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**Impact of the New WIC Food Package on 100% Fruit Juice Consumption in One through
Four-Year-Old WIC Participating Children in Georgia**

By

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Master of Public Health

Epidemiology

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B.S., University of Kentucky, 2005

Faculty Thesis Advisor: Julie Gazmararian, PhD, MPH

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Abstract

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By Elizabeth Foard Tucker

Purpose. Two through five-year-olds' obesity rates doubled from the 1970s to the 2000s. Childhood obesity may be associated with excess 100% fruit juice intake. The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) food package was revised in 2009, including reduced juice subsidization for one through four-year-olds. This study aims to determine if the new food package resulted in decreased juice consumption among WIC participating children in Georgia compared to the old package.

Methods. Three surveys were conducted (baseline and one and four weeks after baseline) with 77 women receiving new WIC vouchers from two Atlanta WIC clinics during October 2009. Fifty women completed all three surveys, reporting the number of times in the past week she and her oldest WIC enrolled child consumed specific foods including juice. Child's juice intake was recorded as a continuous variable and recategorized as a dichotomous variable (≤ 1 time/day or > 1 time/day). The main exposure was the WIC food package in which the child was enrolled, old versus new package. Main outcomes were child's mean juice intake and mean difference from baseline in child's juice intake at one and four weeks.

Results. The baseline number of children drinking juice ≤ 1 time/day (36%) was not significantly different from that at one week (46%, $p=0.30$) or four weeks (38%, $p=1.00$). Child's baseline mean juice intake (12.9 times/week (Standard Deviation(SD)=8.1)) was not significantly different from that at one week (11.1 times/week (SD=6.8), $p=0.07$) or four weeks (11.9 times/week (SD=6.5), $p=0.36$). A covariate adjusted multivariate paired t-test demonstrated the difference from baseline in child's juice intake was not significant ($p=0.09$) at one week (mean difference=-1.8 times/week (SD=7.0)) or four weeks (mean difference=-1.0 times/week (SD=7.6)).

Conclusions. This study demonstrates the new WIC Food Package is not associated with decreased juice intake for enrolled children compared to the old package. Future studies could examine a larger sample size, more precise juice intake measurement, the impact of juice intake education, long term juice consumption changes, juice consumption importance for families, and WIC recipient Body Mass Index changes with Food Package changes.

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Introduction

Childhood Obesity

Childhood obesity is an increasing problem in the United States. Since the 1960s, the prevalence of childhood obesity has been steadily rising (1). During 1971-1974, it is estimated that 5% of children ages two to nineteen years were overweight (Body Mass Index (BMI) >95th percentile) (2). The percentage of children classified as overweight increased drastically over the next twenty-five years to almost 15% during 1999-2002 (2). For 2003-2006, 16.3% of children and adolescents were “overweight” (BMI >95th percentile) and 31.9% were “at risk for overweight” (BMI >85th percentile) as calculated using the 2000 Centers for Disease Control and Prevention (CDC) BMI-for-age growth charts, an accepted measure for obesity in children and adolescents according to the International Obesity Task Force (3-5). Obesity rates specifically among preschool children ages two through five years old more than doubled from 5.0% in 1976-1980 to 10.4% in 2007-2008 (2, 6, 7).

The documentation and diagnosis of infant obesity in children younger than 24 months is rare. The appropriateness of the diagnosis of infant obesity is still debated, but McCormick et al support the need for interventions even at the young age of six months (8). Leiner et al suggest the current lack of documentation of infant obesity may be the result of the 2007 recommendations of the Expert Committee on Assessment, Prevention, and Treatment of Child and Adolescent Overweight and Obesity, which advise yearly assessment of nutritional status in children starting at two years of age but provide no recommendations for children younger than 24 months (9, 10).

Not only is the percentage of overweight children increasing in the United States, but the rate of this increase is accelerating (11). The greatest acceleration has been documented among boys, African American children, Hispanic children and children living in southern states (7, 12).

In addition to the differences in obesity prevalence observed by race/ethnicity and geography, obesity rates differ by socioeconomic status (2). A significant trend has been observed

in the U.S. showing increasing rates of childhood obesity with decreasing household income (13, 14). In a sample of 46,707 U.S. children ages 10 to 17 years from all fifty states and the District of Columbia, children living below the poverty threshold had a significant 1.83 times higher odds of obesity compared with children living at or above 400% of the poverty threshold when adjusted for sociodemographic characteristics and behavioral factors that influence obesity (15). Therefore the rising rates of childhood obesity in the U.S. are particularly worrisome for children who live in low socioeconomic status such as those receiving services from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

Risks of Childhood Obesity

Childhood obesity is concerning because it is associated with numerous medical conditions that can develop during childhood, including increased blood pressure, a risk factor for cardiovascular disease normally seen in adults, particularly in overweight children with central body fat deposition (16, 17). Other conditions related to childhood obesity include type 2 diabetes, also a serious risk factor for cardiovascular disease, asthma, skeletal disorders like Blount disease (tibia vara) and decreased quality of life manifesting as poor psychosocial health, self esteem and physical functioning (18-21).

Childhood obesity also increases a child's risk of developing numerous diseases in adulthood because children who are overweight at any age are more likely to become overweight adults compared to non-overweight children (22, 23). The risk of adult obesity is higher for older obese children (> 10 years old for females and > 9 years old for males) compared with younger obese children (\leq 10 years old for females and \leq 9 years old for males). In a study of 555 white children ages one to 18 years, Guo et al found the association between childhood obesity and obesity at age 35 increases as a child gets older (22). In a study of 2,610 children ages two to 17 years, Freedman et al found similar results (23). This is particularly true for children who are overweight as a teenager (13 to 18 years) or at a young age (2 to 5 years) (22, 23). Overweight

children under the age of ten who have obese parents are also at especially increased risk of becoming overweight adults (24).

Causes of Increasing Rates of Childhood Obesity

No single cause can account for the trend of increasing rates of obesity among children (2). Many causes have been indicated including increased energy intake from high calorie food and drink, increased consumption of pre-packaged foods as a result of the increase in dual career families and single parent families, decreased energy expenditure due to decreased physical activity, and increased television watching (25-29). Another hypothesized contributing factor is the decreased consumption of fat seen across the United States with the movement toward “low fat” and “fat free” foods. Unfortunately the absence of fat in these foods is compensated for by an increased consumption of carbohydrates, particularly simple sugars. It has been proposed that diets with limited sweetened soda and non-citrus juices, but with high amounts of whole grains, vegetables and fruit could decrease the prevalence of childhood obesity (11). Consistent with this hypothesis, one specific factor that may contribute to the childhood obesity epidemic is the consumption of excess amounts (≥ 12 ounces/day) of 100% fruit juice (30).

Changing Trends in Beverage and Energy Intake

Since the 1970s, Americans of all ages have increased their intake of sweetened beverages and fruit juice while decreasing consumption of milk (31, 32). Along with sweetened beverages like soda, 100% fruit juice has actually replaced some milk and nutritious foods in the diets of young children (33). Furthermore, all Americans, on average, take in more energy through food and beverages than they expend through exercise (34). This could partially be explained because the increasing energy intake from beverages is not compensated by a decreased energy intake from foods. The calories added to a meal through beverages are often ignored, leading to an overall increase in energy intake with increased high calorie beverage consumption like fruit juice and soda (35).

Predictors of 100% Fruit Juice Consumption

At least ten factors are associated with a child's consumption of 100% fruit juice and could be considered as predictors for 100% fruit juice consumption in children. First, the amount of milk and food items a child consumes may serve as predictors for the amount of 100% fruit juice a child consumes. Fruit juice has been found to replace milk and nutritious foods in the diets of young children (33). Second, parental food and beverage consumption patterns are also important factors known to impact the food and beverage choices of children even at an early age because children's eating preferences are modeled after parents (36, 37). The age of the child is a third important predictor of juice consumption because children's juice consumption varies with age. Children tend to drink more juice as they grow older from infants to toddlers (33). Juice consumption then decreases with age from two to six years old (38). A fourth potential predictor of a child's juice consumption is parental age. Study results have differed when the age of parents in the study populations differed. Skinner et al found no association between child's juice consumption and obesity. In comparison, Dennison et al examined a younger parent cohort and did find an association between child's juice consumption and obesity (30, 39). Also, older mother's age has been associated with healthy feeding practices including fruit consumption (40). This points to a possible association between younger parental age and increased child's juice consumption.

A fifth potential predictor of juice consumption specifically for WIC recipients is the number of children in the house receiving WIC. If more than one child in a household are receiving WIC subsidized foods, then more juice may be available in the home, which may affect the amount of juice each child consumes. Similarly, a sixth potential predictor of a child's juice consumption is family size. Although WIC subsidized juice is provided for one specific child, other members of the family may also consume the juice provided by WIC, influencing the amount of juice available for the child to consume. A seventh potential predictor of juice

consumption for children is the child's location of care during the day. Children's diet varies by location. Differences have been specifically noted between children's diet at home compared with daycare. Ziegler et al found juice may be consumed in comparable amounts at home and in daycare for snacks, but juice may be provided more frequently at home for lunch compared with daycare (41). It is possible that alternatively more juice may be provided at some daycares compared to that provided at home.

An eighth predictor of a child's juice consumption is the mother's level of education. Mothers with a college education may be more likely to follow the American Academy of Pediatrics recommendations for child's juice consumption (40). A ninth predictor of a child's juice consumption is the enrollment of a household member in the other food assistance programs Supplemental Nutrition Assistance Program (SNAP) and Temporary Assistance for Needy Families (TANF). Juice may be obtained through other subsidy sources in addition to WIC, which may impact the child's juice consumption.

A tenth predictor of child's juice consumption is food insecurity, which exists when "the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in a socially acceptable way is limited or uncertain" (42). Mello et al examined the impact of food insecurity on the dietary behaviors of 1,874 adults. Food insecurity was measured by asking the Behavioral Risk Factors Surveillance System food insecurity question, "In the past 30 days, have you been concerned about having enough food for you or your family?" (43) Respondents who answered yes to this question were considered food insecure. Mello et al found a significant association between food insecurity and consumption of fruit with juice but found no association between food insecurity and fruit intake without juice. The authors concluded this finding indicated food insecure respondents consumed higher amounts of juice compared with food secure respondents. Because many of the food insecure population were participants of WIC, the authors hypothesized the increased juice intake of the food insecure group may have been the result of the subsidization of juice by WIC (44).

The Fruit Juice Controversy

Although clear trends have been observed in both the increase of daily intake of fruit juice and the increasing rates of childhood obesity, the association between fruit juice consumption and childhood obesity remains controversial. In a 1997 study of 168 low to middle class, mostly white (97%) children in upstate New York, Dennison et al found a statistically significant ($p < 0.01$) association between excess 100% fruit juice consumption (≥ 12 ounces per day) and obesity in children ages two and five years. In this study, 32% of children who consumed ≥ 12 ounces of juice per day had a BMI $\geq 90^{\text{th}}$ percentile. By comparison, only 9% of children who consumed < 12 ounces of juice per day had a BMI $\geq 90^{\text{th}}$ percentile (30).

Subsequent research has supported the significant association between fruit juice consumption and obesity, particularly in children who were at risk for overweight or already overweight at baseline. In a prospective study that followed one through four-year-old children receiving WIC in New York State for up to 48 months, Faith et al found increased 100% juice intake was significantly associated ($p < 0.01$) with excess gain of adiposity for all children in the study. For children in this study with a BMI at or above the 85^{th} percentile at baseline, each additional daily serving of 100% fruit juice was significantly associated ($p < 0.01$) with an increase in BMI of 0.009 Standard Deviation (SD) per month (45).

