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Dietary Sources of Energy, Solid Fats, and Added Sugars Among Children and Adolescents in the United States

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Abstract

Objective—The objective of this research was to identify top dietary sources of energy, solid fats, and added sugars among 2–18 year olds in the United States.

Methods—Data from the National Health and Nutrition Examination Survey (NHANES), a cross-sectional study, were used to examine food sources (percentage contribution and mean intake with standard errors) of total energy (2005–06) and calories from solid fats and added sugars (2003–04). Differences were investigated by age, sex, race/ethnicity, and family income, and the consumption of empty calories—defined as the sum of calories from solid fats and added sugars—was compared with the corresponding discretionary calorie allowance.

Results—The top sources of energy for 2–18 year olds were grain desserts (138 kcal/day), pizza (136 kcal), and soda (118 kcal). Sugar-sweetened beverages (soda and fruit drinks combined) provided 173 kcal/day. Major contributors varied by age, sex, race/ethnicity, and income. Nearly 40% of total calories consumed (798 kcal/day of 2027 kcal) by 2–18 year olds were in the form of empty calories (433 kcal from solid fat and 365 kcal from added sugars). Consumption of empty calories far exceeded the corresponding discretionary calorie allowance for all sex-age groups (which range from 8–20%). Half of empty calories came from six foods: soda, fruit drinks, dairy desserts, grain desserts, pizza, and whole milk.

Conclusion—There is an overlap between the major sources of energy and empty calories: soda, grain desserts, pizza, and whole milk. The landscape of choices available to children and adolescents must change to provide fewer unhealthy foods and more healthy foods with fewer calories. Identifying top sources of energy and empty calories can provide targets for changes in the marketplace and food environment. However, product reformulation alone is not sufficient—the flow of empty calories into the food supply must be reduced.

Introduction

In the United States (US) today, over 23 million children and adolescents are overweight or obese (1,2). Excess body weight, poor diet, and sedentary behavior have been associated with an increased risk of many chronic diseases, including hypertension, dyslipidemia, type 2 diabetes, as well as depression, poor self-esteem, and associated quality of life issues (3,4).

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Although overweight and obesity are found in all subpopulations, the burden is particularly striking among children, adolescents, and underserved populations. Children and adolescents are now experiencing weight-related chronic diseases once seen only among adults. Additionally, the prevalence of overweight is higher among adolescents compared to younger children, Mexican-American boys compared to non-Hispanic black or white boys, and Mexican-American and Non-Hispanic black girls compared to non-Hispanic white girls (2).

Multiple factors influence overweight and obesity rates, but ultimately, an imbalance between energy consumed and energy expended is the determining factor. The current environment (including food stores, restaurants, schools, and worksites) and customs surrounding food in the US have been labeled “obesogenic” and “toxic” due to the contributions made to this imbalance by large portion sizes, snacking, away-from-home meals, and consumption of sugar-sweetened beverages (5–7). Ironically, in a food environment that supplies an overabundance of energy, there are too few vegetables, whole grains, fruits, and milk products (8). Therefore, US children and adolescents do not always consume the types and amounts of food they need to support an active, healthy lifestyle (9).

Recommendations for fruits, vegetables, whole grains and other nutrient-bearing food groups are available in the 2005 *Dietary Guidelines for Americans* and MyPyramid (10,11). These resources also define the concept of a “discretionary calorie allowance” to provide limits for excess calories from consumption of food groups beyond recommended amounts *and* all calories from solid fats, alcoholic beverages, and added sugars (SoFAAS). These SoFAAS represent empty calories, or sources of energy with virtually no nutritional value, and have been examined previously in relation to discretionary calorie allowances (12). Although the discretionary calorie allowance should be considered an upper bound on consumption of calories from SoFAAS, such intakes far exceed the recommended discretionary calorie allowances across all sex-age groups in the US population (13). The purpose of this paper is to identify the top as-eaten food sources of energy, solid fats, and added sugars among US children and adolescents. “As-eaten” food sources include composite foods (e.g., cookies), and mixed dishes (e.g., pizza), as well as discrete foods (e.g., milk or apples).

