

## Outcome-Based Issues in WIC

Given that WIC was created to safeguard the health of low-income women, infants, and children, an important measure of effectiveness is whether WIC improves the health of program participants, as measured by birth outcomes, nutritional status, and nutrient intake. The effectiveness of WIC's nutrition education program and WIC's impact on childhood obesity and breastfeeding rates are also important measures of effectiveness.

### WIC's Effect on the Health of Participants

With regard to its impact on nutrition and health, WIC has been one of the most studied of all Federal food and nutrition assistance programs. Research coverage among the different participant groups—infants; children; and pregnant, breastfeeding, and postpartum women—has been uneven, however, and methodological issues, such as selection bias, simultaneity bias, and the complexity of health outcomes, have made it difficult for researchers to obtain clear estimates of the program's impact (Fox et al., 2004).

#### *Birth Outcomes*

Most of the existing research on WIC's impact on nutrition and health has focused on the impact of prenatal WIC participation on birth outcomes. Although pregnant women account for only 11 percent of all WIC participants, WIC research has focused on critical birth outcomes, such as low birthweight, preterm delivery, and infant mortality. Birth outcomes have also been relatively easy to study because they are easily identified and can be observed in the short run.

Most of the studies on birth outcomes reported beneficial effects from WIC participation. In fact, much of the strong congressional support for WIC has been attributed to this research. Two of the most influential studies were published in the early 1990s. A study by Devaney et al. (1990), based on 1987-88 data from five States, found that each dollar spent on prenatal WIC services yielded a \$1.77 to \$3.13 savings in Medicaid costs for newborns and mothers over the first 60 days after birth. The study also found that prenatal WIC participation was associated with increased birthweight, fewer preterm births, and longer gestational age. The U.S. General Accounting Office (1992) statistically combined results from 17 studies conducted between 1971 and 1988 that compared rates of low birthweight among WIC participants and similar nonparticipants and found that prenatal WIC benefits reduced the rate of low birthweight births by 25 percent and reduced the rate of very low birthweight births by 44 percent. GAO concluded that "each Federal dollar invested in WIC benefits returns an estimated \$3.50 over 18 years in discounted present value" to Federal, State, local, and private payers. It is largely on the basis of these two birth outcomes studies that WIC is often cited as being one of the most cost-effective food assistance programs in the Nation.<sup>106</sup>

A number of other studies have examined WIC's impact on birth outcomes since the release of the Devaney and GAO publications. Several years ago,

<sup>106</sup> Although this claim is often used to highlight WIC's effectiveness, in general, it should be noted that these studies were limited to examining the effects solely from *prenatal* participation in WIC.

ERS commissioned a comprehensive review and synthesis of published research on the impact of USDA's domestic food and nutrition assistance programs, including WIC, on participants' diet and health. The resulting report—the most systematic and thorough assessment to date of research on the topic—summarized what is and what is not known about the nutrition- and health-related impact of WIC (Fox et al., 2004). The review, which examined WIC-related research published from 1978 to 2004, concluded that, even with the pervasive problem of selection bias and other limitations, “taken as a whole, the available body of research provides strong, suggestive evidence that WIC has a positive impact on mean birthweight, the incidence of low birthweight, and several other key birth outcomes, and that these positive effects lead to savings in Medicaid costs.”<sup>107</sup> The report further notes that because of the studies' design characteristics, “it is difficult to characterize the relative size of WIC's impact.”

Besharov and Germanis (2001), however, have questioned whether the positive effects of prenatal participation in WIC have been overstated. They state that methodological weaknesses in much of the WIC research—including selection bias and simultaneity bias—add uncertainty to the findings (see the box below, “Selection Bias and Simultaneity Bias”). They also state that much of the previous research lacks generalizability because it was based on one or a few States and may not be applicable to other States. The research is also based on studies conducted over a decade ago when the

<sup>107</sup> Others have reviewed WIC evaluation studies with similar conclusions (see, Abrams, 1993; Ku et al., 1994; Owen and Owen, 1997; and Rossi, 1998).

## Selection Bias and Simultaneity Bias

Issues related to selection bias and simultaneity (or gestational age) bias complicate the interpretation of the research examining WIC's impact on participants' health. WIC research is typically limited to a quasi-experimental design, comparing those who participate in the program with those who do not. A problem exists if WIC participants differ in unobservable ways from eligible nonparticipants and if these unobservable differences influence outcomes. Selection bias can either enhance or downplay the effects of WIC participation. For example, it can exaggerate the benefits of WIC when individuals who value health and nutrition are more likely to participate in the program than individuals who are at higher risk and do not see the value of participating. WIC effects can be downplayed in research if those not participating in WIC are at lower health risk than the WIC sample. The potential for selection bias is evident in almost all WIC studies. While researchers attempt to control for it in study design and analysis, it is uncertain how successful they are.

Simultaneity bias may occur because the longer a mother's pregnancy, the more likely she is to have a healthy baby. The longer she is pregnant, however, the more time she has to enroll in WIC and the greater her chance of participating in the program. As a result, it is possible that the positive effects from longer pregnancies, independent of WIC benefits, will be attributed to participation in WIC, thereby exaggerating WIC's impact.

program was considerably different. Changes in the size, composition, and characteristics of the WIC population make it difficult to generalize results from these earlier studies to today's WIC program.

