Lunch consumption by U.S. children and adolescents

What We Eat in America, NHANES 2017-March 2020

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Highlights

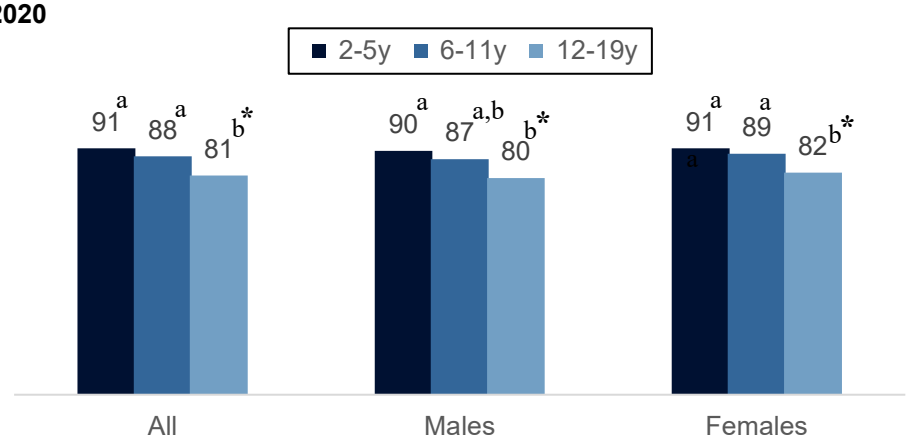
- Overall, 85% of children and adolescents have lunch on a given day.
- Lunch consumption declines as children age. There are no differences between males and females.
- Lunch is consumed more frequently by those at the highest vs lowest income levels, except among children 2-5 years.
- There were no differences in energy intake between any age group. Among those 2-5 and 6-11 years, there were few differences in nutrient intakes. Lunch consumers 12-19 years had higher intakes of protein and several minerals compared to non-consumers.
- Sandwiches, Chicken patties and nuggets, and Pizza are the most frequently reported foods at lunch. Almost one-quarter report Vegetables and/or Fruit at lunch.
- Water is consumed by one-third of children and adolescents at lunch. Almost one-quarter have Sweetened Beverages.

Lunch is commonly considered to be the midday meal. Among children and adolescents, consuming lunch may contribute substantially to nutrient intake (*1*), while skipping lunch has been associated with reduced diet quality (*2,3).* Weekday lunches may be consumed in a school setting, where the physical and social environment may have both positive and adverse effects on what is consumed (*4-7*). Current information about food and nutrient intake of children and adolescents at lunch is lacking. Therefore, this data brief provides recent data on lunch (*see definition, p.9)* consumption by children and adolescents using one day of dietary intake data from What We Eat in America (WWEIA), NHANES 2017-March 2020.

Who consumes lunch?

Overall, 85% of children and adolescents have lunch on a given day (*data not shown*). As shown in Figure 1, lunch is consumed more frequently by those 2-5 years than those 12-19 years. The prevalence of lunch consumption is inversely related to age among both males and females. There are no differences between males and females by age (*data not shown*).

Figure 1. Prevalence (%) of lunch[1] consumption among children and adolescents 2-19 years by gender and age, WWEIA, NHANES 2017- March 2020



[1] *See definition of "lunch", page 8.*
[a,b] *For all children and adolescents and by gender, estimates with different superscripts differ significant by age group, (p<0.001) based on a two-tailed t-test.*
** For all children and adolescents and by gender, significant inverse relationship between lunch consumption and age, p<0.001*
SOURCE: WWEIA, NHANES 2017-March 2020, day 1, children and adolescents 2-19 years

