Appendix A

Study Research Questions

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Table A-1. Study research questions

Research Questions	Chapters
Background and Environmental Characteristics	
1. How do feeding practices vary with working and childcare circumstances?	2
2. What are the main barriers to eating healthy?	3
3. What is the influence of parenting and broader environmental factors—such as the media—on early dietary behaviors that may affect child obesity?	3
4. What is the impact of participation in other federal food benefit programs on feeding practices and health outcomes?	2,3,6
Impact of WIC	
5. Does continued participation in WIC lead to better eating behaviors and health outcomes?	3,6
6. Does continued participation in WIC have a positive corollary effect on access to healthcare and continuity of care?	2
Nutrition and Health Outcomes	
7. What is the nutrient intake of 3 year olds?	5
8. What are the meal and snack patterns?	4
9. How do feeding practices impact children's weight and growth?	6
10. When do "unhealthy" eating habits typically begin and are there early warning signs that a change is occurring?	4

Appendix B1

Details of Sampling and Weighting Procedures

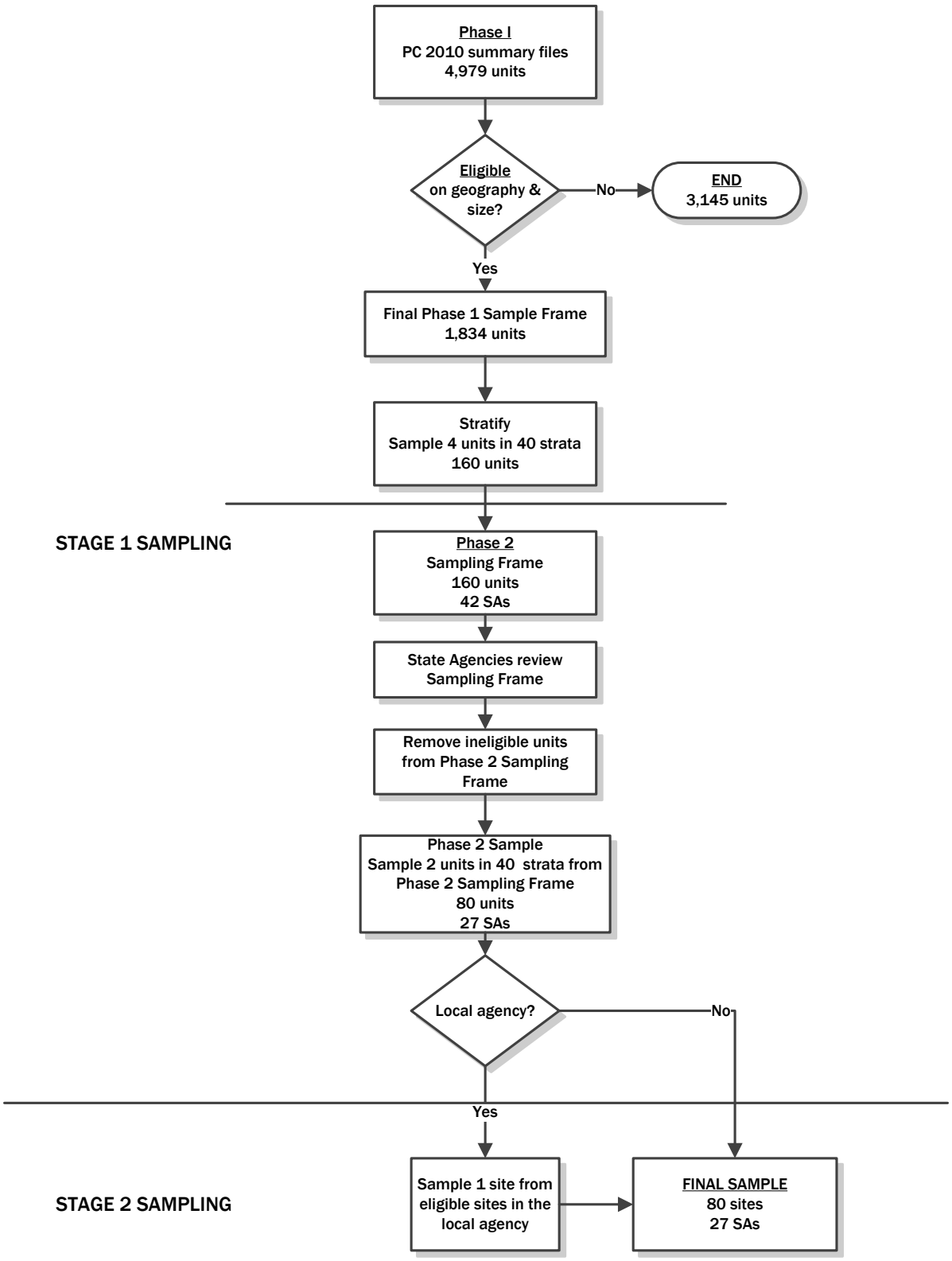
Appendix B1
Details of Sampling and Weighting Procedures

B1.1 Selection of WIC Sites

The WIC service sites were selected using a stratified two-stage sampling approach. Because no national list of service sites exists, we used, as a sampling frame, a summary file at the level of the unit reported by each State Agency (SA) in the census of April 2010 (the WIC Program and Participant Characteristics 2010, or PC2010). This census resulted in a file with one record for each participant being served by WIC in that month. Because State agencies had flexibility for PC2010 for reporting service location identifiers, the IDs provided in the records by the State agencies varied; some State agencies provided the site ID in addition to a local agency code, whereas other State agencies included only a local agency code. As a result, two stages of selection were used to sample sites. The first stage involved the sampling of "PC2010 tabulation units"—the units for which IDs were provided in the PC2010 data. The second stage involved the sampling of sites for situations in which the sampled tabulation unit was a local agency. (For the remainder of this report, these tabulation units will be referred to, using standard statistical terminology, as "first-stage" sampling units.) Additionally, because the information needed to determine final eligibility of sites (namely, current enrollment information and whether the site was expected to be operational during the study recruitment period) was not available in the PC2010 data, the first-stage sample was selected in two phases in order to contact State agencies to obtain additional eligibility information about the sites. The ultimate goal was the selection of 80 WIC sites. Figure B1-1 is a flowchart that gives a general overview of the WIC site sampling process.

As shown in Figure B1-1, Phase 1 of Stage 1 involved the selection of four first-stage sampling units in each of 40 strata to create a Phase 2 sampling frame of 160 units. Stratification involved partitioning the sampling frame into four homogeneous groups and was used to improve the precision of estimates and to ensure representation in the sample of different types of sites. In Phase 2 of Stage 1, we contacted State agencies to determine the eligibility of each of the units sampled in the first phase and then sampled two units from among the eligible first-stage sampling units in each stratum for a total of 80 units. In Stage 2 we sampled the services sites within the sampled units that were local agencies (rather than service sites) and selected one site from each local agency.

Figure B1-1. Overview of WIC site sampling process



Site eligibility was defined in terms of enrollment flow. A minimum average flow of 1.5 new enrollees per day was required for a site to be eligible and ensure a sufficient volume of participants. Additionally, to ensure that recruitment could be completed within the study recruitment period, we imposed a restriction requiring that eligible sites yield the target number of eligible enrollees within a 4-month period.

Following the completion of the sampling of sites for the study, we began site recruitment efforts in earnest to eliminate the adverse effects of site-level nonresponse on sample yield, sampled service sites that were unable to participate in the study were replaced by members of a matched sample.

B1.2 Construction of the Sampling Frame

The sampling frame was constructed from the WIC Program and Participant Characteristics 2010 (PC2010) dataset. PC2010 data were provided through a total of 90 individual SAS data files—one for each State WIC Agency. The PC2010 was obtained from FNS in October 2011. Once received, Westat's subcontractor, Altarum, merged all 90 files into a single analytic file. Altarum thoroughly reviewed the PC2010 Guidance document to better understand each field that is included in the PC2010 database and to identify fields that would be required to develop the first-stage sampling frame file, including the following variables that Altarum derived from information provided in the PC2010 database:

- Unit (i.e., a unique identifier for the PC2010 tabulation unit described in Section B1.1, which was either the WIC site or the local agency);
- Unit Source;
- Number of Exclusively Breastfeeding Women;
- Number of Postpartum Women, Not Breastfeeding;
- Number of Prenatal Women Enrolled in April 2010 (PC2010 reference month);
- Number of Infants Under Age 3 Months Enrolled in April 2010;
- Total Number of Infants Enrolled in April 2010;
- Percent of Infants Enrolled in April 2010 Who Were Under Age 3 Months;
- Total Number of Participants (all Categories);

- Number of Women Participants Under Age 18 Years in April 2010;
- Number of Women Participants Under Age 16 Years in April 2010;
- Percent of Women With High Weight for Height Risk Code; and
- Percent of Children With High Weight for Height Risk Code.

B1.3 Stage 1 Sampling: Selection of the Phase 1 Sample

The Stage 1 sampling was conducted in two phases. The process used to select the Phase 1 sample involved three steps: computation of the measure of size (MOS) used for Phase 1 selection, exclusion of ineligible units, and stratification and selection of the units.

B1.3.1 Measure of Size Computation

The sample design involved sampling sites with probabilities proportional to a measure of size (MOS) (i.e., PPS sampling). For the Phase 1 sample, the MOS was the expected number of eligible enrollees for the first-stage sampling unit, based on the April 2010 enrollment counts from the PC2010. That is, the MOS was calculated for each first-stage sampling unit by summing the total prenatal enrollment and 20 percent of the total enrollment of infants less than 3 months.[1] Based on the aforementioned eligibility considerations, units with a value less than 30 for this MOS (i.e., less than 1.5 enrollees per day, assuming 20 enrollment days per month) were considered ineligible.

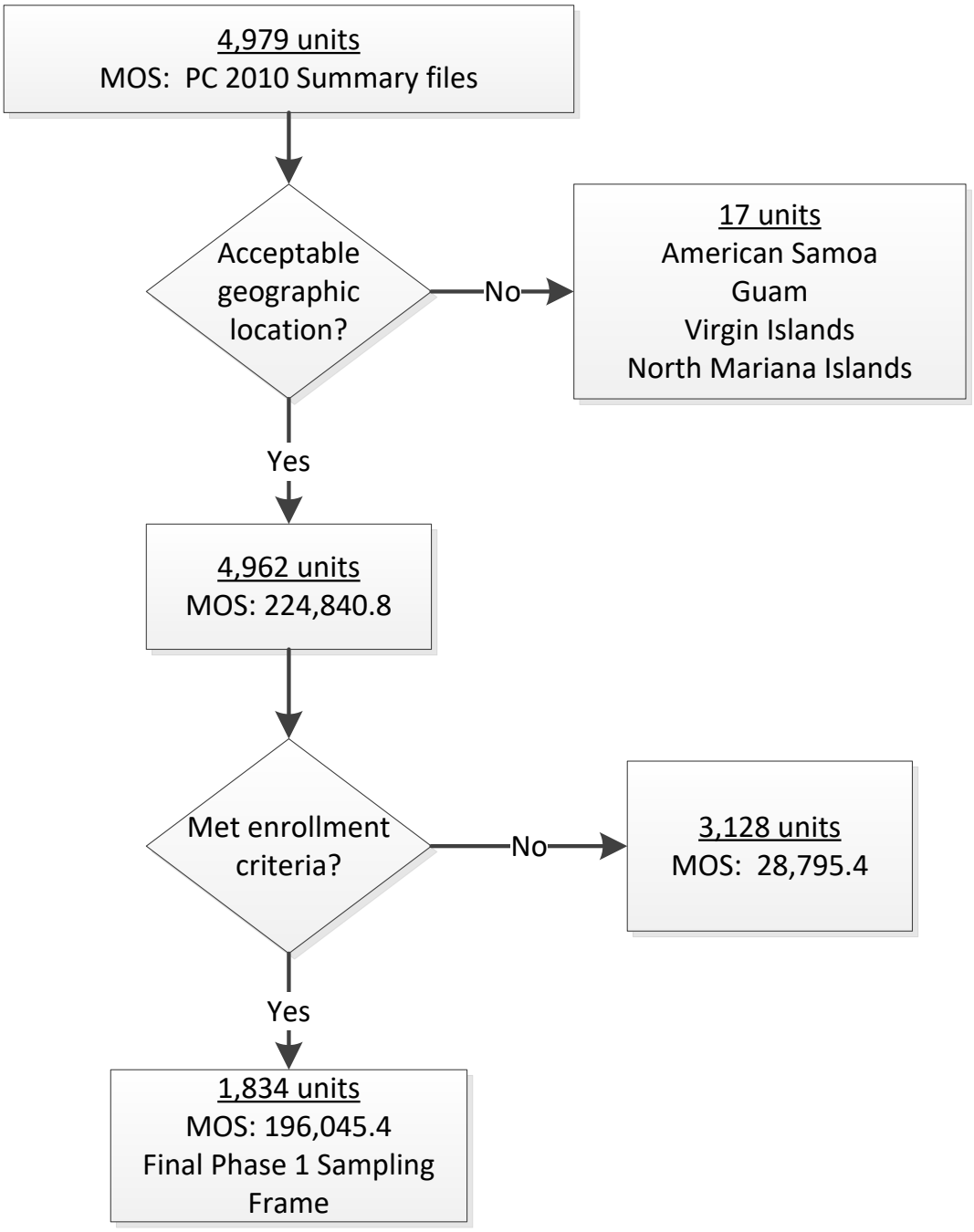
B1.3.2 Exclusion of Ineligible Units

As shown in Figure B1-2, a total of 4,979 units appeared on the PC2010 summary file that served as the basis for creating the sampling frame. Of these, a very small proportion (17 units) was dropped because of geographic location (American Samoa, Guam, Northern Mariana Islands, U.S. Virgin Islands). Since the units in these territories represented only 0.3 percent of the total sampling frame, this did not impact the representativeness of the frame. The remaining 4,962 units had a total MOS of 224,840.8. Of these, 3,128 units (with a total MOS of 28,795.4, about 12.8 percent of the total among geographically eligible units) were dropped because their MOS value was less than 30. As a

[1] The 20 percent figure is based on an estimate from the Early Childhood Longitudinal Study-Birth Cohort that 20 percent of infants enrolled in WIC were not enrolled prenatally.

result, the final Phase 1 sampling frame contained a total of 1,834 units, with a total MOS of 196,045.4.

Figure B1-2. Exclusion of ineligibles from unit selection process



B1.3.3 Stratification and Selection of the Phase 1 Sample

As noted above, the sample was designed to yield 80 sampled service sites. To achieve this, a total of 40 strata were formed, and ultimately (after two phases of selection) two sites were sampled from each of these strata. Five characteristics of the first-stage sampling unit or its SA were used to form the strata (note that the first three of these five characteristics are features of the State WIC Agency Plan that were used to group the WIC SA programs into categories):

- **Peer Counseling Program.** Whether the SA has a breastfeeding peer counseling program in place.[2]
- **Trained Paraprofessionals.** Whether SA policy allows for trained paraprofessionals to provide nutrition education (vs. requiring that staff that provide nutrition education have professional training or credentials).
- **Policy to Provide Formula.** Whether SA policy is to provide one can of formula for breastfeeding infants during the first 30 days of life.
- **Percent of Women Who Used Fully Breastfeeding Package.** This variable was an estimate of the percentage of women in the first-stage sampling unit who utilized the fully breastfeeding food package during the postpartum period. The PC2010 data were used to measure food-package selection by first-stage sampling unit, and this rate was computed by taking the ratio of the number of postpartum women who received the fully breastfeeding package during April of 2010 to the total number of postpartum women receiving any food package that same month.
- **Average of Children's and Mothers' High Weight for Height Rates.** The PC2010 data were used to estimate the percent's of children and of mothers who are "high weight for height"[3] at the first-stage sampling unit level, and these percentages were averaged together to get a measure of risk of being overweight for all participants at the first-stage sampling unit level.

Using these characteristics (i.e., combinations of different levels of these variables), the first-stage sampling units were grouped to form 40 fairly homogenous strata of roughly equal size (in terms of total MOS). Specifically, the first-stage sampling units in a given stratum all came from State Agencies in the same State WIC Agency Plan classification (based on the three SA plan

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[2] It turned out that there was no variation in this characteristic; all states reported offering a breastfeeding-peer counseling program.

