Current Research

Feeding Infants and Toddlers Study: Meal and Snack Intakes of Hispanic and Non-Hispanic Infants and Toddlers

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ABSTRACT

Objective To describe meal and snack patterns of Hispanic and non-Hispanic infants and toddlers.

Design A cross-sectional telephone survey in which mothers or other primary caregivers reported their infants' and toddlers' food and beverage intake for a 24-hour period.

Subjects/setting Subjects were a subset of the national random sample of children aged 4-24 months who participated in the 2002 Feeding Infants and Toddlers Study. The Feeding Infants and Toddlers Study includes a stratified random sample of 3,022 infants and toddlers aged 4-24 months. Three hundred seventy-one Hispanic and 2,637 non-Hispanic children who had 24-hour dietary recalls are included in the subset.

Analyses Means±standard errors of daily intakes of energy, nutrients, and nutrient densities were calculated, as were percentages of children consuming foods at each eating occasion.

Results Hispanic and non-Hispanic infants and toddlers, on average, were fed seven times per day. Overall, the percentages of children who ate snacks increased with age, and more than 80% of toddlers aged 12-24 months consumed afternoon snacks, with more than 90% of Hispanic children consuming an afternoon snack. In each age group, there were significant differences between ethnic groups in nutrient intakes by eating occasion. No significant difference was seen for energy across all meal occasions. At age 6-11 months, Hispanic children had a significantly lower intake of carbohydrate at dinner and lower intake of saturated fat at afternoon snacks compared with non-Hispanic children ($P<.05$). The main difference between Hispanic children's and non-Hispanic children's intakes by eating occasion is at age 12-24 months. Hispanics aged 12-24 months had significantly ($P<.05$) lower percentages of energy from fat and saturated fat and a significantly ($P<.05$) higher percentage of carbohydrate at lunch compared with non-Hispanic children. For dinner, Hispanic toddlers had significantly ($P<.05$) lower intakes of total fat and saturated fat compared with non-Hispanic toddlers at age 12-24 months. Overall fiber intake contributed 2 g/meal for both ethnic groups. Snacks contributed, on average, less than 1 g fiber, except Hispanic toddlers had significantly higher fiber intake at afternoon snacks (1.5 g) than non-Hispanic toddlers. Foods frequently consumed at meals and snacks were lacking in whole grains, vegetables, and fruits. Most nutrients were not significantly different between Hispanics and non-Hispanics for meals and snacks.

Conclusions Considering the sizeable contribution that snacks make toward overall energy, parents and caregivers should plan toddlers' snacks to complement meals by including additional fruits, vegetables, and whole grains that are culturally appropriate rather than fruit drinks, cookies, and crackers. This will increase fiber intake and limit fat and sugar intakes. To develop healthful eating patterns, introduce toddlers to foods eight to 10 times to increase food acceptance and the likelihood of establishing healthful eating patterns. Dietetics professionals need to consider cultural differences when developing meal and snack patterns for Hispanic and non-Hispanic infants and toddlers.

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The prevalence of overweight is increasing for both Hispanic and non-Hispanic children (1). As the rates of overweight and diabetes rise rapidly in Hispanic children, genetics, acculturation, physical activity, and energy intake are now being examined as possible contributing factors. Current literature suggests differences in nutrient intakes of Hispanics compared to non-Hispanics may be less drastic as a result

of acculturation (2). The dietary intake of Hispanic children has been looked at more specifically in terms of macro- and micronutrient intake, but not by meal and snack patterns (3).

Concern has been expressed about the relationship between children's nutrient intakes and the declining frequency of family meals (4-7), the increasing number of skipped meals (5,8-10), snacks in lieu of meals (11-14), and eating at quick-serve restaurants (15,16). Each of these patterns reportedly has a negative influence on the nutritional quality of children's diets. Moreover, there is evidence from longitudinal studies that many of children's eating patterns (eg, dietary variety, food preferences, nutrient intakes, fruit and vegetable consumption) can be tracked over periods of up to 6 years (17-22). The 2002 Feeding Infants and Toddlers Study (FITS) reported that meal and snack patterns begin at age 7 to 8 months and are well established by age 9 to 11 months (23). Researchers have shown that children's eating patterns further deteriorate in adolescence (5,6,24). Thus, the development of healthful meal and snack patterns during infancy and childhood is important (5,17).

A review of the recent literature showed that there were no studies comparing meal and snack patterns among Hispanic and non-Hispanic infants and toddlers. To gain a fuller understanding of dietary practices that affect energy and nutrient intakes during the course of a day, it is important to study how meals and snacks, and food patterns therein, affect total nutrient values. The objective of this study is to describe the nutrient intake and foods consumed at particular eating occasions throughout the day in Hispanic and non-Hispanic infants and toddlers in the United States. Other articles have addressed the demographic characteristics and usual nutrient intakes (25) and infant feeding practices (26) of Hispanic and non-Hispanic infants and toddlers.

METHODS

FITS is a cross-sectional survey, a national random sample of children aged 4-24 months, categorized by Hispanic ethnicity and age group (371 Hispanic and 2,637 non-Hispanic). Data were collected in a telephone survey, including 24-hour dietary recalls of infants' and toddlers' food and nutrient intakes, as reported by parents or other primary caregivers. The recruitment of subjects, the sampling frame, the data collection process, and nutrient analyses procedures have been described elsewhere (25,27,28). All data collection instruments and procedures were reviewed and approved by the Mathematica Policy Research, Inc (Princeton, NJ) Internal Review Board compliance officer and quality assurance system. Because this article is focused on the contribution of foods to nutrient intakes at specific meals and snacks, dietary supplements were excluded from the nutrient analysis. Data are presented for three age groups: infants aged 4-5 months, infants aged 6-11 months, and toddlers aged 12-24 months.

Eating occasions were classified based on mothers' (or other primary caregivers') responses provided by telephone during a 24-hour dietary recall, when they were asked the time and location of each eating occasion and if they considered it a breakfast, lunch, dinner, snack, or other eating occasion. Snacks were then further categorized by researchers as: morning snack (waking until noon or lunch), afternoon snack (noon or lunch until 6 PM), and evening snack (after 6 PM or dinner to bedtime). Other eating occasions were those occasions that mothers did not consider either a meal or a snack. Typically these occasions included night feedings and between-meal feedings of breast milk or formula. If a caretaker responded that a child had more than one eating occasion during 1 day, such as two morning snacks, then the nutrients from foods consumed at these eating occasions were summed for the meal- or snack-specific nutrient intake.

To gain a fuller understanding of dietary practices that affect energy and nutrient intakes during the course of a day, it is important to study how meals and snacks, and food patterns therein, affect total nutrient values.

For each distinct eating occasion, the nutrient intakes of all children were aggregated; group means and standard errors were calculated for each of the three age categories. The percentage of children participating in each eating occasion was calculated; percentages were weighted to adjust for oversampling, nonresponse, and underrepresentation of the Hispanic ethnic group.

Each child's energy and nutrient intakes, percentages of energy from each macronutrient, and nutrient densities at each eating occasion were computed. Group means±standard errors were calculated for each eating occasion by age. Nutrient density (ie, grams, milligrams, or micrograms of intake per 1,000 kcal food energy at the eating occasion level) was calculated to assess dietary quality and the relationship of food consumption to dietary intake and eating occasion at the meal and snack level. However, no statistical differences were seen in energy; therefore, nutrient density was not reported.

Foods commonly consumed at each eating occasion were calculated by categorizing foods eaten at each eating occasion (ie, meats, fruits, vegetables, grains, mixed dishes, sweets and sweetened beverages, and other foods such as margarine and butter), and estimating the percentage of children who consumed specific foods within major and minor food groupings. We used the same food categorization scheme described by Fox and colleagues (29), within major categories (eg, meats), minor categories were created (eg, beef, chicken, and pork). For some categories, more specificity (eg, presenting a second minor category) was necessary to accurately describe foods eaten. For instance, the major vegetables category was further classified into minor categories such as baby food, cooked, or raw vegetables. Fruit was further classified into the minor

Table 1. Percentage of children and daily energy intake per eating occasion, by age and Hispanic ethnicity, among participants in the 2002 Feeding Infants and Toddlers Study

	Child Age					
	4-5 Months		6-11 Months		12-24 Months	
Eating occasion[a]	Hispanic (n=84)	Non-Hispanic (n=538)	Hispanic (n=163)	Non-Hispanic (n=1,228)	Hispanic (n=124)	Non-Hispanic (n=871)
	← *mean %* →					
Breakfast	65.0	60.7	89.5	92.2	97.0	97.0
Lunch	63.1	54.2	89.6	89.3	92.0	94.5
Dinner	62.1	63.1	85.5	92.9	94.8	96.9
Morning snack	32.0	28.1	48.5	41.6	58.0	65.8
Afternoon snack	30.2	32.4	61.1	60.9	90.6	83.3
Evening snack	21.9	28.1	42.6	42.2	62.7	55.6
Other	81.6	80.8	85.0	80.7	73.6	67.0
	← *mean %±SEM*[b] *of daily food energy* →					
Breakfast	12.0±1.4	11.2±0.5	16.5±0.9	17.5±0.3	18.7±1.0	19.3±0.4
Lunch	10.5±1.2	9.2±0.5	15.4±0.9	16.1±0.3	18.6±1.2	21.3±0.4
Dinner	11.1±1.4	10.9±0.5	13.4**±0.8	16.6±0.3	20.0**±0.9	23.4±0.4
Snacks	14.8±2.1	14.9±0.9	21.3±1.7	19.4±0.5	29.2±1.5	25.3±0.5
Other	51.7±4.4	53.8±1.9	33.4±2.2	30.4±0.8	13.5±1.4	10.7±0.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

[a]Eating occasions as reported by mother or caregiver. "Other" eating occasions were defined as those not reported as a meal or snack, such as infant feedings with only breast milk or infant formula.
[b]SEM=standard error of the mean.
**Significantly different from non-Hispanics at $P<.01$.

categories fresh, baby food, or canned fruits. The percentage of toddlers who consumed a particular food at meals, snacks, and other eating occasions were calculated and ranked in descending order of frequency. We report the percentage of toddlers who consumed a particular food item at meals, snacks, and other eating occasions for frequencies of 10% or higher. These percentages are listed in rank order and represent the most frequently consumed foods by toddlers on any given day.