In contrast, other evidence does not support the need for limiting fruit juice consumption in children. Skinner et al found no significant association between excess intake of 100% fruit juice and children's growth parameters in 105 white children ages 24 to 36 months from low, middle and upper socioeconomic status households (39). Newby et al found no significant association between any type of beverage consumption including fruit juice and prospective changes in weight and BMI over a relatively short time interval of six to 12 months in WIC participating two to five-year-old children in North Dakota (46). In a study of 166 non-Hispanic white girls in Pennsylvania who were followed for 10 years from ages five to 15 years, Fiorito et

al found a statistically significant association between increased adiposity and sweetened beverage (sugar-sweetened or artificially sweetened fruit-flavored drinks, sports drinks and drinks containing <100% fruit juice, sodas, and sugar sweetened or artificially sweetened coffee or tea) intake but not 100% fruit juice intake in children (47).

Additional Risks of Fruit Juice

Beyond the concern for obesity, fruit juice has also been associated with increased risk of dental caries in children (48). Although juice can provide important nutrients such as potassium for children, 100% fruit juice is considered less beneficial than whole fruit because most fruit juices do not provide the fiber that whole fruits contain (49). Diets high in fiber have been associated with lower body weight and decreased risk of chronic diseases and cardiovascular disease (50). However, children are not consuming adequate amounts of fiber. One study found children ages 12 to 23 months and 24 to 47 months were only consuming approximately half the recommended daily amount of fiber (51).

National Recommendations for Fruit Juice Intake

In light of the conflicting evidence linking fruit juice with obesity and considering the risk of dental caries and lack of fiber content associated with fruit juice, current national recommendations have erred on the side of caution. For example, the American Heart Association (AHA) and the American Academy of Pediatrics (AAP) recommend providing whole fruit instead of juice, delaying consumption of 100% fruit juice until six months of age, and limiting 100% fruit juice to four to six ounces per day for children one to six years old, and eight to 12 ounces per day for children seven to 18 years old (52, 53). The United States Department of Health and Human Services (HHS) 2005 Dietary Guidelines for Americans recommends 100% fruit juice can be used as a substitution for fruit as a way to promote adequate intake of necessary

nutrients. However, to promote fiber intake, this substitution should be limited to one ½ cup (four ounce) serving of juice per day as a substitute for one ½ cup serving of fruit per day (49).

Development of New WIC Food Packages

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) was established in the 1970s to provide supplemental nutrition to low-income pregnant and breastfeeding women along with infants and children up to five years old who are at nutritional risk. WIC was designed to serve as a scientifically based supplementary nutrition program that could provide services along with general food assistance programs such as the Food Stamp Program or with other supplementary nutrition programs. WIC services include financial assistance for food purchasing along with nutrition education to enable recipients to practice informed, life-long nutritious eating habits that continue even after they leave the program (54).

Through WIC, seven different food packages are available for women, infants and children of varying ages and qualifications. Food Packages I and II provide supplemental nutrition for infants from birth through five months and from six through 11 months respectively. Food Package III provides supplemental nutrition for any participant with certain qualifying conditions such as an infant who needs formula instead of breast milk. Food Package IV provides supplemental nutrition for children one through four years old. Food Packages V, VI and VII provide supplemental nutrition for pregnant or breastfeeding mothers. Among the many foods and beverages offered by WIC, 100% fruit juice is one product that is subsidized for one through four year old children through the WIC Food Package IV (54).

Since the inception of WIC in the 1970s, the health risks of the WIC population have changed. The number of underweight and nutrient deficient children has decreased while obesity has increased (55). Another change since the 1970s is the development of new dietary recommendations published by the U.S. HHS 2005 Dietary Guidelines for Americans and the AAP (49, 52). The Institute of Medicine (IOM) used these guidelines to assess the

appropriateness of WIC food and beverage supplementation. In their assessment, the IOM found one through four-year-old WIC recipients consumed inadequate amounts of vitamin E, fiber, potassium, whole grains, dark green leafy vegetables, deep yellow vegetables and legumes. The IOM assessment also found one through four-year-old WIC recipients consumed excess amounts of saturated fat, added sugars, sodium, zinc, preformed vitamin A, food energy, and 100% fruit juice (55).

Ponza et al also found WIC participating children consume more fruit juice than non-WIC participating children (56). This is concerning since all preschool-aged children who drink 100% fruit juice, excluding children who never drink 100% fruit juice, have been found to drink an average of 10 ounces per day, double the four to six ounces per day recommended by the AAP for children one to six years old (32, 52). This suggests that the average child's consumption of 100% fruit juice is excessive, and WIC participating children are drinking even more juice than the average child.

The excess fruit juice consumed by WIC recipients is consistent with the amount of juice subsidized by the WIC program. Prior to October 1, 2009 when revisions to the WIC Food Packages were enacted nationwide, WIC provided infants ages zero to three months with zero fruit juice, infants ages four to 12 months with a maximum of 96 ounces of fruit juice per month (3.2 ounces per day), and children ages one through four years with a maximum of 288 ounces of fruit juice per month (9.5 ounces per day), far exceeding the national recommendations for fruit juice consumption as described above (52, 53, 57, 58). With WIC supporting fruit juice in excess of the recommended amount, it is not surprising that WIC participating children were drinking more fruit juice than advised (32).

Based on the current national recommendations, in 2006, the U.S. Department of Agriculture Food and Nutrition Service proposed the first comprehensive revisions to the WIC Food Packages since 1980 to align the packages with the 2005 HHS Dietary Guidelines for Americans and the AAP current infant feeding practice guidelines (49, 52). Among the revisions

to the WIC Food Packages, the Food and Nutrition Service proposed adding fruits and vegetables for children starting at six months of age, eliminating fruit juice from packages for infants 0 through 11.9 months of age, and decreasing the monthly allowance of 100% fruit juice for children ages one to 4.9 years to a maximum of 128 ounces per month (4.2 ounces per day) (54, 59). All state agencies were required to comply with the new WIC Food Packages Regulations by October 1, 2009 (60).

Since the new WIC Food Packages were enacted, to our knowledge no data has been published documenting the impact of the decreased fruit juice subsidy on fruit juice consumption among WIC participating children. Using data from the Emory WIC Study, this study aims to determine if the new WIC Food Package IV for children one through four years old, which offers a decreased monthly allowance of 100% fruit juice, results in decreased fruit juice consumption among one through four year old WIC participating children in Georgia compared to the old WIC Food Package IV, which offered a higher monthly allowance of 100% fruit juice.

Methods

The Emory WIC Study

The Emory WIC Study was conducted in two phases. Phase I focused on the impact of the WIC Farmers' Market Nutrition Program. This phase was designed to determine if fruit and vegetable consumption increased among WIC participants who received a one-time \$30 voucher for fresh fruits and vegetables from farmers' markets located at WIC clinics through the Farmers' Market Nutrition Program compared with WIC participants who received the standard WIC voucher package. Phase II of the Emory WIC Study focused on the impact of the new WIC food package on fruit and vegetable consumption for all WIC participants. This study utilized data from Phase II of the Emory WIC Study and was approved by the Emory University institutional review board.

Study Participant Selection

Study participants were selected from the Adamsville and Kirkwood WIC clinics in Atlanta, Georgia. From this point on, the interviewee will be referred to as the "mother," and "child" will refer to the mother's oldest child receiving WIC services. The "mother-child pair" will refer to both the mother and child together. During October and November 2009, after the new WIC food package was initiated, 77 mothers were selected to participate in the study. No men were selected because men are not eligible for WIC benefits. Trained interviewers approached mothers individually who were waiting in the clinic waiting room, explained the Emory WIC Study, and invited the mothers to participate. Mothers were eligible to participate who were visiting the WIC clinic to pick up new WIC vouchers, 18 years or older, not pregnant, not breast feeding, had a child older than 12 months and less than five years old receiving WIC services, and spoke English as the primary language at home.

Exclusions

One mother-child pair was excluded from all analyses because the child had a gastrostomy tube and therefore did not have a typical diet for a child of his age. One mother-child pair was considered an outlier since the reported juice consumption was greater than 35 times per week for all three surveys for this child. This mother-child pair was excluded from all analyses. Of the remaining 75 mother-child pairs, a total of 50 mothers completed all three surveys and were included in subsequent analyses.

Data Collection

Three separate interviews were conducted for each mother-child pair. All interviews were conducted by trained interviewers. After written consent was obtained, the baseline survey was conducted in person while the mother was waiting in the WIC clinic waiting room. Upon completing the baseline survey, each mother was asked for at least one reliable phone number by which she could be contacted and preferred times during which she could be contacted to complete the one-week and four-week follow-up surveys. Each mother was also asked for an email address by which she could be contacted in the event she could not be reached by phone for the follow-up interviews. The second interview was conducted over the phone one week after the baseline survey. The third interview was conducted over the phone four weeks after the baseline survey.

A \$5 Kroger gift card was given to each mother after completing the baseline survey. A \$10 Kroger gift card was mailed to each mother who completed the first and second interviews but could not be contacted to complete the third interview. A \$20 Kroger gift card was mailed to each participant who completed all three interviews.

For the second and third interviews, interviewers called every phone number provided for each mother, leaving voicemail messages with return phone numbers when possible. If a mother could not be reached on the first attempt, a minimum of two more attempts were made at varying

times of day and an email was sent with return contact information for mothers who provided an email address before a mother was considered lost to follow up.

Surveys

Of the three surveys used for the interviews described above, the baseline survey contained 48 questions regarding prior participation in the WIC Farmers' Market Program, mother's and child's demographic information, mother's and child's consumption of specific foods and beverages (61), nutrition knowledge, access to fruits and vegetables, motivation for eating fruits and vegetables, and family resources.

The one-week follow-up survey contained 29 questions including the same food and beverage consumption questions as the baseline survey (61). Additional questions were asked regarding foods purchased with the new WIC vouchers, WIC education received on the last WIC visit, and knowledge of WIC services.

The four-week follow-up survey contained 30 questions again including the same food and beverage consumption questions as the baseline and one-week follow-up surveys and the same questions as the baseline survey regarding nutrition knowledge and access to fruits and vegetables (61). Additional questions were asked in the four-week follow-up survey regarding the perceived benefits of WIC services.

Please see Appendix C to view all three surveys in their entirety.

Exposure Variable

The main exposure variable was the WIC Food Package in which the child was enrolled and was coded as a dichotomous variable as either the old or the new food package. The child was enrolled in the old WIC Food Package prior to October 1, 2009 for the baseline survey. The

child was enrolled in the new WIC Food Package after October 1, 2009 for the one-week and four-week follow-up surveys.

Outcome Variable

The main outcome variable was the child's mean 100% fruit juice intake and the mean difference from baseline in the child's 100% fruit juice intake at one and four weeks. Child's 100% fruit juice intake was measured by mother's report from all three surveys as number of times in the past seven days the child drank 100% fruit juice. Similar measures of food and beverage consumption have been used in other studies such as the Harvard Service Food Frequency Questionnaire validated for children one to five years of age by Blum et al 1999 and used with two- and three-year-old children by Welsh et al 2005 (62, 63). Like the Welsh et al study, the serving size was not defined in the measure of food and beverage consumption for this data set (63).

For this study, child's 100% fruit juice intake was also recategorized as a dichotomous variable as less than or equal to one time per day or more than one time per day. This categorization was chosen because the U.S. HHS 2005 Dietary Guidelines for Americans recommends limiting juice intake to one ½ cup serving per day (49).