More recently, a debate among researchers about WIC's relative impact on birth outcomes played out in several issues of the *Journal of Policy Analysis and Management* (JPAM). An article by Bitler and Currie (2005), based on a 19-State study of WIC-eligible Medicaid mothers, concluded that WIC participation was associated with improved birth outcomes and that the positive impact of WIC was even larger among more disadvantaged women, such as teens, single high school dropouts, and women who received public assistance the previous year. An article in a later issue by Joyce et al. (2005), however, based on a study of women on Medicaid in New York City from 1988 to 2001, found no relationship between prenatal WIC participation and measures of fetal growth among singletons (i.e., infants who are not part of a multiple birth), although there was a strong association between WIC and preterm births among U.S.-born Black twins.<sup>108</sup> Joyce et al. concluded that the mothers' prenatal participation in WIC had relatively little impact on infant health in New York City during the study period. Furthermore, they claimed that associations between WIC and birth weight are suspect (especially given the modest monetary value of the WIC packages) and questioned whether there is a plausible mechanism for WIC to improve birth outcomes given the lack of evidence from medical literature that prenatal nutritional supplementation has a strong effect on reducing preterm births.

The editor of *JPAM* invited two scholars to "make sense of the seemingly contradictory findings" in the two articles (Pirog, 2005). After reading the papers, Ludwig and Miller (2005) acknowledged that selection bias is an issue and that both WIC research and policy would benefit from a better understanding of the determinants of WIC participation. They offered a "less pessimistic conclusion about WIC's impact on birth outcomes compared with the interpretation offered by Joyce." They concluded that it was possible that WIC's bundle of services could affect preterm birth rates and that even a small impact on birth outcomes from WIC participation could be sufficient for WIC benefits to exceed costs. In a more recent *JPAM* article, Joyce et al. (2008), after attempting to address some of the limitations in previous work by including information on the mothers' timing of WIC enrollment, found modest effects of WIC "but on fewer margins and with less impact than has been claimed by policy analysts and advocates."

### ***Other Outcomes***

Other than the research on the effect of WIC on birth outcomes, research on WIC's impact on pregnant women is scarce and relatively dated (Fox et al., 2004). Even fewer studies have looked at WIC's impact on postpartum women. The limited research suggests that postpartum WIC participation may improve the birth outcomes of subsequent pregnancies. The effect of WIC on the health of breastfeeding mothers and their infants has not been studied. (For information on WIC's effect on breastfeeding rates, see the section on "WIC and Breastfeeding Rates," p. 66.)

<sup>108</sup> The authors theorize that the finding regarding Black twins was "confounded by the waning of the crack-cocaine epidemic."

Another area that has not been studied in depth is the health effect of WIC on children, even though they make up almost half of all WIC participants. Little is known about WIC's effect on the long-term growth and development on both physical and cognitive/psychological scales of children (Fox et al., 2004). It is difficult to link future health outcomes with WIC participation. Assessing WIC's impact on the growth and development of children requires a longitudinal study because a long period may be necessary to detect changes. In the early 1990s, Congress canceled a planned FNS-funded longitudinal study of the long-term developmental effects of WIC on children due primarily to the high costs of the project (Devaney, 1998).

Although results from several studies have suggested that WIC participation increases children's intake of selected nutrients, these studies were conducted using old dietary standards (Recommended Dietary Allowances, or RDAs) and outdated methods to assess nutrient adequacy. A new set of dietary reference standards—Dietary Reference Intakes (DRIs)—has been developed to replace and expand the RDAs and combined with a statistically based methodology for assessing nutrient adequacy and recommended methods for assessing program impact. It is unclear whether previously observed increases in nutrient intake attributed to WIC participation are associated with real "benefits," such as an increased proportion of WIC children with adequate nutrient intakes. Although data tabulations by Cole and Fox (2004) show that nearly all WIC infants and children consume adequate amounts of most nutrients, no research is available yet that measures the impact of WIC on nutrient adequacy.

The strongest evidence of WIC's positive impact on children is in the area of iron-deficiency anemia, a serious health concern. In their review of WIC's impact on nutrition and health, Fox et al. (2004) found that most studies of the relationship between WIC participation and iron status revealed that WIC participation had a positive effect on mean levels of hemoglobin or hematocrit and/or a reduction in the incidence of anemia. WIC may also have had an indirect effect on the iron status of nonparticipants due to the presence of WIC foods on supermarket shelves (Devaney et al., 1997). WIC products, such as infant formula and cereal, are required to be iron-fortified and are consumed by nonparticipants as well as WIC program participants.

### ***Research Challenges***

Much of the research on WIC's effect on participants' health is old and predates important changes in WIC, such as participation expansion, racial/ethnic composition changes, and WIC food package revisions. While research on the impact of today's WIC program on participants is necessary to determine the current program's effectiveness, researchers face a number of methodological challenges, in addition to issues of selection bias. For example, many program outcomes develop over a long period and may require measures of both pre- and post-participation in WIC. Studies also need to control for the complex interplay of diet, heredity, and environment that makes determining the specific impact of food and nutrition programs, such as WIC, on long-term outcomes difficult (Fox et al., 2004). Furthermore, a

majority of WIC participants also use other assistance programs, such as Medicaid and the Food Stamp Program, making it necessary to ascertain whether observed “impact” is due to WIC or to other programs.