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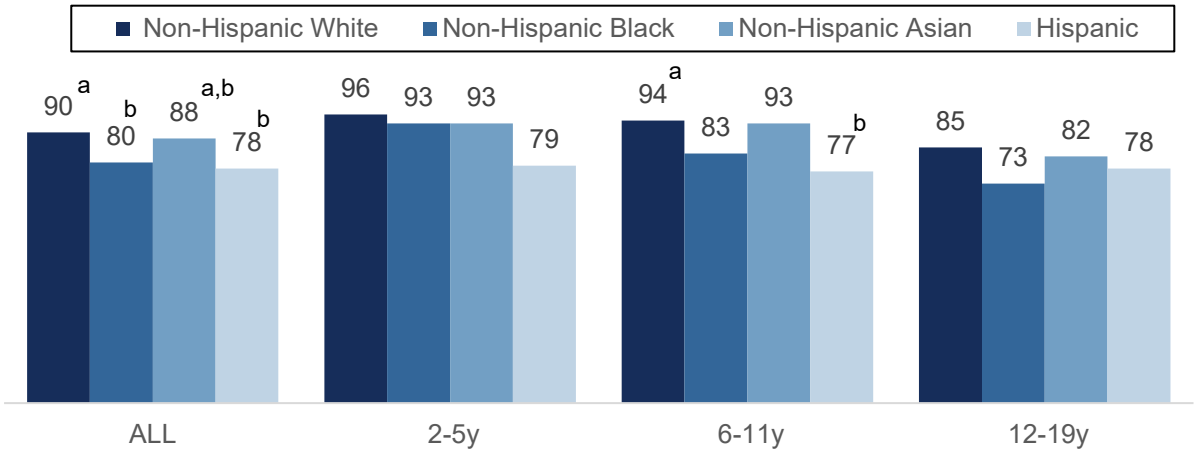
Does the prevalence of lunch consumption differ by race/ethnicity or family income?

Overall, Non-Hispanic White children and adolescents are more likely to report having lunch than Non-Hispanic Asians and Hispanics, as illustrated in Figure 2. The prevalence among Non-Hispanic Asians does not differ from any race/ethnic group. There are no differences between race/ethnic groups by age, except a higher prevalence among Non-Hispanic Whites 6-11 years compared to Hispanics. Among all ages combined, males and females do not differ by race/ethnicity (*data not shown*).

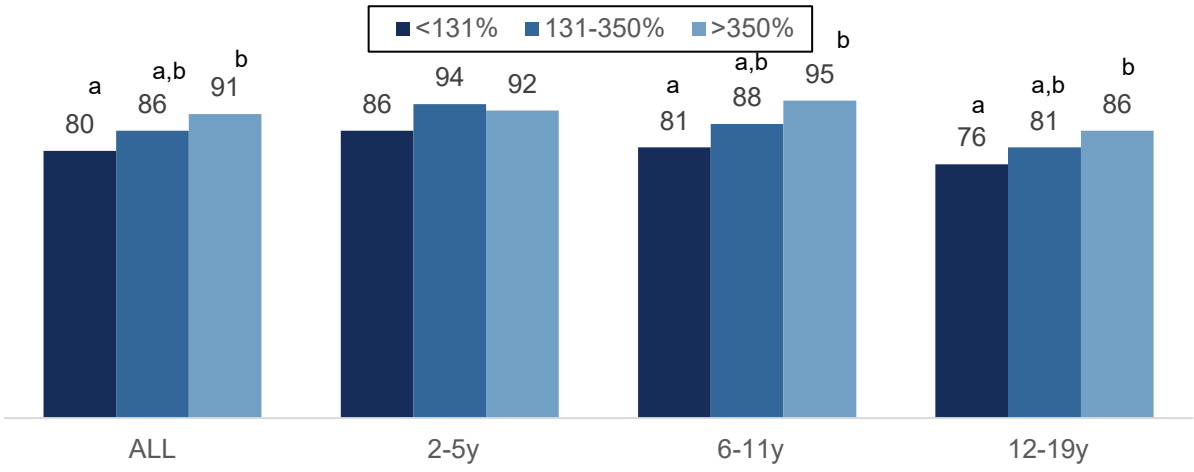
Figure 2. Prevalence (%) of lunch consumption among children and adolescents by race/ethnicity and age, WWEIA, NHANES 2017 – March 2020



[a,b] Within age, percentages with different superscripts differ significantly by race/ethnicity, p<0.001
SOURCE: WWEIA, NHANES 2017-March 2020, day 1, children and adolescents 2-19 years

As Figure 3 illustrates, lunch is consumed more frequently by those at >350% Poverty Income Ratio (PIR)[1] compared to those at <131% PIR, whereas those at 131-350% do not differ from either. As Figure 3 illustrates, similar differences are seen by income level among those 6-11 and 12-19 years. There are no differences in lunch consumption by income among those 2-5 years. The prevalence of lunch consumption by males and females overall does not differ by income level (*data not shown*).