Methods

Data source and sample

Data from the National Health and Nutrition Examination Survey (NHANES), a cross-sectional study, were used to examine food sources of total energy (2005–06) and calories from solid fats and added sugars (2003–04). NHANES is a nationally representative survey with a complex multistage, stratified probability sample. Trained interviewers conducted in-person 24-hour dietary recalls with all eligible persons, using automated data collection systems that included multiple passes. Survey participants ages 12 years and older completed the dietary interview on their own, proxy-assisted interviews were conducted with children ages 6 to 11 years, and proxy respondents reported for children younger than age 5 years (14). The NHANES protocol was approved by the National Center for Health Statistics Research Ethics Review Board, Hyattsville, Maryland, and all participants provided informed consent. Further information regarding the design of the NHANES, including sampling and weighting procedures, can be found at <http://www.cdc.gov/nchs/nhanes.htm>.

Defining a list of specific foods

NHANES dietary intake data are catalogued according to discrete codes representing foods as eaten. For this analysis, food codes representing similar foods were combined to provide an indication of the contribution of distinct foods as-eaten to the consumption of energy, solid fats, and added sugars. That is, the food codes reported by 2–18 year olds during any of the years examined were sorted into 96 mutually exclusive food categories, which are hereafter referred to as *specific foods*. The list of specific foods (Figure 1) was adapted from earlier analyses (15–17) and has been used in a previous project (18).

Defining energy from solid fats and added sugars

USDA's MyPyramid Equivalents Database (MPED) Version 2.0 (19) was used to estimate energy from solid fats and added sugar (MPED values for grams of solid fat and teaspoons of added sugars were converted based on 9 kcal/gram and 16 kcal/teaspoon, respectively). To capture how well diets conform to current guidance, the MPED incorporates data from a "recipe" file, which disaggregates all foods reported in the survey to individual ingredients, and assigns those ingredients to MyPyramid groupings. For example, yogurt with fruit is separated into yogurt, fat, fruit, and caloric sweetener in the recipe file and assigned corresponding cup-equivalents of milk and fruit, grams of solid fat, and teaspoons of added sugar. Because MPED is currently available only through NHANES 03–04, energy from solid fats and added sugars were calculated for those years.

Statistical analysis

Dietary recalls (Day 1 only) for all 2–18 years olds with data deemed reliable by the study developers were included in this analysis. Appropriate weighting factors were applied to adjust for differential probabilities of selection and various sources of non-response. Mean intakes of total energy, energy from solid fats, and energy from added sugars were calculated. The percentage contribution and mean intake (with standard errors) of *specific foods* to total energy, energy from solid fats, and energy from added sugars were also estimated. Differences were examined by age (using age groups featured in current guidance (10,11): 2–3, 4–8, 9–13, and 14–18 years old), sex, race/ethnicity (Non-Hispanic Whites, Non-Hispanic Blacks, Mexican Americans), and family income based on the federal poverty income ratio (PIR) (using three PIR categories: less than 130% of PIR, 131% to 185%, and greater than 185%). The PIR is the ratio of income to the designated poverty threshold for the family's composition as defined by the US Census Bureau; family income less than 185% of PIR is considered low-income and qualifies for the Special Supplemental Program for Women, Infants, and Children and reduced-price school meals, and income less than 130% qualifies for the Supplemental Nutrition Assistance Program (formerly the Food Stamp Program) and free school meals.

Finally, the contribution of "empty calories"—defined as the sum of energy from solid fats and added sugars—was calculated and put side by side with the corresponding discretionary calorie allowance for each sex-age group (11). Low activity levels were assumed, because most children and adolescents do not achieve the 60 minutes per day of cardiorespiratory activity recommended in national physical activity guidelines (20). Data analyses were conducted using SAS (version 9.1, SAS Institute Inc, Cary, NC) and SUDAAN (version 9.0, Research Triangle Institute, Research Triangle Park, NC).