[3] For children (12 months or older), "high weight for height" is determined based on nutrition risk code 110. For children 24 months and older, it is defined as higher than the 95th percentile of BMI for age. For children 12 to 24 months, it is defined as at risk of being overweight by virtue of having a mother or father who is obese (BMI of 30 or greater). For mothers, the criterion is a pregravid BMI of 25 or higher.

characteristics discussed above) and, to the extent possible, had similar fully breastfeeding and "high weight for height" rates.

One first-stage sampling unit (PHFE-WIC, in California) was, by itself, large enough (in terms of the total MOS) to constitute a stratum. That is, this unit (a local agency) was a certainty stratum, meaning that the unit was included in the first-stage sample with certainty. The service sites associated with the local agency were enumerated and sampled as described below.

Table B1-1 presents a tabulation of how the strata were defined. Specifically, each particular combination shown in the (1) cross-tabulation of the features of the WIC State Agency plan, (2) exclusively breastfeeding range, and (3) high weight for height range, constitutes a stratum. This tabulation shows, for each stratum, the total MOS, the number of units on the sampling frame, the number of units selected in the first phase, the number of sampled Phase 1 units that were eligible for Phase 2 selection, and the number of units sampled in the second phase. Each of the counts of units was broken down by local agencies and individual sites.

Besides the certainty stratum, there were a few cases in which a particular first-stage sampling unit was sufficiently large to be sampled with certainty in the first phase of selection; that is, the unit's measure of size (MOS) was greater than one-fourth of the total MOS for its stratum, so that its probability of selection in a probability proportional to size (PPS) design was 1.

Table B1-1. Definitions of the strata used for site sampling and key sampling statistics by stratum

Stratum ID	Features of the state WIC program	% of Women who used fully breastfeeding package	Children and mothers' high weight for height rates (%)	Total stratum measure of size	Number of											
					Units on frame			Phase 1 units sampled			Phase units sampled eligible for phase 2			Phase 2 units sampled		
					Total	Agencies	Sites	Total	Agencies	Sites	Total	Agencies	Sites	Total	Agencies	Sites
101	Does the state operate a breastfeeding peer counseling program? YES Does the State require that general nutrition education be provided by a professional staff member, e.g., dietitian, nurse? NO Is infant formula issued in the 1st month to partially breastfed infants? NO	0 – 10.5691	0 – 36.7147	4,997.2	65	1	64	4	0	4	4	0	4	2	0	2
102		0 – 10.5691	36.7147 – 45.9689	4,952.0	62	0	62	4	0	4	3	0	3	2	0	2
103		10.5691 – 14.4928	0 – 35.5971	4,994.0	61	4	57	4	0	4	4	0	4	2	0	2
104		10.5691 – 14.4928	35.5971 – 44.0943	5,000.0	49	3	46	4	0	4	3	0	3	2	0	2
105		14.4928 – 20.3863	0 – 33.5319	4,973.4	66	4	62	4	0	4	4	0	4	2	0	2
106		14.4928 – 20.3863	33.5319 – 44.3548	4,980.8	63	9	54	4	1	3	2	0	2	2	0	2
107		20.3863 – 63.5838	0 – 30.7242	5,019.4	59	28	31	4	3	1	4	3	1	2	1	1
108		20.3863 – 63.5838	30.7242 – 33.0749	4,988.0	43	16	27	4	2	2	4	2	2	2	1	1
109		20.3863 – 63.5838	33.0749 – 35.2011	4,999.6	52	14	38	4	2	2	4	2	2	2	1	1
110		20.3863 – 63.5838	35.2011 – 52.7565	4,968.4	67	22	45	4	2	2	2	0	2	2	0	2

Table B1-1. Definitions of the strata used for site sampling and key sampling statistics by stratum (continued)

Stratum ID	Features of the state WIC program	% of Women who used fully breastfeeding package	Children and mothers' high weight for height rates (%)	Total stratum measure of size	Number of											
					Units on frame			Phase 1 units sampled			Phase units sampled eligible for phase 2			Phase 2 units sampled		
					Total	Agencies	Sites	Total	Agencies	Sites	Total	Agencies	Sites	Total	Agencies	Sites
200	Does the state operate a breastfeeding peer counseling program? YES Does the State require that general nutrition education be provided by a professional staff member, e.g., dietitian, nurse? NO Is infant formula issued in the 1st month to partially breastfed infants? YES	0 – 100	0 – 100	6,340.4	1	1	0	1	1	0	1	1	0	1	1	0
201		0 – 14.2857	0 – 28.7699	4,874.6	64	14	50	4	1	3	4	1	3	2	0	2
202		0 – 14.2857	28.7699 – 30.9995	4,905.0	47	11	36	4	2	2	3	1	2	2	1	1
203		0 – 14.2857	30.9995 – 33.0338	4,839.8	47	10	37	4	1	3	3	1	2	2	0	2
204		0 – 14.2857	33.0338 – 34.1299	4,913.8	45	14	31	4	3	1	4	3	1	2	1	1
205		0 – 14.2857	34.1299 – 35.0733	4,893.4	48	12	36	4	1	3	4	1	3	2	1	1
206		0 – 14.2857	35.0733 – 35.8987	4,853.8	45	17	28	4	2	2	3	2	1	2	1	1
207		0 – 14.2857	35.8987 – 36.6585	4,881.4	45	18	27	4	3	1	4	3	1	2	2	0
208		0 – 14.2857	36.6585 – 37.5487	4,868.6	40	18	22	4	4	0	4	4	0	2	2	0
209		0 – 14.2857	37.5487 – 39.0369	4,961.8	39	18	21	4	1	3	4	1	3	2	0	2
210		0 – 14.2857	39.0369 – 40.9907	4,768.6	38	17	21	4	3	1	4	3	1	2	2	0
211		0 – 14.2857	40.9907 – 44.6064	4,982.6	53	21	32	4	3	1	4	3	1	2	1	1
212		0 – 14.2857	44.6064 – 61.7659	4,874.4	55	24	31	4	3	1	3	2	1	2	1	1
213		14.2857 – 20.9273	0 – 31.9917	4,934.6	36	9	27	4	2	2	4	2	2	2	2	0
214		14.2857 – 20.9273	31.9917 – 34.1434	4,837.4	45	7	38	4	1	3	4	1	3	2	1	1
215		14.2857 – 20.9273	34.1434 – 35.2664	5,028.0	29	10	19	4	1	3	3	1	2	2	1	1
216		14.2857 – 20.9273	35.2664 – 37.6706	4,989.8	47	19	28	4	2	2	3	2	1	2	1	1
217		14.2857 – 20.9273	37.6706 – 41.8135	4,935.6	49	17	32	4	2	2	4	2	2	2	2	0
218		14.2857 – 20.9273	41.8135 – 55.0665	4,860.4	49	19	30	4	2	2	3	2	1	2	2	0
219		20.9273 – 29.3196	0 – 32.3818	4,892.6	39	8	31	4	2	2	4	2	2	2	1	1
220		20.9273 – 29.3196	32.3818 – 36.7067	4,924.8	56	20	36	4	3	1	4	3	1	2	1	1
221		20.9273 – 29.3196	36.7067 – 38.5783	4,897.2	23	13	10	4	4	0	4	4	0	2	2	0
222		20.9273 – 29.3196	38.5783 – 52.1351	4,912.4	44	22	22	4	3	1	4	3	1	2	2	0
223		29.3196 – 35.9756	0 – 32.5106	4,823.4	30	18	12	4	4	0	3	3	0	2	2	0
224		29.3196 – 35.9756	32.5106 – 49.5159	4,706.6	36	20	16	4	2	2	4	2	2	2	1	1
225		35.9756 – 69.1358	0 – 32.6778	4,878.4	28	24	4	4	3	1	3	3	0	2	2	0
226		35.9756 – 69.1358	32.6778 – 47.0875	4,954.0	38	32	6	4	4	0	3	3	0	2	2	0

Table B1-1. Definitions of the strata used for site sampling and key sampling statistics by stratum (continued)

Stratum ID	Features of the state WIC program	% of Women who used fully breastfeeding package	Children and mothers' high weight for height rates (%)	Total stratum measure of size	Number of											
					Units on frame			Phase 1 units sampled			Phase units sampled eligible for phase 2			Phase 2 units sampled		
					Total	Agencies	Sites	Total	Agencies	Sites	Total	Agencies	Sites	Total	Agencies	Sites
301	Does the state operate a breastfeeding peer counseling program? YES Does the State require that general nutrition education be provided by a professional staff member, e.g., dietitian, nurse? YES Is infant formula issued in the 1st month to partially breastfed infants? N/A	0 – 7.6336	0 – 100	4,222.0	47	4	43	4	1	3	3	1	2	2	1	1
302		7.6336 – 33.3992	0 – 34.2542	4,262.8	37	10	27	4	3	1	3	2	1	2	2	0
303		7.6336 – 33.3992	34.2542 – 50.2087	4,154.4	47	6	41	4	1	3	4	1	3	2	1	1
Total				196,045.4	1,834	554	1,280	157	78	79	139	70	69	79	42	37

B1.3.4 Stage 1 Sampling: Selection of the Phase 2 Sample

Following the selection of the Phase 1 sample of 160 first-stage units, further work was undertaken to enumerate individual service sites (when the first-stage unit was a local agency), ascertain each unit's eligibility, and select the final sample of sites. During April 2012, 42 State Agencies were sent an introductory letter and asked to review a list of local agencies in their State in the Phase 1 sampling frame of 160 units and provide information needed for Phase 2 of sampling. The 42 State Agencies were divided into two groups based on the information they reported for the PC2010 census. The 21 State Agencies in Group A reported their local agencies on the census, but not the service sites under the local agencies. The 21 State Agencies in Group B reported their local agencies but also reported IDs for the sites under the local agencies. Group A was sent a list of all their local agencies on the sampling frame, along with the names of the sites within each local agency, based on information we obtained from their State and local web sites. They were asked to review the list of local agencies and service sites, remove sites that were not operational, and add sites that were missing from the list. State Agencies in Group B were sent a list of local agencies and the ID numbers of service sites under the local agencies, and were asked to provide the name of the site corresponding to the site number(s), and indicate whether or not the site(s) was expected to continue as an operational site for the next 12 months.

The State Agencies were also asked to provide five items of information about their sites on the frame that would be operational for the next 12 months: (1) number of days the site was open to conduct prenatal and infant enrollments during January 2012, (2) total number of participants served that month, (3) number of prenatal women enrolled during that month, (4) number of infants enrolled during that month, and (5) whether any of the prenatal and infant participants were enrolled at outreach locations affiliated with the site.

The information provided by the State Agencies was used to determine eligibility for the Phase 2 sample. Sites that were not expected to continue in operations for the next 12 months and sites that did not meet the eligibility criteria (in terms of enrollment flow) were designated as ineligible. If the first-stage sampling unit was a local agency, that unit was designated as ineligible if all sites associated with the local agency were ineligible; otherwise, that unit was eligible.

Subsampling (second-phase selection) of eligible first-stage sampling units was done to arrive at the final sample of first-stage sampling units. In each of the 40 strata (the same strata used for the Phase 1 sample) two first-stage units were sampled with equal probability from among the eligible units.

B1.4 Stage 2 Sampling

As shown in Figure B1-1, Stage 1 sampling units selected in the Phase 2 sample that were local agencies (i.e., consisted of more than one service site), went through a second stage of sampling to select one service site. For each first-stage sampling unit that was a local agency, the eligible service sites were listed. An MOS that reflected the expected average daily enrollment was obtained for each service site by summing the January 2012 prenatal enrollment and 20 percent of the January 2012 infant enrollment, and dividing this total by the number of enrollment days in January 2012. Within each local agency in the Phase 2 sample, exactly one service site was sampled from the eligible sites with probabilities proportional to this MOS. The final sample of service sites contained a total of 80 sites in 27 State agencies.

B1.5 Site Replacements

During site sampling, candidate replacement sites were designated for each sampled site. These replacements were available for use in the event that the sampled site was unable or unwilling to participate in the study. All replacements were selected at the same time as the original sample from the same stratum as the sampled sites and had a similar measure of size. This replacement of sites by matched substitutes is similar to imputation and thus does not affect the weights of any member of the sample. A total of six sites were replaced.

B1.6 Sampling New WIC Enrollees

B1.6.1 Recruitment Windows

The sample included all prenatal mothers or their babies less than 2.5 months old who were newly enrolled into WIC at the sampled site during a pre-specified recruitment window. Mothers were eligible to participate even if they had enrolled in WIC for a previous pregnancy or previous child. The recruitment window was a consecutive string of days in which all new WIC enrollees in that site were designated to be screened for eligibility and recruited into ITFPS-2. The length of the recruitment window for each site was predetermined based on the estimated amount of time that

would have been needed in July 2012[4] to yield 98 new WIC enrollees per site (the target sample size for each site). Since the flow of new WIC enrollees into the 80 sampled sites was decidedly different, the window length was much shorter in clinics with a "high flow" of new enrollees compared with clinics with a "low flow." The study screening and enrollment processes did not necessarily occur during the recruitment window, but the study participants must have enrolled in WIC at the service site during the recruitment period.

After notifying the sites of their selection into the study, we provided them enrollment data obtained from the WIC PC2010 dataset on their participation, prenatal and infant enrollment rates, and the site days of operation for January 2012. The sites were asked to identify any significant changes to the information (such as increases or decreases in participation or prenatal/infant enrollments between January and August), and to update the site schedule for enrolling new participants.

The length of the recruitment window for each site was calculated based on the updated enrollment figures and the total recruitment period was set at 20 weeks. The recruitment windows ranged from 4 to 77 days per site. The recruitment protocol called for staggering the launch of recruitment in the 80 sites over a nine week period and each site was randomly assigned to a "release group" which corresponded to one of the nine weeks that recruitment was launched. A site's eligibility for a given release group depended on the length of that site's recruitment window. For example, a site that required a 3-month recruitment window could not be assigned to the last release group. Thus, the randomization of recruitment windows took into account each site's window length but was also done in such a manner that the planned number of sites was assigned to each release group. The first and last release groups each included five sites while the remaining release groups each included 10 sites. In general, recruitment in the sites was launched on the Monday of the recruitment week.

The 20-week recruitment period began July 1, 2013 and ended November 18, 2013. Before starting recruitment we increased the recruitment window for each site by 3 percent to serve as a buffer based on new enrollment data that suggested the WIC enrollment was declining. However, even with the 3 percent buffer, after 4 weeks into recruitment with 40 sites in the field (August 1, 2013), we projected we would only reach about 84 percent of the estimated number of eligible WIC women relative to the expected numbers that were estimated in July 2012. As a result, all recruitment windows were extended by an additional 10 percent (with the exception of 5 sites where the full 10 percent extension could not be achieved while still ending recruitment on November 18).

[4] July 2012 was the month the sites provided updated enrollment counts and schedule information prior to calculating recruitment windows.

B1.6.2 Core and Supplemental Samples

Two samples were selected at each service site: a core longitudinal and supplemental cross-sectional sample. The core sample was originally designed to be an equal probability sample of all new enrollees. The supplemental sample was designed to focus on subpopulations with specific characteristics such as African American mothers and infants enrolled postnatally with no prenatal WIC exposure. The supplemental sample was not designed to be analyzed by itself but only in conjunction with the core sample. Under the original design, the two samples were to start out as equal in size with an average of 49 (one half of the total of 98) new enrollees each per service site. The supplemental sample was designed to be considerably smaller after screening and subsampling.

During recruitment, each pregnant client was asked if this was the first time she had enrolled for WIC during this pregnancy, and each mother of a newly enrolling infant was asked if she was enrolled in WIC during her pregnancy for the infant at hand. For both prenatal and postnatal enrollees, only first-time enrollees were eligible for the sample. With this approach, ineligible postpartum mothers and infants were immediately screened out of the sample. During recruitment, the sample was screened to determine race, ethnicity, trimester at enrollment, pre-pregnancy BMI, household composition, and income, and new enrollees not required to achieve the subgroup targets were subsampled from the supplemental sample. This approach was designed to drop approximately: 68 percent of white mothers; 81 percent of Hispanic mothers; 71 percent of mothers in their first trimester; 68 percent of mothers in their second or third trimester; 18 percent of mothers enrolling postnatally; 58 percent of obese mothers; 29 percent of overweight mothers; 71 percent of mother with low or normal pre-pregnancy BMI; 54 percent of mothers with income at or below 75 percent of poverty; 64 percent of mothers with income between 76-130 percent of poverty; and 69 percent of mothers with income above 130 percent of poverty. These rates were based on the sample sizes needed to support the precision requirements (power projections) and were determined by taking into account estimated population distributions.

