty status; preferred language (English, Spanish); and food security.

### Study Variables

Each interview conducted over the first 2 years of the child's life included questions about the mother and target the child's receipt of WIC. The interviews also collected data on sociodemographic characteristics, infant feeding practices and dietary intake, and other health-related behaviors. Based on factors found to be related to continued WIC participation in prior research,<sup>3-7</sup> the following variables were included in the current study.

*Participation in WIC through age 2 years.* At every interview, the respondent was asked "Are you currently getting WIC food or checks for yourself or <CHILD>?" A respondent was considered on WIC through age 2 if she responded "yes" to getting WIC food at 24 months OR she responded "no" at month 24 but "yes" at both the 15 and 18-month interviews. As there was not a 21-month interview, participation at that time was not captured. Because recertification for WIC occurs at 24 months of age, but the timing of the ITFPS-2 interview could have occurred 2 weeks before or 3 weeks after the child's 2-year birthday, respondents may have answered that they were not on WIC at 24 months because they had not yet recertified for the program. In addition, there is limited to no difference in WIC experience between those participating in WIC at 24 months, and those who endorsed participation through the 18-month interview. At 18 months, most of WIC participants are issued 2-3 months of WIC benefits, extending WIC benefit duration up to 21 months of age. Thus, the outcome variable "participation through 2 years" indicates substantial program participation through the second year of life.

Respondents reporting for the first time that they were no longer getting food from WIC at any interview were asked a series of follow-up questions about why they were no longer on the program. One possible response was that they felt that they no longer qualified for WIC, in which case they were excluded from the analytical sample (n=99) to focus on factors related to discontinuing WIC unrelated to eligibility.

*Income and participation in other programs.* Variables related to income status included (1) household income compared with the FPL (coded as  $\leq 100\%$  FPL/  $>100\%$  FPL); (2) participation in *Medicaid* (coded as yes/no); and (3) participation in the *Supplemental Nutrition Assistance Program* (SNAP; coded as yes/no). All 3 variables were assessed annually. As these variables can vary from year to year, the 24-month assessment was used in this analysis because this was the only measurement obtained in the same time frame as the dependent variable.

*History of WIC participation.* Two variables related to previous WIC participation were explored: (1) prior WIC participation, defined as having participated in the program for a previous pregnancy and/or child; and (2) prenatal/postnatal WIC certification, defined as having enrolled in WIC while pregnant with the target child vs enrolling in WIC after delivering the target child. Both variables were asked at the baseline interview (either prenatally or at 1 or 3 months, based on time of enrollment into WIC).

*Breastfeeding behavior.* At all interviews through 5 months of age, caregivers were asked: "are you currently feeding <your child> breastmilk, either from the breast or from a bottle, formula or both?" At interviews from 7 to 11 months, a fourth option of "neither breastmilk or formula" was offered. Responses were coded as: "only breastmilk," "only formula," "both breastmilk and formula," or (starting at 7 months) "I don't feed my baby either breastmilk or formula." To align with Jacknowitz et al,<sup>3,6</sup> in which infant feeding behavior was coded

to capture breastfeeding duration of 6 months or longer, caregiver self-reported feeding behavior collected at the time of the 7-month interview was used to determine feeding behavior. This interview was the closest time to 6 months and was conducted between 6.5 and 7.5 months of age. Fifty-six mothers who reported they were not breastfeeding at 7 months reported that they were breastfeeding at 5 months. For these mothers, responses to the question "how old was <child> when you completely stopped breastfeeding or feeding <him/her> breastmilk from a bottle" were examined. In all 56 cases, breastfeeding had ceased before 6 months of age. Therefore, infant feeding behavior was coded based on the 7-month interview as fully breastfeeding for 6 months or longer, partially breastfeeding (feeding both breastmilk and formula) for 6 months or longer, or not breastfeeding at 6 months.