## **Effectiveness of WIC’s Nutrition Education Program**

Most of the existing research on WIC has focused on the combined or overall impact of WIC rather than on the effectiveness of specific components. Although WIC’s positive effects are usually attributed to the provision of supplemental food, Rossi (1998) claims that they should be viewed as the joint effects of WIC’s supplemental foods, nutrition education, and health care referrals. The importance of separating out the effects of WIC’s individual components was articulated by Besharov and Germanis (2001) who stated that “increasing WIC’s impact is best accomplished with a knowledge of which of its elements seem to have the greatest effect on recipients. That knowledge would help determine whether the intensity of the entire program should be increased or only some element of it, such as the food packages or the nutritional counseling.”

### ***WIC’s Nutrition Education***

Poor diet, along with sedentary lifestyle, is a major cause of morbidity and mortality in the United States. Some of the diseases and conditions linked to poor diet include cardiovascular disease, hypertension, type 2 diabetes, overweight and obesity, iron-deficiency anemia, malnutrition, and some cancers. WIC’s nutrition education—a mandatory component of WIC—is designed to improve health status and achieve positive changes in dietary and physical activity habits, emphasizing relationships between nutrition, physical activity, and health (7 CFR 246.2). Federal regulations require that WIC State agencies spend at least a sixth of their NSA expenditures on nutrition education (7 CFR 246.14). Local WIC agencies are required to offer participants or caretakers at least two nutrition education sessions during each 6-month period, although individuals are not required to attend.

A number of factors make evaluating the effect of WIC’s nutrition education component difficult. For example, because recipients may receive nutrition education along with supplemental foods and referrals to health care services, it is difficult to separate out the effect of each component. Also, the content of the nutrition education, how it is implemented, and the characteristics of the participants (e.g., literacy level, primary language, nutritional needs) varies both among and within States.<sup>109</sup>

### ***Previous Research***

Despite these challenges, a number of attempts have been made to determine the effectiveness of WIC’s nutrition education services. A study by the U.S. General Accounting Office (GAO) (2001a) reviewed previous research conducted between 1995 and 2000 on the effectiveness of WIC’s nutrition education and referral services.<sup>110</sup> The study found that the research was severely limited by methodological constraints, including the use of outdated

<sup>109</sup> WIC does not systematically collect data on the number and characteristics of participants receiving nutrition education, the types of nutrition education provided, the length and frequency of nutrition education, or the outcomes of nutrition education (U.S. General Accounting Office, 2004).

<sup>110</sup> Research published prior to 1995 was eliminated from the study to better examine the program as it currently operates.

and poor-quality data, and concluded that the research provided few, if any, insights into the effectiveness of specific WIC nutrition services.

Since the GAO assessment, several studies have examined the effect of WIC's nutrition education. FNS sponsored a demonstration study of the effectiveness of innovative approaches to nutrition education on prenatal WIC participants. The study incorporated two approaches: a computerized touch-screen video for individual nutrition education and a facilitated group intervention (Randall et al., 2001b). Results showed no increase in nutrition knowledge from the interventions. The study noted, however, that the assessment tool used in the study measured knowledge only, may or may not have affected behavior, and would not detect knowledge in areas not covered by the test.<sup>111</sup>

A more recent ERS-sponsored study found that nutrition education intervention had minimal impact on WIC participants' food purchasing behavior. Bell and Gleason (2007) examined whether WIC clients in Washington State changed their food purchasing behavior after receiving nutrition education encouraging the purchase of 1-percent and skim milk, as well as low-fat cheese, in order to prevent and reduce obesity. Data were collected on food purchases both before and after the nutrition education intervention, and researchers found no significant change in purchasing patterns among the study participants. Focus group participants explained that taste preference, pressure from family members, and historical purchasing patterns influenced their choice of milk or cheese more than WIC nutrition education. The results point out the difficulty of changing food consumption behavior.

The lack of research that demonstrates positive effects from WIC's nutrition education services may be, at least in part, the result of low exposure rates of participants to WIC's nutrition education. An FNS-funded study of the nutrition education services offered in six local WIC agencies in the mid-1990s found that large percentages of women failed to attend nutrition education sessions (Fox et al., 1998).<sup>112</sup> A GAO study of six local WIC agencies found that individual nutrition education sessions ranged from an average of only 4 to 17 minutes (U.S. General Accounting Office, 2001b).<sup>113</sup> As Rossi (1998) points out, 15 minutes for nutrition education is "certainly inadequate for all but superficial instruction."

### ***Enhanced Nutrition Education in WIC***

While recognizing the limited effectiveness of current nutrition education services, Besharov and Germanis (2001) contend that WIC agencies should be allowed greater programmatic flexibility to try new, innovative approaches to make WIC more effective, including enhanced nutrition education for some families and requiring WIC participants to attend nutrition education classes.<sup>114</sup> Many of the program enhancements, however, would require increased funding for both services and evaluations. An increase in costs would be problematic since nutrition education is supported by NSA funds that are currently held constant over time (except for inflation adjustments). The NSA grant in FY 2008 was \$15.71 per participant per month and, in addition to nutrition education, also funded breastfeeding support and

<sup>111</sup> FNS also funded a nutrition education demonstration study aimed at WIC's child participants. The study consisted of a preschool lesson that focused on the Food Guide Pyramid, variety in the diet, and making healthy food choices for 3- and 4-year-old children (Randall et al., 2001a). Results of the study found that children who received the preschool lesson scored significantly higher on the nutrition knowledge test than children not exposed to the preschool lesson. Although the study's findings appear to indicate that nutrition education for young children in WIC settings has limitations, the researchers concluded that providing nutrition education directly to 3- and 4-year old WIC participants is feasible and can increase nutrition knowledge.

