

The Positive Effects of the Revised Milk and Cheese Allowances in the Special Supplemental Nutrition Program for Women, Infants, and Children

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ABSTRACT

In 2009, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) implemented revisions to the WIC food packages. Milk and cheese allowances were reduced, and whole milk was disallowed for participants older than 23 months. Using a pre-post research design and scanner data from a New England supermarket chain on purchases of WIC households, this article assesses how the new WIC packages affected milk and cheese purchases and saturated fat intake among WIC households in Connecticut and Massachusetts. Milk and cheese volume purchased by 515 WIC households in Connecticut was compared before and after the WIC revisions (2009–2010) using generalized estimating equation models. Analysis for Massachusetts was descriptive. After implementation of the new WIC packages in Connecticut, whole-milk share declined from about 60% to 25% in WIC milk purchases, but remained flat at about 50% for purchases with non-WIC funds. Total milk volume fell by 14.2% ($P < 0.001$), whole milk by half ($P < 0.001$), and WIC-eligible cheese by 37.2% ($P < 0.001$). Restrictions on whole milk shifted WIC purchases to reduced-fat milk in Connecticut and low-fat milk in Massachusetts, where reduced-fat milk is not permitted by WIC. The amounts of saturated fat from purchased milk and cheese declined by 85 g/month per WIC household in Connecticut and 107 g/month in Massachusetts. The 2009 WIC revisions led to a substantial decrease in purchases of whole milk and cheese among WIC families in New England. The related reduction in saturated fat intake could have important public health implications.

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THE SPECIAL SUPPLEMENTAL NUTRITION PROGRAM for Women, Infants, and Children (WIC) serves approximately half of the infants born in the United States, 25% of children age 5 years and younger, 29% of pregnant women, and 26% of postpartum women.¹ Participants receive a prescriptive set of supplemental nutrient-dense foods in the WIC food packages (eg, milk, infant formula, cereal), health care referrals, and nutrition education. Because of the program's broad and targeted reach to low-income women, infants, and young children, WIC has considerable potential for early intervention to establish healthy eating habits in vulnerable populations.

In 2005, the Institute of Medicine recommended cost-neutral changes to the WIC food packages to align them with the 2005 Dietary Guidelines for Americans² and infant feeding practice guidelines of the American Academy of Pediatrics. Implemented across all states by October 2009, the revisions promoted the establishment of long-term breastfeeding; increased consumption of fruits, vegetables, and whole grains; and reduced intake of saturated fat, cholesterol, and sugar.³ The main changes included the addition of whole-grain products and cash-value vouchers for fruits and

vegetables, reduced milk, cheese, and juice allowances, and restrictions on the fat content of milk.

The 2010 Dietary Guidelines for Americans⁴ recommend that children between the ages of 2 and 5 years consume 2 to 2½ cups of milk daily; a portion of this can be consumed as other dairy products or calcium-fortified soy products. In the United States, children 3 years and younger consume recommended amounts of milk, and children 4 years and older come in under recommendations.⁵ During the past several decades, children's milk consumption has declined and consumption of sugar-sweetened beverages has increased.⁶ Inadequate milk consumption in childhood is associated with increased risk for bone fracture later in life.⁷ Data on the relationship between milk intake and body mass index are mixed; some studies of children have shown that greater dairy intake is associated with lower body mass index,⁸ others found that the highest levels of milk intake are associated with higher body mass index,⁹ and some identified no effect.¹⁰

Although most efforts are focused on the risks associated with inadequate dairy and calcium intake, there are also risks in overconsuming milk, especially for young children. Children who drink large amounts of milk are either consuming

Independent Variables

The key predictor was a binary variable indicating pre- and post-implementation periods of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) food-package revisions: January to September 2009 and January to September 2010. A set of monthly household-level variables included indicators for household's Supplemental Nutrition Assistance Program (SNAP) participation and receipt of cash assistance. Another indicator was used to distinguish families with infants and babies younger than 2 years of age, who have different milk needs than older WIC-participating children. These households were identified based on their purchases of infant formula, baby foods, or baby products. A continuous variable of household total monthly expenditure on groceries and number of transaction per month were included to account for household-level differences in shopping patterns. Finally, a set of store-level variables, listed in Table 1, was included to capture differences in the socioeconomic composition of the supermarket areas, which can reflect neighborhood differences in prices, product selection and advertising, as well as serve as proxies for unobserved household-level sociodemographic characteristics. Each store was linked to a Census tract where it was located, with the Census-level 2006-2010 American Community Survey data²⁰ extracted for each tract. The average of Census-tract measures was calculated for households shopping in multiple stores.