The Student *t* test was used to compare nutrient intakes of the eating occasion. Statistical Analysis Software (version 8.2, 2001, SAS Institute, Inc, Cary, NC) was used to prepare data files and analytic variables. SUDAAN (version 9.0, 2004, Research Triangle Institute, Research Triangle Park, NC), which correctly incorporates the complex design and sample weights, was used to examine the nutrient intakes and foods consumed during a typical day at different meals (ie, breakfast, lunch, dinner, snacks—morning, afternoon, and evening, and other eating occasions—other occasions were those occasions that mothers did not consider either a meal or a snack).

We also followed accepted reporting guidelines for nutrition data with respect to the reliability of point estimates (30). The data presented in Tables 1 through 4 meet minimum sample size requirements and have been reviewed for reliability. Where the coefficient of variation (calculated as standard error/mean) exceeds 30% the value may be unreliable. Coefficient of variations of 30% or higher were most problematic within the 4- to 5-month age group, where the consumption of some food items was very low (<10%) and there was high variability within the group. In these cases, the estimate was based on an adequate sample size but should be interpreted with more caution due to a high coefficient of variation.

Infants and toddlers were classified as very picky eaters, somewhat picky eaters, or not picky eaters based on caregiver responses. Caregivers were asked if they considered their child a very picky eater, a somewhat picky eater, or not a picky eater. Coded responses included yes, no, don't know, or refusal. The telephone interviewer did not define the term "picky eater." Rather, it was the caregivers' perceptions that were used as the definition of picky eater. Response categories for the number of times mothers offered new foods before deciding that their child disliked a food included, "once, twice, three to five times, six to 10 times, and more than 10 times." The last two response categories were combined to be "six or more times" due to small sample sizes. Data for infants and toddlers considered "very picky" and "somewhat picky" were combined to form a "picky eater" data set for each of the age groups. As described by Carruth and colleagues (31), caregivers who were exclusive breastfeeders were excluded from being asked this question.

RESULTS

Meal and Snack Patterns

Participation in an eating occasion (percent of total sample) and mean energy distribution by eating occa-

Table 2. Mean±standard error of the mean (SEM) macronutrient distributions per eating occasion by age and Hispanic ethnicity for participants in the 2002 Feeding Infants and Toddlers Study who reported the eating occasion (nutrients from dietary supplements are not included)

	Child Age					
	4-5 Months		6-11 Months		12-24 Months	
Macronutrient	Hispanic (n=84)	Non-Hispanic (n=538)	Hispanic (n=163)	Non-Hispanic (n=1,228)	Hispanic (n=124)	Non-Hispanic (n=871)
	← *mean± SEM* →					
Breakfast[a]						
Energy (kcal)	116±8.4	129±3.9	158±7.1	168±3.1	244±15.3	243±5.0
Protein (g)	2.3±0.19	2.7±0.10	3.9±0.31	3.8±0.09	8.1±0.79	8.6±0.22
Fat (g)	5.0±0.44	5.7±0.18	5.2±0.43	5.2±0.15	8.6±0.91	8.4±0.28
Trans fat (g)	0.1†±0.02	0.1±0.01	0.1±0.03	0.1±0.01	0.4±0.06	0.4±0.02
n-3 fatty acids (g)	0.1±0.01	0.1±0.00	0.1±0.01	0.1±0.00	0.1±0.02	0.1±0.01
n-6 fatty acids (g)	0.5±0.07	0.6±0.03	0.8±0.07	0.9±0.03	1.0±0.14	0.9±0.05
Saturated fat (g)	2.3±0.20	2.7±0.09	2.1±0.18	2.3±0.07	3.6±0.39	3.7±0.12
Carbohydrate (g)	15.6±1.24	16.7±0.57	24.4±1.10	27.0±0.49	34.7±2.11	34.5±0.77
Total sugars (g)	10.5±0.88	11.3±0.38	14.3±0.73	15.4±0.32	19.9±1.36	20.3±0.48
Fiber (g)	0.4±0.10	0.4±0.04	1.3±0.13	1.4±0.04	2.0±0.20	1.7±0.06
Protein (% kcal)	7.8±0.30	8.1±0.10	9.2±0.50	8.7±0.10	12.9±0.70	13.7±0.20
Fat (% kcal)	37.7±2.40	39.8±0.90	26.7±1.50	26.1±0.50	29.3±1.70	28.4±0.60
Saturated fat (% kcal)	16.9±1.20	18.6±0.50	10.7±0.70	11.3±0.30	12.6±0.90	12.7±0.30
Carbohydrate (% kcal)	54.5±2.50	52.0±0.90	64.2±1.70	65.1±0.50	57.7±2.10	58.0±0.80
Total sugars (g/1,000 kcal)	92.3±5.25	89.0±1.61	93.7±3.31	92.2±1.18	83.5±3.84	86.6±1.56
Fiber (g/1,000 kcal)	4.1±1.06	3.7±0.46	9.3±0.80	9.2±0.28	8.2±0.64	7.6±0.23
Lunch[b]						
Energy (kcal)	105±6.9	117±3.3	154±9.8	161±3.1	271±21.7	281±6.1
Protein (g)	2.1±0.16	2.5±0.09	4.6±0.51	4.5±0.13	10.7±0.89	11.7±0.32
Fat (g)	4.5±0.43	5.3±0.18	4.6±0.42	5.1±0.16	9.3±1.16	11.0±0.33
Saturated fat (g)	2.1±0.21	2.5±0.09	1.8±0.19	2.2±0.07	3.4±0.53	4.5±0.15
Trans fat (g)	0.1†±0.03	0.1±0.01	0.2±0.03	0.2±0.01	0.7±0.15	0.8±0.03
n-3 fatty acids (g)	0.1±0.01	0.1±0.01	0.1±0.01	0.1±0.00	0.1±0.02	0.2±0.01
n-6 fatty acids (g)	0.4±0.06	0.5±0.03	0.7±0.07	0.8±0.03	1.4±0.20	1.3±0.05
Carbohydrate (g)	14.3±1.56	15.0±0.48	24.3±1.67	24.9±0.47	36.8±2.64	34.8±0.88
Total sugars (g)	10.5±1.23	10.8±0.35	13.8±1.17	14.4±0.33	16.3±1.30	17.7±0.55
Fiber (g)	0.6±0.12	0.6±0.06	1.7±0.13	2.0±0.05	2.2±0.23	2.2±0.08
Protein (% kcal)	8.1±0.80	8.4±0.20	11.6±0.80	10.8±0.20	16.1±0.70	16.4±0.30
Fat (% kcal)	36.6±3.00	39.1±1.00	24.3±1.40	25.8±0.50	26.9*±1.50	33.3±0.60
Saturated fat (% kcal)	16.8±1.50	18.3±0.50	9.5±0.70	10.9±0.30	9.4*±0.80	13.7±0.30
Carbohydrate (% kcal)	55.4±3.20	52.5±1.00	64.1±1.80	63.4±0.60	57.0*±1.70	50.2±0.70
Total sugars (g/1,000 kcal)	99.9±7.94	94.2±1.94	88.6±4.77	91.7±1.45	67.9±5.23	64.1±1.56
Fiber (g/1,000 kcal)	6.5±1.44	6.9±0.84	13.5±1.11	15.3±0.48	9.1±0.84	8.4±0.26
Dinner[c]						
Energy (kcal)	113±7.7	119±4.0	140±10.1	161±3.3	272±14.9	302±6.4
Protein (g)	2.3±0.17	2.6±0.10	5.0±0.54	5.1±0.16	12.4±0.79	14.4±0.40
Fat (g)	4.7±0.48	5.0±0.19	4.5±0.47	4.9±0.15	8.9*±0.71	11.6±0.35
Saturated fat (g)	2.1±0.23	2.3±0.09	1.8±0.21	2.1±0.07	3.5*±0.38	4.7±0.15
Trans fat (g)	0.1†±0.03	0.1±0.01	0.2±0.04	0.2±0.01	0.5*±0.06	0.7±0.04
n-3 fatty acids (g)	0.1±0.01	0.1±0.01	0.1±0.01	0.1±0.00	0.2±0.02	0.2±0.01
n-6 fatty acids (g)	0.5±0.07	0.6±0.03	0.6*±0.06	0.7±0.02	1.0*±0.09	1.4±0.06
Carbohydrate (g)	15.8±1.31	16.1±0.59	20.4*±1.31	24.7±0.51	36.1±2.71	35.6±0.83
Total sugars (g)	10.8±0.81	10.9±0.44	9.6*±0.69	13.0±0.31	15.9±1.45	15.5±0.48
Fiber (g)	0.7±0.16	0.7±0.05	1.7±0.18	2.1±0.06	2.4±0.24	2.4±0.07
Protein (% kcal)	8.3±0.30	8.9±0.20	13.4±0.80	12.1±0.20	19.1±1.20	19.2±0.40
Fat (% kcal)	33.7±2.70	35.4±1.00	25.4±1.50	25.0±0.50	28.3±1.70	32.5±0.50
Saturated fat (% kcal)	15.3±1.40	16.2±0.50	10.0±0.80	10.4±0.20	10.7*±0.80	13.1±0.30
Carbohydrate (% kcal)	57.9±2.70	55.8±1.00	61.3±2.00	62.9±0.50	52.7±2.30	48.3±0.70
Total sugars (g/1,000 kcal)	95.0±4.16	91.9±1.87	76.7±4.91	83.4±1.33	58.0±4.04	52.8±1.41