Following the decision to extend the recruitment windows by 13 percent, the sample was closely monitored to determine whether recruitment targets could be met. Several weeks of tracking the enrollment of prenatal mothers and their infants into WIC in each of the 80 sites confirmed that we could not meet the projected study recruitment targets. To compensate we altered the study participant sampling process to eliminate the subsampling of participants in the supplemental sample. Additionally, the proportion of sampled cases designated for the core (versus supplemental) sample was revised to 87.5 percent (a change from the original 50 percent).

These changes were designed to meet the core target sample size (based on the lower than expected WIC enrollment flows that had been observed to date) and meet or exceed the overall target sample size. The core sample remains nationally representative. Following these changes, no eligible participant was subsampled out; thus, the demographic characteristics of the supplemental sample after the change differed considerably from the demographic profile before the change. These changes went into effect as of August 27, 2013. Cases completing the screener prior to August 27, 2013 were sampled using the original rates, and cases completing the screener on or after August 27, 2013 were sampled using the revised rates.

B1.6.3 Multiple Births

For those study mothers who had twins, triplets, and so on, a single infant was sampled at the first postnatal interview.

B1.7 Details of the Weighting Procedures

B1.7.1 Computation of Survey Weights

For the analyses in this report, survey weights were computed for:

- The prenatal respondents;
- The 1-month interview, 3-month interview, 5-month interview, 7-month interview, 9-month interview, 11-month interview, 13-month interview, 15-month interview, 18-month interview, 24-month interview, 30-month interview, and 36-month interview respondents (separately);
- A set of participants who responded to either the 1- or 3-month interview;
- A set of participants who responded to the prenatal interview, the 1-month interview, the 3-month interview, the 5-month interview, the 7-month interview, the 9-month interview, the 11-month interview, and the 13-month interview;
- A set of participants who responded to the prenatal interview, the 1-month interview, the 3-month interview, the 5-month interview, the 7-month interview, the 9-month interview, the 11-month interview, the 13-month interview, the 15-month interview, the 18-month interview, and the 24-month interview;

- A set of participants who responded to either the 1-month or the 3-month interview, and also responded to the 5-month interview, the 7-month interview, the 9-month interview, the 11-month interview, the 13-month interview, the 15-month interview, the 18-month interview, and the 24-month interview;
- A set of participants who responded to either the 1-month or the 3-month interview, and also responded to the 5-month interview, the 7-month interview, the 9-month interview, the 11-month interview, the 13-month interview, the 15-month interview, the 18-month interview, the 24-month interview, the 30-month interview, and the 36-month interview;
- A set of participants for whom birth length and weight measurements were available;
- A set of participants for whom 6-month length and weight measurements were available;
- A set of participants for whom 12-month length and weight measurements were available;
- A set of participants for whom 24-month length and weight measurements were available;
- A set of participants for whom 36-month length and weight measurements were available; and
- A set of participants for whom each of the 6-month, 12-month, 24-month, and 36-month length and weight measurements were available.

These weights account for differential probabilities of selection and nonresponse. For some analyses, weights were computed for the "combined" set of respondents (including both core and supplemental sample cases); for other analyses, weights were computed for the core sample only. (See below for further discussion of this.)

For each sampled site, the site-level base weight was computed as the reciprocal of the probability of selection of the site. For example, if a site was sampled with probability equal to 1/100, its base weight was 100. Because sites were sampled within strata with probabilities proportionate to their estimated size, there was variation in these probabilities. The site-level base weights varied from 4.9 to 64.9.

The site-level base weights were adjusted to account for the probability of sampling the participant within the site. This adjustment accounts for the length of the recruitment window at the site (relative to the total number of days the site was enrolling participants during the study recruitment

period). The resulting weight was the participant-level base weight, and these weights varied from 23.2 to 245.0.

As discussed in Section B1.3, two samples were selected at each site: a core longitudinal and supplemental sample. For some interviews, both the core and supplemental sample (combined) are interviewed, while for other interviews, only the core sample is interviewed. The participant weights for these interviews include factors to account for the subsampling of participants for the core sample and for the subsampling of participants in the supplemental sample, to produce core-only sample weights and combined sample weights. The weights for a particular interview are based on the sample to which the interview was administered.

For those study mothers who have multiple births, a single infant was sampled at the first postnatal interview, and the weights account for the sampling of the particular infant.

B1.7.2 Adjusting for Nonresponse

Nonresponse occurs as a result of respondents refusing or being unable to participate in some interviews. Because the set of participants who respond differs from interview to interview, the weights used to analyze data from a particular interview were developed to adjust for nonresponse to that particular interview. Some analyses involve participants who respond to a given combination of interviews, or those who respond to either one interview or another. In such cases, custom weights that adjust for nonresponse to the particular combination of interview were developed.

Specifically, to reduce the potential nonresponse bias, the base weights were adjusted to compensate for differential nonresponse. A weighting class adjustment (Brick and Kalton, 1996) was used to adjust for nonresponse. With this approach, weighting classes are formed (using variables known for respondents and non-respondents), and non-respondents' weights are redistributed to respondents within the same weighting class. Characteristics used to form the weighting classes should be associated with the probability of response as well as key survey outcome variables (Little and Vartivarian, 2003). In the early stages of recruitment for WIC ITFPS-2, however, very limited information was available for both respondents and non-respondents. The characteristics used to form weighting classes to adjust for nonresponse at each stage were as follows:

- **Adjusting for log nonresponse and nonresponse to the screener:** Service site.

- **Adjusting for nonresponse to the enrollment instrument or failure to consent to the study:** Mother's age, timing of WIC enrollment (1st trimester, 2nd trimester, 3rd trimester, postnatal), mother's weight category (overweight, obese, other), mother's Hispanic origin, mother's race, poverty status, and language.

- **Adjusting for prenatal interview nonresponse:** Timing of WIC enrollment, mother's age, language, and race.

- **Adjusting for 1-month interview nonresponse:**

  - **Core-only sample:** Timing of WIC enrollment, food security, mother's Hispanic origin, mother's weight category, mother's race, age, language, and poverty status.

  - **Combined sample (core and supplemental):** Timing of WIC enrollment, mother's race, mother's weight category, mother's Hispanic origin, age, food security, language, and poverty status.

- **Adjusting for 3-month interview nonresponse (Core-only sample):** Mother's weight category, food security, language, poverty status, race, timing of WIC enrollment, and mother's age.

- **Adjusting for nonresponse to both the 1- and 3-month interviews:**

  - **Core-only sample:** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, language, and mother's race.

  - **Combined sample (core and supplemental):** Food security, mother's weight category, mother's age, language, mother's race, timing of WIC enrollment, and poverty status.

- **Adjusting for 5-month interview nonresponse (Core-only sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, language, and mother's race.

- **Adjusting for 7-month interview nonresponse (Combined sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, and mother's race.

- **Adjusting for 9-month interview nonresponse (Core-only sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, language, and mother's race.

- **Adjusting for 11-month interview nonresponse (Core-only sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, language, and mother's race.

- **Adjusting for 13-month interview nonresponse (Combined sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, language, mother's race, and WIC enrollment status at 7 months.

- **Adjusting for nonresponse to any interview from the prenatal interview through the 13-month interview (Core-only sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, language, and mother's race.

- **Adjusting for nonresponse to the 1-month interview and the 3-month interview, or to any interview from the 5-month interview through the 13-month interview (Core-only sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, and mother's race**.**

- **Adjusting for nonresponse to the 1-month interview and the 3-month interview, or to any interview from the 5-month interview through the 24-month interview (Core-only sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, and mother's race**.**

- **Adjusting for 15-month interview nonresponse (Core-only sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, language, WIC enrollment status at 13 months, and mother's race.

- **Adjusting for 18-month interview nonresponse (Core-only sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, poverty status, language, WIC enrollment status at 15 months, and mother's race.

- **Adjusting for 24-month interview nonresponse (Combined sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, poverty status, language, WIC enrollment status at 13 months, and mother's race.

- **Adjusting for nonresponse to the 1-month interview and the 3-month interview, or to any interview from the 5-month interview through the 36-month interview (Core-only sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, language, and mother's race**.**

- **Adjusting for 30-month interview nonresponse (Combined sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, poverty status, language, mother's Hispanic origin, and mother's race.

- **Adjusting for 36-month interview nonresponse (Combined sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, poverty status, language, mother's Hispanic origin, and mother's race.

- **Adjusting for nonresponse (i.e., lack of availability) to the birth length and weight measurements (Combined sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, WIC enrollment status at 1 month, and mother's race.

- **Adjusting for nonresponse (i.e., lack of availability) to the 6-month length and weight measurements (Combined sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, language, WIC enrollment status at 3 months, and mother's race.

- **Adjusting for nonresponse (i.e., lack of availability) to the 12-month length and weight measurements (Combined sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, language, WIC enrollment status at 7 months, and mother's race.

- **Adjusting for nonresponse (i.e., lack of availability) to the 24-month length and weight measurements (Combined sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, WIC enrollment status at 13 months, and mother's race.

- **Adjusting for nonresponse (i.e., lack of availability) to the 36-month length and weight measurements (Combined sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, poverty status, language, and mother's race.

- **Adjusting for nonresponse (i.e., lack of availability) to any of the 6-month, 12-month, 24-month, and/or 36-month length and weight measurements (Combined sample):** Food security, mother's weight category, mother's age, timing of WIC enrollment, mother's Hispanic origin, language, and mother's race.

These adjustments were performed sequentially; that is, the base weights were adjusted for log nonresponse and nonresponse to the screener, these adjusted weights were adjusted for nonresponse to the enrollment instrument or failure to consent, and these adjusted weights were adjusted for nonresponse to the particular interview(s). Within these weighting classes, a weighted response rate was computed (using the weights produced in the previous adjustment) and applied to the weights from the previous adjustment (i.e., the weights from the previous adjustment were divided by the weighted response rate in the weighting class) to obtain the corresponding nonresponse-adjusted weights.

B1.7.3 Replicate Weights

In addition to the full sample weights described above, a series of replicate weights were created and attached to each data record for variance estimation. Replication methods provide a relatively simple and robust approach to estimating sampling variances for complex survey data (Rust and Rao, 1996). The basic replication approach is to repeatedly select portions of the sample ("replicates") and then

to apply the weighting process developed for the full sample to each replicate separately. The estimate of interest is calculated for each replicate. The variability among these estimates is then used to estimate the variance of the full sample statistics. The replicate weights were used to calculate standard errors of the survey-based estimates and to conduct significance tests and other analyses.

Different approaches can be used to create these replicates. For WIC ITFPS-2, 40 replicates were created, and the replication approach that was used is a modified balanced repeated replication (BRR) method suggested by Fay (Judkins, 1990). When estimating the variance of ratios of rare subsets, one problem that occasionally arises from standard BRR is that one or more replicate estimates will be undefined due to zero denominators. Instead of increasing the weights of one half-sample by 100 percent and decreasing the weights of the other half-sample to zero as in standard BRR, Fay's method perturbs the weights by ±100 (1-K) percent where K is referred to as "Fay's factor." The perturbation factor for standard BRR is 100 percent, or K=0. For WIC ITFPS-2, K=0.3 was used.

B1.7.4 Determining Which Survey Weight to Use for a Particular Analysis

As discussed in section B1.7.1, several different sets of weights have been computed for diferent analysis purposes. In planning for an analysis, a critical early step is to identify the weight that is appropriate for that analysis. To do this, the analyst should determine how the set of cases being used in the analysis is defined. It is important to note that the choice of survey weight is not a function specifically of the variables being used, but rather of the set of cases being used in the analysis. For example, if the analysis involves estimating the proportion of infants with medical conditions affecting feeding by 5 months of age, by whether or not they were exclusively breastfed through 5 months, including other covariates from the baseline (1- or 3-month) interview, then the set of cases included in the analysis are those who completed the 5-month interview; thus, the appropriate weight is the 5-month interview (cross-sectional) weight. To consider another example, if the analysis involves examining how the introduction of sugar-sweetened beverages by 13 months of age is related to prenatal nutrition education provided by the WIC program and duration of breastfeeding (as measured by whether the infant was still being breastfed at each of 5-, 7-, 9-, 11-, and 13-months), the set of cases included in the analysis are those who completed the prenatal interview, a baseline (1- or 3-month) interview, and each of the 5-, 7-, 9-, 11-, and 13-month interviews; thus, the appropriate weight for that analysis would be the (longitudinal) weight computed for the set of participants who responded to the prenatal interview, the 1-month

interview, the 3-month interview, the 5-month interview, the 7-month interview, the 9-month interview, the 11-month interview, and the 13-month interview.

B1.8 Imputation

Imputation was used to adjust for item nonresponse (i.e., missing data for particular items among those who respond to a given wave). All the key socio-demographic variables (see Section 1.7) are imputed for the total sample. As with weighting, a carefully designed imputation procedure aims to reduce bias due to nonresponse (in this case, item nonresponse). The hot deck imputation method was used to generate the imputations (Kalton and Kasprzyk, 1982). With this approach, imputation cells are formed by cross-classifying variables that are associated with the variable being imputed and, where possible, also associated with the probability of response to the variable being imputed.

B1.9 References

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Appendix B2

B2a: Additional Analysis Details from Chapter 2

B2b: Additional Analysis Details from Chapter 3

B2c: Additional Analysis Details from Chapter 4

B2d: Additional Analysis Details from Chapter 6

Appendix B2a

Additional Analysis Details from Chapter 2

Appendix B2a
Additional Analysis Details from Chapter 2

Table B2a-1 contains details on the percentage of WIC ITFPS-2 caregivers working and going to school by work status at 24 and 30 months.

Table B2a-1. The percentage of WIC ITFPS-2 caregivers working and going to school by work status

Interview Month	Full-time, only	Full-time and school	Part-time only	Part-time and school	Total	Unweighted n	Weighted n
Month 24	23.4%	4.0%	16.7%	4.0%	48.1%	2,456	441,723
Month 30	26.2	4.9	14.3	3.8	49.1	2,621	441,560

Table B2a-2 contains details on the percentage of WIC ITFPS-2 caregivers working and going to school by work status at 24 and 30 months.

Table B2a-2. The percentage of WIC ITFPS-2 caregivers who attend school by work status

Interview Month	School only	Also working part-time	Also working full-time	Total	Unweighted n	Weighted n
Month 24	7.5%	4.0%	4.0%	15.5%	2,456	441,723
Month 30	6.1%	3.8%	4.9%	14.89%	2,621	441,560

Table B2a-3 contains details on the percentage of WIC ITFPS-2 caregivers working and/or going to school at 30 months by select socio-demographic characteristics.