Results

Mean intakes of energy, solid fats, and added sugars, along with the contributions (percentage and absolute intake) of specific foods contributing at least 2%, are available online at www.riskfactor.cancer.gov/foodsources/energy. Data are provided for persons 2–

18 years and by age, sex, race/ethnicity, and income level. For ease of presentation in this paper, mean intakes of energy, solid fats, and added sugars, and results from the top five sources are summarized in Tables 1 and 2 and Figure 2.

Energy

The top five sources of energy for 2–18 years olds were grain desserts (cakes, cookies, donuts, pies, crisps, cobblers, and granola bars) (138 kcal/day), pizza (136 kcal), soda (118 kcal), yeast breads (114 kcal), and chicken and chicken mixed dishes (113 kcal) (Table 1). These foods each contributed more than 5% to energy intake, or more than 100 kcal per child per day. Combining related specific foods within the beverage category, children and adolescents consumed 173 kcal from sugar-sweetened beverages (combining soda and fruit drinks) and 146 kcal from milk (combining whole and reduced-fat versions) (data for fruit drinks and reduced fat milk do not always appear in the top five sources, so these data are available online).

These major contributors varied by age group. For example, the top five sources of energy for 2–3 years olds included whole milk (104 kcal/day), fruit juice (93 kcal), reduced-fat milk (91 kcal), and pasta and pasta dishes (86 kcal). Pasta and reduced-fat milk were also among the top five sources of energy for 4–8 years olds (97 and 95 kcal, respectively).

The top contributors of energy also varied by race/ethnicity (Table 2). For example, major contributors for 2–18 year old Non-Hispanic Blacks included fruit drinks (100 kcal/day) and pasta and pasta dishes (90 kcal), while Mexican-Americans' top sources included Mexican mixed dishes (136 kcal) and whole milk (99 kcal). Non-Hispanic Blacks and Whites consumed more energy from sugar-sweetened beverages (combining soda and fruit drinks) than from milk (combining all milks), whereas Mexican-Americans consumed more energy from milk than from sugar-sweetened beverages (Table 2 and online tables). The top five sources of energy by income were consistent across income levels, but varied in ranking order.

Solid Fats

The average daily intake of energy from solid fats among 2–18 year olds is 433 kcal (Table 1). The major sources of solid fat were pizza (50 kcal/day from solid fat), grain desserts (43 kcal), whole milk (35 kcal), regular cheese (34 kcal), and fatty meats (29 kcal). This list varied by age group, with younger children obtaining a greater share of their solid fat from both whole and reduced-fat milk and 14–18 year olds getting more from fried potatoes. Major contributors also included fried potatoes among non-Hispanic Blacks and persons with PIR between 131% and 185%, Mexican dishes among Mexican-Americans, reduced-fat milk among non-Hispanic Whites and persons with PIR greater than 185%, and pasta among persons with PIR greater than 185% (Table 2).

Added Sugars

The average daily intake of energy from added sugars among all 2–18 year olds was 365 kcal (Table 1). The major sources of added sugars were soda (116 kcal/day from added sugars), fruit drinks (55 kcal), grain desserts (40 kcal), dairy desserts (29 kcal), and candy (25 kcal). The list does not vary markedly by age and demographic groups, but cold cereals were among the top sources for 2–8 year old children, Non-Hispanic Whites, and low-income groups (Table 2).

Sugar-sweetened beverages (soda and fruit drinks) represented the top two sources of calories from added sugars among nearly all age and demographic groups (Tables 1 and 2). The consumption of added sugar from sugar-sweetened beverages was 60 kcal/day for 2–3

year olds, 121 kcal for 4–8 year olds, 169 kcal for 9–13 year olds, and 260 kcal for 14–18 year olds. Among all racial/ethnic and income groups, sugar-sweetened beverages contributed about 45–50% of added sugars. Non-Hispanic Blacks obtained more added sugars from fruit drinks and less from soda than other groups.

Empty Calories

Empty calories represented the sum of calories from solid fat and added sugars. Nearly 40% of total calories consumed (798 kcal/day of 2027 kcal) by 2–18 year olds were in the form of empty calories (433 kcal from solid fat and 365 kcal from added sugars, as shown in Table 1). This contrasts markedly with the discretionary calorie allowances, which range from 8% to 20% of total calories. As shown in Figure 2, consumption of empty calories far exceeded the corresponding discretionary calorie allowance for all sex-age groups.