(continued)

Table 2. Mean±standard error of the mean (SEM) macronutrient distributions per eating occasion by age and Hispanic ethnicity for participants in the 2002 Feeding Infants and Toddlers Study who reported the eating occasion (nutrients from dietary supplements are not included) (continued)

	Child Age					
	4-5 Months		6-11 Months		12-24 Months	
Macronutrient	Hispanic (n=84)	Non-Hispanic (n=538)	Hispanic (n=163)	Non-Hispanic (n=1,228)	Hispanic (n=124)	Non-Hispanic (n=871)
Fiber (g/1,000 kcal)	9.8±2.39	8.7±0.88	14.9±1.45	16.3±0.42	9.2±0.73	8.5±0.23
Morning snack[d]						
Energy (kcal)	151±9.2	143±3.5	121±12.2	119±5.4	125±8.5	127±4.2
Protein (g)	2.3±0.22	2.4±0.13	2.3±0.21	2.5±0.12	4.7±0.65	4.0±0.20
Fat (g)	5.2±0.44	5.0±0.17	6.2±0.76	6.2±0.30	4.7±0.47	5.5±0.22
Saturated fat (g)	2.4±0.25	2.3±0.09	2.8±0.37	2.9±0.15	2.0±0.22	2.5±0.10
Trans fat (g)	0.3±0.04	0.3±0.02	0.2±0.06	0.2±0.02	0.2±0.03	0.2±0.02
n-3 fatty acids (g)	0.1±0.01	0.1±0.01	0.1±0.01	0.1±0.01	0.1±0.01	0.1±0.00
n-6 fatty acids (g)	0.3±0.06	0.3±0.03	0.4±0.05	0.4±0.02	0.3±0.06	0.3±0.03
Carbohydrate (g)	14.4±1.97	13.7±0.67	18.7±1.33	17.1±0.60	25.9±2.31	24.0±0.82
Total sugars (g)	11.8±1.54	11.0±0.59	12.5±1.07	12.6±0.45	18.6±1.78	16.5±0.63
Fiber (g)	0.4†±0.29	0.1±0.03	0.6±0.11	0.4±0.04	1.0±0.16	0.8±0.05
Protein (% kcal)	7.8±0.30	7.7±0.20	7.0±0.30	7.6±0.20	10.2±1.20	9.6±0.40
Fat (% kcal)	44.6±2.90	44.6±1.20	30.9±2.20	35.3±0.90	26.5±2.50	25.4±0.80
Saturated fat (% kcal)	20.1±1.60	20.8±0.60	12.8±1.10	15.7±0.50	11.9±1.30	10.8±0.50
Carbohydrate (% kcal)	47.6±2.90	47.7±1.20	62.0±2.40	57.1±1.00	63.3±3.00	65.0±1.10
Total sugars (g/1,000 kcal)	93.2±5.78	95.2±2.59	100.5±5.44	101.2±2.17	114.1±6.49	111.9±3.04
Fiber (g/1,000 kcal)	2.9†±1.72	2.1±0.60	6.3±1.23	4.3±0.36	7.7±1.20	6.6±0.39
Afternoon snack[e]						
Energy (kcal)	163±20.9	153±3.5	99±14.7	103±4.4	118±11.5	120±3.8
Protein (g)	1.9±0.30	2.1±0.11	2.6±0.33	2.6±0.13	5.3±1.01	4.3±0.20
Fat (g)	5.4±0.90	5.3±0.17	4.4±0.66	5.2±0.26	4.2±0.50	4.8±0.18
Saturated fat (g)	2.4±0.37	2.3±0.08	2.1±0.34	2.5±0.13	1.8±0.23	2.2±0.09
Trans fat (g)	0.4†±0.06	0.4±0.02	0.1±0.04	0.1±0.02	0.2±0.03	0.2±0.01
n-3 fatty acids (g)	0.1±0.02	0.1±0.01	0.1±0.01	0.1±0.00	0.1±0.02	0.1±0.01
n-6 fatty acids (g)	0.2±0.06	0.3±0.03	0.4±0.06	0.5±0.03	0.7±0.23	0.6±0.05
Carbohydrate (g)	13.1±2.18	12.3±0.54	17.8±1.68	17.0±0.58	28.6±3.79	26.8±0.85
Total sugars (g)	9.8±1.91	10.1±0.45	12.3±1.25	12.0±0.42	18.7±1.98	18.2±0.69
Fiber (g)	0.2†±0.07	0.2±0.04	0.8±0.13	0.5±0.03	1.5*±0.22	0.9±0.05
Protein (% kcal)	7.2±0.70	7.4±0.30	8.2±0.90	7.7±0.20	9.9±0.90	9.3±0.30
Fat (% kcal)	35.6±4.10	41.3±1.50	27.7±1.90	32.5±0.70	24.8±2.00	26.9±0.80
Saturated fat (% kcal)	16.0±1.90	19.5±0.70	11.1*±1.00	14.0±0.40	10.2±1.00	10.8±0.40
Carbohydrate (% kcal)	57.2±4.60	51.3±1.60	64.2±2.00	59.8±0.80	65.2±2.60	63.9±1.00
Total sugars (g/1,000 kcal)	102.8±10.49	105.0±3.62	108.5±5.52	104.4±2.05	115.2±7.96	108.4±2.59
Fiber (g/1,000 kcal)	4.1†±1.62	2.2±0.58	9.8±2.60	5.7±0.39	10.3*±1.37	6.2±0.31
Evening snack[f]						
Energy (kcal)		135±3.8	139±12.3	127±5.6	140±14.3	123±4.4
Protein (g)		2.5±0.13	3.0±0.30	2.8±0.15	6.1±0.90	4.6±0.22
Fat (g)		5.4±0.17	7.1±0.92	6.6±0.30	6.6±0.79	5.6±0.22
Saturated fat (g)		2.6±0.09	3.2±0.50	3.1±0.15	2.8±0.32	2.6±0.11
Trans fat (g)		0.3±0.02	0.2±0.07	0.2±0.03	0.3±0.08	0.2±0.02
n-3 fatty acids (g)		0.1±0.01	0.1±0.01	0.1±0.01	0.1±0.01	0.1±0.00
n-6 fatty acids (g)		0.3±0.03	0.4±0.08	0.4±0.02	0.3±0.07	0.3±0.02
Carbohydrate (g)		14.5±0.71	17.5±1.92	15.5±0.58	26.8±3.16	19.4±0.86
Total sugars (g)		11.6±0.57	13.8±1.56	11.2±0.42	19.5*±2.22	13.5±0.61
Fiber (g)		0.6±0.03	0.3±0.21	0.1±0.03	0.5±0.15	0.4±0.04
Protein (% kcal)		7.8±0.20	9.7±1.20	8.6±0.20	12.6±1.20	12.6±0.40
Fat (% kcal)		45.9±1.00	38.5±2.50	37.4±0.80	31.3±2.40	31.5±0.80
Saturated fat (% kcal)		21.7±0.50	16.6±1.20	17.1±0.50	15.7±1.40	15.2±0.60

(continued)

Table 2. Mean±standard error of the mean (SEM) macronutrient distributions per eating occasion by age and Hispanic ethnicity for participants in the 2002 Feeding Infants and Toddlers Study who reported the eating occasion (nutrients from dietary supplements are not included) (continued)