Figure 3. Prevalence (%) of lunch consumption by among children and adolescents 2-19 years by age and family income as percent of poverty level[1], WWEIA, NHANES 2017 – March 2020



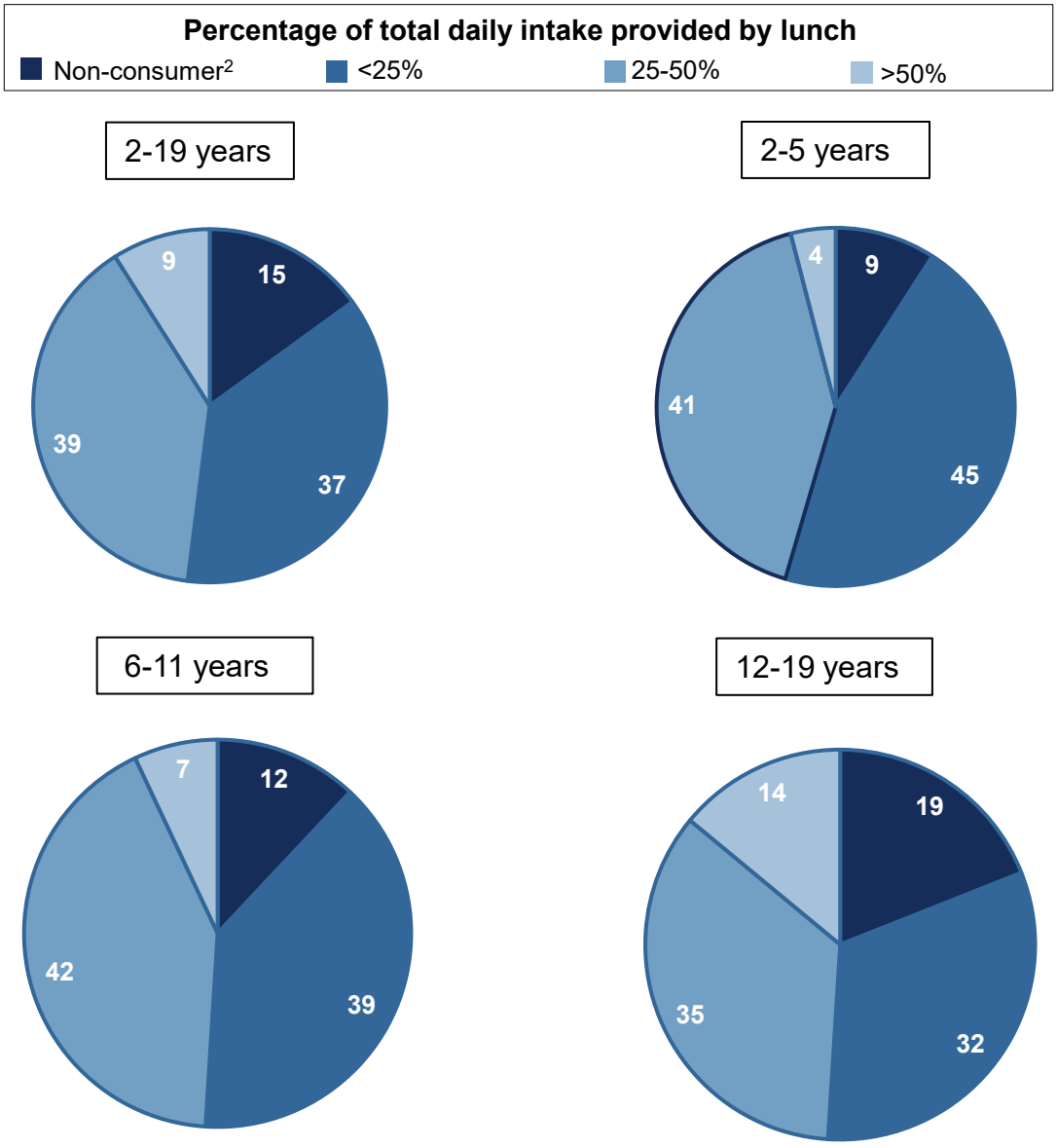
[a,b] Percentages with different superscripts differ significantly by income level, p<0.001
[1] Ratio of family income to the federal poverty guidelines expressed as a percentage (see definitions, p.8)
SOURCE: WWEIA, NHANES 2017-March 2020. day 1, children and adolescents 2-19 years

What percentage of total daily energy is consumed at lunch?

Overall, 15% of children and adolescents do not report having lunch. Figure 4 shows skipping lunch is more likely among older children and adolescents – twice as many adolescents as 2–5-year-olds do not report having lunch on the intake day.