Table B2a-3. Percentage of study mothers working and/or going to school at 30 months by select socio-demographic characteristics

Select socio-demographic subgroups	Work and/or school % (SE)	Unweighted n[a]	Weighted n
Race[b]			
African American	67.6 (2.2)	754	95,674
White	51.6 (1.4)	1,475	260,010
Other	52.8 (3.4)	394	86,161
Ethnicity[b]			
Hispanic	49.1 (2.1)	971	204,448
Non-Hispanic	60.6 (1.8)	1,652	237,397
Marital status[b]			
Married	46.6 (2.2)	908	159,046
Not married	60.1 (1.6)	1,715	282,799
Household food security			
High or marginal	55.7 (1.6)	1,890	319,669
Low	51.5 (2.6)	443	71,177
Very low	57.4 (4.1)	290	50,999
Participation in non-WIC benefit program(s)[b]			
Does not participate in other programs	65.0 (2.3)	436	75,232
Participates in SNAP and possibly other programs	52.2 (1.9)	1,312	218,077
Participates in other program(s) and is not on SNAP	54.9 (2.5)	875	148,536
Timing of WIC enrollment			
1st trimester	53.1 (2.6)	843	137,264
2nd trimester	55.6 (1.9)	1,081	174,590
3rd trimester	57.8 (3.2)	372	69,804
Postnatal	56.3 (3.2)	327	60,188
Mother's BMI category at 24 months[b]			
Normal or Underweight	54.9 (2.3)	935	165,465
Overweight	60.8 (2.2)	751	123,737
Obese	51.2 (2.3)	937	152,643
Income poverty[b]			
75% of poverty guideline	47.5 (2.1)	1,245	209,768
Above 75% but no more than 130% of guideline	58.8 (2.1)	821	141,686
Above 130% of poverty guideline	67.7 (2.4)	557	90,391
Age of mother at child's birth			
16-19 years	58.7 (4.3)	289	51,567
20-25 years	58.6 (2.1)	1,065	176,660
26+ years	51.7 (2.2)	1,269	213,618
Child WIC participation status at 24 months[b]			
Receiving WIC	52.6 (1.8)	1,838	318,062
Not receiving WIC	62.1 (1.8)	785	123,783

[a] n is the number of respondents who completed the interview. n may vary slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

Data source: 30-Month Interviews, Questions SD27 and SD29; Cross-sectional weights for 30-Month Interview are used for this table.

Table B2a-4 contains details on the percentage of WIC ITFPS-2 caregivers ever or currently using child care at 24 and 30 months.

Table B2a-4. The percentage of study children in regular child care, currently and ever

Interview Month	Currently Using Child Care	Ever Used Child Care	Unweighted n	Weighted n
Month 24	43.7%	60.0%	2,461	442,405
Month 30	65.3%	50.3%	2,625	442,408

Table B2a-5 contains details on the percentage of WIC ITFPS-2 caregivers using regular child care at 30 months by select socio-demographic characteristics.

Table B2a-5. Percentage of study mothers using regular child care at 30 months by select socio-demographic characteristics

Select socio-demographic subgroups	Using regular child care % (SE)	Unweighted n[a]	Weighted n
Race[b]			
African American	67.7 (3.3)%	754	95,674
White	45.7 (1.6)	1,475	260,010
Other	46.1 (3.3)	394	86,161
Ethnicity[b]			
Hispanic	43.0 (2.2)	971	204,448
Non-Hispanic	56.7 (2.2)	1,652	237,397
Marital status			
Married	39.9 (2.5)	908	159,046
Not married	56.3 (2.0)	1,715	282,799
Household food security			
High or marginal	50.3 (2.0)	1,890	319,669
Low	49.0 (3.3)	443	71,177
Very low	52.5 (4.8)	290	50,999
Participation in non-WIC benefit program(s)			
Does not participate in other programs	57.3 (3.6)	436	75,232
Participates in SNAP and possibly other programs	47.5 (1.7)	1,312	218,077
Participates in other program(s) and is not on SNAP	51.0 (2.5)	875	148,536
Timing of WIC enrollment			
1st trimester	51.2 (2.9)	843	137,264
2nd trimester	49.0 (2.3)	1,081	174,590
3rd trimester	51.1 (3.1)	372	69,804
Postnatal	50.7 (3.8)	327	60,188
Mother's BMI category at 24 months			
Normal or Underweight	48.9 (2.2)	935	165,465
Overweight	52.7 (3.0)	751	123,737
Obese	49.9 (3.0)	937	152,643
Income poverty			
75% of poverty guideline	43.4 (2.1)	1,245	209,768
Above 75% but no more than 130% of guideline	51.8 (2.8)	821	141,686
Above 130% of poverty guideline	64.5 (3.1)	557	90,391
Age of mother at child's birth[b]			
16-19 years	60.7 (3.7)	289	51,567
20-25 years	51.7 (2.5)	1,065	176,660
26+ years	46.8 (2.6)	1,269	213,618
Child WIC participation status at 24 months[b]			
Receiving WIC	48.3 (2.0)	1,838	318,062
Not receiving WIC	55.6 (2.6)	785	123,783

[a] n is the number of respondents who completed the interview. n may vary slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

Data source: 30-Month Interviews, Question MH19; Cross-sectional weights for 30-Month Interview are used for this table.

Table B2a-6 contains details on the percentage of WIC ITFPS-2 children and/or mothers currently receiving WIC at 30 and 36 months.

Table B2a-4. The percentage of study children and/or mothers receiving WIC at 30 and 36 months

Interview Month	Receiving WIC	Not Receiving WIC	Unweighted n	Weighted n
Month 30	62.5%	37.5%	2,623	441,880
Month 36	59.4%	40.6%	2,606	441,571

Table B2a-7a contains details on the percentage of WIC ITFPS-2 study children receiving WIC at 30 months by select socio-demographic characteristics.

Table B2a-7a. Percentage of study children receiving WIC at 30 months by select socio-demographic characteristics

Select socio-demographic subgroups	Receiving WIC at 30 months % (SE)		Unweighted n[a]	Weighted n
	Yes	No		
Race[b]				
African American	58.6% (2.1)	41.4% (2.1)	754	95,674
White	59.9 (2.7)	40.1 (2.7)	1,475	260,010
Other	74.7 (3.5)	25.3 (3.5)	394	86,161
Ethnicity[b]				
Hispanic	73.0 (3.2)	27.0 (3.2)	971	204,448
Non-Hispanic	53.5 (1.6)	46.5 (1.6)	1,652	237,397
Marital status				
Married	60.4 (2.7)	39.6 (2.7)	908	159,046
Not married	63.8 (2.4)	36.2 (2.4)	1,715	282,799
Household food security				
High or marginal	63.0 (2.5)	37.0 (2.5)	1,890	319,669
Low	60.9 (3.3)	39.1 (3.3)	443	71,177
Very low	61.6 (3.7)	38.4 (3.7)	290	50,999
Participation in non-WIC benefit program(s)[b]				
Does not participate in other programs	44.6 (3.7)	55.4 (3.7)	436	75,232
Participates in SNAP and possibly other programs	70.0 (2.3)	30.0 (2.3)	1,312	218,077
Participates in other program(s) and is not on SNAP	60.6 (3.0)	39.4 (3.0)	875	148,536
Timing of WIC enrollment[b]				
1st trimester	73.2 (2.7)	26.8 (2.7)	843	137,264
2nd trimester	62.4 (2.3)	37.6 (2.3)	1,081	174,590
3rd trimester	54.6 (4.1)	45.4 (4.1)	372	69,804
Postnatal	47.7 (3.2)	52.3 (3.2)	327	60,188
Mother's BMI category at 24 months[b]				
Normal or Underweight	57.4 (2.8)	42.6 (2.8)	935	165,465
Overweight	63.1 (2.6)	36.9 (2.6)	751	123,737
Obese	67.7 (2.8)	32.3 (2.8)	937	152,643
Income poverty[b]				
75% of poverty guideline	70.5 (2.9)	29.5 (2.9)	1,245	209,768
Above 75% but no more than 130% of guideline	63.2 (2.6)	36.8 (2.6)	821	141,686
Above 130% of poverty guideline	43.0 (3.1)	57.0 (3.1)	557	90,391
Age of mother at child's birth[b]				
16-19 years	58.8 (5.2)	41.2 (5.2)	289	51,567
20-25 years	59.4 (2.3)	40.6 (2.3)	1,065	176,660
26+ years	66.0 (2.6)	34.0 (2.6)	1,269	213,618
Child WIC participation status at 24 months[b]				
Receiving WIC	80.7 (1.5)	19.3 (1.5)	1,838	318,062
Not receiving WIC	15.9 (1.5)	84.1 (1.5)	785	123,783

[a] n is the number of respondents who completed the interview. n may vary slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

Table B2a-7b contains details on the percentage of WIC ITFPS-2 study children receiving WIC at 36 months by select socio-demographic characteristics.

Table B2a-7b. Percentage of study mothers receiving WIC at 36 months by select socio-demographic characteristics

Select socio-demographic subgroups	Receiving WIC at 36 months % (SE)		Unweighted n[a]	Weighted n
	Yes	No		
Race[b]				
African American	56.1% (2.1)	43.9% (2.1)	752	95,255
White	57.2 (2.3)	42.8 (2.3)	1,460	261,152
Other	69.7 (3.6)	30.3 (3.6)	394	85,164
Ethnicity[b]				
Hispanic	70.1 (2.8)	29.9 (2.8)	990	206,499
Non-Hispanic	50.0 (1.8)	50.0 (1.8)	1,616	235,071
Marital status				
Married	58.9 (3.0)	41.1 (3.0)	922	163,824
Not married	59.7 (2.2)	40.3 (2.2)	1,684	277,747
Household food security				
High or marginal	59.4 (2.4)	40.6 (2.4)	1,878	318,971
Low	57.4 (3.1)	42.6 (3.1)	443	73,409
Very low	62.2 (4.5)	37.8 (4.5)	285	49,191
Participation in non-WIC benefit program(s) [b]				
Does not participate in other programs	39.0 (4.0)	61.0 (4.0)	416	73,691
Participates in SNAP and possibly other programs	66.7 (2.0)	33.3 (2.0)	1,315	221,057
Participates in other program(s) and is not on SNAP	58.6 (2.7)	41.4 (2.7)	875	146,823
Timing of WIC enrollment[b]				
1st trimester	69.1 (2.7)	30.9 (2.7)	841	139,590
2nd trimester	61.0 (2.7)	39.0 (2.7)	1,064	175,632
3rd trimester	47.2 (3.2)	52.8 (3.2)	374	67,480
Postnatal	45.5 (3.2)	54.5 (3.2)	327	58,868
Mother's BMI category at 24 months				
Normal or Underweight	58.1 (2.9)	41.9 (2.9)	924	168,471
Overweight	57.4 (2.4)	42.6 (2.4)	748	122,592
Obese	62.5 (2.5)	37.5 (2.5)	934	150,508
Income poverty[b]				
75% of poverty guideline	67.4 (2.7)	32.6 (2.7)	1,242	208,160
Above 75% but no more than 130% of guideline	59.8 (2.8)	40.2 (2.8)	806	142,100
Above 130% of poverty guideline	40.7 (2.7)	59.3 (2.7)	558	91,310
Age of mother at child's birth				
16-19 years	60.3 (4.9)	39.7 (4.9)	278	49,668
20-25 years	56.1 (2.5)	43.9 (2.5)	1,045	174,757
26+ years	61.8 (2.5)	38.2 (2.5)	1,283	217,145
Child WIC participation status at 24 months[b]				
Receiving WIC	75.0 (1.7)	25.0 (1.7)	1,822	316,701
Not receiving WIC	19.8 (1.5)	80.2 (1.5)	784	124,869

[a] n is the number of respondents who completed the interview. n may vary slightly due to item non-response.

[b] Chi-square statistic testing of race differences is significant at $p \leq 0.05$

Table B2a-8a contains details on the percentage of WIC ITFPS-2 households receiving SNAP 30 months by select socio-demographic characteristics.

Table B2a-8a. Percentage of households receiving SNAP at 30 months by select socio-demographic characteristics

Select socio-demographic categories	Receiving SNAP at 30 months % (SE)		Unweighted n[a]	Weighted n
	Yes	No		
Race[b]				
African American	63.9% (2.7)	36.1% (2.7)	754	95,674
White	47.1 (1.9)	52.9 (1.9)	1,475	260,010
Other	42.0 (3.6)	58.0 (3.6)	394	86,161
Ethnicity				
Hispanic	49.9 (2.5)	50.1 (2.5)	971	204,448
Non-Hispanic	49.7 (1.8)	50.3 (1.8)	1,652	237,397
Marital status[b]				
Married	35.1 (2.2)	64.9 (2.2)	908	159,046
Not married	58.0 (1.6)	42.0 (1.6)	1,715	282,799
Household food security				
High or marginal	49.0 (1.8)	51.0 (1.8)	1,890	319,669
Low	53.3 (2.7)	46.7 (2.7)	443	71,177
Very low	49.9 (3.5)	50.1 (3.5)	290	50,999
Timing of WIC enrollment				
1st trimester	52.6 (2.3)	47.4 (2.3)	843	137,264
2nd trimester	50.5 (2.3)	49.5 (2.3)	1,081	174,590
3rd trimester	45.8 (3.7)	54.2 (3.7)	372	69,804
Postnatal	46.0 (4.3)	54.0 (4.3)	327	60,188
Mother's BMI category at 24 months[b]				
Normal or Underweight	43.7 (1.9)	56.3 (1.9)	935	165,465
Overweight	52.8 (2.4)	47.2 (2.4)	751	123,737
Obese	53.9 (2.8)	46.1 (2.8)	937	152,643
Income poverty[b]				
75% of poverty guideline	67.8 (2.3)	32.2 (2.3)	1,245	209,768
Above 75% but no more than 130% of guideline	40.9 (2.8)	59.1 (2.8)	821	141,686
Above 130% of poverty guideline	21.9 (2.6)	78.1 (2.6)	557	90,391
Age of mother at child's birth				
16-19 years	50.6 (5.0)	49.4 (5.0)	289	51,567
20-25 years	52.3 (2.6)	47.7 (2.6)	1,065	176,660
26+ years	47.5 (1.7)	52.5 (1.7)	1,269	213,618
Child WIC participation status at 24 months[b]				
Receiving WIC	55.5 (2.0)	44.5 (2.0)	1,838	318,062
Not receiving WIC	35.0 (1.9)	65.0 (1.9)	785	123,783

[a] n is the number of respondents who completed the interview. n may vary slightly due to item non-response.

[b] Chi-square statistic testing of race differences is significant at $p \leq 0.05$.

Table B2a-8b contains details on the percentage of WIC ITFPS-2 households receiving SNAP at 36 months by select socio-demographic characteristics.

Table B2a-8b. Percentage of study mothers receiving SNAP at 36 months by select socio-demographic characteristics

Select socio-demographic categories	Receiving SNAP at 36 months % (SE)		Unweighted n[a]	Weighted n
	Yes	No		
Race[b]				
African American	62.7% (3.0)	37.3% (3.0)	752	95,255
White	45.7 (1.8)	54.3 (1.8)	1,460	261,152
Other	43.4 (3.2)	56.6 (3.2)	394	85,164
Ethnicity				
Hispanic	48.9 (2.6)	51.1 (2.6)	990	206,499
Non-Hispanic	49.0 (1.9)	51.0 (1.9)	1,616	235,071
Marital status[b]				
Married	33.4 (2.0)	66.6 (2.0)	922	163,824
Not married	58.1 (1.8)	41.9 (1.8)	1,684	277,747
Household food security				
High or marginal	48.1 (1.9)	51.9 (1.9)	1,878	318,971
Low	50.5 (2.3)	49.5 (2.3)	443	73,409
Very low	51.9 (4.0)	48.1 (4.0)	285	49,191
Timing of WIC enrollment				
1st trimester	51.6 (2.4)	48.4 (2.4)	841	139,590
2nd trimester	50.6 (2.4)	49.4 (2.4)	1,064	175,632
3rd trimester	45.2 (3.7)	54.8 (3.7)	374	67,480
Postnatal	42.0 (3.6)	58.0 (3.6)	327	58,868
Mother's BMI category at 24 months[b]				
Normal or Underweight	43.2 (2.6)	56.8 (2.6)	924	168,471
Overweight	52.7 (2.5)	47.3 (2.5)	748	122,592
Obese	52.3 (2.5)	47.7 (2.5)	934	150,508
Income poverty[b]				
75% of poverty guideline	67.3 (2.5)	32.7 (2.5)	1,242	208,160
Above 75% but no more than 130% of guideline	39.4 (2.4)	60.6 (2.4)	806	142,100
Above 130% of poverty guideline	22.0 (2.9)	78.0 (2.9)	558	91,310
Age of mother at child's birth				
16-19 years	55.3 (4.8)	44.7 (4.8)	278	49,668
20-25 years	51.2 (2.4)	48.8 (2.4)	1,045	174,757
26+ years	45.7 (1.7)	54.3 (1.7)	1,283	217,145
Child WIC participation status at 24 months[b]				
Receiving WIC	54.5 (2.0)	45.5 (2.0)	1,822	316,701
Not receiving WIC	34.7 (2.1)	65.3 (2.1)	784	124,869

[a] n is the number of respondents who completed the interview. n may vary slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

Table B2a-9a contains details on the percentage of WIC ITFPS-2 households receiving NSLP, SBP, or SFSP 30 months by select socio-demographic characteristics.