	Child Age					
	4-5 Months		6-11 Months		12-24 Months	
Macronutrient	Hispanic (n=84)	Non-Hispanic (n=538)	Hispanic (n=163)	Non-Hispanic (n=1,228)	Hispanic (n=124)	Non-Hispanic (n=871)
Carbohydrate (% kcal)		46.3±1.00	51.8±2.90	54.0±0.90	56.1±2.90	55.9±1.10
Total sugars (g/1,000 kcal)		92.6±2.20	102.1±6.34	93.1±2.32	106.0±6.10	96.6±2.68
Fiber (g/1,000 kcal)		2.1†±0.76	6.5±1.95	4.2±0.38	5.0±0.75	6.3±0.49
Other[g]						
Energy (kcal)	435.9±32.39	426.4±11.42	330.6±19.11	315.7±6.81	231.5±22.44	187.8±7.68
Protein (g)	8.3±0.74	8.3±0.26	7.2±0.48	7.0±0.18	9.1±0.83	7.7±0.35
Fat (g)	24.1±1.88	23.8±0.65	16.9±0.99	16.5±0.35	10.5±1.09	8.2±0.37
Saturated fat (g)	0.8±0.14	0.8±0.05	0.4±0.07	0.3±0.02	0.5±0.09	0.3±0.02
Trans fat (g)	0.3±0.03	0.3±0.02	0.3±0.02	0.3±0.01	0.2±0.01	0.1±0.01
n-3 fatty acids (g)	2.8±0.34	2.9±0.12	2.2±0.18	2.2±0.07	0.5±0.10	0.4±0.03
n-6 fatty acids (g)	11.3±0.97	11.3±0.31	7.9±0.49	8.1±0.17	5.7±0.53	4.9±0.22
Carbohydrate (g)	47.7±3.37	45.8±1.26	37.9±2.33	35.5±0.84	25.9±3.8	21.5±1.04
Total sugars (g)	40.1±3.13	39.6±1.13	31.7±2.04	29.2±0.70	23.7±3.76	19.7±0.96
Fiber (g)	0.2†±0.06	0.1±0.02	0.4±0.10	0.2±0.03	0.3±0.07	0.3±0.05
Protein (% kcal)	7.3±0.30	7.7±0.10	8.8±0.40	8.8±0.10	16.8±1.10	16.8±0.60
Fat (% kcal)	46.9±1.50	48.9±0.40	45.8±0.80	46.6±0.30	39.0±1.90	36.4±0.90
Saturated fat (% kcal)	21.8±0.80	23.3±0.20	21.0±0.50	22.4±0.20	21.5±1.10	20.6±0.60
Carbohydrate (% kcal)	45.8±1.60	43.4±0.40	45.4±0.80	44.6±0.30	44.3±2.20	46.8±1.10
Total sugars (g/1,000 kcal)	93.7±3.78	94.3±1.20	96.2±2.42	93.7±0.95	101.5±5.80	109.9±2.63
Fiber (g/1,000 kcal)	0.7†±0.25	0.3±0.06	1.3±0.38	0.7±0.10	1.2±0.33	1.5±0.28

[a]Unweighted numbers of children consuming breakfast were: age 4-5 mo, Hispanic n=55, non-Hispanic n=334; age 6-11 mo, Hispanic n=147, non-Hispanic n=1,134; age 12-24 mo, Hispanic n=119, non-Hispanic n=846.

[b]Unweighted numbers of children consuming lunch were: age 4-5 mo, Hispanic n=50, non-Hispanic n=291; age 6-11 mo, Hispanic n=145, non-Hispanic n=1,083; age 12-24 mo, Hispanic n=116, non-Hispanic n=827.

[c]Unweighted numbers of children consuming dinner were: age 4-5 mo, Hispanic n=52, non-Hispanic n=341; age 6-11 mo, Hispanic n=141, non-Hispanic n=1,136; age 12-24 mo, Hispanic n=118, non-Hispanic n=845.

[d]Unweighted numbers of children consuming a morning snack were: age 4-5 mo, Hispanic n=27, non-Hispanic n=157; age 6-11 mo, Hispanic n=75, non-Hispanic n=527; age 12-24 mo, Hispanic n=73, non-Hispanic n=572.

[e]Unweighted numbers of children consuming an afternoon snack were: age 4-5 mo, Hispanic n=26, non-Hispanic n=181; age 6-11 mo, Hispanic n=98, non-Hispanic n=748; 12-24 mo Hispanic n=110, non-Hispanic n=721.

[f]Unweighted numbers of children consuming an evening snack were: age 4-5 mo, Hispanic n=19, non-Hispanic n=151; age 6-11 mo, Hispanic n=71, non-Hispanic n=527; age 12-24 mo, Hispanic n=68, non-Hispanic n=481. Values are not shown because the sample size of 4- to 5-month-olds was too small (n=19) to report a mean.

[g]Other eating occasions were defined as those not reported as a meal or snack, such as infant feedings with only breast milk or infant formula. Unweighted numbers of children consuming another eating occasion were: age 4-5 mo, Hispanic n=67, non-Hispanic n=432; age 6-11 mo, Hispanic n=137, non-Hispanic n=981; age 12-24 mo, Hispanic n=95, non-Hispanic n=595.

*Significantly different from non-Hispanics at $P<.05$.

†Coefficient of variation of 30% or higher.

sion of those infants and toddlers who participated are reported in Table 1. Regardless of age group, among Hispanic toddlers the median number of daily eating occasions was seven, and the total number of meals and snacks consumed ranged from four to 12. The non-Hispanic 4-5 months age group had a median of six daily eating occasions and the 6-24 months age group had a median of seven daily eating occasions and a range of three to 15 meals and snacks (data not shown). Breakfast, lunch, and dinner were eaten by more than 85% of the children, excluding 4- to 5-month-olds. Overall the percentages of children reporting to eat snacks increased with age. More than 80% of toddlers aged 12-24 months had afternoon snacks, with more than 90% consumption of an afternoon snack by Hispanics.

Energy Intake

Breakfast provided <20% of the daily energy intake of infants and toddlers. The percentage of energy was significantly less ($P<.001$) at dinner between Hispanic toddlers aged 6-11 and 12-24 months. Compared with the rest of the eating occasions, other eating occasions provided the highest amount of energy among infants, providing about half of daily energy intake for 4- to 5-month-olds (52% of intake for Hispanic toddlers, 54% of intake

for non-Hispanic toddlers) and one third of the daily energy intake for 6- to 11-month-olds (33% of intake for Hispanic toddlers, 30% of intake for non-Hispanic toddlers). Snacks contributed the second highest percentage of energy when compared with other single meal eating occasions for both Hispanic and non-Hispanic infants and toddlers, and about 25% of toddlers' daily energy intake came from snacks for both ethnic groups. Hispanic toddlers aged 6 to 24 months had a higher percentage of energy from snacks than non-Hispanic toddlers.

Macronutrient and Fiber Distributions

Table 2 shows the macronutrient distributions of mean intakes, mean nutrient densities, and standard errors at meals, snacks, and other eating occasions by age for those who reported the eating occasion. There were no differences for the 4- to 5-month-olds for all eating occasions. The 6- to 11-month-old Hispanic toddlers had a significantly ($P<.05$) lower intake of carbohydrate at dinner as well as a significantly ($P<.05$) lower percentage of energy from saturated fat for afternoon snacks. The main differences between the Hispanic and non-Hispanic groups were for the toddlers aged 12-24 months. Hispanic toddlers aged 12-24 months had significantly ($P<.05$) lower percentages of energy from fat and saturated fat for lunch compared with non-Hispanic toddlers, as well as a significantly ($P<.05$) higher percentage of energy from carbohydrate for lunch. At dinner, Hispanic children had significantly ($P<.05$) lower intakes of total fat and saturated fat compared with non-Hispanic children at age 12-24 months. Hispanic children also had significantly ($P<.05$) higher fiber intakes for afternoon snacks. However, fiber intakes decreased per 1,000 kcal for both ethnic groups between age 6-11 months and age 12-24 months.

Nutrient Intakes

Mean intakes and standard errors of key micronutrients are shown for each eating occasion and age group in Table 3. Only those who had the eating occasion are included in these estimates. No significant difference was seen for energy across all meal occasions; thus, nutrient density data is not shown. Most nutrients were not significantly different for Hispanic children vs non-Hispanic children for eating occasions. The 4- to 5-month-old infants were similar for breakfast, dinner, snacks, and other occasions, but they differed in that calcium and phosphorus intakes were significantly lower ($P<.05$) for Hispanic children consuming lunch than for non-Hispanic children. Interestingly, vitamin E intake was significantly ($P<.05$) lower for breakfast, lunch, and dinner for Hispanics vs non-Hispanics at age 6 to 11 months. In addition, Hispanic children aged 6 to 11 months had significantly ($P<.05$) lower vitamin C and iron intake at dinner than non-Hispanic children. The 12- to 24-month-old Hispanic children had significantly ($P<.05$) lower intakes of phosphorus at dinner but significantly ($P<.05$) higher intakes of vitamin A for evening snacks compared with non-Hispanic children.

Foods Eaten

Beverages and complementary foods consumed by at least 10% of infants and toddlers by meal and snack occasion, age, and ethnicity are shown in Table 4. Both Hispanic and non-Hispanic 4- to 5-month-old children commonly consumed infant formula, breast milk, water, and dry baby food cereal across all eating occasions. Breakfast and lunch beverage trends were similar among Hispanics and non-Hispanics aged 6-11 months; both consumed beverages frequently such as formula, water, and 100% fruit juice. Both groups consumed complementary foods, such as non–baby food cereal, meats, sweets, vegetables, and mixed dishes including soups or baby food dinners. Both groups (15% Hispanics, 14% non-Hispanics) ate desserts at lunch. Non-Hispanic children aged 6-11 months more frequently consumed fruit, vegetables, and dry baby food cereal at dinner, compared with Hispanics in this age group who more frequently ate meat. Twelve- to 24-month-old Hispanics and non-Hispanics at breakfast had similar percentage levels of whole milk, 100% fruit juice, water, and reduced-fat milk. Both groups commonly consumed unsweetened and sweetened cereals, butter and oils, eggs, bananas, and hot cereals, but a higher percentage of Hispanics consumed sweets than non-Hispanics. At lunch and dinner, both groups frequently drank sweetened beverages and low-fat milk, in addition to the beverages commonly consumed at breakfast. At lunch, both groups frequently consumed bread, chicken, pasta, fresh fruit, and cheese. Common foods for Hispanic children also included cooked potatoes and raw vegetables, and non-Hispanic children more frequently consumed sandwiches, hot dogs, and dessert. At dinner, both groups frequently ate pasta and bread, mixed dishes, meats, cooked potato, and condiments, and Hispanic children ate dried bean sources, whereas non-Hispanic children had butter and oils and green beans as popular foods.