Energy intake from lunch as a percentage of total daily intake categorized into levels is shown in Figure 4. Lunch provides less than one-quarter of total energy intake for over one-third of children and adolescents. Another one-third or more obtain 25-50% of their daily energy from lunch. About one in ten obtain more than half of their total energy intake at lunch, and their frequency increases with age.

Figure 4. Percentage[1] of individuals by level of total daily energy intake from lunch, children and adolescents 2-19 years, WWEIA, NHANES 2017 – March 2020.



[1] Estimates may not sum to 100 due to rounding.

[2] See definition of "consumer/non-consumer" on page 8.

SOURCE: WWEIA, NHANES 2017-March 2020, day 1, children and adolescents 2-19 years

Do total daily intakes of energy and nutrients differ between lunch consumers and non-consumers?

Within age group, intakes of energy and most nutrients between lunch consumers and non-consumers do not differ, as shown in Table 1. There is no difference in intake of any nutrient between consumers and non-consumers among those 2-5 years. Among the 6–11-year age group, only saturated fat and calcium intakes are higher for consumers. Intake of protein and several minerals is higher among lunch consumers 12-19 years compared to non-consumers. Among children and adolescents overall, lunch consumers consume more protein, Vitamins A and K, calcium, phosphorus, potassium and sodium than non-consumers (*data not shown*).

Table 1. Mean daily intake of energy and selected nutrients by lunch consumption status[1], children and adolescents 2-19 years, WWEIA, NHANES 2017 – March 2020.

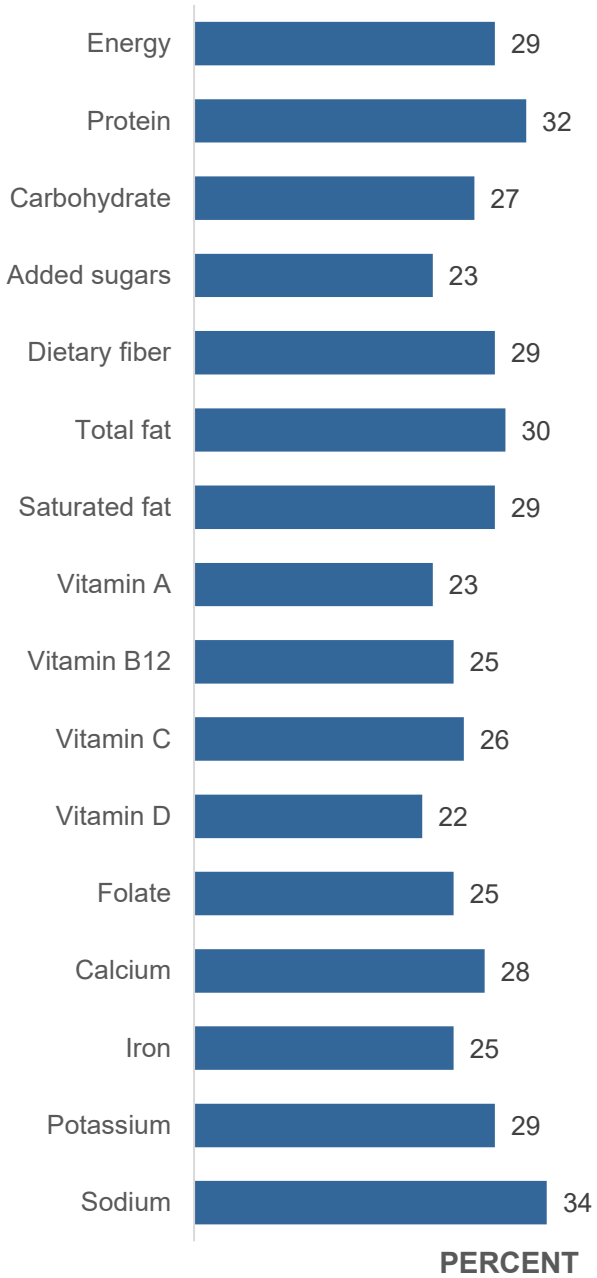
Energy/Nutrient	2-5 years		6-11 years		12-19 years	
	C	NC†	C	NC†	C	NC†
Energy (kcal)[2]	1546	1518	1969	1778	2107	1854
Macronutrients and food components						
Protein (g)	54	50	66	56	77*	63
Carbohydrate (g)	205	211	255	241	260	232
Added sugars (tsp eq)	11	15	17	19	19	19
Dietary fiber (g)	12	11	15	13	15	12
Total fat (g)	59	54	79	68	86	76
Saturated fat (g)	20	20	28*	23	29	26
Vitamins						
Vitamin A (mcg RAE)	550	517	613	488	559	471
Vitamin B12 (mcg)	4	4	4	4	5	4
Vitamin C (mg)	87	73	75	64	65	54
Vitamin D (mcg)	5	6	5	5	4	4
Folate (mcg DFE)	362	425	492	456	515	422
Minerals						
Calcium (mg)	956	929	1037*	815	1005*	798
Iron (mg)	10	12	14	13	14	12
Potassium (mg)	1992	1941	2117	1777	2222*	1811
Sodium (mg)	2200	1922	2983	2476	3507*	2817