*WIC education impact.* A key component of WIC program services is nutrition education; thus, a measure of the self-reported impact of education was included in the study. At the 24-month interview, all caregivers were asked, "Have you changed how you feed yourself or your family because of something you learned at WIC?" Responses to this yes/no question were used to capture changes in behavior that may have been influenced by the WIC education experience.

*Demographic factors.* Four demographic factors were explored: race/ethnicity of the mother (coded as Non-Hispanic white, Non-Hispanic black, Non-Hispanic other, and Hispanic), maternal employment status (coded as working full-time, working part-time, not working), whether the mother was currently living with the father of the child (coded as yes/no), and highest education received by the child's mother (coded as more than high school education/high school graduate or less). Racial/ethnic information and whether the mother was living with the child's father were collected at the baseline interview, employment and education were collected at the 24-month interview.

## Data Analysis

A balanced repeated replication method was used to create weights for the dataset for the longitudinal data (a full description of sample weighting can be found in Appendix B of the WIC ITFPS-2 Infant Report).<sup>11</sup> The data were weighted with a Fay correction of 0.3 for the balanced repeated replication method and applied using the PROC SURVEY procedures in SAS 9.3 software (SAS Institute Inc, Cary, NC, 2011). At the 24-month interview, 99 respondents reported that they no longer received WIC because they perceived they were not eligible for the program. These respondents were excluded from the final sample (n = 1,250). Descriptive analyses were assessed for 11 variables potentially related to program participation: household income level, SNAP participation, Medicaid participation, prior WIC participation, prenatal/postnatal WIC enrollment, breastfeeding

behavior, the WIC education experience, race/ethnicity, maternal employment status, presence of father in the household, and caregiver's highest level of education. Associations between the potential predictors and program retention were analyzed using multivariate logistic regression for survey data. Odds ratio (OR) and 95% confidence intervals were computed to examine factors associated with WIC participation over 2 years.

## RESULTS

Most of the participants reported continued WIC participation through 2 years (87%). Income eligibility for WIC is defined as being at or below 185% of the FPL, but nearly 70% of study respondents had incomes at or below 100% of the FPL. Nearly three quarters of study participants concurrently participated in the

Medicaid program and about half received SNAP benefits. Half of the study participants had received WIC benefits for a previous pregnancy and/or child. Most of the participants (89%) enrolled in WIC during pregnancy with the study child, with 74% enrolling in the first or second trimester. Most mothers (70%) were no longer breastfeeding at 6 months, and the majority (62%) reported that they had made a change in how they fed themselves or their family based on something they learned from WIC. The sample was ethnically diverse, fewer than half of mothers (48%) were employed, over half of the mothers (56%) indicated that they were living with the father of the target child, and most women (63%) had a high school education or less at the time of the 24-month interview (Table 1).

There were no statistically significant intercorrelations between any of

**Table 1.** Characteristics of the Longitudinal Study Sample at 24 Months (n = 1,250)

Characteristic	Full Sample		
	Weighted (N = 409,703)	Unweighted (n = 1,250)	Percentage
Enrolled in WIC at 18–24 mo	348,132	1,059	87
Household income at or below 100% FPL	257,357	802	68
Participates in SNAP	205,466	634	50
Participates in Medicaid	314,992	975	77
Received WIC before this child	228,188	718	56
Timing of WIC enrollment for this child			
First trimester	133,034	467	32
Second trimester	170,825	499	42
Third trimester	59,851	161	15
Postnatal	45,994	123	11
Breastfeeding behavior at 6 months			
Not breastfeeding	286,170	878	70
Partially breastfeeding	49,832	153	12
Fully breastfeeding	73,702	219	18
Changed feeding habits for self or family after receiving WIC nutrition education	124,870	783	62
Race/ethnicity			
Non-Hispanic white	114,085	378	28
Hispanic	188,245	500	46
Non-Hispanic black	84,781	312	21
Non-Hispanic other	22,592	60	5
Mother's employment status			
Not employed	843	623	52
Employed part-time	89,407	280	22
Employed full-time	107,859	346	26
Mother living with child's father	230,036	693	56
Mother with more than high school education	152,253	491	37

FPL indicates federal poverty level; SNAP, Supplemental Nutrition Assistance Program; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children.