Snacks from beverages for infants aged 4-5 months were mainly formula, breast milk, and water for both Hispanics and non-Hispanics, but non-Hispanic infants also frequently consumed 100% fruit juice at afternoon snacks. Six- to 11-month-old Hispanic and non-Hispanic infants frequently consumed beverages such as formula, water, and 100% fruit juice at morning and afternoon snacks, as well as breast milk at morning snacks. Both groups of 6- to 11-month-olds frequently consumed formula, breast milk, and water at evening snacks. Twelve- to 24-month-old Hispanic and non-Hispanic children frequently drank water, 100% fruit juice, whole milk, and fruit drinks at morning and afternoon snacks, and Hispanic children also frequently consumed low-fat milk as a morning snack. Both groups of toddlers commonly consumed whole milk, water, and sweetened beverages at evening snacks, and Hispanic toddlers frequently drank reduced-fat (2%) unflavored milk and non-Hispanic toddlers frequently drank low-fat (1%, flavored or unflavored) milk.

Snacks from complementary foods for the children aged 4-5 months were mainly fruit and cereal, and Hispanics more frequently consumed fruit at afternoon and evening snacks. The transition into table foods at age 6-11 months for both groups consistently included fruit, cereal, cracker, and cookie consumption for all snack occasions.

Table 3. Mean±standard error of the mean (SEM) nutrient intake per eating occasion by age and Hispanic ethnicity for participants in the 2002 Feeding Infants and Toddlers Study who reported the eating occasion (nutrients from dietary supplements are not included)

	Child Age					
	4-5 Months		6-11 Months		12-24 Months	
Nutrient	Hispanic	Non-Hispanic	Hispanic	Non-Hispanic	Hispanic	Non-Hispanic
	← *mean±SEM* →					
Breakfast[a]						
Sodium (mg)	27±2.3	32±1.2	93±18.7	71±3.5	255±20.7	285±9.6
Vitamin C (mg)	14±1.4	15±0.6	19±1.1	22±0.6	22±3.0	17±1.0
Calcium (mg)	92±9.1	108±4.3	115±8.4	131±3.2	190±16.5	202±5.9
Folate (μg)	14.6±1.43	15.3±0.56	25.4±4.43	26.2±0.90	58.8±7.06	61.9±1.95
Phosphorus (mg)	63±5.6	74±3.1	102±7.7	107±2.5	195±17.7	205±5.3
Vitamin E (mg)	1.5±0.13	1.7±0.06	1.3*±0.08	1.6±0.04	0.8±0.09	0.7±0.03
Vitamin A (μg RAE[b])	93±11.2	95±3.3	90±10.6	87±2.7	145±16.2	145±4.5
Iron (mg)	3.2±0.42	3.6±0.21	5.0±0.36	5.4±0.14	2.9±0.31	3.0±0.12
Lunch[c]						
Sodium (mg)	33±6.4	34±1.7	173±30.8	126±6.9	527±55.5	490±14.9
Vitamin C (mg)	14±2.0	14±0.5	20±2.8	19±0.6	17±2.3	16±0.8
Calcium (mg)	67*±6.9	89±3.5	75±6.1	91±3.1	127±15.7	166±6.1
Folate (μg)	15.0±1.25	16.4±0.69	27.3±2.65	26.4±0.73	53.8±6.36	41.9±1.24
Phosphorus (mg)	46*±4.3	62±2.6	83±6.5	92±2.7	171±16.5	198±5.6
Vitamin E (mg)	1.3±0.12	1.6±0.05	1.0*±0.08	1.3±0.04	0.8±0.09	0.8±0.03
Vitamin A (μg RAE)	133±25.8	125±6.5	144±16.8	160±6.3	101±18.0	103±4.6
Iron (mg)	1.6±0.23	2.3±0.15	1.9±0.19	2.1±0.08	2.1±0.23	1.7±0.06
Dinner[d]						
Sodium (mg)	28±2.4	32±1.5	178±34.1	127±7.3	481±44.6	514±15.9
Vitamin C (mg)	14±1.3	14±0.6	13*±0.9	16±0.5	19±3.0	15±0.9
Calcium (mg)	76±7.7	95±4.2	78±8.1	94±2.7	128±15.6	170±6.3
Folate (μg)	14.6±1.11	16.4±0.68	28.7±3.86	28.4±0.94	54.3±5.42	52.3±1.83
Phosphorus (mg)	56±4.7	66±2.9	88±8.4	98±2.5	182*±12.8	230±6.8
Vitamin E (mg)	1.4±0.13	1.5±0.06	0.9*±0.07	1.2±0.03	0.9±0.08	0.9±0.03
Vitamin A (μg RAE)	112±17.3	128±6.1	135±17.7	164±5.7	113±15.7	137±8.9
Iron (mg)	2.5±0.45	3.0±0.20	1.8*±0.19	2.6±0.10	1.9±0.13	2.0±0.06
Morning snack[e]						
Sodium (mg)	33±3.5	34±1.7	58±6.9	58±3.3	141±19.0	135±7.4
Vitamin C (mg)	13±2.1	13±0.8	20±3.4	15±0.8	16±3.0	13±1.1
Calcium (mg)	77±8.8	92±6.0	75±9.0	86±4.0	146±22.9	110±6.4
Folate (μg)	14.3±1.87	14.4±0.84	24.2±3.59	18.4±0.83	20.9±2.20	22.6±1.41
Phosphorus (mg)	52±6.1	58±4.1	57±6.0	63±2.9	121±18.0	100±5.1
Vitamin E (mg)	1.5±0.17	1.7±0.09	1.2±0.11	1.4±0.06	0.6±0.08	0.4±0.03
Vitamin A (μg RAE)	107±11.6	112±6.3	83±10.1	87±3.6	64±9.4	59±5.9
Iron (mg)	1.5±0.27	2.0±0.24	1.9±0.24	1.8±0.11	0.8±0.13	1.0±0.06
Afternoon snack[f]						
Sodium (mg)	27±3.8	31±2.0	83±13.1	76±5.4	212±48.2	166±7.5
Vitamin C (mg)	11±2.1	13±0.8	15±1.9	14±0.8	13±2.4	14±1.1
Calcium (mg)	68±11.8	75±4.4	71±9.3	78±3.8	130±24.2	104±5.5
Folate (μg)	12.9±2.24	12.8±0.72	19.3±2.66	17.9±0.79	23.0±4.43	20.3±0.99
Phosphorus (mg)	46±8.4	50±3.3	58±7.2	62±3.1	124±22.3	98±4.4
Vitamin E (mg)	1.3±0.25	1.4±0.08	1.1±0.13	1.1±0.04	0.6±0.15	0.6±0.04
Vitamin A (μg RAE)	97±18.5	102±10.2	74±10.3	77±3.4	74±15.4	56±4.1
Iron (mg)	1.4±0.27	1.5±0.13	1.4±0.18	1.5±0.07	0.9±0.15	0.9±0.04
Evening snack[g]						
Sodium (mg)		49±13.5	86±19.8	63±5.0	175±27.5	130±7.6
Vitamin C (mg)		13±0.8	15±3.3	13±0.7	16±3.8	7±0.7

(continued)

Table 3. Mean±standard error of the mean (SEM) nutrient intake per eating occasion by age and Hispanic ethnicity for participants in the 2002 Feeding Infants and Toddlers Study who reported the eating occasion (nutrients from dietary supplements are not included) (continued)

	Child Age					
	4-5 Months		6-11 Months		12-24 Months	
Nutrient	**Hispanic**	**Non-Hispanic**	**Hispanic**	**Non-Hispanic**	**Hispanic**	**Non-Hispanic**
Calcium (mg)		95±5.9	84±8.2	96±4.5	179±21.5	138±7.8
Folate (μg)		14.8±0.80	19.6±2.82	16.5±0.80	33.7±8.82	17.9±1.27
Phosphorus (mg)		59±4.1	62±6.0	71±3.6	156±20.9	120±6.2
Vitamin E (mg)		1.8±0.09	1.5±0.16	1.4±0.06	0.6±0.11	0.4±0.03
Vitamin A (μg RAE)		113±5.4	104±11.5	89±3.9	109*±14.4	65±4.4
Iron (mg)		2.1±0.27	1.6±0.26	2.1±0.16	1.3±0.33	0.8±0.07
Other[h]						
Sodium (mg)	120.2±12.37	123.0±3.81	112.3±8.68	104.7±2.82	159.8±19.12	130.5±6.34
Vitamin C (mg)	46.1±5.48	40.6±1.29	34.5±2.73	32.0±0.95	21.1±7.57	12.7±1.11
Calcium (mg)	301.8±31.69	297.9±10.02	260.3±19.33	261.7±7.23	304.5±27.77	267.4±12.61
Folate (μg)	51.0±4.86	48.5±1.62	44.6±3.07	41.1±1.02	22.2±2.78	17.3±0.93
Phosphorus (mg)	180.0±22.00	183.6±7.46	176.6±14.83	176.9±5.45	237.2±22.54	211.2±9.97
Vitamin E (mg)	6.1±0.58	6.0±0.18	4.1±0.28	4.3±0.10	1.1±0.23	0.7±0.06
Vitamin A (μg RAE)	411.9±33.64	395.1±10.76	289.5±16.97	277.5±6.38	182.1±37.41	118.5±6.08
Iron (mg)	5.1±0.70	5.0±0.31	4.8±0.52	4.6±0.19	1.0†±0.31	0.7±0.06