<sup>112</sup> For example, the percentage of women in each site who received two contacts during the prenatal period ranged from a low of 24 percent to a high of 92 percent. Among postpartum women, the maximum percentage for receipt of two nutrition education contacts ranged from 5 to 59 percent.

<sup>113</sup> An FNS-funded study estimated that nutrition education seminars in 1988 averaged 15 minutes (Williams et al., 1990).

<sup>114</sup> Possible program enhancements cited by Besharov and Germanis include additional or enhanced nutrition education services to families with obese children or parents with a drug- or alcohol-abuse problem and supplementing nutrition education classes with individual counseling sessions.

promotion, health care referrals, and administrative tasks, such as outreach, eligibility determination, voucher issuance, and vendor management. Without increases in the per person NSA grant, higher nutrition education costs would necessitate cutbacks in other services funded by the NSA grants.

## WIC and Childhood Obesity

WIC was established in the early 1970s to combat the malnutrition and hunger facing many low-income Americans. Since then, however, the major nutrition problems facing Americans have shifted from underconsumption to overconsumption of calories, leading to an increasing prevalence of obesity and overweight in children. Overweight children are more likely to experience health problems during their youth and also tend to become obese adults. Obesity in adulthood is a known risk factor for a number of chronic diseases, including heart disease, diabetes, stroke, and some forms of cancer. Between 1988-94 and 2003-04, the prevalence of overweight among children ages 2-5 increased from 7.2 percent to 13.9 percent (Centers for Disease Control and Prevention, 2008).<sup>115</sup> As the prevalence of overweight among children increases, questions have been raised as to whether food and nutrition assistance programs, such as WIC, contribute to childhood overweight by providing too much food and encouraging overeating.<sup>116</sup> Understanding the impact of WIC on children's weight status is especially important since, at any point in time, half of all infants and a quarter of all children ages 1-4 in this country participate in WIC.

### *Previous Research*

Research has shown that the proportion of overweight or obese children participating in the WIC program is growing. An FNS-funded study (based on data from 1992, 1994, 1996, and 1998) of overweight among children participating in WIC found that overweight prevalence increased 20 percent over the period, reaching 13.2 percent in 1998 (Cole, 2001). For boys, overweight prevalence increased from 11.6 to 13.9 percent; for girls, overweight prevalence increased from 10.3 to 12.4 percent.

The prevalence of overweight, however, has also increased among non-WIC children. Evidence shows that children who receive WIC have weight similar to eligible nonparticipants, suggesting that the increase in overweight among WIC children is a reflection of the increase in overweight among the general population of children. One ERS study using 1988-94 data compared WIC children ages 1-4 with income-eligible nonparticipants and higher income children and found no difference between the three groups in the prevalence of risk for being overweight (Lin, 2005).<sup>117</sup> There was also no difference between WIC children and income-eligible children in the prevalence of overweight. WIC children, however, were more likely to be overweight than higher income children. A more recent ERS study using data from two periods (1988-94 and 1999-2002) also suggests that there is little evidence that WIC participation increases the prevalence of overweight in children (Ver Ploeg et al., 2007). The study found that WIC children had BMI and probabilities for overweight similar to those of eligible nonparticipants. This was true for both boys and girls and for both survey periods. Furthermore, the weight status of WIC participants was similar to that of higher income

<sup>115</sup> Children with body mass index (BMI) values at or above the 95th percentile of the sex-specific BMI growth charts were categorized as overweight.

<sup>116</sup> For example, see Besharov (2002).

<sup>117</sup> A child with weight-for-height at or above the 85th percentile and less than the 95th percentile was classified as at risk of being overweight, and a child with weight-for-height at or above the 95th percentile was classified as overweight.

children with one exception: In 1999-2002, higher income boys were less likely to be at risk of overweight and have lower BMI than boys participating in WIC.

Another ERS study found no evidence that participation in WIC contributes to increased caloric intake among low-income children. Oliveira and Chandran (2005) examined the consumption patterns of WIC children with those of three different groups: Eligible nonparticipating children living in non-WIC households, eligible nonparticipating children living in WIC households (i.e., some other household member participated in WIC), and children living in high-income households that made them ineligible for WIC. Participation in WIC was associated with a significant increase in calories consumed from all WIC-allowed foods combined (i.e., low-sugar cereal, 100 percent fruit and/or vegetable juice, eggs, milk, cheese, peanut butter, and dried peas/beans). WIC participants, however, consumed significantly fewer calories from non-WIC foods than the two groups of eligible nonparticipants. Although WIC participants consumed more total calories than children not eligible because their household income was too high, there was no evidence that participation in WIC contributed to increased caloric consumption among children eligible to participate. These results suggest that WIC foods replace non-WIC foods in the diets of children participating in WIC rather than add to their overall food consumption.