Covariates

Data from twenty-two survey questions were considered for inclusion in the final analysis model based on associations observed between these variables and child's juice consumption in the literature (30, 33, 36-41, 43, 44). All other survey questions were not considered for inclusion in the final model because they were not relevant to the research question.

Data for thirteen of the covariates considered for inclusion in the final model were taken from the food and beverage consumption questions from the baseline, one-week and four-week

surveys. Like child's juice consumption, mother's and child's food and beverage consumption were considered continuous variables and reported as the number of times in the past seven days that the mother and the child each ate or drank each item. Food and beverage consumption considered as covariates were mother's consumption of 100% fruit juice and mother's and child's consumption of milk, whole grains, potatoes, carrots, salad, and vegetables excluding potatoes, carrots and salad.

Data for the remaining nine covariates considered were taken from the baseline survey demographic data. First, the child's age was measured in months and considered a continuous variable. Second, the mother's age was measured in years and considered a continuous variable. To ensure this variable was normally distributed, mother's age was categorized as 50 years for any mother 50-years-old or greater. Third, the number of children in the house receiving WIC was categorized by the number reported up to four children. To ensure this was a normally distributed variable, households with four or more children receiving WIC were categorized as having four children receiving WIC. Fourth, child's care during the day was categorized as (1) stays at home with family; (2) stays at the home of a friend or community member; (3) attends daycare or Head Start; (4) attends pre-Kindergarten or preschool; or (5) other.

Fifth, family size was calculated as the sum of the total number of adults and children living in the mother's home. Family size was categorized by the number reported up to seven people. To ensure this variable was normally distributed, families with seven people or more were categorized as seven people. Mother's education level was a sixth demographic covariate considered. For this study, mother's education level was categorized as (1) never attended school or kindergarten only; (2) grades one through eight (elementary); (3) grades nine through 11 (some high school); (4) grade 12 or GED (high school graduate); (5) one to three years of college (some college or technical school); (6) four years of college (college graduate); (7) master's degree; or (8) doctoral degree or post-doctoral degree. The seventh and eighth demographic covariates considered were enrollment of a household member in the other food assistance programs

Supplemental Nutrition Assistance Program (SNAP) and Temporary Assistance for Needy Families (TANF). Household enrollment in SNAP and TANF were each dichotomous variables categorized as yes or no. A ninth demographic covariate considered was whether or not the mother was concerned she would not have enough money for nutritious meals in the last twelve months. Mother's concern regarding money for nutritious meals was a dichotomous variable categorized as yes or no.

Statistical Analysis

The mean and standard deviation was calculated for all continuous variables. Frequency distributions were calculated for each categorical variable. All variables were tested for correlation with each other.

McNemar's exact test was chosen to compare child's juice intake as a dichotomous variable from the same population at two different points in time. This test was used to compare the number of children consuming juice ≤ 1 time per day at one and four weeks with baseline. If this number was greater at one or four weeks compared with baseline, then this could be considered a decrease in consumption of juice. In that case, more children would be consuming the recommended daily amount of fruit juice one or four weeks after starting the new WIC Food Package compared with baseline.

The Wilcoxon signed rank test was chosen to compare child's juice intake as a continuous variable from the same population at two different points in time. This test was used to compare child's mean juice intake at one and four weeks with baseline. This test was chosen because it does not require the assumption that the difference between the two variables of interest is normally distributed.

Both McNemar's exact test and the Wilcoxon signed rank test were used to determine if there was a significant change in 100% fruit juice intake after using the new WIC vouchers for one and four weeks separately. Because both these tests are designed to analyze paired data, each

comparison considered only the change between two points in time. These comparisons did not consider the change in juice consumption between all three points in time (baseline, one and four weeks) simultaneously because these tests are limited to comparing two data points at a time. Therefore, no conclusions can be drawn from these analyses regarding overall significant change in 100% fruit juice consumption.

A covariate-adjusted multivariate paired t-test was used to simultaneously compare the individual differences from baseline of child's juice intake at one and four weeks. This test was used to determine if there was an overall significant change in 100% fruit juice intake throughout the entire data collection period. To determine if each covariate should be included in the final analysis model, each potential covariate described above was individually tested for significant association with the main outcome variable, difference from baseline in child's 100% fruit juice intake at one and four weeks. This association was determined by including only the potential covariate and the main outcome variable in a multivariate paired t-test model. If the model was statistically significant with a p-value less than 0.05, then the covariate was considered to have a significant association with the main outcome variable. Significant covariates were then tested for correlation with each other. All non-correlated, significant covariates were included in the final multivariate paired t-test model.

All statistical analyses were performed using SAS 9.2 software (SAS Institute Inc., Cary, NC).

Results

Descriptive statistics

Table 1 indicates that mean child's age was 30.9 months (Standard Deviation {SD} = 11.3 months). Mean mother's age was 32.3 years (SD = 9.3 years). Of the 50 mothers, 96% self-identified as black race while 4% did not answer this question. The mean number of children in each household receiving WIC services was 1.5 children (SD = 0.7 children). The mean family size was 4.6 people (SD = 1.3 people). More than half (58%) of the children stayed at home with family, nearly one quarter (24%) attended daycare or Head Start, 4% stayed at the home of a friend or community member, and 14% attended pre-Kindergarten or preschool. Regarding mother's highest level of education, 12% of the mothers had completed some high school, 40% were high school graduates, 42% had completed some college, and 6% were college graduates. The majority of households (84%) had at least one household member enrolled in SNAP, while the majority of households (88%) did not have a household member enrolled in TANF. Almost one third (30%) of mothers were concerned they would not have enough money to eat nutritious meals in the last 12 months.

At baseline 36% of children consumed 100% fruit juice one time per day or less in accordance with the HHS 2005 Dietary Guidelines for Americans (Table 2). At one week, 46% of children consumed 100% fruit juice one time per day or less. At four weeks, 38% of children consumed 100% fruit juice one time per day or less (Table 2). The mean child's 100% fruit juice intake at baseline was 12.9 times per week (SD = 8.1 times per week) (Table 3). The mean of the differences in juice intake from baseline for all children indicated that juice intake decreased on average by 1.8 times per week from baseline to the one week follow up survey (Table 3). There continued to be a decrease at four weeks although less of a decrease. The mean of the differences in juice intake from baseline for all children indicated that juice intake decreased on average by 1.0 time per week from baseline to the four week follow up survey (Table 3).

McNemar's exact test indicated that the proportion of children drinking 100% fruit juice one time per day or less at baseline (36%) was not significantly different from the proportion of children drinking 100% fruit juice one time per day or less at one week (46%, $p = 0.30$) or four weeks (38%, $p = 1.00$). Appendix A displays the two by two tables from which the marginal frequencies were taken for McNemar's exact test.

The Wilcoxon signed rank test showed child's mean juice intake was not significantly different from baseline (12.9 times/week (standard deviation = 8.1)) at either one week (11.1 times/week (SD = 6.8), $p = 0.07$) or four weeks (11.9 times/week (SD = 6.5), $p = 0.36$).

Multivariate Analysis

Each variable, except for mother's self-identified race, included in Tables 1 and 3 was considered for inclusion in the final multivariate paired t-test analysis model. Mother's self-identified race was the only variable not considered for inclusion in the final analysis model because no variability was observed between responses.

Tables 1 and 3 show the p-values for each multivariate paired t-test model used to determine the association between each variable in the tables with the outcome variable, the difference from baseline in child's juice intake at one and four weeks. Significant p-values (p -value < 0.05) indicate the covariate was significantly associated with the outcome and was therefore included in the final multivariate paired t-test model. An example of the models used to determine the significance of potential covariates is displayed in Appendix B.

Four covariates were significantly associated with the outcome variable. Because no significant covariate was correlated with another significant covariate, all four were included in the final model. These four covariates were family size (p -value < 0.01), child's care during the day (p -value < 0.01), and difference from baseline in child's carrot intake (p -value = 0.03) and milk intake (p -value = 0.03). When adjusted for these four covariates, the multivariate paired t-test demonstrated the difference from baseline in child's juice intake was not significant ($p =$

0.09) at one week (mean difference = -1.8 times/week (SD = 7.0)) or four weeks (mean difference = -1.0 times/week (SD = 7.6)). The final covariate adjusted multivariate paired t-test model is shown in Table 4.

Discussion

Results from this study indicate there is not a significant association between the amount of 100% fruit juice provided by WIC and the amount of 100% fruit juice WIC participating children consume. These results may indicate that despite the efforts of WIC to provide a more appropriate amount of juice for its recipients, children who are not cared for at home during the day may continue to drink more juice than is appropriate since juice may be provided at daycare or other locations outside of the WIC provision. These results may also point to the need for increased or improved education for families regarding juice consumption to promote appropriate juice intake by WIC participating children. This education could be provided by the WIC clinics during the recommended WIC educational sessions or through written materials. In addition, this study may indicate the WIC Food Program needs to further decrease the amount of 100% fruit juice provided to its recipients before a significant decrease in consumption will be observed.

Strengths

There are at least four strengths of this study. First, the design of two follow-up periods at one and four weeks provided greater insight into the ongoing impact of the new WIC Food Package IV reduced fruit juice provision. A second strength is the categorization of the child's 100% fruit juice intake as a continuous and a dichotomous variable to reflect the different national guidelines. This ensures the results indicate how WIC recipients follow the national guidelines for juice consumption. These two forms of categorization also enabled analyses through three different strategies using McNemar's exact test, the Wilcoxon signed ranked test, and the multivariate paired t-test. Results for all three of these analyses were consistent with each other, reinforcing the validity of the results. Third, the comprehensive list of covariates considered for inclusion in the final analysis model ensured the final multivariate model was adjusted for the appropriate covariates. A final strength of this study is that this may be the first study to assess the impact of the WIC Food Package revisions on juice consumption.

Limitations

This study has at least five limitations. First, one-third of the original sample was lost during the follow-up period, which may contribute sample bias to these results, particularly considering the demographic differences between the analysis population and the population that was lost to follow up. The 25 mothers lost to follow up were younger (mean mother's age = 26.8 years (SD = 6.7 years)) compared with the analysis population (mean mother's age = 32.3 years (SD = 9.3 years)). The mothers lost to follow up were also less educated (20% completed some high school, 56% graduated high school, 20% completed some college) compared with the analysis population (12% completed some high school, 40% graduated high school, 42% completed some college). Because the children of younger, less educated mothers are at increased risk of consuming excess amounts of 100% fruit juice, it is possible the new WIC Food Package would result in a greater decrease in juice consumption among the population that was lost follow-up (30, 39, 40). Therefore, the loss of this population to follow-up may have biased the results toward the null, falsely diminishing the impact of the new WIC Food Package on child's juice consumption. It should be noted that retaining two-thirds of the sample population for analyses is a good retention rate for the WIC population.

A second limitation is the small sample size and short follow up time. It cannot be determined from this study how the revised WIC Program will impact 100% fruit juice consumption beyond four weeks. It is possible that a greater decrease would be observed with longer follow up as families adjust to the new WIC Food Packages. Alternatively, no significant change may be observed even with longer follow up if families consider juice a staple food item they are willing to purchase even without the WIC subsidy.

A third limitation of this study was that all data were collected by self report and parental report, which is prone to recall bias. Also, the validity of parental reporting of dietary intake of children may be prone to inaccuracy (64). A fourth limitation was that reported quantities of food

and beverage items were not measured to confirm the accuracy of interviewee report, and serving sizes were not defined, which may have produced data that were not representative of true consumption. However, the measures of food and beverage consumption chosen for this study have been previously used and validated for children (62, 63).