† Estimate may be less reliable due to small sample size and/or large relative standard error
Abbreviations: C: Consumer; NC: Non-consumer; kcal: kilocalories; g: grams; tsp eq, teaspoon equivalents; mcg: micrograms; RAE: Retinol Activity Equivalents; mg: milligrams; DFE: Dietary folate equivalents
[1] See definition of "consumer/non-consumer" on page 8.
[2] See definition of "kilocalorie' on page 8.
** Difference within age group between consumers and non-consumers is significant, p<0.001.*
SOURCE: WWEIA, NHANES 2017-March 2020, day 1, children and adolescents 2-19 years

Among lunch consumers, how much does lunch contribute to total daily intakes of energy and nutrients?

Almost one-third of lunch consumers' total energy intake is provided by lunch. As shown in Figure 5, lunch contributes around one-quarter to one-third of intake for all the nutrients shown.

Figure 5. Contribution (%) of lunch to total daily intakes of energy and selected nutrients of lunch consumers[1], children and adolescents 2-19 years, WWEIA, NHANES 2017 – March 2020



[1] *See definition of "consumer/non-consumer' on page 8.*

SOURCE: What We Eat in America, NHANES 2017-March 2020, children and adolescents 2-19 years

What foods are consumed at lunch?

The most frequently consumed foods by children and adolescents at lunch and their contribution to energy intake are shown in Table 2. About two-thirds report mixed dishes, about half of which are sandwiches. Mixed dishes are also the highest contributor to energy intake, particularly pizza and burgers. Poultry items such as chicken patties, tenders and nuggets are also commonly reported. Almost one-quarter of children and adolescents have vegetables at lunch, of which almost half are French fries and other fried potatoes, and about one in five report having fruit. cookies and brownies are the most common sweet bakery product at lunch.

Table 2. Foods frequently consumed at lunch: Percentage of children and adolescents 2-19 years consuming and mean energy contribution when consumed, WWEIA, NHANES 2017 – March 2020.

WWEIA Food Category[1]	Consumers (%)	Mean energy contribution per consumer of a food from that category (kcal)[2]
Mixed Dishes	**64**	**420**
Sandwiches[3]	31	393
Deli/cured meat sandwiches	10	398
Peanut butter and jelly	6	349
Burgers	5	477
Pizza	11	488
Protein Foods	**24**	**266**
Poultry	14	296
Cold cuts and cured meats	5	163
Vegetables	**23**	**153**
Vegetables, excluding potatoes	13	110
Lettuce and lettuce-based salads	3	227
French fries and other fried potatoes	10	187
Fruit	**21**	**78**
Apples	8	80
Citrus fruits	3	60
Grains	**12**	**233**
Breads, Rolls, Tortillas	6	194
Rice	3	187
Snacks and Sweets	**29**	**240**
Savory Snacks	12	163
Sweet Bakery Products	10	254
Cookies and Brownies	7	189

[1] See "WWEIA Food Categories" in definitions, page 8.
[2] kcal: kilocalories (see definitions, page 8)
[3] Includes ingredients that may typically be added such as ketchup, mustard or mayonnaise to sandwiches and burgers, salad dressing to salads, ketchup to French fries

SOURCE: WWEIA, NHANES 2017-March 2020, day 1, children and adolescents 2-19 years

What beverages are consumed at lunch?

Overall, over three-quarters of children and adolescents have a beverage at lunch, as shown in Table 3. Water is reported by about one-third and almost one-quarter of consumers have a Sweetened beverage such as soft drinks, fruit drinks or energy beverages. Milk, Flavored milk and 100% juice are less frequently reported and each are consumed by less than one in ten children and adolescents.