**Table 2.** Multivariable Logistic Regression Model Predicting Ongoing WIC Participation at 18–24 Months of Age (n = 1,250)

Characteristic	OR	95% CI
Household income at or below 100% FPL (vs >100% FPL)	2.22	1.34–3.66
Participates in SNAP (vs nonparticipant)	1.42	0.86–2.36
Participates in <i>Medicaid</i> (vs nonparticipant)	1.43	0.75–2.76
Received WIC before this child (vs nonrecipient)	1.36	0.84–2.23
Timing of WIC enrollment for this child		
Postnatal	1.00	—
First trimester	1.84	0.83–4.08
Second trimester	1.12	0.57–2.19
Third trimester	0.46	0.21–1.00
Breastfeeding behavior at 6 months		
Not breastfeeding	1.00	—
Partially breastfeeding	1.41	0.57–3.51
Fully breastfeeding	2.84	1.43–5.66
Changed feeding habits for self or family after receiving WIC nutrition education (vs did not change habits)	2.60	1.67–4.07
Race/ethnicity		
Non-Hispanic white	1.00	—
Hispanic	1.32	0.72–2.43
Non-Hispanic black	1.36	0.66–2.80
Non-Hispanic other	1.61	0.80–3.22
Mother's employment status		
Not employed	1.00	—
Employed part-time	0.92	0.53–1.58
Employed full-time	0.60	0.35–1.02
Mother living with child's father (vs not living with child's father)	0.77	0.51–1.16
Mother with more than high school education (vs high school graduate or less)	0.93	0.52–1.65

CI indicates confidence interval; FPL, federal poverty level; OR, odds ratio; SNAP, *Supplemental Nutrition Assistance Program*; WIC, *Special Supplemental Nutrition Program for Women, Infants, and Children*.

Note: The full model controlled for all variables listed in Table 1. A higher odds ratio indicates a higher chance of continued participation in WIC through 18–24 months.

the independent variables. Associations between the independent variables and WIC program retention through the 2 years of age were assessed using multivariate logistic regression. Of the 11 variables included in the model, 3 were significantly and independently associated with program retention through 2 years (Table 2). Infants in households with incomes at or below 100% FPL were more than twice as likely as those with incomes above 100% FPL to continue WIC participation. Infants who were fully breastfed for at least 6 months were nearly 3 times as likely to continue with WIC services through the 2 years of age than infants who were not breastfed at 6 months of age. Finally, changing a family feeding habit based on something learned at WIC was associated with a 2.6 times greater likelihood of continued WIC participation.

## DISCUSSION

Results of this study highlight many important similarities with previous studies, as well as some variation from previous work. Although a small number of published studies have examined barriers and incentives to WIC participation,<sup>4,5,12</sup> notably, there are only 2 published studies of predictors of WIC retention into the second year of life to which these results can be directly compared: the study by Jacknowitz et al,<sup>3</sup> using data from the 2001 ECLS-B, and the study by Whaley et al<sup>7</sup> that examined 2016 WIC administrative data from WIC participants in Southern California. Consistent with these previous studies, income status was highly associated with ongoing WIC participation. Participants with lower incomes were more likely to continue to access WIC benefits through

2 years of age, suggesting that children who continue receiving WIC services are from families with higher economic needs.