Table B2a-9a. Percentage of households receiving NSLP, SBP, or SFSP at 30 months by select socio-demographic characteristics

Select socio-demographic categories	Receiving NSLP, SBP, or SFSP at 30 months % (SE)		Unweighted n[a]	Weighted n
	Yes	No		
Race				
African American	35.3% (2.2)	64.7% (2.2)	754	95,674
White	34.2 (2.0)	65.8 (2.0)	1,475	260,010
Other	35.2 (3.7)	64.8 (3.7)	394	86,161
Ethnicity				
Hispanic	37.3 (3.4)	62.7 (3.4)	971	204,448
Non-Hispanic	32.4 (1.3)	67.6 (1.3)	1,652	237,397
Marital status[b]				
Married	36.7 (2.6)	63.3 (2.6)	908	159,046
Not married	33.5 (2.0)	66.5 (2.0)	1,715	282,799
Household food security[b]				
High or marginal	32.0 (1.8)	68.0 (1.8)	1,890	319,669
Low	40.1 (3.0)	59.9 (3.0)	443	71,177
Very low	43.7 (3.4)	56.3 (3.4)	290	50,999
Timing of WIC enrollment				
1st trimester	38.9 (3.3)	61.1 (3.3)	843	137,264
2nd trimester	32.1 (2.0)	67.9 (2.0)	1,081	174,590
3rd trimester	33.3 (3.3)	66.7 (3.3)	372	69,804
Postnatal	33.9 (3.2)	66.1 (3.2)	327	60,188
Mother's BMI category at 24 months[b]				
Normal or Underweight	29.7 (2.0)	70.3 (2.0)	935	165,465
Overweight	37.5 (2.5)	62.5 (2.5)	751	123,737
Obese	37.7 (2.6)	62.3 (2.6)	937	152,643
Income poverty[b]				
75% of poverty guideline	40.1 (2.8)	59.9 (2.8)	1,245	209,768
Above 75% but no more than 130% of guideline	35.8 (1.9)	64.2 (1.9)	821	141,686
Above 130% of poverty guideline	20.2 (2.5)	79.8 (2.5)	557	90,391
Age of mother at child's birth[b]				
16-19 years	13.9 (3.5)	86.1 (3.5)	289	51,567
20-25 years	24.1 (1.5)	75.9 (1.5)	1,065	176,660
26+ years	48.4 (2.4)	51.6 (2.4)	1,269	213,618
Child WIC participation status at 24 months[b]				
Receiving WIC	38.3 (2.2)	61.7 (2.2)	1,838	318,062
Not receiving WIC	25.2 (1.8)	74.8 (1.8)	785	123,783

[a] n is the number of respondents who completed the interview. n may vary slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

Table B2a-9b contains details on the percentage of WIC ITFPS-2 households receiving NSLP, SBP, or SFSP at 36 months by select socio-demographic characteristics.

Table B2a-9b. Percentage of study mothers receiving NSLP, SBP, or SFSP at 36 months by select socio-demographic characteristics

Select socio-demographic categories	Receiving NSLP, SBP, or SFSP at 36 months % (SE)		Unweighted n[a]	Weighted n
	Yes	No		
Race				
African American	38.2% (2.4)	61.8% (2.4)	752	95,255
White	35.9 (2.0)	64.1 (2.0)	1,460	261,152
Other	37.4 (4.4)	62.6 (4.4)	394	85,164
Ethnicity				
Hispanic	39.7 (3.3)	60.3 (3.3)	990	206,499
Non-Hispanic	34.0 (1.2)	66.0 (1.2)	1,616	235,071
Marital status[b]				
Married	40.8 (2.5)	59.2 (2.5)	922	163,824
Not married	34.2 (1.8)	65.8 (1.8)	1,684	277,747
Household food security[b]				
High or marginal	34.5 (1.7)	65.5 (1.7)	1,878	318,971
Low	42.2 (3.3)	57.8 (3.3)	443	73,409
Very low	42.6 (3.2)	57.4 (3.2)	285	49,191
Timing of WIC enrollment[b]				
1st trimester	40.1 (3.2)	59.9 (3.2)	841	139,590
2nd trimester	38.5 (1.9)	61.5 (1.9)	1,064	175,632
3rd trimester	33.1 (2.8)	66.9 (2.8)	374	67,480
Postnatal	26.9 (3.2)	73.1 (3.2)	327	58,868
Mother's BMI category at 24 months[b]				
Normal or Underweight	32.8 (1.9)	67.2 (1.9)	924	168,471
Overweight	39.5 (2.5)	60.5 (2.5)	748	122,592
Obese	38.6 (2.3)	61.4 (2.3)	934	150,508
Income poverty[b]				
75% of poverty guideline	42.7 (3.0)	57.3 (3.0)	1,242	208,160
Above 75% but no more than 130% of guideline	37.2 (2.0)	62.8 (2.0)	806	142,100
Above 130% of poverty guideline	22.1 (2.2)	77.9 (2.2)	558	91,310
Age of mother at child's birth[b]				
16-19 years	13.7 (3.5)	86.3 (3.5)	278	49,668
20-25 years	26.9 (1.6)	73.1 (1.6)	1,045	174,757
26+ years	49.7 (2.2)	50.3 (2.2)	1,283	217,145
Child WIC participation status at 24 months[b]				
Receiving WIC	40.1 (2.2)	59.9 (2.2)	1,822	316,701
Not receiving WIC	27.9 (1.7)	72.1 (1.7)	784	124,869

[a] n is the number of respondents who completed the interview. n may vary slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

Table B2a-10a contains details on the percentage of WIC ITFPS-2 households receiving Medicaid at 30 months by select socio-demographic characteristics.

Table B2a-10a.Percentage of study households with someone receiving Medicaid at 30 months by select socio-demographic characteristics

Select socio-demographic categories	Receiving Medicaid at 30 months % (SE)		Unweighted n[a]	Weighted n
	Yes	No		
Race				
African American	77.8 (1.5)	22.2 (1.5)	754	77.8 (1.5)
White	72.3 (1.7)	27.7 (1.7)	1,469	72.3 (1.7)
Other	71.3 (3.6)	28.7 (3.6)	394	71.3 (3.6)
Ethnicity				
Hispanic	74.7 (2.0)	25.3 (2.0)	970	204,141
Non-Hispanic	72.1 (1.9)	27.9 (1.9)	1,647	236,479
Marital status[b]				
Married	63.8 (3.0)	36.2 (3.0)	906	158,587
Not married	78.7 (1.3)	21.3 (1.3)	1,711	282,034
Household food security				
High or marginal	74.1 (1.5)	25.9 (1.5)	1,887	318,885
Low	70.6 (3.1)	29.4 (3.1)	441	70,968
Very low	72.5 (2.9)	27.5 (2.9)	289	50,767
Timing of WIC enrollment[b]				
1st trimester	79.1 (2.3)	20.9 (2.3)	841	136,689
2nd trimester	73.7 (1.7)	26.3 (1.7)	1,079	174,130
3rd trimester	68.3 (2.8)	31.7 (2.8)	370	69,615
Postnatal	64.9 (2.7)	35.1 (2.7)	327	60,188
Mother's BMI category at 24 months				
Normal or Underweight	70.3 (1.9)	29.7 (1.9)	934	165,353
Overweight	76.1 (2.1)	23.9 (2.1)	748	123,223
Obese	74.3 (2.2)	25.7 (2.2)	935	152,045
Income poverty[b]				
75% of poverty guideline	82.4 (1.6)	17.6 (1.6)	1,242	209,062
Above 75% but no more than 130% of guideline	73.8 (2.1)	26.2 (2.1)	820	141,532
Above 130% of poverty guideline	51.6 (2.6)	48.4 (2.6)	555	90,028
Age of mother at child's birth				
16-19 years	69.8 (4.3)	30.2 (4.3)	288	51,265
20-25 years	74.5 (1.8)	25.5 (1.8)	1,062	175,946
26+ years	73.2 (1.9)	26.8 (1.9)	1,267	213,410
Child WIC participation status at 24 months[b]				
Receiving WIC	79.3 (1.5)	20.7 (1.5)	1,834	317,220
Not receiving WIC	57.9 (2.5)	42.1 (2.5)	783	123,401

[a] n is the number of respondents who completed the interview. n may vary slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$

Table B2a-10b contains details on the percentage of WIC ITFPS-2 households receiving Medicaid at 36 months by select socio-demographic characteristics.

Table B2a-10b.Percentage of study households with someone receiving Medicaid at 36 months by select socio-demographic characteristics

Select socio-demographic categories	Receiving Medicaid at 36 months % (SE)		Unweighted n[a]	Weighted n
	Yes	No		
Race				
African American	74.0 (1.9)	26.0 (1.9)	750	94,998
White	71.5 (1.8)	28.5 (1.8)	1,452	260,213
Other	74.5 (3.3)	25.5 (3.3)	393	84,772
Ethnicity[b]				
Hispanic	77.7 (1.7)	22.3 (1.7)	988	205,996
Non-Hispanic	68.2 (1.8)	31.8 (1.8)	1,607	233,987
Marital status[b]				
Married	62.6 (3.2)	37.4 (3.2)	918	163,286
Not married	78.6 (1.1)	21.4 (1.1)	1,677	276,697
Household food security				
High or marginal	72.4 (1.7)	27.6 (1.7)	1,870	317,677
Low	73.1 (3.5)	26.9 (3.5)	442	73,328
Very low	73.4 (3.4)	26.6 (3.4)	283	48,977
Timing of WIC enrollment[b]				
1st trimester	77.2 (2.1)	22.8 (2.1)	838	139,089
2nd trimester	73.9 (1.6)	26.1 (1.6)	1,057	174,938
3rd trimester	66.7 (3.3)	33.3 (3.3)	373	67,089
Postnatal	65.0 (2.9)	35.0 (2.9)	327	58,868
Mother's BMI category at 24 months[b]				
Normal or Underweight	68.9 (2.2)	31.1 (2.2)	921	167,904
Overweight	73.5 (2.2)	26.5 (2.2)	745	122,141
Obese	76.2 (2.0)	23.8 (2.0)	929	149,937
Income poverty[b]				
75% of poverty guideline	84.2 (1.5)	15.8 (1.5)	1,237	207,469
Above 75% but no more than 130% of guideline	72.8 (2.0)	27.2 (2.0)	803	141,478
Above 130% of poverty guideline	46.1 (3.2)	53.9 (3.2)	555	91,036
Age of mother at child's birth				
16-19 years	73.8 (3.1)	26.2 (3.1)	276	49,449
20-25 years	73.7 (1.9)	26.3 (1.9)	1,041	174,307
26+ years	73.8 (3.1)	26.2 (3.1)	276	49,449
Child WIC participation status at 24 months[b]				
Receiving WIC	78.7 (1.4)	21.3 (1.4)	1,813	315,729
Not receiving WIC	57.2 (2.4)	42.8 (2.4)	782	124,254

[a] n is the number of respondents who completed the interview. n may vary slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$

Appendix B2b

Additional Analysis Details from Chapter 3

Appendix B2b
Additional Analysis Details from Chapter 3

Table B2b-1 contains details on access to fresh fruits and vegetables by food security.

Table B2b-1. Percentage of study mothers by level of agreement with statements about access to fresh fruits and vegetables and household food security (Month 30)

Statement and Level of Agreement	Household Food Security (measured using 6-item module)		
	High or Marginal Food Security % (SE)	Low Food Security % (SE)	Very Low Food Security % (SE)
It is easy to buy fresh fruits and vegetables in my community[b]			
Agree or Strongly Agree	89.7 (1.1)	79.5 (2.1)	81.3 (3.3)
Neither Agree nor Disagree	6.0 (0.8)	10.9 (1.8)	6.8 (1.7)
Disagree or Strongly Disagree	4.3 (0.6)	9.6 (1.9)	11.9 (2.7)
There are a lot of fresh fruits and vegetables in my community[b]			
Agree or Strongly Agree	90.4 (0.9)	82.8 (2.2)	82.1 (4.0)
Neither Agree nor Disagree	5.3 (0.8)	7.9 (1.6)	8.0 (2.2)
Disagree or Strongly Disagree	4.4 (0.5)	9.3 (1.8)	9.9 (2.8)
The fresh fruits and vegetables in my community are of high quality[b]			
Agree or Strongly Agree	79.0 (1.1)	68.3 (3.0)	63.4 (3.0)
Neither Agree nor Disagree	12.9 (1.0)	15.7 (2.1)	21.0 (1.9)
Disagree or Strongly Disagree	8.1 (0.8)	16.0 (2.3)	15.6 (3.0)
Unweighted n[a]	1,884	441	290
Weighted n	318,587	71,042	50,999

[a] n is the number of respondents who completed the interview. n may vary slightly due to item non-response.

[b] Chi-square statistic testing of household food security differences is significant at $p \leq 0.05$.

Data source: 30-Month Interview, Questions AP1-AP3. Cross-sectional weights for 30-Month Interview are used for this table.

Table B2b-2 contains details on the percentage of WIC ITFPS-2 mothers agreeing that cost is a barrier to fresh fruit and vegetable consumption, by significantly associated socio-demographic variables.

Table B2b-2. Percentage of study mothers agreeing that cost is a barrier to fresh fruit and vegetable consumption, by significantly associated socio-demographic characteristic (month 30)

Select socio-demographic categories	It is difficult to eat fresh fruits and vegetables because they cost too much % (SE)			Unweighted n[a]	Weighted n
	Agree/Strongly Agree	Neither Agree nor Disagree	Disagree/Strongly Disagree		
Household food security[b]					
High or marginal	21.7 (1.2)	13.2 (1.2)	65.1 (1.8)	1,891	319,785
Low	39.6 (2.8)	20.1 (2.3)	40.3 (2.5)	443	71,177
Very low	46.0 (3.3)	15.8 (2.2)	38.2 (3.1)	290	50,999
Marital status[b]					
Married	30.5 (1.6)	15.3 (1.2)	54.2 (2.1)	908	159,046
Not married	25.7 (1.1)	14.3 (1.5)	60.1 (1.6)	1,716	282,915
Age of mother at child's birth[b]					
16-19 years	17.3 (2.8)	14.1 (2.3)	68.6 (3.4)	290	51,683
20-25 years	24.1 (1.5)	15.6 (1.6)	60.3 (1.5)	1,065	176,660
26+ years	32.5 (1.4)	14.0 (1.2)	53.5 (1.9)	1,269	213,618

[a] n is the number of respondents who completed the interview. n may differ slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

Table B2b-3a contains details on the percentage of WIC ITFPS-2 mothers agreeing that it is important for children to finish the food on their plates, by significantly associated socio-demographic variables.

Table B2b-3a. Percentage of study mothers agreeing that it is important for children to finish the food on their plates, by significantly associated socio-demographic characteristic (month 30)

Select socio-demographic categories	It is important for children to finish the food on their plates % (SE)			Unweighted n[a]	Weighted n
	Agree/Strongly Agree	Neither Agree nor Disagree	Disagree/Strongly Disagree		
Race[b]					
African American	46.5% (2.2)	24.4% (1.5)	29.0% (1.8)	754	95,701
White	36.3 (1.5)	27.5 (1.5)	36.2 (1.6)	1,471	259,458
Other	44.2 (2.5)	28.4 (2.5)	27.4 (2.4)	392	85,638
Ethnicity[b]					
Hispanic	42.6 (2.0)	28.2 (1.8)	29.2 (1.7)	969	204,130
Non-Hispanic	37.9 (1.7)	26.0 (1.3)	36.1 (1.7)	1,648	236,668
Marital status[b]					
Married	32.5 (2.2)	29.2 (2.3)	38.3 (2.0)	904	158,138
Not married	44.3 (1.6)	25.8 (1.3)	29.9 (1.3)	1,713	282,659
Income poverty[b]					
75% of poverty guideline	45.2 (1.8)	25.2 (1.5)	29.6 (1.4)	1,243	209,223
Above 75% but no more than 130% of guideline	36.0 (2.5)	29.5 (1.9)	34.6 (2.1)	817	141,184
Above 130% of poverty guideline	34.5 (2.1)	27.4 (1.8)	38.1 (2.1)	557	90,391
Age of mother at child's birth[b]					
16-19 years	49.9 (4.6)	28.3 (3.9)	21.9 (2.9)	290	51,683
20-25 years	44.5 (2.2)	28.9 (1.8)	26.6 (1.8)	1,063	176,448
26+ years	34.0 (1.8)	25.2 (1.6)	40.9 (1.5)	1,264	212,666

[a] n is the number of respondents who completed the interview. n may differ slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

Table B2b-3b contains details on the percentage of WIC ITFPS-2 mothers agreeing that it is important that the parent decides how much the child should eat, by significantly associated socio-demographic variables.