[a]Unweighted numbers of children consuming breakfast were: aged 4-5 mo, Hispanic n=55, non-Hispanic n=334; aged 6-11 mo, Hispanic n=147, non-Hispanic n=1,134; aged 12-24 mo, Hispanic n=119, non-Hispanic n=846.
[b]RAE=retinol activity equivalents.
[c]Unweighted numbers of children consuming lunch were: aged 4-5 mo, Hispanic n=50, non-Hispanic n=291; aged 6-11 mo, Hispanic n=145, non-Hispanic n=1,083; age 12-24 mo, Hispanic n=116, non-Hispanic n=827.
[d]Unweighted numbers of children consuming dinner were: age 4-5 mo, Hispanic n=52, non-Hispanic n=341; age 6-11 mo, Hispanic n=141, non-Hispanic, n=1,136; age 12-24 mo, Hispanic n=118, non-Hispanic n=845.
[e]Unweighted numbers of children consuming a morning snack were: aged 4-5 mo, Hispanic n=27, non-Hispanic n=157; aged 6-11 mo, Hispanic n=75, non-Hispanic n=527; aged 12-24 mo, Hispanic n=73, non-Hispanic n=572.
[f]Unweighted numbers of children consuming an afternoon snack were: aged 4-5 mo, Hispanic n=26, non-Hispanic n=181; aged 6-11 mo, Hispanic n=98, non-Hispanic n=748; aged 12-24 mo, Hispanic n=110, non-Hispanic n=721.
[g]Unweighted numbers of children consuming an evening snack were: aged 4-5 mo, Hispanic n=19, non-Hispanic n=151; aged 6-11 mo, Hispanic n=71, non-Hispanic n=527; aged 12-24 mo, Hispanic n=68, non-Hispanic n=481. Values are not shown because the sample size of 4- to 5-month-olds was too small (n=19) to report a mean.
[h]Other eating occasions were defined as those not reported as a meal or snack, such as infant feedings with only breast milk or infant formula. Unweighted numbers of children consuming another eating occasion were: aged 4-5 mo, Hispanic n=67, non-Hispanic n=432; aged 6-11 mo, Hispanic n=137, non-Hispanic n=981; aged 12-24 mo, Hispanic n=95, non-Hispanic n=595.
*Significantly different from non-Hispanics at $P<.05$.
†Coefficient of variation of 30% or higher.

Hispanic children also commonly consumed a meat or protein food for evening snacks. By age 12-24 months, crackers, cookies, and fruit were popular foods in both groups for morning and evening snacks, and Hispanic children also frequently ate a meat or protein source. In addition to foods stated for breakfast and evening snacks, both groups frequently consumed protein foods and salty snacks at afternoon snacks and desserts at evening snacks.

At other eating occasions, Hispanic and non-Hispanic children frequently consumed similar beverages and foods. For 4- to 5-month-olds, these included formula, breast milk, water, dry baby food cereal, and fruit. For 6- to 11-month-olds, the most commonly consumed beverages and foods were similar to those of 4- to 5-month-olds, but Hispanic children more frequently consumed 100% fruit juice and not fruit. Among toddlers, both Hispanics and non-Hispanics most frequently consumed whole and reduced-fat milk, water, 100% fruit juice, and sweets, but Hispanic toddlers also frequently consumed low-fat milk and breast milk.

Picky Eating

There were no overall significant differences in picky eaters (42.3% Hispanic toddlers, 45.3% non-Hispanic toddlers, 95% confidence interval=31.3, 53.3 for Hispanics; 41.4, 49.2 for non-Hispanics). Non-Hispanics were significantly ($P<.01$) more likely to offer new foods six or more times at age 12-24 months than Hispanics before deciding their toddler did not like the food.

DISCUSSION

This study enables us to assess patterns of major food contributors and nutrient intakes at specific eating occasions. Despite the lack of national standards defining meal and snack portions for infant and toddlers, we are

Table 4. Most frequently consumed beverages and types of complementary foods at meals and snacks by Hispanic and non-Hispanic infants and toddlers, aged 4 to 24 mo, who participated in the 2002 Feeding Infants and Toddlers Study

	Hispanic		Non-Hispanic		Hispanic		Non-Hispanic	
Meal and snack occasion	**Beverage**	**%**	**Beverage**	**%**	**Complementary food**	**%**	**Complementary food**	**%**
Breakfast								
4-5 mo	n=55		n=334		n=55		n=334	
	Formula	67	Formula	65	BF[a] cereal dry	49	BF cereal dry	47
	Breast milk	17	Breast milk	22	BF fruit	16	BF fruit	22
	Water	12	Water	12				
6-11 mo	n=147		n=1,134		n=147		n=1,134	
	Formula	40	Formula	46	BF cereal dry	57	BF cereal dry	56
	Water	26	Water	24	BF fruit	24	BF fruit	31
	100% fruit juice	22	100% fruit juice	19	Fresh fruit	15	Unsweetened RTE[c] cereal	11
	Breast milk	12			Any meat or protein	15	Sweets	10
					Sweets[b]	14		
					Cereal	12		
12-24 mo	n=119		n=846		n=119		n=846	
	Whole milk, unflavored	42	Whole milk, unflavored	44	Sweets	33	Unsweetened RTE cereal	23
	100% fruit juice	29	100% fruit juice	25	Eggs	22	Bread	20
	Water	21	Water	23	Unsweetened cereal	19	Butter/oil	18
	Fruit drink	12	Reduced-fat milk, unflavored	15	Banana	18	Eggs	18
	Low-fat milk	10			Hot cereal	14	Sugar/syrups	16
					Butter/oil	13	Bananas	15
					Presweetened cereal	10	Sweetened RTE cereal	15
							Waffle	15
							Hot cereal	11
Lunch								
4-5 mo	n=50		n=291		n=50		n=291	
	Formula	48	Formula	65	BF vegetable	27	BF vegetable	25
	Breast milk	28	Breast milk	22	Any yellow vegetable[d]	20	BF cereal dry	24
	Water	19	Water	14	BF cereal dry	18	BF fruit	18
					BF fruit	11	Any yellow vegetable	13
6-11 mo	n=145		n=1,083		n=145		n=1,083	
	Water	40	Formula	36	BF vegetable	21	BF fruit	32
	Formula	28	Water	27	Cooked vegetable	19	BF vegetable	32
	100% apple juice	14	100% fruit juice	18	Any yellow vegetable	19	BF dinner	22
					BF fruit	16	Any yellow vegetable	19
					BF dinner	15	Sweets	16
					Desserts[e]	13	Cooked vegetable	14
					Meat	13	Desserts	13
					Soup	12	Non-BF fruit	12
					Non-BF fruit	12	Meat	10
					Potato	12		
					BF cereal, dry	10		
12-24 mo	n=116		n=291		n=116		n=291	
	Water	37	Water	34	Bread	26	Bread	23
	Whole milk, unflavored	13	Whole milk, unflavored	27	Chicken	25	Chicken	22
	Fruit drink	20	100% fruit juice	19	Pasta	17	Fresh fruit	21
	100% fruit juice	23	Sweetened beverage	14	Potato	16	Sandwich[f]	21
					Fresh fruit	13	Cheese	18
					Raw vegetables	11	Canned fruit	13
					Cheese	10	Condiment	13
							Hot dog	12
							Pasta	11

(continued)

Table 4. Most frequently consumed beverages and types of complementary foods at meals and snacks by Hispanic and non-Hispanic infants and toddlers, aged 4 to 24 mo, who participated in the 2002 Feeding Infants and Toddlers Study (continued)