Also consistent with both previous studies, breastfeeding behavior in the first year was significantly associated with continued WIC participation through 2 years of age. This finding was true despite the various measures of breastfeeding behavior captured in the 3 studies because of different study design, measures of breastfeeding, and measures of program participation. The current study suggests that infants fully breastfed for 6 months or longer are nearly 3 times as likely to participate in WIC through 2 years, compared with infants fed only formula at 6 months of age. The data from Southern California demonstrated that women who fully breastfed for 6 months or longer were at 3 times as

likely to recertify their child on WIC at 1 year old, and those who partially breastfed were up to twice as likely, as compared with women who breastfed less than 6 months.<sup>7</sup> Similarly, Jacknowitz et al. found that children who were breastfed for 6 months or longer were significantly more likely to remain on the program through 2 years of age.

Women enrolled in the WIC program have access to breastfeeding education and support activities during their prenatal and postpartum periods, with federally mandated breastfeeding training related to the promotion and management of breastfeeding required for all WIC staff. The staff educates participants about the benefits of breastfeeding and how to breastfeed and maintain optimal milk production to ensure the best health outcomes for both mother and baby.<sup>13</sup> In many WIC sites (including 80% of sites in this study), breastfeeding education and support are further facilitated by breastfeeding peer counselors and/or lactation consultants.<sup>11</sup> For women who breastfeed, substantial ongoing support is available for the duration of continued breastfeeding. By comparison, postpartum women who do not breastfeed continue to receive nutrition education and referrals to health and social services, but generally have comparatively fewer support activities available to them. This study is the third to demonstrate a significant increase in WIC program retention for fully breastfed children, compared with fully formula-fed children. For formula-feeding mothers, the perceived benefits of WIC once the need for formula ceases may not be as salient. Future studies should explore the extent to which formula-feeding mothers feel supported by WIC beyond receipt of the food package, and whether retention among breastfed children is associated with family engagement and support provided through WIC breastfeeding services.

A novel contribution of this study, and particularly germane to the nutrition education community, is the finding that caregivers who reported that they changed how they fed themselves or their families because of something they learned at

WIC were significantly more likely to continue WIC participation for their child through 2 years of age. Whaley et al<sup>7</sup> documented a small but significant association between receipt of online nutrition education and continued WIC participation, but the robust finding from this study suggests that what caregivers learn from WIC and apply to practice is associated with continued engagement with the program. A cornerstone of WIC that sets it apart from other federal nutrition programs is the delivery of nutrition education to all participants; thus, this finding bolsters the importance of WIC nutrition education not only for the behavior change it encourages but for its association with continued participation into the second year. Continued WIC participation offers more opportunities to get nutritious foods to young children and education, referrals and support to caregivers throughout early childhood.

One predictor of retention that this study did not replicate from previous studies was Medicaid participation. Whaley et al<sup>7</sup> reported significant associations between prenatal WIC participation and program retention, a finding not replicated in the current study. Because of the different timing, samples, and means of data collection employed across the 3 studies, it is not surprising to find variation in the results. In addition, the differences in datasets mean that the primary outcome of interest, WIC program participation in the second year of life, was measured differently across the 3 studies. The different datasets—the longitudinal ECLS-B data, a large WIC administrative dataset, and the current longitudinal study of WIC participants—bring a unique assortment of methodologies that provide more breadth than any single study could accomplish. The convergence of findings across studies on several key predictors lends support to the importance of these predictors for ongoing WIC participation.

The current study found a relatively high rate of WIC participation through 2 years of age (87%). This rate surpassed those reported by both Whaley et al<sup>7</sup> at 14 months (82%), and Jacknowitz et al<sup>3,6</sup> at 2 years of age (77%). It is