Table B2b-3b. Percentage of study mothers agreeing that it is important that the parent decides how much the child should eat, by significantly associated socio-demographic characteristic (month 30)

Select socio-demographic categories	It is important that the parent decides how much the child should eat % (SE)			Unweighted n[a]	Weighted n
	Agree/Strongly Agree	Neither Agree nor Disagree	Disagree/Strongly Disagree		
Race[b]					
African American	63.8% (2.1)	13.5% (1.8)	22.8% (2.1)	754	95,701
White	54.3 (2.1)	15.1 (1.0)	30.5 (1.8)	1,471	259,458
Other	61.3 (2.3)	14.2 (1.8)	24.5 (2.1)	392	85,638
Ethnicity[b]					
Hispanic	11.0 (1.3)	8.2 (1.0)	80.8 (1.5)	969	204,130
Non-Hispanic	6.0 (1.0)	10.1 (1.2)	83.9 (1.4)	1,648	236,668
Marital status[b]					
Married	52.3 (2.0)	15.5 (1.3)	32.3 (1.7)	904	158,138
Not married	60.8 (1.6)	14.1 (1.1)	25.1 (1.1)	1,713	282,659
Income poverty[b]					
75% of poverty guideline	63.6 (1.6)	11.7 (1.1)	24.7 (1.3)	1,243	209,223
Above 75% but no more than 130% of guideline	52.0 (2.3)	17.7 (1.8)	30.3 (1.5)	817	141,184
Above 130% of poverty guideline	53.1 (2.2)	16.3 (1.8)	30.5 (2.3)	557	90,391
Age of mother at child's birth[b]					
16-19 years	65.2 (3.5)	11.5 (2.2)	23.3 (3.1)	290	51,683
20-25 years	57.7 (2.2)	17.3 (1.4)	25.0 (1.7)	1,063	176,448
26+ years	55.9 (1.7)	13.1 (1.1)	31.0 (1.5)	1,264	212,666

[a] n is the number of respondents who completed the interview. n may differ slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

Table B2b-4 contains details on the percentage of WIC ITFPS-2 mothers indicating the degree to which their child is a picky eater, by significantly associated socio-demographic variables.

Table B2b-4. Percentage of study mothers indicating the degree to which their child is a picky eater, by significantly associated socio-demographic characteristic (month 30)

Select socio-demographic categories	Picky Eating (30 months) % (SE)			Unweighted n[a]	Weighted n
	Very picky eater	Somewhat picky eater	Not a picky eater		
Race[b]					
African American	20.7% (1.8)	40.4% (2.1)	38.9% (2.3)	755	95,790
White	13.0 (1.5)	43.1 (1.8)	43.9 (1.8)	1,473	259,654
Other	11.3 (2.7)	38.0 (3.0)	50.7 (3.3)	394	86,161
Ethnicity[b]					
Hispanic	10.7 (1.6)	41.7 (2.1)	47.7 (2.2)	969	204,092
Non-Hispanic	17.5 (1.4)	41.4 (1.4)	41.1 (1.1)	1,653	237,514
Income poverty[b]					
75% of poverty guideline	14.7 (1.6)	37.7 (2.1)	47.6 (2.1)	1,244	209,529
Above 75% but no more than 130% of guideline	14.1 (1.6)	44.1 (1.8)	41.9 (2.0)	821	141,686
Above 130% of poverty guideline	13.8 (2.1)	46.3 (2.4)	39.8 (2.2)	557	90,391
Child WIC participation status at 24 months[b]					
Receiving WIC	14.4 (1.6)	38.5 (1.6)	47.2 (1.7)	1,836	317,707
Not receiving WIC	14.1 (1.4)	49.4 (2.0)	36.5 (1.5)	786	123,899

[a] n is the number of respondents who completed the interview. n may differ slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

Table B2b-5 contains details on the percentage of WIC ITFPS-2 mothers by how often they follow select feeding rules and practices.

Table B2b-5 Percentage of study mothers by how often they follow select feeding rules and practices

Select Rules and Practices	Study Mothers % (SE)
Keep track of what the child eats	
Always	40.2% (1.3)
Usually	28.6 (1.1)
About half the time	14.4 (0.9)
Occasionally	13.2 (0.7)
Never	3.7 (0.5)
Try to get the child to finish his or her food	
Always	42.5 (1.5)
Usually	28.3 (1.1)
About half the time	10.7 (0.9)
Occasionally	12.7 (0.9)
Never	5.8 (0.5)
Try to get the child to eat even if he or she does not seem hungry	
Always	16.2 (1.2)
Usually	16.8 (1.0)
About half the time	12.5 (0.7)
Occasionally	19.0 (0.8)
Never	35.5 (1.3)
Carefully control how much the child eats	
Always	36.6 (1.7)
Usually	22.4 (1.0)
About half the time	9.0 (0.7)
Occasionally	12.1 (0.8)
Never	19.9 (1.2)
Be very careful not to feed the child too much	
Always	45.8 (1.3)
Usually	19.2 (0.9)
About half the time	5.8 (0.5)
Occasionally	9.8 (0.9)
Never	19.5 (1.0)
Unweighted n[a]	2,616
Weighted n	441,073

[a] n is the number of respondents who completed the interview. n may differ slightly due to item non-response.

Table B2b-6 contains details on the median scores of WIC ITFPS-2 mothers indicating how often they keep track of what their child eats, by significantly associated socio-demographic variables.

Table B2b-6. Median scores of study mothers indicating how often they keep track of what their child eats, by significantly associated socio-demographic characteristic (month 30)

Select socio-demographic categories	I keep track of what {CHILD} eats Median (SE)	Unweighted n[a]	Weighted n
Race[b]			
African American	1.0 (0.1)	752	95,477
White	1.5 (0.0)	1,472	259,678
Other	1.3 (0.0)	392	85,918
Ethnicity[b]			
Hispanic	1.4 (0.0)	969	204,127
Non-Hispanic	1.3 (0.0)	1,647	236,946
Marital status[b]			
Married	1.4 (0.0)	905	158,721
Not married	1.3 (0.0)	1,711	282,352
Participation in non-WIC benefit program(s)[b]			
Does not participate in other programs	1.2 (0.0)	434	75,000
Participates in SNAP and possibly other programs	1.3 (0.0)	1,309	217,731
Participates in other program(s) and is not on SNAP	1.4 (0.0)	873	148,342
Timing of WIC enrollment[b]			
1st trimester	1.4 (0.0)	840	136,980
2nd trimester	1.3 (0.0)	1,079	174,334
3rd trimester	1.4 (0.0)	371	69,689
Postnatal	1.2 (0.1)	326	60,071
Age of mother at child's birth[b]			
16-19 years	1.1 (0.1)	290	51,683
20-25 years	1.3 (0.0)	1,062	176,358
26+ years	1.4 (0.0)	1,264	213,032

[a] n is the number of respondents who completed the interview. n may differ slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

NOTE: Frequency scores range from 1 to 5. 1 = always, 2 = usually, 3 = about half the time, 4 = occasionally, 5 = never.

Table B2b-7 contains details on the median scores of WIC ITFPS-2 mothers indicating how often they try to get their child to finish his or her food, by significantly associated socio-demographic variables.

Table B2b-7. Median scores of study mothers indicating how often they try to get their child to finish food, by significantly associated socio-demographic characteristic (month 30)

Select socio-demographic categories	I try to get {CHILD} to finish his or her food Median (SE)	Unweighted n[a]	Weighted n
Race[b]			
African American	1.0 (0.1)	752	95,477
White	1.4 (0.0)	1,472	259,678
Other	1.1 (0.0)	392	85,918
Ethnicity[b]			
Hispanic	1.2 (0.0)	969	204,127
Non-Hispanic	1.3 (0.0)	1,647	236,946
Marital status[b]			
Married	1.5 (0.0)	905	158,721
Not married	1.1 (0.0)	1,711	282,352
Participation in non-WIC benefit program(s)[b]			
Does not participate in other programs	1.3 (0.1)	434	75,000
Participates in SNAP and possibly other programs	1.2 (0.0)	1,309	217,731
Participates in other program(s) and is not on SNAP	1.3 (0.0)	873	148,342
Mother's BMI category at 24 months[b]			
Normal or Underweight	1.3 (0.0)	932	165,035
Overweight	1.0 (0.0)	750	123,693
Obese	1.4 (0.0)	934	152,344
Poverty level[b]			
75% of poverty guideline	1.1 (0.0)	1,241	209,249
Above 75% but no more than 130% of guideline	1.4 (0.0)	819	141,548
Above 130% of poverty guideline	1.4 (0.0)	556	90,276
Age of mother at child's birth[b]			
16-19 years	1.0 (0.1)	290	51,683
20-25 years	1.2 (0.0)	1,062	176,358
26+ years	1.4 (0.0)	1,264	213,032

[a] n is the number of respondents who completed the interview. n may differ slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

NOTE: Frequency scores range from 1 to 5. 1 = always, 2 = usually, 3 = about half the time, 4 = occasionally, 5 = never.

Table B2b-8 contains details on the median scores of WIC ITFPS-2 mothers indicating how often they try to get their child to eat when the child doesn't seem hungry, by significantly associated socio-demographic variables.

Table B2b-8. Median scores of study mothers indicating how often they try to get their child to eat when the child doesn't seem hungry, by significantly associated socio-demographic characteristic (month 30)

Select socio-demographic categories	I try to get {CHILD} to eat even if he/she doesn't seem hungry Median (SE)	Unweighted n[a]	Weighted n
Race[b]			
African American	3.0 (0.2)	752	95,477
White	3.4 (0.1)	1,472	259,678
Other	2.9 (0.2)	392	85,918

[a] n is the number of respondents who completed the interview. n may differ slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

NOTE: Frequency scores range from 1 to 5. 1 = always, 2 = usually, 3 = about half the time, 4 = occasionally, 5 = never.

Table B2b-9 contains details on the median scores of WIC ITFPS-2 mothers indicating how often they try carefully control how much their child eats, by significantly associated socio-demographic variables.

Table B2b-9. Median scores of study mothers indicating how often they carefully control how much their child eats by significantly associated socio-demographic characteristic (month 30)

Select socio-demographic categories	I carefully control how much {CHILD} eats Median (SE)	Unweighted n[a]	Weighted n
Ethnicity[b]			
Hispanic	1.4 (0.0)	969	204,127
Non-Hispanic	1.8 (0.0)	1,647	236,946
Participation in non-WIC benefit program(s)[b]			
Does not participate in other programs	1.6 (0.1)	434	75,000
Participates in SNAP and possibly other programs	1.5 (0.0)	1,309	217,731
Participates in other program(s) and is not on SNAP	1.7 (0.1)	873	148,342
Age of mother at child's birth[b]			
16-19 years	1.2 (0.1)	290	51,683
20-25 years	1.6 (0.0)	1,062	176,358
26+ years	1.7 (0.0)	1,264	213,032

[a] n is the number of respondents who completed the interview. n may differ slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

NOTE: Frequency scores range from 1 to 5. 1 = always, 2 = usually, 3 = about half the time, 4 = occasionally, 5 = never.

Table B2b-10 contains details on the median scores of WIC ITFPS-2 mothers indicating how often they are very careful not to feed their child too much, by significantly associated socio-demographic variables.

Table B2b-10. Median scores of study mothers indicating how often they are very careful not to feed their child too much by significantly associated socio-demographic characteristic (month 30)

Select socio-demographic categories	I am very careful not to feed {CHILD} too much Median (SE)	Unweighted n[a]	Weighted n
Race[b]			
African American			
White			
Other			
Ethnicity[b]			
Hispanic	1.4 (0.0)	969	204,127
Non-Hispanic	1.1 (0.0)	1,647	236,946
Marital status[b]			
Married	1.6 (0.1)	905	158,721
Not married	1.0 (0.0)	1,711	282,352
Household food security[b]			
High or marginal	1.2 (0.0)	1,885	319,104
Low	1.4 (0.1)	441	70,970
Very low	1.0 (0.1)	290	50,999
Participation in non-WIC benefit program(s)[b]			
Does not participate in other programs	1.2 (0.1)	434	75,000
Participates in SNAP and possibly other programs	1.1 (0.0)	1,309	217,731
Participates in other program(s) and is not on SNAP	1.3 (0.0)	873	148,342

[a] n is the number of respondents who completed the interview. n may differ slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

NOTE: Frequency scores range from 1 to 5. 1 = always, 2 = usually, 3 = about half the time, 4 = occasionally, 5 = never.

Table B2b-11 contains details on the percentage of WIC ITFPS-2 mothers indicating how often the television is on during meals or snacks, by significantly associated socio-demographic variables.

Table B2b-11. Percentage of study mothers indicating how often the television is on during meals or snacks, by significantly associated socio-demographic characteristic (month 30)

Select socio-demographic categories	Television is on during meals or snacks (30 months) % (SE)				Unweighted n[a]	Weighted n
	Most of the time	Some of the time	Rarely	Never		
Race[b]						
African American	29.2 (1.4)	30.6 (1.8)	20.0 (1.4)	20.2 (1.6)	755	95,790
White	18.1 (1.4)	31.7 (1.3)	27.2 (1.4)	23.0 (1.1)	1,475	260,010
Other	16.3 (3.2)	32.8 (2.4)	27.2 (2.3)	23.7 (3.1)	394	86,161
Ethnicity[b]						
Hispanic	16.4 (1.9)	29.7 (1.3)	28.5 (1.6)	25.4 (1.4)	971	204,448
Non-Hispanic	23.5 (1.3)	33.3 (1.6)	23.1 (1.2)	20.1 (1.1)	1,653	237,514
Child WIC participation status at 24 months[b]						
Receiving WIC	18.5 (1.3)	32.2 (1.0)	25.5 (1.3)	23.9 (1.1)	1,838	318,062
Not receiving WIC	24.6 (2.0)	30.4 (2.3)	25.8 (1.5)	19.2 (1.6)	786	123,899

[a] n is the number of respondents who completed the interview. n may differ slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

Table B2b-12 contains details on the percentage of WIC ITFPS-2 mothers indicating how often the family sat down for meals together in the past week, by significantly associated socio-demographic variables.

Table B2b-12. Percentage of study mothers indicating how often the family sits down for a meal together in the past week, by significantly associated socio-demographic characteristic (month 30)

Select socio-demographic categories	How often the family sat down for meals together in the past week (30 months) % (SE)					Unweighted n[a]	Weighted n
	7+ times	5-6 times	3-4 times	1-2 times	Never		
Race[b]							
African American	27.6 (2.0)	23.7 (1.9)	32.8 (2.5)	12.9 (1.3)	3.0 (0.8)	755	95,790
White	40.9 (1.7)	26.3 (1.2)	24.0 (1.2)	7.3 (0.9)	1.6 (0.4)	1,474	259,887
Other	42.7 (3.6)	27.0 (2.7)	22.1 (2.5)	6.7 (1.5)	1.6 (0.7)	394	86,161
Ethnicity[b]							
Hispanic	42.3 (2.4)	26.0 (1.5)	22.9 (1.6)	7.0 (0.9)	1.9 (0.6)	971	204,448
Non-Hispanic	34.9 (1.9)	25.8 (1.3)	27.9 (1.2)	9.5 (1.0)	1.9 (0.5)	1,652	237,391
Marital status[b]							
Married	43.3 (1.8)	24.7 (1.8)	23.8 (1.7)	5.9 (1.1)	2.3 (0.7)	908	159,046
Not married	35.5 (2.3)	26.5 (1.4)	26.6 (1.3)	9.8 (0.8)	1.6 (0.3)	1,715	282,792

[a] n is the number of respondents who completed the interview. n may differ slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

Appendix B2c

Additional Analysis Details from Chapter 4

Appendix B2c
Additional Analysis Details from Chapter 4

Table B2c-1 contains details on fruit consumption at 36 months by select socio-demographic characteristics.