Among 2–18 year olds, about half of these empty calories came from six specific foods: soda, fruit drinks, dairy desserts, grain desserts, pizza, and whole milk (Figure 2). Solid fats and added sugars found in all other foods combined supplied the remainder. Sugar-sweetened beverages were the largest contributor, providing 22% of empty calories (data available online). In fact, among both males and females 9–13 and 14–18 years old, the empty calories consumed from soda and fruit drinks alone effectively “used up” or exceeded the discretionary calorie allowance.

Discussion

To our knowledge, this is the first paper to provide data on sources of solid fats and added sugars (collectively, empty calories) as well as total energy, among diets of children and adolescents, examined by race/ethnicity, income, and age groups. The variables examined are based on the most recent available data on a nationally representative sample of US children and adolescents.

Several previously published analyses laid the foundation for this work (15–18,21–25). Subar et al. examined data from the 1989–1991 Continuing Survey of Food Intakes by Individuals (15) and found 2–18 year olds in the US consumed 11.7% of energy from milk and 4.3% of total energy from soda (and 6.5% from all sugar-sweetened beverages). A higher proportion of energy consumption from soda and all sugar-sweetened beverages (5.8% and 8.5%, respectively) and a lower proportion of milk (7.1%) were identified in the current study. These trends regarding an increase in total energy from soda and fruit drinks are consistent with previous research (24–25). More recently, Wang et al. found that 2–19 years olds consumed 10–15% of energy intake from sugar-sweetened beverages and 100% fruit juice (25). Although the food groupings and age groupings were slightly different, our results are consistent with their findings (2–18 year olds consumed 11.1% of energy intake from sugar-sweetened beverages and 100% fruit juice) (25).

A notable overlap was found between the major sources of energy and major sources of empty calories: soda, grain desserts, pizza, and whole milk. Soda is made up solely of empty calories; grain desserts can provide some nutrients but are generally rich in both solid fats and added sugars; and pizza and whole milk supply needed nutrients but are also rich in solid fats. Whole milk has more nutrient-dense alternatives: fat-free milk and/or reduced-fat milk. Pizza and grain desserts are generally made commercially; these foods could benefit from reformulation to reduce the empty calories and make them healthier.

The landscape of choices available to children and adolescents must change to provide fewer unhealthy foods and more healthy foods with fewer calories. Several analyses have attempted to quantify the existing “energy gap,” or energy imbalance that contributes to

overweight and obesity among children and adolescents (26–27). Whether the energy gap is 150 (26) or 350 kcal/day (27), identifying sources of energy and empty calories can provide targets for changes in the marketplace and the food environment. Dietitians, nutritionists, and other health professionals can work to promote healthier food environments for children and adolescents at multiple levels—at the macro-, community-, school-, and individual-levels.

Groups such as the Healthy Weight Commitment Foundation, a partnership among major food and beverage manufacturers, trade associations, retailers, and others, have formed around the common goal of reducing childhood obesity by 2015 (28). Given recent weight status trends, this is an ambitious goal, but one that the food industry is uniquely positioned to influence through the use of product innovation, portion control, and promotions. For example, a major cereal manufacturer has committed to reducing to single digits the grams of sugar per serving in sugar-sweetened breakfast cereals advertised to children (29), and other companies participating in this new initiative may consider smaller-portion packages. However, such steps will not reduce obesity if they do not significantly reduce the flow of empty calories into the nation's food supply, limit unhealthy foods, and provide consistent messaging about healthy foods. Future studies may investigate links between changes in empty calories in the food supply and changes in dietary intake.

Limitations

Several caveats are worth noting, to aid in interpretation of the data. First, decisions regarding how to group or separate foods influenced the rankings. Fat-free milk, reduced-fat milk and whole milk were analyzed separately, as were soda, fruit drinks, and fruit juices, to allow for meaningful differences to be seen where they existed (for example, whole milk was a top source among younger children compared to adolescents). Although it was informative to examine these as discrete foods, it was also useful to combine them to see their additive contribution to energy intakes.