Table 3. Beverages frequently consumed at lunch: Percentage of children and adolescents 2-19 years consuming and mean energy contribution when consumed, WWEIA, NHANES 2017 – March 2020

WWEIA Food Category[1]	Consumers (%)	Mean energy contribution per consumer of a food from that category (kcal)[2]
Beverages	**77**	**88**
Water	33	0
Plain water (bottled and tap)	32	0
Sweetened Beverages	22	126
Flavored Milk	9	155
100% juice	9	101
Milk	8	121
Tea[3]	4	100
Coffee[3]	1	97
Dairy Drinks and Substitutes	1	275

[1] See "WWEIA Food Categories" in definitions, page 8.
[2] Kcal: kilocalories (see definitions, page 8)
[3] Includes milk, cream, sugar and other ingredients that may be added that may or may not contain kcal.

SOURCE: WWEIA, NHANES 2017-March 2020, day 1, children and adolescents 2-19 years

Definitions

Kilocalories (kcal): Scientific unit used in reporting the energy content of food; informally referred to as "calories".

Lunch: meal occasions designated by the respondent as "brunch", "lunch" or the Spanish equivalent "comida." The time an eating occasion occurs has no implication as to the type of meal. An eating occasion reported during typical lunch hours (i.e., midday) is not considered to be lunch unless the respondent specifies it as such.

Consumer/non-consumer: In general, anyone who reported any lunch occasion *(see definition above)* was considered a "consumer," whereas anyone who did not was considered a "non-consumer." By age, the number of lunch consumers (C) and non-consumers (NC) were: 2-5y: C=840, NC=100; 6-11y: C=1208, NC=203; 12-19y: C=1342, NC=398. Classification as a consumer or non-consumer for this analysis has no implications as to habitual consumption.

Family income (as percentage of poverty level): the ratio of family income to the federal poverty guidelines expressed as a percentage (Poverty Income Ratio). The Department of Health and Human Services' poverty guidelines were used as the poverty measure to calculate the ratio *(8)*.

WWEIA Food Categories: Available at *www.ars.usda.gov/Services/docs.htm?docid=23429* is a full list of the WWEIA Food Categories *(9)*, a scheme for classifying each food and beverage reported in WWEIA, NHANES into one of 169 mutually exclusive categories. In contrast to the WWEIA Food Categories' item-by-item classification, this analysis classified as a group any foods or beverages that were represented in the dietary data by two or more items linked as having been consumed together. In such cases, all linked items were classified together into the most appropriate WWEIA Food Category. For example, a deli sandwich represented in the dietary data as Bread, bologna, cheese, and mustard would be assigned to the "Deli and Cured Meat sandwiches" group, along with similar sandwiches that were not represented by multiple items, i.e., the "single-code sandwiches" that make up the WWEIA Food Category "mixed dishes - sandwiches (single code) – Burgers." Similarly, if milk and/or sugar were reported as being consumed with tea, it was assigned to the tea group in this analysis. Another difference from the WWEIA Categories concerned the beverage analysis on page 8. In the WWEIA Food Categories, water and milk/milk beverages are in distinct main food groups- "Water" and "Milk and dairy:, respectively. In this analysis, they are included under "Beverages". The non-beverage dairy categories, namely, cheese and yogurt, are represented on page 7 as "Dairy, excluding milk beverages".

Data source

Estimates in this report are based on one day of dietary intake data collected in What We Eat in America (WWEIA), the dietary intake interview component of the National Health and Nutrition Examination Survey (NHANES), in 2017-March 2020 Prepandemic (*10*). Using the 5-step USDA Automated Multiple-Pass Method (AMPM) for the 24-hour recall, day 1 dietary data were collected in-person. A total of 4,091 individuals 2-19 years (2,068 males and 2,023 females) who provided complete and reliable dietary intake data in 2017-March 2020 and met study criteria were included. Those whose race/ethnicity was classified as "Other" (N=385) were not included in the analysis for race/ethnicity only (p2). In the analysis by family income (p3), there were 413 participants not included in the analysis because there was no information about income. Sample weights were applied in all analyses to produce nationally representative estimates. USDA's What We Eat in America Food Categories (*9*) were used to describe food intake. Intakes of energy and nutrients were calculated using the 2017-2018 and 2019-2020 versions of USDA's Food and Nutrient Database for Dietary Studies *(11)*. Comparisons were made using t-tests. Results were considered significantly different at $p<0.001$.

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