A fifth limitation is that diet may vary from day to day. By calculating an average amount per week, this study attempted to account for variance, but individual variations in diet may still not be fully represented in the data.

Future Directions

There are at least six avenues to pursue in future studies. First, future studies could focus efforts on strategies to retain the younger, less educated portion of the sample population because this was the portion of the population lost to follow up in this study. Second, future studies could more precisely quantify changes in juice intake by measuring food and beverage consumption in ounces rather than by number of times per day. Third, future studies could also examine changes in juice intake as a result of juice consumption education for mothers. Structured education sessions in WIC clinics could be provided as an intervention for one arm of participants compared to a second arm of participants who receive the current WIC clinic education sessions. Fourth, long term studies also need to be conducted to assess the impact of the revised WIC Food Package on fruit juice consumption over many months and years. Juice intake may decrease further as families adjust to the new WIC Food Packages. Fifth, future studies could also assess the degree of importance WIC participating families place on juice consumption. If families consider juice to be a product important enough to purchase with money beyond the WIC subsidy, then changing the amount of juice subsidized by WIC will likely have minimal impact on juice consumption. If this is the case, then this may further emphasize the need for education as an adjunct to decreasing the juice subsidy in order to effectively promote decreased juice consumption.

The future studies suggested above would further examine and promote decreases in fruit juice consumption among WIC participating children. Of course one of the ultimate goals of the WIC Food Package revisions is to decrease the prevalence of obesity in the WIC recipient population. With the many changes made to the WIC Food Packages in 2009 to promote healthier eating, it is possible that WIC participating children may experience a decrease in obesity even if fruit juice consumption does not decrease as a result of other changes to the WIC Food Packages. A sixth avenue to pursue for future studies is through prospective studies to determine if the new WIC Food Package will result in decreased adiposity, body mass index and obesity rates among WIC participating children.

Conclusions

The findings of this study provide information for WIC to assess the impact of the new WIC Food Package IV on 100% fruit juice consumption. Although these results imply that decreasing the WIC provision of 100% fruit juice to follow AAP recommendations may not have been successful in decreasing fruit juice consumption among WIC participating children in the Atlanta, Georgia area, it is still an important change. These results indicate that WIC may need to provide specific juice consumption education to promote adherence to the AAP recommendations. This study may also indicate that the efforts of WIC alone cannot decrease the amount of 100% fruit juice consumed by low-income children. For example, if excess juice consumption occurs in daycare settings, daycare employees may also need juice intake education to decrease juice consumption. Such an intervention may require collaboration between WIC and other agencies. Food subsidy programs such as WIC should continue to work toward providing healthier options in more appropriate quantities for their recipients along with educating recipient families about appropriate nutrition to enable low-income populations to make healthy food choices.

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Table 1. Child's and Mother's Demographic Characteristics for Emory WIC Study Participants Who Completed All Three Surveys (N = 50)

	Mean (SD ^a)	n	(%)	Association with difference from baseline in child's juice intake at 1 or 4 weeks (p-value ^b)
Child's Age (months)	30.9 (11.3)	50	(100%)	0.11
12 to 23		12	(24%)	
24 to 35		11	(22%)	
36 to 47		18	(36%)	
48 to 59		9	(18%)	
Mother's Age (years)	32.3 (9.3)	50	(100%)	0.26
18 to 19		1	(2%)	
20 to 24		11	(22%)	
25 to 29		14	(28%)	
30 to 34		6	(12%)	
35 to 39		6	(12%)	
40 to 44		5	(10%)	
45 to 49		2	(4%)	
50 or older		5	(10%)	
Mother's Self Identified Race	N/A ^c			
Black or African American		48	(96%)	
Missing		2	(4%)	
Number of Children in House Receiving WIC	1.5 (0.7)	50	(100%)	0.81
1		31	(62%)	
2		14	(28%)	
3		4	(8%)	
4 or more		1	(2%)	
Family Size	4.6 (1.3)	50	(100%)	<0.01
2		1	(2%)	
3		11	(22%)	
4		14	(28%)	
5		11	(22%)	
6		8	(16%)	
7 or more		5	(10%)	

Table 1. Continued from previous page

	Mean (SD ^a)	n	(%)	Association with difference from baseline in child's juice intake at 1 or 4 weeks (p-value ^b)
Child's Care During the Day				<0.01
Stays at home with family		29	(58%)	
Stays at the home of a friend or community member		2	(4%)	
Attends daycare or Head Start		12	(24%)	
Attends pre-K / school		7	(14%)	
Mother's Highest Level of Education				0.21
Grades 9 through 11 (some high school)		6	(12%)	
Grade 12 or GED (high school graduate)		20	(40%)	
College 1 to 3 years (some college or technical school)		21	(42%)	
College 4 years (college graduate)		3	(6%)	
Member of Household Enrolled in SNAP^c				0.08
No		8	(16%)	
Yes		42	(84%)	
Member of Household Enrolled in TANF^d				0.75
No		44	(88%)	
Yes		6	(12%)	
Mother concerned she would not have enough money for nutritious meals in last 12 months				0.14
No		35	(70%)	
Yes		15	(30%)	

^aSD = Standard Deviation

^bp-value based on multivariate paired t-test comparing difference from baseline in child's 100% fruit juice intake at 1 and 4 weeks adjusted for covariate indicated

^cSNAP = Supplemental Nutrition Assistance Program

^dTANF = Temporary Assistance for Needy Families

Table 2. Child's Dichotomous Juice Intake at Baseline, One Week and Four Weeks for Emory WIC Study Participants Who Completed All Three Surveys (N = 50)

	Baseline	1 Week	4 Week
	(n (%))	(n (%))	(n (%))
Number of children who consumed juice \leq 1 time per day	18 (36%)	23 (46%)	19 (38%)
Number of children who consumed juice $>$ 1 time per day	32 (64%)	27 (54%)	31 (62%)

Table 3. Child's and Mother's Food and Beverage Intake at Baseline, One Week and Four Weeks for Emory WIC Study Participants Who Completed All Three Surveys (N = 50)

	Baseline	1 Week	4 Weeks	Association with difference from baseline in child's juice intake at 1 and 4 weeks
	(Servings Per Week)	(Servings Per Week)	(Servings Per Week)	
	(Mean (SD^a))	(Mean (SD^a))	(Mean (SD^a))	(p-value^b)
Child's 100% Fruit Juice Intake	12.9 (8.1)	11.1 (6.8)	11.9 (6.5)	
Mean Difference from Baseline		-1.8 (7.0)	-1.0 (7.6)	
Child's Milk Intake	13.4 (7.9)	13.8 (7.5)	13.7 (8.5)	
Mean Difference from Baseline		0.4 (8.9)	0.3 (9.7)	0.03
Child's Fruit Intake	10.5 (8.7)	8.4 (6.9)	9.5 (6.4)	
Mean Difference from Baseline		-2.1 (7.5)	-1.0 (8.3)	0.30
Child's Salad Intake	1.7 (2.7)	1.7 (2.2)	1.5 (2.0)	
Mean Difference from Baseline		0.0 (2.7)	-0.1 (2.4)	0.06
Child's Potato Intake	1.9 (2.3)	2.0 (1.3)	1.9 (2.3)	
Mean Difference from Baseline		0.1 (2.4)	-0.0 (2.6)	0.06
Child's Carrot Intake	1.1 (1.6)	1.8 (2.5)	1.7 (2.9)	
Mean Difference from Baseline		0.6 (1.9)	0.5 (3.3)	0.03
Child's Vegetable Intake	7.2 (4.7)	6.7 (5.1)	7.7 (6.8)	
Mean Difference from Baseline		-0.5 (5.6)	0.5 (6.6)	0.05

Table 3. Continued from previous page

	Baseline	1 Week	4 Weeks	Association with difference from baseline in child's juice intake at 1 and 4 weeks
	(Servings Per Week)	(Servings Per Week)	(Servings Per Week)	
	(Mean (SD^a))	(Mean (SD^a))	(Mean (SD^a))	(p-value^b)
Mother's 100% Fruit Juice Intake	8.2 (6.9)	7.0 (8.3)	8.2 (7.4)	
Mean Difference from Baseline		1.2 (9.3)	0.0 (8.5)	0.07
Mother's Milk Intake	6.2 (7.2)	4.2 (3.9)	5.6 (5.8)	
Mean Difference from Baseline		-1.9 (7.0)	-0.5 (8.7)	0.08
Mother's Fruit Intake	7.6 (8.3)	7.2 (8.6)	7.9 (8.3)	
Mean Difference from Baseline		0.4 (9.9)	0.2 (8.7)	0.06
Mother's Salad Intake	2.7 (3.5)	2.5 (2.5)	2.9 (3.7)	
Mean Difference from Baseline		-0.2 (3.1)	0.2 (3.5)	0.06
Mother's Potato Intake	2.1 (5.0)	2.2 (2.3)	1.8 (2.5)	
Mean Difference from Baseline		0.1 (5.1)	-0.3 (5.1)	0.06
Mother's Carrot Intake	1.9 (4.2)	1.6 (2.9)	1.3 (2.3)	
Mean Difference from Baseline		-0.3 (3.0)	-0.6 (4.6)	0.07
Mother's Vegetable Intake	6.3 (5.9)	6.5 (6.1)	7.0 (5.5)	
Mean Difference from Baseline		0.2 (4.8)	0.7 (6.7)	0.06

^aSD = Standard Deviation

^bp-value based on multivariate paired t-test comparing difference from baseline in child's 100% fruit juice intake at 1 and 4 weeks adjusted for covariate indicated

Table 4. Final Covariate Adjusted Multivariate Paired T-Test Model Comparing Differences from Baseline of Child's Juice Intake at One and Four Weeks for Emory WIC Study Participants Who Completed All Three Surveys (N=50)

Model	Intercept p-value ^a
(Child's Juice Intake Difference ^b) = β_0^c + β_1^d (Family Size ^e) + β_2^f (Child's Care During the Day ^g) + β_3^h (Child's Carrot Intake Difference ⁱ) + β_4^j (Child's Milk Intake Difference ^k)	0.09

^aThe final model was considered significant if the intercept (β_0) p-value was less than 0.05

^bChild's Juice Intake Difference = the difference from baseline in child's 100% fruit juice intake at one and four weeks considered as a continuous variable

^c β_0 = Intercept

^d β_1 = Slope of the covariate Family Size

^eFamily Size = the total number of children and adults living in the home considered as a continuous variable

^f β_2 = Slope of the covariate Child's Care During the Day

^gChild's Care During the Day = the location where the child is cared for during the day considered as a categorical variable

^h β_3 = Slope of the covariate Child's Carrot Intake Difference

ⁱChild's Carrot Intake Difference = the difference from baseline in child's carrot intake at one and four weeks considered as a continuous variable

^j β_4 = Slope of Child's Milk Intake Difference

^kChild's Milk Intake Difference = the difference from baseline in child's milk intake at one and four weeks considered as a continuous variable

Appendix A

Two by Two Tables Used for McNemar's Exact Test

Tables A and B are the actual tables from which the marginal frequencies were taken to compute McNemar's exact test comparing the frequency of children consuming 100% fruit juice one time per day or less of 100% fruit juice at baseline with that at one and four weeks.