Second, the rankings for the specific foods also depended in part on how ubiquitously a given food was consumed. Foods that contained the most calories, solid fats, and/or added sugars were not necessarily the major contributors to population intake. Because some foods were commonly consumed in the population, they contributed more to total intake than foods that contained more energy (or solid fats or added sugars) per portion. Similarly, because adolescents require and consumed more energy than smaller children, the rankings for all ages considered together were heavily influenced by those of older children and teenagers.

Third, the mean contribution represents the average per capita rather than per user. For example, all persons age 2–18 consumed an average of 116 kcal/day from soda. If the analysis was restricted to only those children and adolescents who reported drinking soda on a given day, average caloric intake from soda would be higher.

Finally, these analyses make use of data from NHANES 2003–04. Although more recent NHANES data are available, MPED updates have not kept up with NHANES releases. It is not expected that substantial shifts in sources of energy, saturated fat or added sugars occurred in the relatively short span between these survey cycles. However, updated databases for MyPyramid equivalents are necessary to enable monitoring of trends. More current MPED data also are necessary for any other analysis requiring that food intake be evaluated in relation to dietary guidance.

Conclusion

The epidemic of obesity among children and adolescents is now widely regarded as one of the most important public health problems in the US. Most experts agree that the solution will involve changes in both diet and physical activity, in order to affect energy balance. For diet, this means a reduction in energy from current consumption levels. Although reduction in energy intake from any source could lead to weight change, it would seem imprudent to advise children to cut down on key nutrient-bearing food groups, such as fruits, vegetables, whole grains, fat-free milk, and lean meats. This is especially true given that solid fats and added sugars are consumed in amounts far in excess of allowance levels. This paper identifies the major sources of overall energy and empty calories, providing context for dietary guidance that could specifically focus on limiting calories from these sources and for changes in the food environment.

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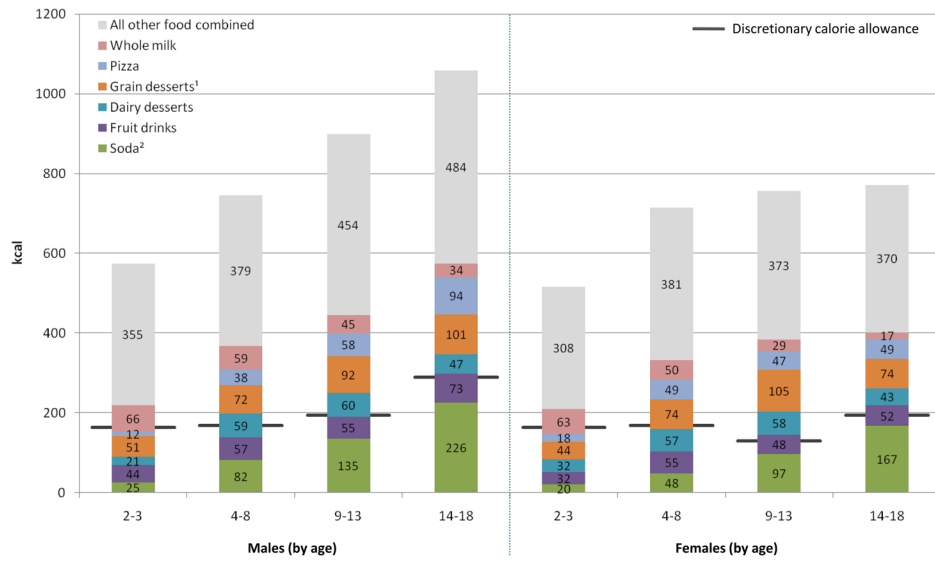
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Beverages	Produce	Entrees
Whole milk	Broccoli	Chili
Reduced fat milk	Carrots	Mexican mixed dishes
Skim milk	Coleslaw	Pizza
Vegetable juice	Corn	Soups
100% fruit juice, not orange/grapefruit juice	Fried white potatoes	Meal replacements
100% orange/grapefruit juice	Lettuce	Pasta and pasta dishes
Fruit drinks	Onions	Rice and rice mixed dishes
Soda ^b	Other cruciferous	Egg rolls
Milk substitute and evaporated milk	Other white potatoes	
Alcoholic beverages	Peas	Refrigerator/Frozen
Coffee	Spinach	Yogurt
Tea	String beans	Cottage/ricotta/cream cheese
	Sweet potatoes	Dairy desserts
	Tomatoes	Frozen meals
	Tomato sauces	
Bakery/Breads	Vegetable medleys and other vegetables	Deli
Hot cereal	Vegetable mixed dishes	Regular cheese
Pancakes/waffles/French toast	Apples and pears	Reduced fat cheese
Quickbreads	Avocado	Dried beans
Cold cereals	Bananas	Burgers
Grain desserts ^c	Citrus fruits	Cold cuts
Yeast breads	Dried fruit	Eggs and egg mixed dishes ^g
	Grapes	Tuna and tuna mixed dishes
	Melon	Shrimp and shrimp mixed dishes
	Peaches/plums/apricots/nectarines	Other fish and fish mixed dishes
	Strawberries	Liver and other organ meats
	Other fruit and fruit salad	Beef and beef mixed dishes
Dressings, spreads, other additions^d		Chicken and chicken mixed dishes
Butter ^e	Snacks	Duck and duck mixed dishes
Cream	Potato/corn/other chips ^f	Other meat and meat mixed dishes
Margarine ^{e,f}	Popcorn	Pork and pork mixed dishes
Mayonnaise	Pretzels	Turkey and turkey mixed dishes
Miscellaneous solid fats	Nuts/seeds and nut/seed mixed dishes	Sausage, franks, bacon, and ribs
Nondairy creamer/cream substitutes	Candy	Tofu and meat substitutes
Oils ^e	Crackers	
Salad dressing		
Sauces		
Sour cream		
Condiments		
Gelatins		
Jams and jelly		
Sugars/honey		
Syrups/toppings		