### ***Revisions to the WIC Food Packages May Help Reduce the Prevalence of Obesity***

Although previous research has not linked WIC participation to overweight and obesity, the high prevalence of overweight and obesity among the WIC population was one reason the IOM Committee to Review the WIC Food Packages recommended changes in the WIC food packages that promote healthy body weight for WIC participants (Institute of Medicine, 2005). Because it is difficult to achieve long-term weight loss, prevention of obesity is critical, and prevention efforts need to begin at an early age. The WIC program provides a natural entry point for early intervention because it reaches a large number of the Nation's infants and children. Furthermore, WIC targets overweight individuals for participation in the program. Overweight is one of the anthropometric nutritional risk criteria used for determining program eligibility. For a given participant category (i.e., infant, child, pregnant women, etc.), the highest priority is given to people demonstrating medically based nutritional risks, including anthropometric risks such as overweight (see table 4).<sup>118</sup>

Among the revisions to the WIC food packages, changes that may have a positive effect on preventing/reducing overweight among participants include:

- The addition of cash-value vouchers for fruits and vegetables.
- The elimination of juice from the infant food packages and reductions in the quantities of juice for children and women.
- Reductions in the quantities of milk and cheese for children and women.

<sup>118</sup> In 2001, FNS added a new nutritional risk criteria for infants and children—at risk of becoming overweight—to the allowable criteria that may be used to establish WIC program eligibility (USDA, 2001). The new criteria, based on expert recommendations, classify children 24 months old and over with weight-for-height at or above the 85th percentile as being at risk for becoming overweight. The new criteria also include the existence of one or both obese parents as an allowable contributing factor to the overall risk of a child becoming overweight or obese in later years. This factor was based on scientific evidence suggesting that the presence of obesity in a parent greatly increases the risk of overweight in preschoolers (Whitaker, 2004).



- Reductions in the quantities of eggs for children and women.
- Authorization of only milk with 2 percent or lower fat content for women and children age 2 and older.
- The addition of whole-wheat or whole-grain products for children and pregnant and breastfeeding women, allowing substitutions of other whole-grain foods for bread, and requiring that at least half of WIC cereals be whole grain.
- A delay in the introduction of complementary foods to infants by 2 months (from child's 4th month to their 6th month).
- Additional incentives to support long-term breastfeeding.

WIC State agencies are required to implement the new food package provisions no later than October 1, 2009.

## WIC and Breastfeeding Rates

Breastfeeding is widely acknowledged to be the best feeding method for most infants. Breastfeeding provides a range of benefits for infants' health, growth, immunity, and development and has also been shown to improve maternal health (U.S. Department of Health and Human Services, 2000). Breastfeeding also provides significant economic benefits, reducing health care costs and other costs.<sup>119</sup> The American Academy of Pediatrics (AAP) recommends that mothers exclusively breastfeed their infants for the first 6 months of life, with continuation of breastfeeding through 12 months and beyond as other foods are introduced (American Academy of Pediatrics, 2005). Although WIC promotes breastfeeding to all its pregnant women (unless medically contraindicated), low breastfeeding rates among WIC participants have raised questions about WIC's effects on breastfeeding.

### *WIC Participation Is Associated With Lower Breastfeeding Rates*

Historically, both breastfeeding initiation rates (as measured by breastfeeding in the hospital) and breastfeeding rates at 6 months postpartum have been lower among WIC women than among non-WIC women (fig. 21).<sup>120</sup> In 2003, 76.1 percent of non-WIC women initiated breastfeeding compared with only 54 percent of WIC women (Ryan and Zhou, 2006).<sup>121</sup> The disparity in breastfeeding rates by WIC status remains pronounced at 6 months of age, with non-WIC women still more likely to breastfeed than WIC women (42.7 percent compared with 21 percent). Breastfeeding rates, both in-hospital and at 6 months, were significantly higher for non-WIC women across a variety of demographic characteristics, including mother's race/ethnicity, age, education, employment status, and census region (Ryan and Zhou, 2006).

Lower breastfeeding rates among WIC women do not necessarily mean that WIC decreases the likelihood of breastfeeding. Studies of WIC are typically complicated by selection issues (i.e., mothers who choose to participate in WIC are likely to be different than mothers who do not participate). One might expect that the provision of free infant formula would make the

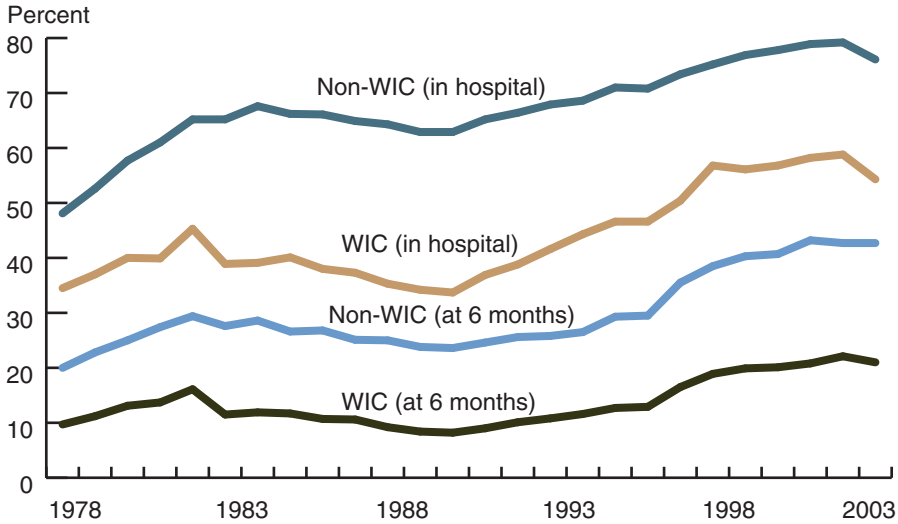
<sup>119</sup> An ERS study estimated that a minimum of \$3.6 billion would be saved if breastfeeding rates increased from 1996 levels (64 percent in-hospital, 29 percent at 6 months) to those recommended by the U.S. Surgeon General in 2000 (75 and 50 percent, respectively) (Weimer, 2001). Riordan (1997) estimated that not breastfeeding was associated with over \$1 billion of extra health care costs each year associated with three health conditions—otitis media, infant diarrhea, and respiratory syncytial virus. Ball and Wright (1999) estimated that these three conditions cost the managed care health system between \$331 and \$475 per never-breastfed infant during the first year of life.