important to note that WIC participation through 2 years did not necessarily mean that participants stayed continuously enrolled on WIC; however, participants did stay continuously enrolled in the study, regardless of WIC participation. The study participants may have had periods in which they were not receiving WIC, but all participants who were coded as participating in WIC through 2 years of age reported receipt of WIC at 24 months of age or, if not at 24 months, at both 15 and 18 months of age. Thus, participation through 2 years of age indicated substantial WIC participation in the second year of life, but not necessarily during all 12 months. As a national longitudinal sample collected from WIC programs in 27 states and territories, the methodology for WIC ITFPS-2 is distinctly different from previous studies. It may be that, although participants remain eligible for the study regardless of their WIC participation status, they were more likely to continue receiving WIC benefits than WIC participants not involved in the study. It is also possible that study participants may have chosen to discontinue the study if they also left WIC. Finally, WIC participation was assessed through participant self-report in the WIC ITFPS-2 and was only captured for the mother and study child; whereas, Whaley et al<sup>7</sup> determined participation through WIC administrative records documenting recertification by 14 months of age. Documenting program use through administrative records was not possible for the current study; thus, there may be some self-reporting bias in the current sample for ongoing WIC participation. This finding is a distinct limitation of the current study.

Sample weights were calculated to control for the characteristics of those who did not respond to all surveys from 1 or 3 months through 24 months. This nonresponse adjustment is intended to maximize the chances that study findings accurately represent not only those who remained in the study but account for any differences among participants who discontinued study participation. However, in the end, a limitation of this study is that those who left the study may be different from those who remained.

An additional limitation includes the lack of measures collected at 18 months, including questions about income and behavior change because of what families learned at WIC. Because the behavior change questions at 24 months are not time referenced, and therefore may include any changes from the prenatal period through 24 months of age, the 24-month measures, though imperfect, were selected as the best option for this study. Ideally, these measures would have also been captured mid-year at 18 months of age.

The WIC ITFPS-2 will continue to follow children through the entire period of WIC eligibility, providing further opportunities to gain more insight into patterns of WIC participation and predictors of ongoing participation. This study is only the third to examine predictors of WIC retention beyond 1 year of age and is the first to include a national sample of children followed since birth. The longitudinal nature of this study and the national sample are clear strengths, offering opportunities for continued exploration of WIC program retention through 5 years of age as the data become available. The findings that lower-income, breastfeeding, and nutrition education each relate to ongoing WIC participation through 2 years of age have clear research and practice applications as WIC programs around the country consider approaches for retaining young children on the program.

## IMPLICATIONS FOR RESEARCH AND PRACTICE

This study identifies specific areas that state and local WIC programs may target when addressing program retention. First, providing engaging nutrition education that fosters learning and behavior change among participants is a core WIC service, and findings from this study suggest that when participants find it impactful, it encourages ongoing program participation. Efforts to continue the high-quality one-on-one, group, and technology-based education are likely to keep participants engaged in the program, thereby optimizing health outcomes for children

and families. This study found that nearly two thirds of mothers reported changing the way they fed themselves or their families because of something they learned at WIC; however, about one third of mothers did not report making a change. Further research on the types and content of education that lead to healthy behavior change is encouraged.

Second, the breastfeeding support offered by WIC may also help with program retention into the second year. More work is needed to understand the opportunities to enhance the support WIC offers to women who cannot or choose not to breastfeed. By 3 months of age, most of the women on WIC are doing at least some formula feeding,<sup>11</sup> and by 6 months of age 70% of mothers are exclusively formula feeding; thus it is essential to explore how WIC can maximally support all women regardless of whether their infant is on formula or breastfeeding.

It is noteworthy that participants with the lowest incomes are more likely to continue receiving WIC benefits. This finding reinforces that WIC is continuing to reach the families who are likely to need it and benefit from it the most. Whether WIC ITFPS-2 families who are employed become income ineligible through their employment status, perceive they are no longer WIC eligible because of their employment status, or cannot find the time to continue to visit a WIC site because of their employment status cannot be determined by the study data and merits further study.

The WIC ITFPS-2 will continue to collect data on the study cohort until children turn 6 years old. Therefore, the dataset produced by this study will contain a wealth of information that can be used to investigate WIC-related research questions. Future reports will examine annual WIC retention through 5 years of age, while also investigating specific reasons families choose to continue or discontinue WIC. It is hoped that this first WIC ITFPS-2 report on predictors of WIC retention will help the WIC community focus on strategies that hold promise for retaining eligible participants.

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