Table A. Two by Two Table Comparing Child's 100% Fruit Juice Intake at Baseline and One Week Used for McNemar's Exact Test Marginal Frequencies

Frequency Percent	1 Week ≤ 1 Time Per Day	1 Week > 1 Time Per Day	
Baseline ≤ 1 Time Per Day	13 children 26%	5 children 10%	18 children 36%
Baseline > 1 Time Per Day	10 children 20%	22 children 44%	32 children 64%
	23 children 46%	27 children 54%	50 children 100%

Table B. Two by Two Table Comparing Child's 100% Fruit Juice Intake at Baseline and Four Weeks Used for McNemar's Exact Test Marginal Frequencies

Frequency Percent	4 Weeks ≤ 1 Time Per Day	4 Weeks > 1 Time Per Day	
Baseline ≤ 1 Time Per Day	11 children 22%	7 children 14%	18 children 36%
Baseline > 1 Time Per Day	8 children 16%	24 children 48%	32 children 64%
	19 children 38%	31 children 62%	50 children 100%

Appendix B

Multivariate Paired T-Test Models for Potential Covariate Assessment

The following model is an example of the models used to test each potential covariate listed in Tables 1 and 3 for significant association with the outcome variable, difference from baseline in child's 100% fruit juice intake at one and four weeks. Each model was identical to the model below except for the inclusion of a different potential covariate. The potential covariate was considered significant and included in the final model if the intercept (β_0) for the model was significant.

$$(\text{Child's Juice Intake Difference}) = \beta_0 + \beta_1(\text{Child's Milk Intake Difference})$$

Where:

Child's Juice Intake Difference = the difference from baseline in child's 100% fruit juice intake at one and four weeks considered as a continuous variable

β_0 = Intercept

β_1 = Slope of the potential covariate Child's Milk Intake Difference

Child's Milk Intake Difference = the difference from baseline in child's milk intake at one and four weeks considered as a continuous variable

Appendix C

Please see the following pages for the baseline, one week and four week surveys.

Baseline Survey

**Rollins School of Public Health, Emory University
New WIC Voucher Package
Cost and Influence on Fruit and Vegetable Consumption**

Consent Signed (Yes/No)_____ Interviewer Name_____

Today is (day of week)_____ Today's Date (MM/DD/YYYY)_____

Type of Study Participant (Check One): New WIC Package

Introduction

Thank you for agreeing to be part of our survey today. Your responses are very important to us and will help us understand more about the new WIC vouchers. What you tell us will not influence your WIC coverage in any way.

Mother's Information

Prior participation in WIC Farmers' Market (FM) Program

First I'd like to ask you a few questions about the Farmers' Market program.

B1. Have you ever received WIC Farmers' Market coupons before?

- No [GO TO B2]
- Yes [GO TO B1a]
- Don't know/unsure – [DO NOT READ] [GO TO B2]
- Refused [DO NOT READ] [GO TO B2]

B1a. Did you receive Farmers' Market coupons this summer?

- Yes No

B1b. Did you receive Farmers' Market coupons last year?

- Yes No

B1c. Did you receive Farmers' Market coupons more than one year ago?

- Yes No

Mother's Fruit and Vegetable Consumption

These next questions are about the fruits and vegetables you ate or drank in the past week, that is the last seven days. Please tell me how often you ate or drank each one, for example, twice per day, once per day, twice a week, and so forth. Remember, I am only interested in the foods **you** ate. Include all foods **you** ate both at home and away from home.

FOR INTERVIEWER: If R answers less than once per week, enter "0" times per week.

B2. Thinking about the past week, this is the past 7 days, how often did **you** drink 100% fruit juices such as orange, grapefruit, or tomato? You can tell me either the number of times per day or the number of times per week. Do not include fruit-flavored drinks with added sugar or fruit juice you made at home and added sugar to.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

B3. In the past week, not counting juice, how often did **you** eat fruit? You can tell me either the number of times per day or the number of times per week. Please think about all forms of fruits including fresh or raw, frozen, canned or cooked.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

B4. In the past week, how often did **you** eat green salad? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

B5. In the past week, how often did **you** eat potatoes, not including French fries, fried potatoes, or potato chips? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

B6. In the past week, how often did **you** eat carrots? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

B7. In the past week, not including what you just told me about (green salads, potatoes and carrots), how often did **you** eat other vegetables? You can tell me either the number of times per day or the number of times per week.

(Examples of other vegetables include: tomatoes, green beans, corn, cabbage, collard greens and broccoli but you can count any kind of vegetable). Please think about all forms of vegetables including fresh or raw, frozen, canned or cooked.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Mother's Milk and Whole Grain Consumption

These next few questions are about the milk and whole grains **you** ate or drank in the last week.

B8. In the past week, how often did **you** have milk (either to drink or on cereal) or milk alternatives like soy milk? Do **not** include small amounts of milk in coffee or tea. You can tell me either the number of times per day or the number of times per week.

__ Per day [GO TO B8a]

__ Per week [GO TO B8a]

- Never [GO TO B9]
- Don't know /unsure [DO NOT READ] [GO TO B9]
- Refused [DO NOT READ] [GO TO B9]

B8a. What kind of milk did you usually drink when **you** had milk during the **last week**? Would you say... *(read responses except last two)*

- Skim or Non-fat Milk
- 1% Milk
- 2% Milk
- Whole Milk
- Soy Milk
- Other (rice, almond) Please specify_____
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

B9. In the past week, how often did **you** eat whole grains? Whole grains include oatmeal, brown rice, bulgur, barley, whole-grain pasta, soft corn tortillas, whole-wheat tortillas, or any of the following kinds of bread: whole wheat, oatmeal, rye or pumpernickel. Remember to include toast, rolls, and bread in sandwiches. Do **not** include white rice or white bread. You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Child Information

These next few questions are about your oldest child who receives WIC services.

B10. How old is **your oldest child** who receives WIC? You can tell me either in months or in years.

__ __ months

__ __ years

Don't know /unsure [DO NOT READ]

Refused [DO NOT READ]

B11. Which of the following describes this child's usual care? (*read responses except last two*)

Stays at home with family

Stays at the home of friend or community member

Attends daycare or Head Start

Attends pre-K /school

Other, Please specify _____

Don't know /unsure [DO NOT READ]

Refused [DO NOT READ]

Child's Fruit and Vegetable Consumption. These next questions are about the fruits and vegetables your oldest child who receives WIC ate or drank in the past week, that is the last seven days. Include all foods **he/she** ate, both at home and away from home.

B12. Thinking about the past week, this is the past 7 days, how often did your

oldest child who receives WIC drink 100% fruit juices such as orange, grapefruit, or tomato? You can tell me either the number of times per day or the number of times per week. Do not include fruit-flavored drinks with added sugar or fruit juice you made at home and added sugar to.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

B13. In the past week, not counting juice, how often did your **oldest child** who receives WIC eat fruit? You can tell me either the number of times per day or the number of times per week. Please think about all forms of fruits including fresh or raw, frozen, canned or cooked

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

B14. In the past week, how often did your **oldest child** who receives WIC eat green salad? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

B15. In the past week, how often did your **oldest child** who receives WIC eat potatoes not including French fries, fried potatoes, or potato chips? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

B16. In the past week, how often did your **oldest child** who receives WIC eat carrots? You can tell me either the number of times per day or the number per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

B17. In the past week, not including what you just told me about (green salads, potatoes and carrots), how often did your **oldest child** who receives WIC eat other vegetables? You can tell me either the number of times per day or the number of times per week. (Examples of other vegetables include: tomatoes, green beans, corn, cabbage, collard greens and broccoli but you can count any kind of vegetable). Please think about all forms of vegetables including fresh or raw, frozen, canned or cooked.

-- Per day

-- Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Child's Milk and Whole Grain Consumption

These next few questions are about the milk and whole grains your oldest child who receives WIC ate or drank in the last week.

B18. In the past week, how often did your **oldest child** who receives WIC have milk or milk alternatives like soy milk (either to drink or on cereal)? You can tell me either the number of times per day or the number of times per week.

-- Per day [GO TO B18a]

-- Per week [GO TO B18a]

- Never [GO TO B19]
- Don't know /unsure [DO NOT READ] [GO TO B19]
- Refused [DO NOT READ] [GO TO B19]

B18a. What kind of milk did your **oldest child** who receives WIC usually drink when he/she had milk during the **last week**? Would you say... (*read responses except last two*)

- Skim or Non-fat Milk
- 1% Milk
- 2% Milk
- Whole Milk
- Soy Milk
- Other (rice, almond) Please specify_____
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

B19. In the past week, how often did your **oldest child** who receives WIC eat whole grains? Whole grains include oatmeal, brown rice, bulgur, barley, whole-grain pasta, soft-corn tortillas, whole-wheat tortillas, or any of the following kinds of bread: whole wheat, oatmeal, rye or pumpernickel. Remember to include toast, rolls, and bread in sandwiches. Do **not** include white rice or white bread. You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Nutrition Knowledge

These next few questions ask you about your thoughts and feelings about eating fruits and vegetables.

B20. How many total servings of fruits and vegetables do you think **you** should eat **every day** for good health? (*PAUSE*) That's a combined total of **both** fruits and vegetables?

___ Enter number

Don't know /unsure [DO NOT READ]

Refused [DO NOT READ]

B21. How many total servings of fruits and vegetables do you think **your child** (oldest child who receives WIC) should eat **every day** for good health? (*PAUSE*) That's a combined total of **both** fruits and vegetables?

___ Enter number

Don't know /unsure [DO NOT READ]

Refused [DO NOT READ]

B22. Next, I'm going to read you some statements about all types and forms of fruits and vegetables that is **fresh, frozen and canned**. Please respond to the following statements with: strongly disagree, disagree, neutral, agree or strongly agree.

I don't eat fruits and vegetables as much as I'd like to because (<i>read this phrase before each of the following statements (except last one)</i>):	Strongly				
	<u>Dis-Agree</u>	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
I didn't grow up eating many fruits and vegetables	1	2	3	4	5

I don't like the taste of most fruits and vegetables	1	2	3	4	5
My family doesn't like fruits and vegetables	1	2	3	4	5
[do not read intro] I already eat plenty of fruits and vegetables	1	2	3	4	5

B23. Now, I am going to read you some statements about eating **fresh** fruits and vegetables. Please respond to the following statements with: strongly disagree, disagree, neutral, agree or strongly agree.

I don't eat FRESH fruits and vegetables as much as I'd like to because (<i>read this phrase before each of the following statements</i>):	Strongly				
	<u>Dis-Agree</u>	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
I don't know how to choose good quality fresh fruits and vegetables	1	2	3	4	5
I don't know when certain fruits and vegetables are in season	1	2	3	4	5
I don't know how to store most fresh fruits and vegetables	1	2	3	4	5
It is difficult to store fresh fruits and vegetables in my home	1	2	3	4	5
They often spoil before I get a chance to eat them	1	2	3	4	5
I don't know how to prepare most fresh fruits and vegetables	1	2	3	4	5
Fresh fruits and vegetables take too much time to prepare	1	2	3	4	5

I don't eat FRESH fruits and vegetables as much as I'd like to because (read this phrase before each of the following statements):	Strongly				Strongly
	Dis-Agree	Disagree	Neutral	Agree	Agree
	1	2	3	4	5
Fresh fruits and vegetables cost too much Money	1	2	3	4	5
Fresh fruits and vegetables are too big and/or too bulky to carry home easily	1	2	3	4	5

FOR INTERVIEWER: IF Respondent answered more than one "agree" for both B22 AND B23 combined, then ask B24; Otherwise, GO TO B25.