<sup>120</sup> While breastfeeding rates, both in-hospital and at 6 months, have generally increased since 1990, they remain below the breastfeeding goals set in *Healthy People 2010*, the U.S. Government's statement of national health objectives designed to identify the most significant preventable threats to health and to establish national goals to reduce these threats (U.S. Department of Health and Human Services, 2000). *Healthy People 2010's* breastfeeding goals are 75 percent in the early postpartum period, 50 percent at 6 months, and 25 percent at 1 year.

<sup>121</sup> "Breastfeeding initiation" is not necessarily synonymous with "exclusively breastfeeding," even in the first days of an infant's life. For example, a study of breastfeeding in California hospitals found large differences in the intensity of breastfeeding even in the hospital. In some hospitals, large proportions of mothers reporting "any breastfeeding" were accompanied by very small proportions reporting "exclusive breastfeeding" (California WIC Association and UC Davis Human Lactation Center, 2007).

Figure 21

**Breastfeeding rates, by WIC status, 1978-2003**



Source: Ryan and Zhou, 2006.

program more attractive to mothers who choose not to breastfeed and who might not have breastfed even in the absence of the program. In addition, mothers in lower socioeconomic groups, including women who are Black, poor, and less educated—that is, women who are more likely to participate in WIC—have traditionally been less likely to breastfeed their children (Li and Grummer-Strawn, 2002). Breastfeeding may also be a challenge after the mother returns to work or school, especially for low-income women who tend to work in environments that do not allow for breaks to pump breastmilk and do not provide refrigerated storage facilities for the milk. A review of published research on the impact of WIC on breastfeeding found no solid evidence that WIC had an impact on initiation and/or duration of breastfeeding (Fox et al., 2004). Although most of the reviewed studies were completed prior to the expansion of breastfeeding promotion efforts in WIC, more recent studies also provide conflicting results.<sup>122</sup>

***WIC’s Breastfeeding Promotion Efforts***

Breastfeeding women have been a focus of WIC since the program’s inception. The legislation first authorizing WIC as a pilot program in 1972 (P.L. 92-433) specifically identified “lactating women,” pregnant women, and infants as the program’s target groups and excluded nonbreastfeeding postpartum women. The 1975 legislation that established WIC as a permanent program (P.L. 94-105) made breastfeeding women eligible to participate up to 1 year after birth. The legislation also extended categorical eligibility to nonbreastfeeding postpartum women, but only up to 6 months after birth.

Beginning in the late 1980s, WIC instituted a number of changes aimed at increasing breastfeeding rates among participants (USDA, 2008a). For example, in 1989, the Child Nutrition and WIC Reauthorization Act earmarked \$8 million per year to promote breastfeeding, authorized the

<sup>122</sup> For, example, Chatterji and Brooks-Gunn (2004) found that WIC participation was associated with small increases in the probability of initiating breastfeeding, while Bitler and Currie (2005) found that WIC participation was associated with decreased likelihood of breastfeeding. Jackowitz et al. (2007) found that WIC participation was associated with decreased likelihood of exclusive breastfeeding.

use of NSA funds to purchase breastfeeding aids, such as breast pumps, and required WIC State agencies to designate a breastfeeding coordinator to provide training on breastfeeding promotion and support to local agency staff responsible for breastfeeding. In 1992, an enhanced WIC food package was established for women who exclusively breastfeed their infants. In 1994, the method for determining the amount of funds for WIC breastfeeding promotion and support was revised, and WIC State agencies were required to spend \$21 per year (adjusted annually for inflation) for each pregnant and breastfeeding woman. In 1998, the William F. Goodling Child Nutrition Reauthorization Act (P.L. 105-336) authorized the use of food funds for the purchase or rental of breast pumps for participants.

Despite these efforts, disparities in breastfeeding rates between WIC and non-WIC women still exist. In fact, the gap in breastfeeding rates at 6 months by WIC status has increased in recent years (fig. 21). Some have questioned whether WIC's breastfeeding promotion and support efforts are sufficient. Ryan and Zhou (2006) estimated that, in 2005, only \$34 million, or less than 1 percent of WIC's total budget, excluding rebates, was designated for initiatives to increase breastfeeding among WIC women. Lawrence (2006) claims this amount is too small to be effective. Increasing breastfeeding promotion and support activities, however, may present a challenge to the WIC program, given proposals to freeze funding levels for NSA, which funds breastfeeding promotion (see the section on "Funding for Nutrition Services and Administration (NSA)," p. 39).