^aNHANES=National Health and Nutrition Examination Survey
^bIncludes sodas, energy drinks, sports drinks, and sweetened bottled water including vitamin water.
^cIncludes cakes, cookies, donuts, pies, crisps, cobblers, granola bars.
^dIncludes low-fat items such as low-fat salad dressings, cream cheese, and sour cream.
^eButter, margarines, and oils do not include those used in yeast breads, grain-based desserts, quickbreads, pancakes/waffles/French toast, dairy desserts, salad dressing, mayonnaise, pasta and pasta mixed dishes, Mexican mixed dishes, ready-to-eat cereal, crackers, pretzels, potato/corn/other chips, candy.
^fIncludes lowfat versions.
^gExcludes eggs found in grain-based desserts, pancakes/waffles/French toast, yeast breads, quickbreads, dairy desserts, egg rolls, pasta and pasta mixed dishes.

Figure 1.
 List of specific foods: Result of grouping like foods reported in 2003–2004 and 2005–2006 NHANES^a



¹Includes cakes, cookies, donuts, pies, crisps, cobblers, granola bars. ²Includes sodas, energy drinks, sports drinks, and sweetened bottled water including vitamin water.
Data Source: NHANES 2003-04

Figure 2. Food sources and mean intake of empty calories for male and female children and adolescents in the United States, relative to discretionary calorie allowance. Among 2–18 year olds, about half of empty calories came from six specific foods: soda, fruit drinks, dairy desserts, grain desserts, pizza, and whole milk. The discretionary calorie allowance for each sex/age group is based on low activity levels, because most children and adolescents do not achieve the 60 minutes per day of cardio-respiratory activity recommended in national physical activity guidelines (21).