	Hispanic		Non-Hispanic		Hispanic		Non-Hispanic	
Meal and snack occasion	**Beverage**	**%**	**Beverage**	**%**	**Complementary food**	**%**	**Complementary food**	**%**
							Desserts	11
							French fries	11
Dinner								
4-5 mo	n=52		n=341		n=52		n=341	
	Formula	54	Formula	57	BF cereal, dry	39	BF cereal, dry	39
	Breast milk	21	Breast milk	20	BF apple mix	14	BF vegetable	29
	Water	11	Water	15	BF vegetable	14	BF fruit	20
					Protein combinations	12	Any yellow vegetable	20
					BF dinner	11		
					Any yellow vegetables	10		
6-11 mo	n=141		n=1,136		n=141		n=1,136	
	Water	34	Formula	34	BF vegetable	20	BF vegetable	33
	Formula	25	Water	27	BF fruit	18	BF fruit	29
	100% fruit juice	17	100% fruit juice	14	Cooked vegetable	17	BF dinner	27
					BF cereal, dry	15	Any yellow vegetables	24
					Desserts	15	BF cereal, dry	21
					Meat	15	Cooked vegetables	21
					BF dinner	14	Desserts	14
					Any yellow vegetables	13		
12-24 mo	n=118		n=845		n=118		n=845	
	Water	36	Water	31	Pasta	35	Mixed side dishes	40
	Whole milk, unflavored	28	Whole milk, unflavored	27	Mixed dishes	32	Chicken	27
	100% fruit juice	26	100% fruit juice	17	Chicken	30	Potato	26
	Soda	12	Sweetened beverage	16	Potato	23	Pasta	25
	Fruit drink	11	Low-fat milk	11	Condiment	20	Fruit	21
	Low-fat milk	11			Beef	19	Bread	20
	100% apple juice	11			Bread	16	Condiments	18
					Cooked tomatoes	14	Cheese	16
					Any yellow vegetables	13	Butter/oil	14
					Dried beans	12	Green beans	13
					Raw vegetables	16	Beef	12
							Any yellow vegetables	10
Morning snack								
4-5 mo	n=27		n=157		n=27		n=157	
	Formula	53	Formula	58	BF cereal, dry	18	BF cereal, dry	14
	Breast milk	33	Breast milk	33	Fruit	10	Fruit	13
			Water	10				
6-11 mo	n=75		n=527		n=75		n=527	
	Formula	43	Formula	49	Fruit	37	Cake or cookie	12
	Water	28	Water	23	Cracker	17	RTE cereal	10
	100% fruit juice	22	100% fruit juice[g]	19	Fresh fruit[h]	13		
	Breast milk	17	Breast milk	16	BF cookie	12		
			100% apple juice	10	BF cereal dry	10		
12-24 mo	n=73		n=572		n=73		n=572	
	Water	29	Water	34	Crackers	18	Cracker	20
	Whole milk, unflavored	23	100% fruit juice	25	Cookie	17	Cookie	15
	100% fruit juice	22	Whole milk, unflavored	22	Any meat or protein source	17	RTE cereal	12
	Fruit drink	13	Fruit drink	11	Banana	13	Fresh fruit	12
	Low-fat milk	10						

(continued)

Table 4. Most frequently consumed beverages and types of complementary foods at meals and snacks by Hispanic and non-Hispanic infants and toddlers, aged 4 to 24 mo, who participated in the 2002 Feeding Infants and Toddlers Study (continued)

	Hispanic		Non-Hispanic		Hispanic		Non-Hispanic	
Meal and snack occasion	**Beverage**	**%**	**Beverage**	**%**	**Complementary food**	**%**	**Complementary food**	**%**
Afternoon snack								
4-5 mo	n=26		n=181		n=26		n=181	
	Formula	58	Formula	60	BF dessert	16	BF cereal, dry	11
	Water	28	Breast milk	26	BF cereal, dry	14		
	Breast milk	20	Water	18	Fruit[i]	11		
			100% fruit juice	12				
6-11 mo	n=98		n=748		n=98		n=748	
	Formula	38	Formula	41	BF cookie	17	Cracker	15
	Water	35	Water	27	Cracker	14	Unsweetened RTE cereal	12
	100% fruit juice	17	100% fruit juice	22	Fresh fruit	12	BF cookie	11
12-24 mo	n=110		n=271		n=110		n=271	
	Water	37	Water	36	Any meat or protein source	22	Cracker	29
	Whole milk, unflavored	19	100 % fruit juice	24	Cookie	17	Cookie	20
	100% fruit juice	17	Whole milk, unflavored	21	Cracker	17	Any meat or protein source	19
	Fruit drink	17	Fruit drink	11	Banana	13	Fresh fruit	17
					Apple	11	Salty snack	12
					Salty snack	11		
Evening snack	n=19		n=151		n=19		n=151	
4-5 mo	Formula	57	Formula	60	Fruit	27	BF cereal, dry	19
	Breast Milk	32	Breast milk	37	BF peaches	11		
			Other beverage	10	Watermelon	11		
6-11 mo	n=71		n=527		n=71		n=527	
	Formula	44	Formula	51	Fruit	13	BF cereal, dry	12
	Breast milk	29	Water	19	Any meat or protein source	14	Fresh fruit	10
	Water	19	Breast milk	14	Cake or cookie	11	Cake or cookie	10
					Cracker	10		
12-24 mo	n=68		n=481		n=68		n=481	
	Whole milk, unflavored	36	Whole milk, unflavored	32	Dessert	43	Desserts	33
	Water	22	Water	28	Fresh fruit	25	Cookie	13
	Reduced-fat milk unflavored	14	Low-fat milk	13	Cookie	24	Cracker	11
	Sweetened beverage	11	Sweetened beverage	10	Any meat or protein source	15	Cereal	10
							Fresh fruit	10
							RTE cereal	10
Other[j]	n=67		n=432		n=67		n=432	
4-5 mo	Formula	65	Formula	63	BF cereal, dry	22	BF cereal, dry	19
	Breast milk	49	Breast milk	45	BF fruit	10	Fruit	11
	Water	30	Water	15				
6-11 mo	n=137		n=981		n=137		n=981	
	Formula	66	Formula	70	BF cereal, dry	15	BF cereal, dry	13
	Breast milk	32	Breast milk	24			Fruit	12
	Water	27	Water	18				
	100% fruit juice	14						
12-24 mo	n=95		n=595		n=95		n=595	
	Whole milk, unflavored	44	Whole milk, unflavored	43	Sweets	16	Sweets	16
	Water	38	Water	35				
	Reduced-fat milk, unflavored	15	100% fruit juice	15				
	Low-fat milk	15	Reduced-fat milk, unflavored	13				

(continued)

Table 4. Most frequently consumed beverages and types of complementary foods at meals and snacks by Hispanic and non-Hispanic infants and toddlers, aged 4 to 24 mo, who participated in the 2002 Feeding Infants and Toddlers Study (continued)

	Hispanic		Non-Hispanic		Hispanic		Non-Hispanic	
Meal and snack occasion	Beverage	%	Beverage	%	Complementary food	%	Complementary food	%
	Breast milk	13						
	100% fruit juice	11						

[a]BF=baby food.
[b]Sweets include baby-food desserts, desserts, candy, ice cream, frozen yogurt, pudding, sugars and syrups, flavorings, preserves, sweet rolls, donuts, muffins, and sweetened beverages.
[c]RTE=ready to eat.
[d]Any yellow vegetable includes sweet potatoes, carrots, and squash in cooked, raw, and baby food forms.
[e]Desserts include cakes, cookies, pies, and pastries.
[f]Sandwich includes all kinds (eg, peanut butter, cheese, and hamburger).
[g]100% fruit juice includes 100% apple juice.
[h]Fresh fruit is included within the fruit category.
[i]Fruit includes baby food peaches and watermelon.
[j]Other eating occasions were defined as those not reported as a meal or snack, such as infant feedings with only breast milk or infant formula.

able to describe and discuss significant differences in nutrient and food intake patterns in Hispanic and non-Hispanic children by meal occasion. In Hispanic and non-Hispanic infants and toddlers, we are aware that, overall, Hispanic toddlers consumed a significantly higher percentage of energy from carbohydrate and a significantly lower percentage of energy from fat (25) than non-Hispanics. By reviewing foods consumed and nutrient intakes by eating occasion, we provide more depth as to the types of foods and nutrients consumed by Hispanic and non-Hispanic infants and toddlers throughout the course of a day.

Investigating snacks apart from meals provides noteworthy results, especially in light of the following: snacks provide more than 25% of Hispanic and non-Hispanic infants' daily energy intake with a higher percentage of energy from snacks (29%) for Hispanics at age 6-24 months; 80% of toddlers aged 12-24 months consume afternoon snacks; daily, all snacks combined provided more energy than breakfast, which provided <20% of all infant and toddlers' daily energy intake; among toddlers, snacks as a group contributed a higher percentage of energy than any single meal occasion for both Hispanics and non-Hispanics. In addition, national consumption of snacks by 2- to 5-year-old children has increased by 32% since 1977 and contributed to a 5% increase in daily energy intake (11,32). Although other eating occasions provided half of the energy for 4- to 5-month-olds and one third of 6- to 11-month-olds' energy, breast milk and formula feedings were the predominant contributors of energy. Not surprisingly, data on nutrient intake and foods frequently eaten did not differ significantly across meal occasions or ethnicity for 4- to 5-month-olds, except that Hispanic children had lower calcium and phosphorus intakes at lunch. Thus, older infants and toddlers with more established meal and snack patterns are the focus of the discussion of nutrient intakes and foods frequently consumed by Hispanic and non-Hispanic children.

Nutrients in snacks, meals, and other eating occasions, including fiber, vitamin E, vitamin C, and iron, were also assessed across age and ethnicity groups. Snacks were not a main part of the diet at age 4-5 months, and there were no nutrient composition differences between the Hispanic and non-Hispanic infants. Aside from saturated fat differences, there were no significant nutrient differences among the 6- to 11-month-olds. Hispanic toddlers had higher fiber intakes for afternoon snacks than non-Hispanics, but, as previously reported (33), toddlers had usual fiber intakes well below the Adequate Intake of 17 to 19 g/day. Whereas fiber-rich foods should be encouraged, it is unclear if the Adequate Intake for toddlers is achievable for all children (34) because the Adequate Intake was based on a study with limited data and a child's small stomach may struggle to meet the 14 g per 1,000 kcal recommendation as fibrous foods are often bulky and filling. Nonetheless, snacks contributed, on average, <1 g fiber per snack, except for Hispanic toddlers, who had significantly higher fiber intake at afternoon snacks (1.5 g) than non-Hispanic toddlers. This difference in intake may be due to the higher consumption of fresh fruits such as bananas and apples in their diet. At breakfast, lunch, and dinner, Hispanic and non-Hispanic toddlers had about 2 g fiber per meal. Low fiber intake per 1,000 kcal among Hispanic and non-Hispanic toddlers show that the incorporation of more table foods in the diet did not contribute to an increase in fiber as would be expected.