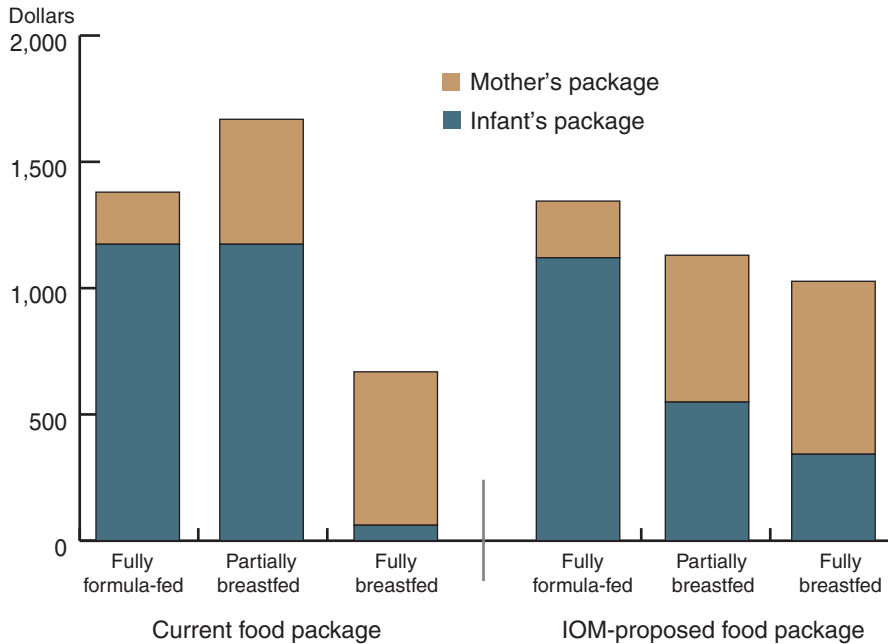
### ***Changes to the WIC Food Packages May Increase Breastfeeding Incentives***

The lower breastfeeding rates among WIC women have led some to suggest that providing free infant formula to WIC infants discourages breastfeeding. Rossi (1998) states that WIC may be providing "a perverse incentive favoring bottle feeding." Although the *old* food package for breastfeeding women offers the largest quantity of a greater selection of foods, the Institute of Medicine's review of the WIC food packages (2005) estimated that the average value for *1 year of program* benefits for fully formula-feeding infant/mother pairs (\$1,380) and for partially breastfeeding infant/mother pairs (\$1,668) is more than twice the value of program benefits for those who breastfeed and whose infants do not receive infant formula from the WIC program (\$668) (fig. 22).

The 2007 revisions to the WIC food packages for infants and all postpartum women were designed to strengthen WIC's breastfeeding promotion efforts and provide additional incentives for mothers to initiate and continue to breastfeed. A three-pronged approach was used (72 *Federal Register* 68965). The revised food packages address the fully breastfeeding woman's higher need for calories, vitamins, and minerals by providing greater quantities of a larger selection of foods. Similarly, the package for fully breastfed older infants is the only one to include baby food meats to meet the infant's need for supplemental sources of iron and zinc (Institute of Medicine, 2005). The revisions attempt to minimize early supplementation with infant formula, which can interfere with the establishment or continuation of breastfeeding. The amount of milk a breastfeeding woman produces depends

Figure 22

**Estimated annual market value (pre-rebate) of current and IOM-proposed WIC food packages for infant/mother pairs, 2002**



IOM=Institute of Medicine.

Note: The costs for partially and fully breastfed assumed that mothers breastfed for 12 months

Source: Economic Research Service calculations based on Institute of Medicine (2005) data.

directly on how often and how long she nurses. Providing supplemental formula to a new breastfeeding mother may interfere with her milk production and success at continued breastfeeding. Thus, the proposed rule initially recommended only two infant feeding options for the infant's first month—either full breastfeeding or full formula-feeding. Concerns were raised, however, that a mother who feels less confident about her ability to breastfeed may choose to either categorize her infant as fully formula fed, thus receiving more formula than necessary for the breastfeeding infant and further compromising successful breastfeeding, or not breastfeed at all. The revised food packages authorize three infant feeding options in the first month after birth:

- Fully formula feeding.
- Fully breastfeeding (with no supplemental formula).
- Partial breastfeeding (a State option), where an infant may receive the equivalent of not more than 104 fluid ounces of reconstituted infant formula. This allows WIC State agencies the option of issuing one can of powder infant formula to the mother upon request.

The revised food packages increase the market value of the food packages for the fully breastfeeding infant/mother pair relative to the fully formula-feeding infant/mother pair, with the objective of increasing the mother's incentive to breastfeed. There is some evidence that attractive food packages for fully breastfeeding mother/infant pairs might increase the mother's incentive to breastfeed (Institute of Medicine, 2005). Under the old food

package, the market value of the food packages is nearly twice as large for the formula-feeding infant/mother pair than for the fully breastfeeding infant/mother pair.<sup>123</sup> Under the IOM's proposed food packages (which differ somewhat from the revised food packages), the difference in market value between the formula-feeding and the fully breastfeeding infant/mother packages becomes smaller.

Using 2002 prices, the IOM estimated that the average annual costs to WIC of food benefits for the fully breastfeeding infant/mother pair increases from \$668 in the *old* food package to \$1,027 in the *proposed* food package (fig. 23).<sup>124</sup> This is about 75 percent of the value of the food package for the fully formula-fed infant/mother pair (which declined slightly in monetary value from \$1,380 to \$1,345).