Table 1

Mean intake and major sources of energy, solid fats and added sugars among children and adolescents in the United States (2–18 years old)

Top five sources																					
Age Group	#1	%	Mean (kcal)	SE	#2	%	Mean (kcal)	SE	#3	%	Mean (kcal)	SE	#4	%	Mean (kcal)	SE	#5	%	Mean (kcal)	SE	
<i>Energy^a</i>																					
All	Grain desserts ^b	6.8	138	6.7	Pizza	6.7	136	8.5	Soda ^c	5.8	118	8.7	Yeast breads	5.6	114	6.8	Chicken ^d	5.6	113	8.1	
2–3	Whole milk	7.1	104	8.2	100% fruit juice ^e	6.3	93	9.4	Reduced fat milk	6.2	91	10.7	Pasta ^f	5.9	86	9.4	Grain desserts ^b	4.6	68	6.6	
4–8	Grain desserts ^b	7.6	136	10.8	Yeast breads	5.4	98	5.1	Pasta ^f	5.4	97	11.4	Reduced fat milk	5.3	95	7.2	Pizza	5.3	95	12.3	
9–13	Grain desserts ^b	7.1	145	15.6	Pizza	6.3	128	9.5	Chicken ^d	6.0	122	13.1	Yeast breads	5.4	109	5.8	Soda ^c	5.2	105	12.1	
14–18	Soda ^c	9.3	226	18.2	Pizza	8.8	213	24.5	Grain desserts ^b	6.5	157	8.4	Yeast breads	6.2	151	14.5	Chicken ^d	5.9	143	16.6	
<i>Solid Fats^g</i>																					
All	Pizza	11.5	50	3.6	Grain desserts ^b	9.8	43	2.4	Whole milk	8.2	35	3.2	Regular cheese	7.9	34	2.9	Fatty meats ^h	6.7	29	2.5	
2–3	Whole milk	16.7	58	5.6	Fatty meats ^h	11.1	39	5.0	Regular cheese	8.6	30	6.0	Reduced fat milk	8.1	28	3.8	Grain desserts ^b	7.2	25	2.4	
4–8	Whole milk	11.3	45	5.6	Pizza	10.2	41	6.0	Grain desserts ^b	9.0	36	2.6	Regular cheese	7.0	28	4.5	Reduced fat milk	6.9	28	3.6	
9–13	Grain desserts ^b	11.4	51	6.0	Pizza	11.2	50	5.2	Regular cheese	8.9	40	5.3	Whole milk	6.7	30	4.4	Fatty meats ^h	6.5	29	2.9	
14–18	Pizza	14.7	70	9.3	Grain desserts ^b	9.7	46	2.8	Regular cheese	7.6	36	3.2	Fried potatoes	6.9	33	2.3	Fatty meats ^h	5.7	27	3.0	
<i>Added Sugarsⁱ</i>																					
All	Soda ^c	31.8	116	5.3	Fruit drinks	15.0	55	3.1	Grain desserts ^b	10.9	40	2.3	Dairy desserts	7.9	29	3.4	Candy	6.8	25	2.2	
2–3	Fruit drinks	19.3	38	3.7	Soda ^c	11.4	22	3.3	Grain desserts ^b	11.3	22	1.7	Candy	8.5	17	2.5	Cold cereals	8.3	16	1.6	
4–8	Soda ^c	19.9	65	7.5	Fruit drinks	17.0	56	5.9	Grain desserts ^b	11.2	37	2.8	Dairy desserts	10.4	34	5.9	Cold cereals	8.3	27	1.9	
9–13	Soda ^c	30.7	117	11.7	Fruit drinks	13.6	52	5.7	Grain desserts ^b	12.4	47	5.6	Dairy desserts	8.8	33	5.2	Candy	7.8	30	3.1	
14–18	Soda ^c	44.5	197	9.7	Fruit drinks	14.1	63	5.6	Grain desserts ^b	9.4	42	2.9	Candy	5.6	25	4.1	Dairy desserts	5.5	24	2.7	

Data Source: Energy data from NHANES 2005–2006, Solid Fats and Added Sugars data from NHANES 2003–2004.

NHANES 2005–2006: Sample size by group by group: Ages 2–18 (n=3778), 2–3 (n=497), 4–8 (n=899), 9–13 (n=1047), 14–18 (n=1335).

NHANES 2003–2004: Sample size by group by group: Ages 2–18 (n=3553), 2–3 (n=424), 4–8 (n=781), 9–13 (n=1001), 14–18 (n=1347).