B24. You answered that you don't eat as much fruit and vegetables as you like to because of (list answers in which respondent chose "agree" or "strongly agree" from above questions B22 AND B23). Which one of these reasons would you say is the biggest reason you don't eat as many fruit and vegetables as you like to?

FOR INTERVIEWER: Put a star to the left of the row in B22 or B23 with selected answer.

Access to Fruits and Vegetables

Now I'm going to ask you some questions about your grocery shopping habits.

B25. I'd like you to think about the place where you purchase most of the food that you buy for yourself and your family using WIC vouchers.

a1. What is the name of that place? _____

a2. Where is it located?

_____ (Street name and intersection)

B26. Next, I'm going to read you a statement about the (say the name of selection in B25 (e.g. Kroger on Edgewood)). Please choose your answer from Excellent, Good, Fair or Poor.

How would you rate the <i>(say primary selection from B25) in terms of</i> <i>(Read this phrase before each of the following statements):</i>	Excellent 1	Good 2	Fair 3	Poor 4	Not Applicable N/A <i>(do not read)</i>
The selection of fresh fruits and vegetables available <i>(can clarify with: that is, whether there is a wide range of items to choose from so that you can usually find what you want to purchase there)</i>	1	2	3	4	N/A
The quality of fresh fruits and vegetables	1	2	3	4	N/A
The way you were treated	1	2	3	4	N/A
Ease in accepting WIC vouchers	1	2	3	4	N/A
Cleanliness	1	2	3	4	N/A
Ease in ability to ask questions of staff about fresh fruits and vegetables	1	2	3	4	N/A
Ease in receiving a sample or a taste test of fresh fruits and/or vegetables	1	2	3	4	N/A
The selection of canned or frozen fruits and vegetables	1	2	3	4	N/A

How would you rate the (say primary selection from B25) in terms of (Read this phrase before each of the following statements):	Excellent 1	Good 2	Fair 3	Poor 4	Not Applicable N/A (do not read)
The selection of whole grain foods such as whole grain bread, tortillas, pasta and brown rice	1	2	3	4	N/A
The selection of white rice and white bread	1	2	3	4	N/A
The selection of low-fat milk such as 1% and skim or non-fat milk	1	2	3	4	N/A
The selection of regular fat milk such as 2% and whole milk	1	2	3	4	N/A

B27. Next, I'm going to read you a statement about the cost of things at (say *the name of the selection in B25 (e.g. Kroger on Edgewood)*). Please choose your answer from very affordable, somewhat affordable, not very affordable, or not at all affordable.

How would you rate the (say primary selection from B25) in terms of (Read this phrase before each of the following statements):	Very affordable 1	Some what affordable 2	Not very affordable 3	Not at all affordable 4	Not Applicable N/A <i>(do not read)</i>
The cost or affordability of the fresh fruits and vegetables	1	2	3	4	N/A
The cost or affordability of the canned or frozen fruits and vegetables	1	2	3	4	N/A
The cost or affordability of whole grain foods such as bread, tortillas, pasta and rice	1	2	3	4	N/A
The cost or affordability of white rice and white bread	1	2	3	4	N/A
The cost or affordability of low-fat milk such as 1% and skim or non-fat milk.	1	2	3	4	N/A
The cost or affordability of regular fat milk such as 2% and whole milk	1	2	3	4	N/A

B28. In thinking again about the place where you get most of your food, how do you usually get there? *(Read responses)*

Your own vehicle

Bus

- Marta
- You pay someone to drive you there
- Ride free in someone else's vehicle
- Bike
- Walk
- Other, Please specify_____

Extrinsic/Intrinsic Motivation

B29. Next I am going to read you some statements about reasons you eat fruits and vegetables. Please tell me how true each of the following statements is for you. You can tell me "Not at all true," "Not True," "Neutral," "True" or "Very True."

A reason I eat fruits and vegetables is... (read this phrase before each of the following statements)	Not at All True 1	Not True 2	Neutral 3	True 4	Very True 5
Because I have a strong value for eating healthy	1	2	3	4	5
Because I personally believe it is a good thing for my health	1	2	3	4	5
Because I would feel better about myself if I did eat a healthy diet	1	2	3	4	5
Because it is important to treat my body with respect	1	2	3	4	5
Because I want to set a good example for my family	1	2	3	4	5

Family Resources

B30. In the last 12 months, were you ever concerned about having enough money to eat nutritious meals?

- Yes
- No
- Don't know/ Unsure [DO NOT READ]
- Refused [DO NOT READ]

B31. Does your household have a working stove, sink and refrigerator to store and prepare meals at home?

- Yes
- No
- Don't know/ Unsure [DO NOT READ]
- Refused [DO NOT READ]

WIC Vouchers

The next few questions are about how long your grocery store WIC vouchers last.

B32. Did you run out of the WIC grocery store vouchers you received on your last WIC visit before you came in today?

- Yes [GO To B32a]
- No [GO TO B33]

B32a. When did you run out of the WIC grocery store vouchers? Would you say...
(read responses)

- One week ago
- Two weeks ago
- Three weeks ago

A month ago or more

Now I have a few last questions that I would like to ask about you.

B33. Are you Hispanic or Latino?

Yes

No

Don't know / Not sure [DO NOT READ]

Refused [DO NOT READ]

B34. Which one or more of the following would you say is your race?

(Check all that apply) (Read responses)

White

Black or African American

Asian

Native Hawaiian or Other Pacific Islander

American Indian or Alaska Native

Or

Other, Please specify _____

Do not read:

No additional choices

Don't know / Not sure [DO NOT READ]

Refused [DO NOT READ]

FOR INTERVIEWER If more than one response to prior B34; continue to B35. Otherwise, GO TO B36.
--

B35. Which one of these groups would you say best represents your race (*Read responses*)?

White

Black or African American

Asian

Native Hawaiian or Other Pacific Islander

American Indian or Alaska Native

Other, Please specify _____

B36. Are you now breastfeeding or nursing a child?

Yes

No

Don't Know/Unsure [DO NOT READ]

Refused [DO NOT READ]

B37. What is your age?

__ _ Code age in years

Don't know / Not sure [DO NOT READ]

Refused[DO NOT READ]

B38. What is the primary language spoken in your home? (*Mark one box*)

English

Spanish

Other, Please specify_____

B39. What is the highest grade or year of school you have completed?

Never attended school or kindergarten only

Grades 1 through 8 (elementary)

Grades 9 through 11 (some high school)

Grades 12 or GED (high school graduate)

College 1 to 3 years (some college or tech school)

College 4 years (college graduate)

Master's degree

Doctoral degree (JD, PhD, MD)

Post-Doctoral degree

B40. What is your current marital status? Would you say...(*Read responses*)

Never been married

Member of an unmarried couple

Married

Separated

Divorced

Widowed

B41. How many children less than 18 years of age live in your household?

__ Number of children

None

Refused [DO NOT READ]

B42. Including yourself, how many adults live in your household?

1

2

3

4

5

6 or more

B43. Are you or anyone in your household enrolled in the Food Stamps or SNAP (that is the Supplemental Nutrition Assistance Program)?

Yes

No

Don't Know/Unsure [DO NOT READ]

Refused [DO NOT READ]

B44. Are you or anyone in your household enrolled in the Temporary Assistance to Needy Families (TANF) or welfare cash assistance program?

Yes

No

Don't Know/Unsure [DO NOT READ]

Refused [DO NOT READ]

B45. Do you receive WIC services for yourself?

Yes

No

- Don't Know/Unsure [DO NOT READ]
- Refused [DO NOT READ]

B46. How many children in your household receive WIC services? Would you say (read responses)?

- One child
- Two children
- Three Children
- Refused [DO NOT READ]

That's the end of the interview. We need to make sure we have the right address to mail your \$20 Kroger gift card for participation in the phone surveys we will conduct in one and four weeks.

B47. What is the address we should mail your \$20 Kroger gift card?

Record address (Street/ Apt./ City/ Zip)

B48. Is this mailing address the same as your physical (residential) address?

- Yes [GO TO B49]
- No [GO TO B48a]
- Don't know/not sure [DO NOT READ]
- Refused [DO NOT READ]

B48a. What is your physical address? *Record address (Street/ Apt./ City/ Zip)*

B49. We need to know a good number to call you back in one week and again four weeks from now. At what phone number would you like me to call you? Is there a time that would be convenient?

1. *Record time and phone number*_____.

*Contact:*_____

2. *Record time and phone number*_____.

*Contact:*_____

3. *Record time and phone number*_____.

*Contact:*_____

B48. Do you have an e-mail address?

Yes [GO TO B48a]

No [GO TO END]

B48a. May we contact you by e-mail?

Yes, record E-mail address _____

No

Explain that the project manager should be contacted if her contact information changes (see number on consent). Remind that phone interviews need to be completed before \$20 Kroger gift card is mailed.

Thank you for your time!! And here is your \$5 gift card.

Record Kroger Gift Card Number _____

One Week Follow-Up Survey

**Rollins School of Public Health, Emory University
New WIC Package
Cost and Influence on Fruit and Vegetable Consumption**

Consent Signed (Yes/No) _____ Interviewer Name _____

Today is (day of week) _____ Today's Date (mm/dd/yyyy) _____

Type of Study Participant (Check One): New WIC Package

Introduction

This is _____ calling from the Emory University WIC Study. I interviewed you last week when you picked up your vouchers at the _____ WIC center. It's time for your follow-up interview today. Remember if you finish this very short interview and one more, I can mail you a \$20 Kroger gift card. Is this a good time for you to complete the interview? It should take less than ten minutes.

Thank you – or arrange a call back time.

Call back time and day _____.

Mother's Fruit and Vegetable Consumption

These first questions are about the fruits and vegetables you ate or drank in the past week, that is the last seven days. Please tell me how often you ate or drank each one, for example, twice per day, once per day, twice a week, and so forth. Remember, I am only interested in the foods **you** ate. Include all foods **you** ate both at home and away from home.

FOR INTERVIEWER: If R answers less than once per week, enter "0" times per week.

1W1. Thinking about the past week, this is the past 7 days, how often did **you** drink 100% fruit juices such as orange, grapefruit, or tomato? You can tell me either the number of times per day or the number of times per week. Do not include fruit-flavored drinks with added sugar or fruit juice you made at home and added sugar to.

__ Per day

__ Per week

Never

Don't know /unsure [DO NOT READ]

Refused [DO NOT READ]

1W2. In the past week, not counting juice, how often did **you** eat fruit? You can tell me either the number of times per day or the number of times per week. Please think about all forms of fruits including fresh or raw, frozen, canned or cooked.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W3. In the past week, how often did **you** eat green salad? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W4. In the past week, how often did **you** eat potatoes, not including French fries, fried potatoes, or potato chips? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W5. In the past week, how often did **you** eat carrots? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W6. In the past week, not including what you just told me about (green salads, potatoes and carrots), how often did **you** eat other vegetables? You can tell me either the number of times per day or the number of times per week.

(Examples of other vegetables include: green beans, corn, collard greens and broccoli but you can count any kind of vegetable). Please think about all forms of vegetables including fresh or raw, frozen, canned or cooked.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Mother's Milk and Whole Grain Consumption

These next few questions are about the milk and whole grains **you** ate or drank in the last week.

1W7. In the past week, how often did **you** have milk (either to drink or on cereal) or milk alternatives like soy milk? Do **not** include small amounts of milk in coffee or tea. You can tell me either the number of times per day or the number of times per week.