Model

Given the nonnegative and positively skewed outcome variables, regression modeling was based on generalized linear models from the Poisson family with a logarithmic link function.¹⁹ The models were estimated using generalized estimating equations (GEE) to account for repeated observations within households; an exchangeable working correlation and robust standard errors were used.²¹ Each outcome was examined in two models. Using a binary indicator for the implementation period, the first model estimated the adjusted mean difference between the two periods, controlling for a number of covariates. The following model was used:

$$E[Y_{it}|X_i, X_{it}] = \exp(\beta_0 + \beta_1 * \text{PERIOD}_{it} + \beta_2 * \text{INFANT}_{it} + \beta_3 * \text{SNAP}_{it} + \beta_4 * \text{EBT}_{it} + \beta_5 * \text{TOTEXP}_{it} + \beta_6 * \text{NTRANS}_{it} + \beta_7 * T_{it} + \beta_8 * S_{it}) \quad (1)$$

where PERIOD_{it} is an implementation indicator (0 for pre- and 1 for postimplementation); INFANT_{it} indicates a household i that purchased infant or baby-related products at time t , EBT_{it} is receipt of cash assistance by household i at time t , TOTEXP_{it} is total grocery expenditure for household i at time t , and NTRANS_{it} measures the number of transactions at time t . Finally, T_{it} is a set of eight binary variables indicating the month of purchase (January is a reference) and S_{it} denotes a vector of nine store-level sociodemographic covariates.

All analyses were completed in Stata 11.2 (2009, Stata Corp).

Figure 1. Estimation methods used in a study of the effects of revised milk and cheese allowances in the Special Supplemental Nutrition Program for Women, Infants, and Children.

excess calories or displacing other necessary nutrients. If milk is not low-fat or nonfat, excessive intake of saturated fat can occur. Overconsumption of milk can lead to anemia¹¹ and constipation¹² in toddlers and preschoolers, and can be associated with some cancers in adulthood.^{13,14} Given the risks of both over- and underconsumption of milk and dairy products, the prudent course of action is to provide children with low-fat dairy options in amounts that correspond to dietary recommendations.

Before the WIC food-package revisions, the federal monthly maximum allowance of cow's milk to WIC-participating 1- to 4-year-old children was 768 oz (3.2 cups/day), although states could provide less milk and the average prescribed amount to children was 530 oz (2.2 cups/day).¹⁵ Milk provided by WIC covered virtually all dairy needs of young children. Cow's milk with any fat content was allowed. Participants also received cheese allowances (1 to 2 lb monthly, depending on the participant category) and could also substitute cheese for milk, with an average monthly prescribed amount of 1.6 to 1.8 lb. Combined, the WIC allowances of milk and cheese exceeded dietary recommendations for dairy consumption in very young children.⁴

Because children were likely consuming dairy products that were purchased or received outside of WIC, there was a risk of excess saturated fat consumption from dairy.

The new WIC packages provide 512 oz of milk monthly to 1- to 4-year-old children in all states. Whole milk (not less than 3.25% milk fat) is authorized only to children younger than 2 years, and women and older children receive milk with no more than 2% milk fat. States can further restrict it to low-fat or nonfat milk.¹⁶ Some states (eg, Florida, Massachusetts, Minnesota, New York) allowed only low-fat or nonfat milk for women and older children, but many states were less stringent and have also allowed reduced-fat milk (eg, California, Texas). For children, cheese is allowed by WIC as a milk substitute only.

The new WIC dairy allowances could affect milk and cheese purchases of WIC participants in multiple ways. WIC participants could choose to offset all or most of the reduction in WIC-provided milk and cheese with increased purchases using non-WIC funds. This would have no effect on nutrition outcomes. Another possibility is that WIC participants did not accept restrictions on whole-milk and reduced-fat milk consumption altogether, leading it to drop below

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