The low intakes of whole grains and fiber from snacks by the Hispanic and non-Hispanic infants and toddlers reflect results from the US Department of Agriculture's Continuing Surveys of Food Intake by Individuals of 1977-1978 and 1987-1988, which showed children aged 2 to 5 years had a decreasing mean fiber intake (32,35), and primary sources of fiber changed, in order of ranking contribution, from vegetables, fruits, bread, nuts, legumes, starch, and cereal to bread (wheat or white), cereal, ready-to-eat cereal, fruit, vegetables, and starch. The consumption of french fries, butter/oils, and sweetened beverages by infants and toddlers emphasizes the growing trend of lacking consumption of whole grains, fruits, and vegetables in the diets of children at an earlier

age (36,37). In terms of fruit and vegetable consumption, both National Health and Nutrition Examination Survey (38) and Hispanic Health and Nutrition Examination Survey (3) data show that Hispanic and non-Hispanic children consume less than the recommended five or more servings per day; Hispanic children consumed the least. Although Hispanics and non-Hispanics across all age groups frequently consumed yellow vegetables at meals, and toddlers consumed fruit and cereals at snacks, they also commonly consumed crackers, cookies, salty snacks, and desserts.

Differences in fat intakes were primarily seen between toddlers (age 12-24 months) at lunch and dinner. Hispanics consuming lunch had a lower percentage of energy intake from saturated fat and a higher percentage of energy intake from carbohydrates. These findings reinforce those of usual nutrient intakes of fat and carbohydrates among Hispanic and non-Hispanic toddlers (25). Non-Hispanic toddlers at lunch commonly consumed hot dogs (12%) and french fries (11%) compared with Hispanic toddlers, who commonly consumed cooked potatoes (16%) and raw vegetables (11%), and this may be a factor that contributed to the lower percentage of energy intake from saturated fat for Hispanics at lunch. Hispanics more frequently ate sweets than non-Hispanics at lunch, possibly contributing to the higher percentage of energy from carbohydrates. Murphy and colleagues (39) reported that hot dogs and lunchmeats were consumed by around 22% of Mexican-American children and provided approximately 4% of total fat intake. Although Murphy and coworkers' study (39) was done in older children, the types of foods and contributors of saturated fat, *trans* fat, and n-3 and n-6 fats are similar to the foods consumed by non-Hispanic toddlers. Hispanics consuming dinner had lower fat and saturated fat intakes than non-Hispanics, which could be associated with non-Hispanic toddlers at dinner more frequently consuming butter and oil.

The types of beverages that toddlers consume, especially those at snacks, need to be monitored for energy, sugar, and nutrient adequacy, especially with the increase of childhood obesity and diabetes.

Although Hispanic infants and toddlers had adequate intakes of fat, we also considered the quality of dietary fat consumed, as it affects child growth and development. The consumption of whole milk in meals, snacks, and other eating occasions was predominant in Hispanic and non-Hispanic toddlers, although low-fat milks were also common in both groups. During weaning and at least until age 2 years, a child's diet should supply 30% to 40% of energy from fat and should provide essential fatty acids at levels similar to those in breast milk (40). The American Academy of Pediatrics discusses breast milk and formulas as contributors of essential fatty acids, linoleic, and α-linolenic acid, but skim and low-fat cow's milk contribute low levels of these fatty acids (41-43). Whole milk is recommended for children aged 1 to 2 years and caregivers should not switch to reduced-fat milk until the child is older (42,43).

Along with increased fat intakes, sugar in the form of fruit drinks was frequently consumed by Hispanic and non-Hispanic 12- to 24-month-olds. In reviewing infants' and toddlers' consumption of sweetened beverages, primarily fruit drinks, it was not until age 12-24 months that fruit drinks were commonly consumed among both Hispanics and non-Hispanics at dinner and snacks, which is concerning because sweetened beverages may be replacing or adding to the consumption of more nutritious beverages, contributing to an increase in calories and a loss of nutrients. Whereas the American Academy of Pediatrics does not have specific recommendations that limit the amounts of fruit drinks or carbonated beverages in the diets of infants and toddlers, the Academy does state that fruit drinks are not nutritionally equivalent to 100% juice and cannot be considered as a fruit serving (44). Toddlers' consumption of sweetened beverages is also of concern because this dietary practice occurs in older children as well, as soft drinks contribute approximately one third of the added sugar intake of Americans aged 2 years and older (45). The types of beverages that toddlers consume, especially those at snacks, need to be monitored for energy, sugar, and nutrient adequacy, especially with the increase of childhood obesity and diabetes.

With the rise of childhood obesity and diabetes (46), the consumption of appropriate amounts and types of beverages and foods among infants, primarily at snacks, is also important to consider. Out of all eating occasions, the only group of 4- to 5-month-olds commonly drinking 100% fruit juice was non-Hispanics at afternoon snacks. Nevertheless, the American Academy of Pediatrics recommends that juices not be introduced before age 6 months (44), and other researchers also have reported early introduction of 100% juice (47-49) and daily amounts >6 oz consumed by some children (50). Complementary foods commonly consumed as snacks by 4- to 5-month-old and 6- to 11-month-old Hispanic and non-Hispanic children draw attention to the introduction of less nutritious snacks in older infants. For example, both Hispanic and non-Hispanic 4- to 5-month-olds commonly consumed fruit and cereal, whereas 6- to 11-month-olds consumed crackers and cookies in addition to fruit and cereal. Not only are crackers and cookies inferior choices to fruit and cereal, studies indicate that less nutritious snacks could influence taste preferences that are developed throughout complementary feeding (17,18,51,52).

To further assist in the development of healthful dietary patterns for infants and toddlers, it is important to encourage new foods often to develop a more varied diet later in life. Non-Hispanic caretakers were more likely than Hispanic caretakers to introduce a food more than six times before deciding the 12- to 24-month-old child did not like it, yet studies show that up to 10 to 15 exposures may be necessary before a specific food is accepted (31,53). Moreover, mothers tend not to offer foods to their children that they themselves do not like (18). Therefore, educating caregivers about variety and the timing of food introduction into meals and snacks may be important to a child's food preferences later in life.

Overall, most micronutrients were not significantly different between Hispanic and non-Hispanic children for meals, snacks, and other eating occasions. However, Hispanic children had some significantly lower nutrient values when compared with non-Hispanic children across age groups. The 4- to 5-month-old infants had similar nutrient intakes for breakfast, dinner, and snacks; Hispanics had lower calcium and phosphorus intakes at lunches. Both Hispanics and non-Hispanics of this age consumed infant formula, breast milk, water, and dry baby food across all meal and snack occasions. Interestingly, Hispanics had significantly lower vitamin E intakes among 6- to 11-month-olds at breakfast, lunch, and dinner. Briefel and colleagues (26) reported usual intakes of both Hispanics and non-Hispanics did not have adequate intakes, and a larger percentage of Hispanic toddlers had inadequate intakes. In addition, Hispanics aged 6-11 months had significantly lower vitamin C and iron intakes at dinner than non-Hispanics. This difference may be that although Hispanics reported eating meat at dinner, which is an excellent source of iron, non-Hispanics reported consuming more fruits and vegetables, which are good sources of vitamin C, along with dry baby food cereals, which are fortified with vitamin C and iron.

To further assist in the development of healthful dietary patterns for infants and toddlers, it is important to encourage new foods often to develop a more varied diet later in life.

Limitations of the FITS study are that the food intake patterns are based on one 24-hour recall for each child and may not represent usual food intake. Because the Hispanic infant and toddler data are a subset of FITS, we are limited in the total population size for all age groups, and the design was not intended to be representative of the entire Hispanic population in the United States. One of the problems associated with research about meals and snacks is that inconsistent definitions prevent valid comparisons among studies. In other studies, researchers have established criteria, such as time of day and certain meal components constituting the meal, and they categorized eating occasions accordingly. Thus, caution should be used when interpreting and comparing data from different studies about meal and snack patterns. Nonetheless, the data are important to better understand the relationship between ethnicity and dietary habits.

Further research on foods and preparation of nutrient databases for comparing intakes of ethnic groups is needed. The development of appropriate serving size standards for infants and toddlers and the influence on dietary intake analyses are needed to improve nutrition education messages for infants and toddlers. Future research is needed to examine how specific ethnic subgroups (eg, Mexican, Cuban, Puerto Rican) of Hispanic Americans and their food traditions and practices contribute to the types of foods, flavors, meals, and snacks fed to their children.

CONCLUSIONS

- Considering the sizeable contribution that snacks make on overall energy, parents and caregivers should plan toddlers' snacks to complement meals by including additional fruits, vegetables, and whole grains that are culturally appropriate rather than fruit drinks, cookies, and crackers. This will increase fiber intake and limit fat and sugar intakes.
- To develop healthful eating patterns, introduce toddlers to foods eight to 10 times to increase food acceptance and the likelihood of establishing healthful eating patterns.
- Dietetic professionals need to consider cultural differences when developing meal and snack patterns for Hispanic and non-Hispanic clients.

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