Per day [GO TO B8a]

Per week [GO TO B8a]

Never [GO TO B9]

Don't know /unsure [DO NOT READ] [GO TO B9]

Refused [DO NOT READ] [GO TO B9]

1W7a. What kind of milk did you usually drink when **you** had milk during the **last week**? Would you say... *(read responses except last two)*

Skim or Non-fat Milk

1% Milk

2% Milk

Whole Milk

Soy Milk

Other (rice, almond) Please specify _____

Don't know /unsure [DO NOT READ]

Refused [DO NOT READ]

1W8. In the past week, how often did **you** eat whole grains? Whole grains include oatmeal, brown rice, bulgur, barley, whole-grain pasta, soft corn tortillas, whole-wheat tortillas, or any of the following kinds of bread: whole wheat, oatmeal, rye or pumpernickel. Remember to include toast, rolls, and bread in sandwiches. Do **not** include white rice or white bread. You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Child Information

These next few questions are about your oldest child who receives WIC services. This is the same child you answered about during our last interview.

1W9. How old is **your oldest child** who receives WIC? You can tell me either in months or in years.

__ months

__ years

- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Child's Fruit and Vegetable Consumption

These next questions are about the fruits and vegetables your oldest child who receives WIC ate or drank in the past week, that is the last seven days. Include all foods **he/she** ate, both at home and away from home.

1W10. Thinking about the past week, this is the past 7 days, how often did your **oldest child** who receives WIC drink 100% fruit juices such as orange, grapefruit, or tomato? You can tell me either the number of times per day or the number of times per week. Do not include fruit-flavored drinks with added sugar or fruit juice you made at home and added sugar to.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W11. In the past week, not counting juice, how often did your **oldest child** who receives WIC eat fruit? You can tell me either the number of times per day or the number of times per week. Please think about all forms of fruits including fresh or raw, frozen, canned or cooked.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W12. In the past week, how often did your **oldest child** who receives WIC eat green salad? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W13. In the past week, how often did your **oldest child** who receives WIC eat potatoes not including French fries, fried potatoes, or potato chips? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W14. In the past week, how often did your **oldest child** who receives WIC eat carrots? You can tell me either the number of times per day or the number per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W15. In the past week, not including what you just told me about (green salads, potatoes and carrots), how often did your **oldest child** who receives WIC eat other vegetables? You can tell me either the number of times per day or the number of times per week. (Examples of other vegetables include: green beans, corn, peas, collard greens and broccoli but you can count any kind of vegetable). Please think about all forms of vegetables including fresh or raw, frozen, canned or cooked.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Child's Milk and Whole Grain Consumption. These next few questions are about the milk and whole grains your oldest child who receives WIC ate or drank in the last week.

1W16. In the past week, how often did your **oldest child** who receives WIC have milk or milk alternatives like soy milk (either to drink or on cereal)? You can tell me either the number of times per day or the number of times per week.

__ Per day [GO TO B18a]

__ Per week [GO TO B18a]

- Never [GO TO B19]
- Don't know /unsure [DO NOT READ] [GO TO B19]
- Refused [DO NOT READ] [GO TO B19]

1W16a. What kind of milk did your **oldest child** who receives WIC usually drink when **he/she** had milk during the **last week**? Would you say... *(read responses except last two)*

- Skim or Non-fat Milk
- 1% Milk
- 2% Milk
- Whole Milk
- Soy Milk
- Other (rice, almond) Please specify_____
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W17. In the past week, how often did your **oldest child** who receives WIC eat whole grains? Whole grains include oatmeal, brown rice, bulgur, barley, whole-grain pasta, soft-corn tortillas, whole-wheat tortillas, or any of the following kinds of bread: whole wheat, oatmeal, rye or pumpernickel. Remember to include toast, rolls, and bread in sandwiches. Do **not** include white rice or white bread. You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Foods purchased with new WIC vouchers: These next few questions are about the foods you purchased with your new WIC vouchers.

1W18. Did you buy any of the following **fruits** with your new WIC vouchers? Please answer yes or no. Did you buy any... *[repeat this phrase]*

	Yes	No	Don't Know <i>(do not read)</i>
Did you buy any...[repeat this phrase]	1	2	3
Apples	1	2	3
Pears	1	2	3
Bananas	1	2	3
Oranges	1	2	3
Strawberries	1	2	3
Grapes	1	2	3
Peaches	1	2	3
Plums	1	2	3
Watermelon or other melon	1	2	3
Something else, please specify _____	1	2	3

1W19. Did you buy any of the following **vegetables** with your new WIC vouchers ?
Please answer yes or no. Did you buy any... *[repeat this phrase]*:

	Yes	No	Don't Know <i>(do not read)</i>
	1	2	3
Did you buy any... <i>[repeat this phrase]</i>:			
Green Beans	1	2	3
Carrots	1	2	3
Broccoli	1	2	3
Greens, Collards/Chard/Spinach/Kale or any other dark leafy green	1	2	3
Head lettuce such as iceberg, romaine, bibb, or leafy salad type greens	1	2	3
Cucumbers	1	2	3
Corn	1	2	3
Peppers	1	2	3
Squash	1	2	3
Okra	1	2	3
Tomatoes	1	2	3
Sweet Potatoes or Yams	1	2	3
Something else? Please specify_____	1	2	3

1W20. Among the **fruits** you bought with your new WIC vouchers, was it **your** first time to try eating any of them?

- Yes
- No
- No, didn't buy any fruit
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W21. Among the **vegetables** you bought with your new WIC vouchers, was it **your** first time to try eating any of them?

- Yes
- No
- No, didn't buy any vegetables
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W22. Among the **fruits** you bought with your new WIC vouchers, was it **your oldest child who receives WIC's** first time to try eating any of them?

- Yes
- No
- No, didn't buy any fruit
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W23. Among the **vegetables** you bought with your new WIC vouchers, was it **your oldest child who receives WIC's** first time to try eating any of them?

- Yes
- No
- No, didn't buy any vegetables
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

WIC Education

This next question asks you about the education you received on your last WIC visit. Your answer will not influence your WIC coverage in any way.

1W24. What kind of education did you receive on your last WIC visit about the new WIC food package? Would you say... *(read responses) – check all that apply*

- General use of the new food package vouchers
- Education about low-fat milk and milk alternatives
- Education about whole grain breads and cereals, types and/or package size
- Education focused on types of fruits and vegetables
- Education mentioned how to pay the difference if more than \$6 of fruits and vegetables
- Nothing specific to the new vouchers
- Other education, Please specify _____
- No education received

1W25. Next I'm going to read a list of foods, and for each one, please tell me whether or not you think it's included in the new WIC food package.

Do you think (fill in food item from list) are included? [repeat this question for each]	Yes, included	No, not included	Don't Know (do not read)
Fresh Fruits and vegetables	1	2	3
Frozen Fruits and vegetables	1	2	3
Canned Fruits in their juice	1	2	3
Canned Fruits in heavy syrup	1	2	3
Canned Vegetables	1	2	3
Red potatoes	1	2	3
White potatoes	1	2	3
Sweet potatoes	1	2	3
Whole grain cold cereals	1	2	3
Whole grain hot cereals	1	2	3
Whole grain breads	1	2	3

1W26. Were all food items on your new WIC vouchers available at the grocery store where you usually shop?

- Yes
- No, GO TO 1W26B
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W26b. Which items were **not** available? (read responses except last two)

- Low-Fat Milk
- Other Low-Fat dairy item
- Whole Grain Bread
- Other Whole Grain Item (cereal, tortillas)
- Frozen Vegetables
- Canned vegetables
- Fresh vegetables
- Frozen fruit
- Canned fruit
- Fresh Fruit
- Something else, please list _____
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

1W27. Please tell me the extent to which you agree or disagree with the following statement: **I think the new WIC food package will help me feed my family healthier foods. Would you say you....** (read responses):

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- Strongly disagree

We need to make sure we have the right address to mail your \$20 Kroger gift card for participation in the survey.

1W28. To what the address should we mail your \$20 Kroger gift card after our next interview?

Record address (Street/ Apt./ City/ Zip)

1W29. For the last interview, I'll call you back three weeks from now. Do you want me to call the same number? What time would you like me to call you back?

1. *Record time and phone number*_____.

*Contact:*_____

2. *Record time and phone number*_____.

*Contact:*_____

3. *Record time and phone number*_____.

*Contact:*_____

Give your contact information including printed name and phone – and explain that you should be contacted if her contact information changes. Remind that phone interviews need to be complete before \$20 Kroger gift card is mailed.

Thank you for completing the Survey!

Four Week Follow-Up Survey

**Rollins School of Public Health, Emory University
New WIC Package
Cost and Influence on Fruit and Vegetable Consumption**

Interviewer Name _____

Today is (day of week) _____ Today's Date (mm/dd/yyyy) _____

Type of Study Participant (Check One): New WIC Package

Introduction

This is _____ calling from the Emory University WIC Study. I interviewed you three weeks ago and it's time for your final interview today. Remember if you finish this interview, I can mail you a \$20 Kroger gift card. Is this a good time for you to complete the interview? It should take less than ten minutes.

Thank you – or arrange a call back time.

Call back time and day_____.

Mother's Fruit and Vegetable Consumption

These first questions are about the fruits and vegetables you ate or drank in the past week, that is the last seven days. Please tell me how often you ate or drank each one, for example, twice per day, once per day, twice a week, and so forth. Remember, I am only interested in the foods **you** ate. Include all foods **you** ate both at home and away from home.

FOR INTERVIEWER: If R answers less than once per week, enter "0" times per week.

4W1. Thinking about the past week, this is the past 7 days, how often did **you** drink 100% fruit juices such as orange, grapefruit, or tomato? You can tell me either the number of times per day or the number of times per week. Do not include fruit-flavored drinks with added sugar or fruit juice you made at home and added sugar to.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

4W2. In the past week, not counting juice, how often did **you** eat fruit? You can tell me either the number of times per day or the number of times per week. Please think about all forms of fruits including fresh or raw, frozen, canned or cooked.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

4W3. In the past week, how often did **you** eat green salad? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

4W4. In the past week, how often did **you** eat potatoes, not including French fries, fried potatoes, or potato chips? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

4W5. In the past week, how often did **you** eat carrots? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

4W6. In the past week, not including what you just told me about (green salads, potatoes and carrots), how often did **you** eat other vegetables? You can tell me either the number of times per day or the number of times per week.

(Examples of other vegetables include: green beans, corn, collard greens and broccoli but you can count any kind of vegetable). Please think about all forms of vegetables including fresh or raw, frozen, canned or cooked.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Mother's Milk and Whole Grain Consumption

These next few questions are about the milk and whole grains **you** ate or drank in the last week.

4W7. In the past week, how often did **you** have milk (either to drink or on cereal) or milk alternatives like soy milk? Do **not** include small amounts of milk in coffee or tea. You can tell me either the number of times per day or the number of times per week.

Per day [GO TO 4W7a]

Per week [GO TO 4W7a]

Never [GO TO 4W8]

Don't know /unsure [DO NOT READ] [GO TO 4W8]

Refused [DO NOT READ] [GO TO 4W8]

4W7a. What kind of milk did you usually drink when **you** had milk during the **last week**? Would you say... *(read responses except last two)*

Skim or Non-fat Milk

1% Milk

2% Milk

Whole Milk

Soy Milk

Other (rice, almond) Please specify _____

Don't know /unsure [DO NOT READ]

Refused [DO NOT READ]

4W8. In the past week, how often did **you** eat whole grains? Whole grains include oatmeal, brown rice, bulgur, barley, whole-grain pasta, soft corn tortillas, whole-wheat tortillas, or any of the following kinds of bread: whole wheat, oatmeal, rye or pumpernickel. Remember to include toast, rolls, and bread in sandwiches. Do **not** include white rice or white bread. You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Child Information

These next few questions are about your oldest child who receives WIC services. This is the same child you answered about during our last interview.