Table B2c-1. Percentage of study children consuming fruit at 36 months by select socio-demographic characteristics

Select socio-demographic categories	Percentage of study children consuming fruit % (SE)			Unweighted n[a]	Weighted n
	Any fruit or 100% juice	Any fruit (no juice)	100% fruit juice		
Race[b]					
African American	88.0% (1.9)	66.5% (2.0)	68.7% (2.3)	741	94,039
White	89.9 (0.9)	71.3 (1.7)	68.2 (1.5)	1,451	259,116
Other	95.7 (0.9)	79.6 (2.1)	73.6 (2.4)	394	85,164
Ethnicity[b]					
Hispanic	93.8 (0.9)	74.3 (2.1)	73.3 (1.8)	984	205,139
Non-Hispanic	87.8 (0.9)	69.8 (1.4)	65.9 (1.4)	1,602	233,181
Marital status[b]					
Married	90.7 (1.1)	76.8 (1.8)	67.6 (1.7)	915	162,689
Not married	90.5 (0.9)	69.1 (1.3)	70.4 (1.6)	1,671	275,630
Participation in non-WIC benefit program(s) [b]					
Does not participate in other programs	88.6 (1.5)	72.3 (2.5)	65.5 (2.5)	414	73,372
Participates in SNAP and possibly other programs	90.8 (0.8)	69.3 (1.7)	70.9 (1.5)	1,302	218,630
Participates in other program(s) and is not on SNAP	91.3 (1.1)	75.7 (1.8)	69.0 (1.9)	870	146,318
Poverty level[b]					
75% of poverty guideline	90.4 (1.0)	68.3 (1.9)	71.6 (1.8)	1,229	206,953
Above 75% but no more than 130% of guideline	91.5 (1.1)	75.4 (2.0)	68.2 (1.8)	802	140,767
Above 130% of poverty guideline	89.7 (1.7)	74.7 (2.2)	66.0 (2.0)	555	90,600
Age of mother at child's birth[b]					
16-19 years	89.3 (2.5)	62.6 (3.4)	70.8 (4.3)	277	49,628
20-25 years	89.0 (1.1)	67.3 (1.8)	69.3 (1.7)	1,034	172,712
26+ years	92.2 (0.8)	77.8 (1.6)	69.0 (1.3)	1,275	215,979

[a] n is the number of respondents who completed the interview at month 36. n may differ slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

Table B2c-2a contains details on vegetable consumption at 36 months by race.

Table B2c-2a. Percentage of study children consuming different types of vegetables on any given day by race (Month 36)

Food Group/Food	Race		
	Black or African American % (SE)	White % (SE)	Other % (SE)
Any vegetable[h]	70.9 (1.6)	62.4 (1.6)	53.6 (3.8)
Cooked vegetables[bh]	67.2 (1.8)	54.9 (1.6)	43.9 (3.3)
Raw vegetables	13.3 (1.4)	17.5 (1.6)	16.3 (2.3)
Types of vegetables[c]			
Dark green vegetables[d]	11.8 (1.7)	10.4 (1.2)	10.6 (2.0)
Red and orange vegetables[e]	13.0 (1.2)	13.8 (1.0)	11.9 (2.8)
White potatoes	14.7 (2.4)	13.6 (1.3)	9.5 (1.3)
French fries and other fried potatoes[h]	23.8 (2.5)	15.5 (1.2)	13.3 (2.6)
Other starchy vegetables[fh]	17.7 (1.4)	12.0 (0.9)	7.4 (1.2)
Other vegetables[g]	34.0 (1.8)	36.4 (1.6)	30.3 (3.3)
Unweighted n[a]	741	1,451	394
Weighted n	94,039	259,116	85,164

[b] Includes 100% vegetable juice.

[c] Includes commercial baby food, cooked vegetables, and raw vegetables.

[d] Reported dark green vegetables include broccoli, spinach, and other greens, and romaine lettuce.

[e] Reported red and orange vegetables include carrots, pumpkin, sweet potatoes, and winter squash.

[f] Reported starchy vegetables include corn, green peas, immature lima beans, black-eyed peas (not dried), cassava, and rutabaga.

[g] Other reported vegeables include artichoke, asparagus, beets, brussels sprouts, cabbage, cauliflower, celery, cucumber, eggplant, green beans,lettuce, mushrooms, okra, onion, pea pods, peppers, tomatoes/tomato sauce, wax/yellow beans, and zucchini/summer squash.

[h] Chi-square statistic testing of race differences is significant at $p \leq 0.05$.

Data source: AMPM 24 Hour Recall for Food Intake, Month36. Cross-sectional weights for 36 Month Interviews are used for this table.

Table B2c-2b contains details on vegetable consumption at 36 months by race and ethnicity.

Table B2c-2b. Percentage of study children consuming different types of vegetables on any given day by ethnicity (Month 36)

Food Group/Food	Study Children % (SE)	Ethnicity	
		Hispanic % (SE)	Non-Hispanic % (SE)
Any vegetable[h]	62.5 (1.6)	53.6 (2.6)	70.4 (1.1)
Cooked vegetables[bh]	55.4 (1.7)	45.2 (2.0)	64.4 (1.1)
Raw vegetables	16.4 (1.1)	15.1 (1.8)	17.5 (1.7)
Types of vegetables[c]			
Dark green vegetables[d]	10.8 (0.9)	10.6 (1.6)	10.9 (1.0)
Red and orange vegetables[e]	13.3 (0.8)	11.9 (1.3)	14.5 (1.1)
White potatoes[h]	13.0 (1.0)	10.3 (1.2)	15.4 (1.4)
French fries and other fried potatoes[h]	16.9 (1.3)	13.0 (1.1)	20.2 (1.8)
Other starchy vegetables[fh]	12.3 (0.7)	8.6 (1.1)	15.6 (1.0)
Other vegetables[gh]	34.7 (1.4)	30.5 (2.1)	38.4 (2.0)
Unweighted n[a]	2,586	984	1,602
Weighted n	438,319	205,139	233,181

[b] Includes 100% vegetable juice.

[c] Includes commercial baby food, cooked vegetables, and raw vegetables.

[d] Reported dark green vegetables include broccoli, spinach, and other greens, and romaine lettuce.

[e] Reported red and orange vegetables include carrots, pumpkin, sweet potatoes, and winter squash.

[f] Reported starchy vegetables include corn, green peas, immature lima beans, black-eyed peas (not dried), cassava, and rutabaga.

[g] Other reported vegeables include artichoke, asparagus, beets, brussels sprouts, cabbage, cauliflower, celery, cucumber, eggplant, green beans,lettuce, mushrooms, okra, onion, pea pods, peppers, tomatoes/tomato sauce, wax/yellow beans, and zucchini/summer squash.

[h] Chi-square statistic testing of race differences is significant at $p \leq 0.05$.

Data source: AMPM 24 Hour Recall for Food Intake, Month36. Cross-sectional weights for 36 Month Interviews are used for this table.

Table B2c-2c contains details on vegetable consumption at 36 months by WIC participation status.

Table B2c-2c. Percentage of study children consuming different types of vegetables on any given day by 24 month WIC Status (Month 36)

Food Group/Food	Study Children % (SE)	Child WIC Participation Status (24 months)	
		Receiving WIC % (SE)	Not Receiving WIC % (SE)
Any vegetable[h]	**62.5 (1.6)**	**60.0 (2.0)**	**68.9 (1.8)**
Cooked vegetables[bh]	55.4 (1.7)	53.8 (2.1)	59.6 (2.2)
Raw vegetables[h]	16.4 (1.1)	14.9 (1.1)	20.0 (2.1)
Types of vegetables[c]			
Dark green vegetables[d]	10.8 (0.9)	11.4 (1.0)	9.2 (1.3)
Red and orange vegetables[e]	13.3 (0.8)	13.1 (1.0)	13.9 (1.5)
White potatoes	13.0 (1.0)	12.6 (1.2)	14.3 (1.5)
French fries and other fried potatoes	16.9 (1.3)	16.0 (1.5)	19.0 (1.7)
Other starchy vegetables[f]	12.3 (0.7)	12.1 (1.0)	12.9 (1.5)
Other vegetables[gh]	34.7 (1.4)	33.1 (1.5)	38.7 (2.0)
Unweighted n[a]	2,586	1,808	778
Weighted n	438,319	314,441	123,878

[b] Includes 100% vegetable juice.

[c] Includes commercial baby food, cooked vegetables, and raw vegetables.

[d] Reported dark green vegetables include broccoli, spinach, and other greens, and romaine lettuce.

[e] Reported red and orange vegetables include carrots, pumpkin, sweet potatoes, and winter squash.

[f] Reported starchy vegetables include corn, green peas, immature lima beans, black-eyed peas (not dried), cassava, and rutabaga.

[g] Other reported vegeables include artichoke, asparagus, beets, brussels sprouts, cabbage, cauliflower, celery, cucumber, eggplant, green beans,lettuce, mushrooms, okra, onion, pea pods, peppers, tomatoes/tomato sauce, wax/yellow beans, and zucchini/summer squash.

[h] Chi-square statistic testing of race differences is significant at $p \leq 0.05$.

Data source: AMPM 24 Hour Recall for Food Intake, Month36. Cross-sectional weights for 36 Month Interviews are used for this table.

Table B2c-3 contains details on whole grain consumption at 36 months by select socio-demographic characteristics.

Table B2c-3. Percentage of study children consuming whole grains at 36 months by select socio-demographic characteristics

Select socio-demographic categories	Percentage of study children consuming whole grains % (SE)	Unweighted n[a]	Weighted n
Race[b]			
African American	46.9 (1.8)	741	94,039
White	41.8 (1.6)	1,451	259,116
Other	34.1 (2.9)	394	85,164
Ethnicity[b]			
Hispanic	35.7 (2.3)	984	205,139
Non-Hispanic	46.4 (1.3)	1,602	233,181
Age of mother at child's birth[b]			
16-19 years	31.9 (4.1)	277	49,628
20-25 years	41.5 (1.9)	1,034	172,712
26+ years	43.5 (1.8)	1,275	215,979

[a] n is the number of respondents who completed the interview at month 36. n may differ slightly due to item non-response.

[b] Chi-square statistic testing of differences is significant at $p \leq 0.05$.

There Are No Additional Analysis Details
From Chapter 5

Appendix B2d

Additional Analysis Details from Chapter 6

Appendix B2d
Additional Analysis Details from Chapter 6

Table B2d-1 contains data on BMI percentile groups of study children.

Table B2d-1. The percentage distribution of BMI percentile categories during the third year

Weight-for-Length Range	Third Year (32 to 40 months) % (SE)
Underweight (less than 5th percentile)	4.1 (0.5)
Normal/Healthy Weight (5th to less than 85th percentile)	65.2 (1.4)
Overweight (85th to less than 95th percentile)	13.6 (1.0)
Obese (95th or higher percentile)	17.0 (1.0)
Unweighted n	1,886
Weighted n	442,544

Table B2d-2 contains data on median feeding beliefs and practices at 30 months, by third year BMI percentile groups.

Table B2d-2. Median feeding belief and practice scores at 30 months by child third year BMI percentile group

Select Feeding Beliefs and Practices (30 months)	Median Feeding Belief and Practice Scores			
	Underweight % (SE)	Normal/ Healthy Weight % (SE)	Overweight % (SE)	Obese % (SE)
Beliefs				
OK for child to walk around while eating	2.6	3.0	3.3	3.3
Important for child to finish all food on plate	2.5	2.4	2.3	2.3
Feeding child is the best way to stop crying	3.4	3.5	3.5	3.5
Important parent decides how much child should eat	1.8	1.9*	1.9	1.8*
Practices				
I keep track for what food child eats	1.5	1.3	1.4	1.5
I try to get child to finish his/her food	1.3	1.3	1.4	1.2
I try to get child to eat even if child seems not hungry	2.5	3.2	3.3	3.5
I carefully control how much child eats	2.1	1.7	1.5	1.5
I am very careful not to feed child too much	1.6*	1.4^	1.1^	1.0*
Unweighted n[a]	77	1,009	230	262
Weighted n	14,767	232,794	50,561	60,937

* Median differences are statistically significant for BMI percentile groups.

^ Median differences are statistically significant for BMI percentile groups.

[a] n is the number of children who had valid 36-Month measurement data.

Table B2d-3 contains information on the percentage of mothers of children in each third year BMI percentile group endorsing different beliefs about restrictions on savory snacks.

Table B2d-3. The percentage of study children in each third year BMI percentile group by beliefs about restrictions on savory snacks at 30 months

Beliefs about restrictions on savory snacks	Child Third Year BMI Percentile Group			
	Underweight % (SE)	Normal/ Healthy Weight % (SE)	Overweight % (SE)	Obese % (SE)
Children should be allowed to eat snack foods whenever they want to	2.7 (1.9)	3.1 (0.6)	1.7 (1.0)	3.7 (1.9)
Children should be allowed to eat snack foods occasionally	91.9 (3.9)	92.7 (0.9)	86.2 (2.4)	90.4 (2.5)
Children should never eat snack foods	5.4 (3.5)	4.2 (0.7)	12.1 (2.3)	6.0 (1.9)
Unweighted n[a]	77	1,009	230	262
Weighted n	14,767	232,794	50,561	60,937

[a] n is the number of children who had valid 36-Month measurement data.

Appendix B3

Dietary Intake Coding Procedures and Estimating Usual Intake

Appendix B3
Dietary Intake Coding Procedures and Estimating Usual Intake

B4.1 Dietary Intake Procedures for WIC ITFPS-2

The procedures for child dietary intake include a 24-hour dietary recall using the same system used in the National Health and Nutrition Examination Survey, What We Eat in America (NHANES, WWEIA) interview. This system consists of three components: the Automated Multiple Pass Method (AMPM) 24-hour recall interview system, the Post Interview Processing System (PIPS), and the SurveyNet coding application[1]. The system uses the U.S. Department of Agriculture (USDA) Food and Nutrient Database for Dietary Studies, 5.0 (FNDDS5) as the source of the nutrient values.[2] The WIC Infant and Toddler Feeding Practices Study (WIC ITFPS-2) collects the child's dietary intake from the child's caregiver at every interview from 1- to 24-months, and then annually at 36-, 48-, and 60- months. A 10 percent subsample of children at 13, 15, 18, 24, 36, 48, and 60 months completes a second intake to allow estimation of "usual" intake.

B.4.1.1 AMPM Interview Data Entry

The AMPM interview asks the mother to recall all her child's dietary intake for the previous day in a systematic fashion. The interview guides the mother through the day and asks her to report all foods, beverages, and dietary supplements for each eating event during the 24-hour period; the interviewer records all responses. The interview produces a 24-hour snapshot of all foods, beverages, and dietary supplements consumed by the child. In preparation for the 13-month interview, participants received a package of measuring guides to help them report their child's portion sizes during the interview. The study team customized the interview procedures used in WIC ITFPS-2 to capture breastfeeding and formula feeding details that allowed for more specific data analyses. These additional procedures captured whether the mother fed the infant expressed

[1] Raper, N., Perloff, B., Ingwersen, L., Steinfeldt, L., and Anand, J. (2004). An overview of USDA's dietary intake data system. *Journal of Food Composition and Analysis, 17(3)*, 545-555.

[2] Ahuja, J.K.A., Montville, J.B., Omolewa-Tomobi, G., Heendeniya, K.Y., Martin, C.L., Steinfeldt, L.C., Anand, J., Adler, M.E,. LaComb, R.P., and Moshfegh, A.J. (2012). *USDA food and nutrient database for dietary studies, 5.0-documentation and user guide.* Beltsville, MD: U.S. Department of Agriculture, Agricultural Research Service, Food Surveys Research Group.

breastmilk or directly from the breast and the frequency of breast and bottle feedings. Additionally, if caregivers report that they do not know what the child ate while away from the caregiver, the dietary interviewer asked the caregiver to obtain the missing details about those foods from a knowledgeable source; afterward, the data retrieval interviewer contacted the caregiver within two working days to obtain the missing information.