The revised food packages affect partially breastfed infant/mother pairs the most.<sup>125</sup> Whereas partially breastfed infants may currently receive up to the full amount of infant formula as fully formula-feeding infants, under the revised food package, they would receive only about half the infant formula. Although the objective is to encourage mothers to increase both duration and intensity of partial breastfeeding, there are concerns that some women may choose, instead, to breastfeed even less—or not at all—to qualify for the full amount of infant formula in the fully formula-feeding package.

There is a large degree of interest in how these package changes will affect a mother's breastfeeding decisions and practices. FNS is requesting approval

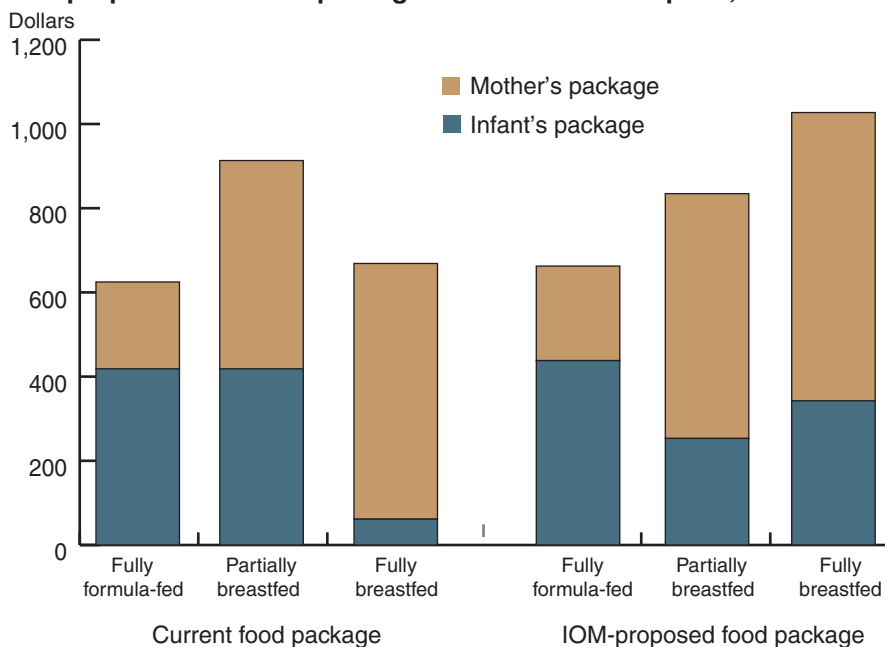
<sup>123</sup> Because a fully breastfed infant receives no WIC foods during its first few months, it is important to look at the infant/mother pair.

<sup>124</sup> The IOM-proposed food packages differ only very slightly from the revised food packages; mostly the proposed food package allowed yogurt in the women's food packages and did not allow for any infant formula for partially breastfed infants during the first month of life. All cost estimates are based on breastfeeding for 12 months.

<sup>125</sup> As already mentioned, there are very few differences between the proposed and revised food packages, and they are not likely to affect these estimates by much.

Figure 23

**Estimated annual cost to WIC (post-rebate) of the current and IOM-proposed WIC food packages for infant/mother pairs, FY 2002**



IOM=Institute of Medicine.

Note: The costs for partially and fully breastfed assumed that mothers breastfed for 12 months

Source: Economic Research Service calculations based on Institute of Medicine (2005) data.

from the Office of Management and Budget to collect information needed to evaluate the impact of the interim final rule on food package choices and breastfeeding outcomes for postpartum women who participate in WIC (73 *Federal Register* 34702-34703).

### ***Breastfeeding Could Increase WIC Costs***

While breastfeeding is cost effective from both the individual's and society's perspective, increasing WIC participants' breastfeeding rates could raise program costs, depending on the duration and intensity of breastfeeding. Increased breastfeeding rates could affect the level of infant formula rebates, which considerably lower the cost of buying infant formula. Using 2002 prices, the IOM estimated that the market value of the *proposed* food package was about 25 percent higher for the fully formula-feeding infant/mother pair than for the fully breastfeeding infant/mother pair (\$1,345 compared with \$1,027) if infants breastfeed for 12 months. After rebates, the cost to WIC of offering the fully formula-feeding food packages is about half (\$663) (fig. 23). Rebates have no effect on WIC's costs for offering the fully breastfeeding package, which would still cost the program \$1,027 for a year of benefits. Thus, after rebates, each breastfeeding infant/mother pair costs the program \$364 more per year than a fully formula-feeding infant/mother pair. Similarly, after rebates, each partially breastfeeding infant/mother pair would cost the program \$173 more per year than a fully formula-feeding infant/mother pair.

On the other hand, if mothers breastfeed for only 6 months (a more likely scenario, considering that only about 40 percent of all women in the United States still breastfeed at 6 months), the program would save approximately \$66 per fully breastfeeding infant/mother pair and \$48 per partially breastfeeding infant/mother pair compared with a fully formula-feeding infant/mother pair under the proposed food packages.<sup>126</sup> Given the similarities between the proposed and revised food packages, the cost estimates presented here are not likely to be very different for the revised food packages. Thus, the extent to which the revised food packages increase the prevalence and duration of breastfeeding among WIC mothers could have a significant impact on program costs.

<sup>126</sup> In 2003, 21 percent of WIC women and 43 percent on non-WIC women breastfed at 6 months (fig. 21).