4W9. How old is **your oldest child** who receives WIC? You can tell me either in months or in years.

__ months

__ years

- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Child's Fruit and Vegetable Consumption

These next questions are about the fruits and vegetables your oldest child who receives WIC ate or drank in the past week, that is the last seven days. Include all foods **he/she** ate, both at home and away from home.

4W10. Thinking about the past week, this is the past 7 days, how often did your **oldest child** who receives WIC drink 100% fruit juices such as orange, grapefruit, or tomato? You can tell me either the number of times per day or the number of times per week. Do not include fruit-flavored drinks with added sugar or fruit juice you made at home and added sugar to.

__ Per day

__ Per week

Never

Don't know /unsure [DO NOT READ]

Refused [DO NOT READ]

4W11. In the past week, not counting juice, how often did your **oldest child** who receives WIC eat fruit? You can tell me either the number of times per day or the number of times per week. Please think about all forms of fruits including fresh or raw, frozen, canned or cooked.

__ Per day

__ Per week

Never

Don't know /unsure [DO NOT READ]

Refused [DO NOT READ]

4W12. In the past week, how often did your **oldest child** who receives WIC eat green salad? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

4W13. In the past week, how often did your **oldest child** who receives WIC eat potatoes not including French fries, fried potatoes, or potato chips? You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

4W14. In the past week, how often did your **oldest child** who receives WIC eat carrots? You can tell me either the number of times per day or the number per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

4W15. In the past week, not including what you just told me about (green salads, potatoes and carrots), how often did your **oldest child** who receives WIC eat other vegetables? You can tell me either the number of times per day or the number of times per week. (Examples of other vegetables include: green beans, corn, peas, collard greens and broccoli but you can count any kind of vegetable). Please think about all forms of vegetables including fresh or raw, frozen, canned or cooked.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Child's Milk and Whole Grain Consumption

These next few questions are about the milk and whole grains your oldest child who receives WIC ate or drank in the last week.

4W16. In the past week, how often did your **oldest child** who receives WIC have milk or milk alternatives like soy milk (either to drink or on cereal)? You can tell me either the number of times per day or the number of times per week.

__ Per day [GO TO 4W16a]

__ Per week [GO TO 4W16a]

- Never [GO TO 4W17]
- Don't know /unsure [DO NOT READ] [GO TO 4W17]
- Refused [DO NOT READ] [GO TO 4W17]

4W16a. What kind of milk did your **oldest child** who receives WIC usually drink when he/she had milk during the **last week**? Would you say... *(read responses except last two)*

- Skim or Non-fat Milk
- 1% Milk
- 2% Milk
- Whole Milk
- Soy Milk
- Other (rice, almond) Please specify _____
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

4W17. In the past week, how often did your **oldest child** who receives WIC eat whole grains? Whole grains include oatmeal, brown rice, bulgur, barley, whole-grain pasta, soft-corn tortillas, whole-wheat tortillas, or any of the following kinds of bread: whole wheat, oatmeal, rye or pumpernickel. Remember to include toast, rolls, and bread in sandwiches. Do **not** include white rice or white bread. You can tell me either the number of times per day or the number of times per week.

__ Per day

__ Per week

- Never
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

Nutrition Knowledge

These next few questions ask you about your thoughts about eating fruits and vegetables.

4W18. How many total servings of fruits and vegetables do you think **you** should eat every day for good health? (*PAUSE*) That's a combined total of **both** fruits and vegetables?

___ Enter number

Don't know /unsure [DO NOT READ]

Refused [DO NOT READ]

4W19. How many total servings of fruits and vegetables do you think **your** oldest child who receives WIC that you just answered about should eat every day for good health? (*PAUSE*) That's a combined total of **both** fruits and vegetables?

___ Enter number

Don't know /unsure [DO NOT READ]

Refused [DO NOT READ]

4W20. Next, I'm going to read you some statements about all types and forms of fruits and vegetables that is **fresh, frozen and canned**. Please respond to the following statements with: strongly disagree, disagree, neutral, agree or strongly agree.

I don't eat fruits and vegetables as much as I'd like to because (<i>read this phrase before each of the following statements (except last one)</i>):	Strongly Dis-Agree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
I didn't grow up eating many fruits and vegetables	1	2	3	4	5
I don't like the taste of most fruits and vegetables	1	2	3	4	5
My family doesn't like fruits and vegetables	1	2	3	4	5

[do not read <i>intro</i>] I already eat plenty of fruits and vegetables	1	2	3	4	5
---	---	---	---	---	---

4W21. Now, I am going to read you some statements about eating **fresh** fruits and vegetables. Please respond to the following statements with: strongly disagree, disagree, neutral, agree or strongly agree.

I don't eat FRESH fruits and vegetables as much as I'd like to because (<i>read this phrase before each of the following statements</i>):	Strongly Dis-Agree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
I don't know how to choose good quality fresh fruits and vegetables	1	2	3	4	5
I don't know when certain fruits and vegetables are in season	1	2	3	4	5
I don't know how to store most fresh fruits and vegetables	1	2	3	4	5
It is difficult to store fresh fruits and vegetables in my home	1	2	3	4	5
They often spoil before I get a chance to eat them	1	2	3	4	5
I don't know how to prepare most fresh fruits and vegetables	1	2	3	4	5
Fresh fruits and vegetables take too much time to prepare	1	2	3	4	5
Fresh fruits and vegetables cost too much Money	1	2	3	4	5

I don't eat FRESH fruits and vegetables as much as I'd like to because <i>(read this phrase before each of the following statements):</i>	Strongly Dis-Agree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
Fresh fruits and vegetables are too big and/or too bulky to carry home easily	1	2	3	4	5

FOR INTERVIEWER: IF Respondent answered more than one "agree" for both 4W20 AND 4W21 combined, then ask 4W22; Otherwise, GO TO 4W23.

4W22. You answered that you don't eat as much fruit and vegetables as you like to because of *(list answers in which respondent chose "agree" from above questions 4W20 AND 4W21)*. Which one of these reasons would you say is the biggest reason you don't eat as many fruit and vegetables as you like to?

FOR INTERVIEWER: Put a star to the left of the row in 4W20 or 4W21 with selected answer.

Access to Fruits and Vegetables

Now I'm going to ask you some questions about your grocery shopping habits.

4W23. I'd like you to think about the place where you purchase most of the food that you buy for yourself and your family using the WIC vouchers.

a1. What is the name of that place? _____

a2. Where is it located?

(Street name and intersection)

4W24. Next, I'm going to read you a statement about the (*say the name of selection in 4W23 (e.g. Kroger on Edgewood)*). Please choose your answer from Excellent, Good, Fair or Poor.

How would you rate the (<i>say primary selection from 4W23</i>) in terms of (<i>Read this phrase before each of the following statements</i>):	Excellent	Good	Fair	Poor	Not Applicable N/A <i>(do not read)</i>
	1	2	3	4	
The selection of fresh fruits and vegetables available (<i>can clarify with: that is, whether there is a wide range of items to choose from so that you can usually find what you want to purchase there</i>)	1	2	3	4	N/A
The quality of fresh fruits and vegetables	1	2	3	4	N/A
The way you were treated	1	2	3	4	N/A
Ease in accepting WIC vouchers	1	2	3	4	N/A
Cleanliness	1	2	3	4	N/A
Ease in ability to ask questions of staff about fresh fruits and vegetables	1	2	3	4	N/A
Ease in receiving a sample or a taste test of fresh fruits and/or vegetables	1	2	3	4	N/A

How would you rate the <i>(say primary selection from 4W23)</i> in terms of <i>(Read this phrase before each of the following statements):</i>	Excellent 1	Good 2	Fair 3	Poor 4	Not Applicable N/A <i>(do not read)</i>
The selection of canned or frozen fruits and vegetables	1	2	3	4	N/A
The selection of whole grain foods such as whole grain bread, tortillas, pasta and brown rice	1	2	3	4	N/A
The selection of white rice and white bread	1	2	3	4	N/A
The selection of low-fat milk such as 1% and skim or non-fat milk	1	2	3	4	N/A
The selection of regular fat milk such as 2% and whole milk	1	2	3	4	N/A

4W25. Next, I'm going to read you a statement about the cost of things at (say the name of the selection in 4W23 (e.g. Kroger on Edgewood)). Please choose your answer from very affordable, somewhat affordable, not very affordable, or not at all affordable.

How would you rate the (say primary selection from 4W23) in terms of (Read this phrase before each of the following statements):	Very affordable 1	Some what affordable 2	Not very affordable 3	Not at all affordable 4	Not Applicable N/A (do not read)
The cost or affordability of the fresh fruits and vegetables	1	2	3	4	N/A
The cost or affordability of the canned or frozen fruits and vegetables	1	2	3	4	N/A
The cost or affordability of whole grain foods such as bread, tortillas, pasta and rice	1	2	3	4	N/A
The cost or affordability of white rice and white bread	1	2	3	4	N/A
The cost or affordability of low-fat milk such as 1% and skim or non-fat milk.	1	2	3	4	N/A
The cost or affordability of regular fat milk such as 2% and whole milk	1	2	3	4	N/A

4W26. Next I am going to read you some statements about reasons you eat fruits and vegetables. Please tell me how true each of the following statements is for you. You can tell me “Not at all true,” “Not True,” “Neutral,” “True” or “Very True.”

A reason I eat fruits and vegetables is... (read this phrase before each of the following statements)	Not at All True 1	Not True 2	Neutral 3	True 4	Very True 5
Because I have a strong value for eating healthy	1	2	3	4	5
Because I personally believe it is a good thing for my health		2	3	4	5
Because I would feel better about myself if I did eat a healthy diet	1	2	3	4	5
Because it is important to treat my body with respect	1	2	3	4	5
Because I want to set a good example for my family	1	2	3	4	5

4W27. Next, I'm going to read you some statements about the WIC services you receive for yourself and your family. Please respond to the following statements with: strongly disagree, disagree, neutral, agree, or strongly agree.

	Strongly Dis-Agree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
The food I get with WIC vouchers is healthy for my kids	1	2	3	4	5
This food I get with my WIC vouchers is healthy for me	1	2	3	4	5
The food I get with WIC vouchers includes things that my kids like to eat	1	2	3	4	5
The food I get with WIC vouchers includes things that I like to eat	1	2	3	4	5
I understand what foods WIC vouchers can be used for	1	2	3	4	5
I am happy with the WIC voucher program	1	2	3	4	5

4W28. What kind of bread would you purchase for you and your family if you were using your own money without WIC vouchers? (Read responses except last two)

- 100% Whole Wheat
- White
- Other, List _____
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

4W29. What kind of milk would you purchase for you and your family if you were using your own money without WIC vouchers? (Read responses except last two)

- Skim or Non-fat Milk
- 1% Milk
- 2% Milk
- Whole Milk
- Soy Milk
- Other (rice, almond) Please specify_____
- Don't know /unsure [DO NOT READ]
- Refused [DO NOT READ]

4W30. Do you have a child between the ages of 12 months and 24 months who receives WIC services?

- Yes
- No

Thank you for your participation in these surveys. Your responses are extremely valuable to us.

4W31. To what address we should mail your \$20 Kroger gift card?

Record address (Street/ Apt./ City/ Zip)

Thank you for completing the Survey!