B.4.1.2 Post Interview Processing System

Westat processes the recall data through PIPS. During PIPS processing, approximately 70 percent of foods are auto-coded, meaning that the system assigns a food code and/or a portion quantity to the interview data. The PIPS also creates SurveyNet batches of no more than 20 intake days each, which the study team separated by recall month (3-, 5-, 7-, etc.). The online Coder Tracking System tracks each batch through the various coding and review steps. Dietary coders assign themselves batches and complete the coding for all intake days within a single assigned batch using SurveyNet.

B.4.1.3 Standard SurveyNet Processing

Assigning Food Codes

SurveyNet displays a shorthand version of each interview question and the selected response for all food description and portion data in a text box at the top of the food-coding screen. Dietary coders review this interview data, select the appropriate food code and enter the quantity reported. In cases where the PIPS automatically assigns the food code or quantity, the dietary coder merely review the pre-filled fields to ensure that there are no changes needed. Changes to these preassigned data may be required if the interviewer entered a comment or a text response in any field that would cause the coder to change the pre-assigned code or quantity. For all foods not auto-coded during PIPS, the dietary coders review all question responses to determine the most appropriate food code to apply.

Recipe Modifications

Coding supervisors have the ability to create recipe modifications to more closely match the reported food. Coding supervisors follow the same modification guidelines used in NHANES, which allow modification of a recipe for the type of fat used in cooking; the type of milk used in

preparing selected foods (e.g., beverages, pudding, cooked cereal); the amount of liquid used to prepare condensed soup (when different from instructions); and the type of salad dressing used in salads such as coleslaw or chicken salad.

New Foods

The coders also flag new food items that they cannot link to an acceptable food code in SurveyNet. Coding supervisors do additional research to determine if the food could match an existing food code or if they need to flag the food for nutrient modification after analysis because the nutrient profile of the foods differs too much from existing food codes. The study team handled several food items in this way: agave syrup, almond milk, chia seed, edamame, Greek yogurt, hemp seed, and quinoa. Senior coding staff obtained nutrient information for these products from USDA Database for Survey Research and corrected the information in the SurveyNet analysis files.

Coding Guidelines

The coders use NHANES coding guidelines to resolve common coding problems and to establish consistent coding methods. These guidelines contain rules for coding foods when not enough information is available (e.g., how much meat to code in a sandwich when the respondent did not report the amount, how to handle reports of nonstick spray, etc.). The study team developed a second set of coding guidelines for coding amounts of dietary supplements, since the default dose for non-children's supplements in the NHANES Dietary Supplement Database is generally appropriate for adults rather than infants and children. The study team develops additional guidelines throughout the study, as they encounter and resolve new issues. Coding staff document these guidelines in a decision log maintained throughout the study.

Entering Quantities

Once the food code is assigned or reviewed (in the case of auto-coding), coders review the autocoded quantity or enter the amount of food reported. SurveyNet allows entry of portions using the same food models presented in the AMPM, and provides predetermined weights for foods in commonly eaten portions (e.g., one-half grapefruit, one medium chicken leg). SurveyNet automatically converts food amounts entered as a shape, by dimensions (length, width, and height),

volume or weight in imperial units to a weight in grams. Coders also use SurveyNet to code imprecise measures, such as "handful," "medium bowl," or "swallow." When respondents report "Don't know" for the quantity consumed, coders are instructed to first consult the coding guidelines, which provide default amounts for items in a sandwich or salad, and other common combinations. If no coding guideline exists, coders select the "quantity not specified" portion option available in SurveyNet.[3]

Estimating Breastmilk Intake

In order to allow complete nutrient analysis of infant dietary intake, the study team developed coding procedures for determining the quantity of breastmilk consumed by breastfed infants. The study team established guidelines for coding the amount of breastmilk when fed from the breast, based on research from the Feeding Infants and Toddlers Study[4] and the Davis Area Research on Lactation in Infant Nutrition and Growth study.[5] These guidelines use the child's age and breastfeeding exclusivity status to estimate intake quantities. For fully breastfed infants (i.e., those who did not report consuming infant formula or any other milks) between birth and 5.9 months, the guidelines assume a total breastmilk intake of 780 ml/day. For fully breastfed infants between 6 and 11.9 months, the guidelines assume a total breastmilk intake of 600 ml/day. For partially breastfed infants between birth and 5.9 months, the guidelines call for imputing breastmilk intake by summing the amounts of infant formula and other milks reported, and subtracting that total amount from 780 ml/day. For example, if the mother of a partially breastfed, 3 month old infant reported that her infant had 240 ml of infant formula and no other milks, coders also coded 540 ml of breastmilk for the intake. For partially breastfed infants between 6 and 11.9 months, the guidelines impute breastmilk intake by summing the amounts of infant formula and other milks reported and subtracting that total amount from 600 ml/day. For partially breastfed infants whose reported intake is more than 780 ml or 600 ml of formula and/or other milks, the guidelines limit the total breastmilk intake to 78 ml or 60 ml per day, respectively. In the study sample, only 1.2 percent of young infants (birth to 5.9 months) and 0.7 percent of older infants (6 to 11.9 months) were partially

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[3] For participants less than 2 years old, one-half of the "quantity not specified" amount was coded.

[4] Butte, N. F., Fox, M. K., Briefel, R. R., Siega-Riz, A. M., Dwyer, J. T., Deming, D. M., & Reidy, K. C. (2010). Nutrient intakes of US infants, toddlers, and preschoolers meet or exceed dietary reference intakes. *Journal of the American Dietetic Association, 110*(12), S27-S37.

[5] Heinig, M. J., Nommsen, L. A., Peerson, J. M., Lonnerdal, B., & Dewey, K. G. (1993). Intake and growth of breast-fed and formula-fed infants in relation to the timing of introduction of complementary foods: the DARLING study. *Acta Paediatrica*, *82*(s385), 999-1006.

breastfed and reported consuming more than 780 ml/day or 600ml/day, respectively, of formula and other milks.

Combinations

SurveyNet flags foods added to another food (e.g., milk added to cereal) or eaten in combination (e.g., the bread, meat, cheese, and spread on a sandwich) using combination codes. The system usually identifies combinations during data collection by AMPM and PIPS assigns the combination code in SurveyNet. If coders need to add additional food codes to represent the reported food, the coder uses the combination code to link the foods.

Review

After the dietary coders assign food codes, coders and supervisors conduct quality control by verifying, adjudicating, and editing the assigned food codes and portion amounts. Verifying involves a detailed review of coded intakes by a second coder. A coding supervisor reviews and adjudicates any notepad entries made by the second coder highlighting questions or disagreement between coders. The supervisor reviews and edits all adjudicated records and makes decisions on notepad questions and unfound foods. The adjudication process also allows evaluation of the accuracy of each coder's work. This QC process selects two intakes from every batch for calculation of accuracy, assessing 10 percent of each coder's work. Coders must maintain 95 percent accuracy.

Analysis

Coding supervisors use SurveyNet to process the coded intakes and obtain the nutrient analysis. The system automatically generates error reports that document unresolved issues such as missing or invalid food codes, recipe modifications, or portion codes. Supervisors resolve all errors and re-run the analysis. The system produces two analysis data files: an "ANA" file, which contains one line of data for every food or supplement reported by the respondent on the intake day; and a "TOT" file, which contains one line of data for each respondent for a single intake day. The analysis files include 65 nutrients from the Food and Nutrient Database for Dietary Studies, 5.0 (FNDDS5).

Quality Control Review

The study team performs standard quality control (QC) checks on the analyzed data as a means of identifying errors. Outlier reports identify unusually high or low portions for key food items and high or low amounts of key nutrients. Coding supervisors review outliers and correct any deemed to be the result of coding errors. These outlier checks including the following:

Portion Outliers. Portion outlier reports identify errors in the reported amount of foods consumed. In addition, they serve as a check for intakes where coders applied an incorrect form of the food when specifying the amount.[6] The USDA SurveyNet software used to code AMPM intakes also identifies intakes where the portion of the reported food is either below or above established portion size range for that food item; these portion size ranges are specific for the age and gender of the respondent.

In addition to portion outliers, reports identify total calorie, macro-, and micro- nutrient outliers. Coding supervisors examine all records flagged as outliers and correct any interviewer or coding errors. The records are re-analyzed prior to generating outlier reports for the remaining nutrients.

Minimum Criteria for Inclusion in Dataset. When conducting reviews of the intakes identified in any of the outlier reports, coding supervisors determine whether or not the intake met minimum criteria. In general, an intake does not meet minimum criteria if any of the following situations are noted:

1. **Interview is broken off prior to completing the time and occasion pass.** For intakes other than those collected at the 1-, 3-, and 5-month recall, if the breakoff happens before the time and occasion is recorded for every food in the intake, the intake fails the minimum criteria and coding supervisors delete the intake from the dataset. Without time and occasion information for each food, it is not possible to determine that the reported foods span an entire day's intake. For intakes collected at 1-, 3-, and 5-months, the coders apply the coding guidelines developed for infant breastmilk consumption; the guidelines do not require the time and occasion information.

2. **Intake is judged as "unreliable."** Although interviewers do not provide feedback on whether or not a respondent is reliable, coding supervisors implement guidelines developed in previous studies.

[6] For example, the coder entered 1 cup of rice as uncooked by mistake when the respondent reported cooked rice.

3. **Meals with missing foods.** Coding supervisors apply this flag when a respondent reports a meal, but cannot recall foods eaten at the meal. For example, the respondent reports the child eating a meal at a friends' house but cannot recall the foods.

USDA Food Pattern Food Groups

The study team edits and finalizes all dietary recall data files before re-running the SurveyNet analysis to obtain corrected nutrient values. Using the Food Pattern Equivalent Database (FPED) 2010-2011,[7] the study team appends food pattern equivalent (FPE) values to the dietary data. Coding supervisors identify food codes that do not have a match in the FPED and imputes any needed food group values.

FITS Food Groups

In order to allow comparisons of the WIC ITFPS-2 dietary data to the Feeding Infants and Toddler Study (FITS), the study team assigned each FNDDS food code to one of the food groups developed for FITS 2002 and 2008.[8] The FITS adapted the food groups used to analyze data from the Continuing Survey of Food Intakes by Individuals (CSFII), a recent nationwide dietary intake study available at the time of the 2002 FITS. The FITS adjusted some food groups to allow slightly different analysis of foods of interest to the diets of infants and toddlers. For example, because diets of young infants are largely milk-based, FITS moved yogurt, milk desserts, and cheese into other groups, leaving milk (breastmilk, formula, cow's milk and other fluid milks) in a group of its own.

B4.2 Infant Intake Analysis

WIC ITFPS-2 collects usual intake information on infants ages 1 to 11 months with a single intake per individual per month. Although researchers often collect usual intake data through 24-hour dietary recalls conducted two or more times in a short time window in order to estimate measurement error (variance over repeated interviews), for the infant usual intake data collection it is

[7] Bowman, S.A., Clemens, J.C., Thoerig, R.C., Friday, J.E., Shimizu, M., and Moshfegh, A.J. 2013. *Food Patterns Equivalents Database 2009-10: Methodology and User Guide* [Online]. Food Surveys Research Group, Beltsville Human Nutrition Research Center, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Maryland. Available at: http://www.ars.usda.gov/nea/bhnrc/fsrg

[8] Fox, M. K., Pac, S., Devaney, B., & Jankowski, L. (2004). Feeding infants and toddlers study: What foods are infants and toddlers eating? *Journal of the American Dietetic Association*, 104, 22-30.

not considered necessary because diet is less varied in infancy, and it is expected that measurement error would be minimal.

To check whether the WIC ITFPS-2 intake collection for infants yields valid usual intake estimates, the study team compared results from WIC ITFPS-2 to the results for a similar age range from the NHANES usual intake data collection. The NHANES data have repeated measures of individuals in a narrow time window, allowing estimation of measurement error. The analysis model allows for separate estimates of measurement and person variability. The study team compared means and the between-person variability indicators between the NHANES and WIC ITFPS-2 data sources for ages 1 to 5 months and 7 to 11 months.[9]

Focusing on three major nutrients, protein, iron, and zinc, analysis shows that for the 1 to 5 month old group the means are comparable for the three nutrients, whereas the variances are somewhat larger for the WIC ITFPS-2 sample, as expected, ranging from 1.4 to 1.8 times larger for WIC ITFPS-2 than for NHANES. For the 7 to 11 month group the means are still quite similar but the variances for the WIC ITFPS-2 group are larger than the NHANES variances by proportions that are greater than those for the 1 to 5 month group. For protein, iron, and zinc, the WIC ITFPS-2 variances are larger by a factor of 1.4, 3.1, and 1.8 for protein, iron and zinc respectively.

Because these differences are not substantial, the results indicated that the WIC ITFPS-2 1- to 11-month single-observation intake measures are sufficiently valid for reporting usual intake.

B4.3 The National Cancer Institute Method for Analyzing Usual Intake Data

The National Cancer Institute (NCI) method for estimating usual intake uses as input repeated administrations of a 24-hour dietary recall over a narrow time window (see Tooze et al., 2006 for an introduction to the model).[10] This method has several differences from an analysis based on single observations per person. First, the repeated measures over time allow for the estimate of measurement variance (variability within person over time) separately from between-person

[9] The WIC data have only one observation per individual so measurement variance and between-individual variance are the intertwined.

[10] Tooze, J.A., Kipnis, V., Buckman, D.W., Carroll, R.J., Freedman, L.S., Guenther, P.M., Krebs-Smith, S.M., Subar, A.F., and Dodd, K.W. (2010). A mixed-effects model approach for estimating the distribution of usual intake of nutrients: the NCI method. *Statistics in Medicine, 29*(27):2857-68.

variance. This results in adjustment of food and nutrient means and correlations and their associated standard errors for measurement error, i.e., the method estimates of what these values would be without measurement error. Second, the NCI method employs algorithms to transform the data to distribute outcomes more like a symmetric normal distribution.[11] This reduces the bias created by outliers (nutrient data is often highly skewed) and supports the validity of the assumption that errors are normally distributed, which is an assumption of the mixed model underlying the approach.[12] Third, the NCI method produces model-based estimates of distributions of food and nutrient intakes that have decreased bias and error by using covariates to obtain outcome estimates. Fourth, the NCI method enables the valid estimation of "episodically" consumed food, i.e. foods not consumed on a daily basis, by employing a two-part model where one part of the model estimates the probability that the food will be consumed on a given day and the other part of the model estimates the amount of the food that is consumed if it is consumed at all. Since episodically consumed foods are common in adults, this extends the range of applications for the model. Note that the current application of the NCI method to WIC ITFPS-2 data does not use the episodically consumed feature because episodic foods are assumed to be less common in infants and toddlers, but this feature will be used in the future as needed.

B4.3.1 Results for the Analysis of Dietary Intake Data for Children Ages 13, 15, 18, and 24 Months

The analysis of WIC ITFPS-2 AMPM data from ages 13, 15, 18, 24, and 36 months used the NCI model for daily-consumed nutrients and FPEs. Note that these data have two observations for about 10 percent of the sample, enabling the estimate of measurement error. All coded nutrients and FPEDs were adjusted, except those that had 0 values. The analysis used sampling weights.

To test the utility of the NCI model approach with WIC ITFPS-2 data, the study team executed an analysis with nutrients for ages 13 through 18 months. In this analysis, the model-based variances, adjusting for measurement error and employing covariates, ranged from 9 to 41 percent of the observed variance. This indicates that employing the NCI model approach to current data will more precisely estimate nutrient and FPE distributions. Chapter 5 of the report provides the dietary intake data.

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[11] Box, G.E.P., and Cox, D. (1964). An analysis of transformations. *Journal of the Royal Statistical Society*, Series B, *26*, 211-252.

[12] SAS Institute Inc. (2008). *SAS/STAT® 9.2 user's guide*. Cary, NC: SAS Institute Inc., Proc Genmod.