SE: Standard Error.

- ^aEnergy mean intake (kcal) by group: Ages 2–18 (2027), 2–3 (1471), 4–8 (1802), 9–13 (2035), 14–18 (2427).
- ^bIncludes cakes, cookies, donuts, pies, crisps, cobblers, granola bars.
- ^cIncludes sodas, energy drinks, sports drinks, and sweetened bottled water including vitamin water.
- ^dIncludes chicken and chicken mixed dishes.
- ^eExcludes orange and grapefruit juice.
- ^fIncludes pasta and pasta dishes.
- ^gSolid fats mean intake (kcal) by group: Ages 2–18 (433), 2–3 (350), 4–8 (401), 9–13 (450), 14–18 (476).
- ^hIncludes sausage, franks, bacon, and ribs.
- ⁱAdded sugars mean intake (kcal) by group: Ages 2–18 (365), 2–3 (197), 4–8 (329), 9–13 (381), 14–18 (444).

Table 2

Mean intake and major sources of energy, solid fats and added sugars among children and adolescents in the United States (2–18 years old), by Race/Ethnicity and Family Income

Top five sources																					
Group ^d	#1	%	Mean (kcal)	SE	#2	%	Mean (kcal)	SE	#3	%	Mean (kcal)	SE	#4	%	Mean (kcal)	SE	#5	%	Mean (kcal)	SE	
Energy^b																					
NHW	Grain desserts ^c	7.2	152	9.3	Pizza	7.0	148	12.8	Soda ^d	6.4	134	13.4	Yeast breads	6.1	129	10.5	Chicken ^e	5.2	109	11.3	
NHB	Chicken ⁿ	8.4	163	13.8	Grain desserts ^l	6.3	123	9.3	Pizza	6.1	119	8.6	Fruit drinks	5.1	100	13.8	Pasta ^f	4.7	90	11.2	
Mex-Am	Mexican dishes	7.1	136	8.5	Grain desserts ^l	5.9	114	10.8	Pizza	5.5	105	19.2	Whole milk	5.1	99	8.3	Soda ^m	4.8	92	4.6	
<=130%	Grain desserts ^l	6.1	117	9.4	Chicken ⁿ	6.0	116	13.7	Pizza	5.9	114	9.6	Soda ^m	5.3	101	12.8	Yeast breads	5.1	99	4.7	
131–185%	Pizza	10.1	203	62.7	Soda ^m	7.0	142	48.6	Grain desserts	6.9	138	13.4	Yeast breads	6.5	131	32.7	Pasta ^o	5.2	104	19.0	
>=186%	Grain desserts ^l	7.1	148	9.2	Pizza	6.5	135	12.4	Soda ^m	5.9	122	7.8	Yeast breads	5.7	119	7.7	Chicken ⁿ	5.5	114	9.0	
Solid Fats^e																					
NHW	Pizza	13.0	57	5.3	Grain desserts ^l	9.4	41	3.5	Regular cheese	8.9	39	4.1	Reduced fat milk	7.2	32	3.4	Whole milk	6.7	30	4.0	
NHB	Pizza	11.4	49	3.2	Grain desserts ^l	10.4	45	4.1	Fatty meats ^h	10.1	44	7.5	Whole milk	8.8	38	3.0	Fried potatoes	6.2	27	1.7	
Mex-Am	Whole milk	12.0	52	4.5	Grain desserts ^l	10.6	45	3.2	Mexican dishes	9.8	42	5.9	Pizza	8.3	36	3.9	Regular cheese	7.1	31	4.1	
<=130%	Whole milk	12.7	56	5.1	Pizza	10.0	44	6.9	Grain desserts ^l	9.7	43	3.0	Fatty meats ^h	8.4	37	5.2	Regular cheese	7.1	31	2.7	
131–185%	Pizza	13.7	59	13.8	Regular cheese	10.5	46	16.7	Whole milk	9.0	39	8.8	Grain desserts ^l	8.5	37	2.9	Fried potatoes	8.4	36	10.4	
>=186%	Pizza	12.2	52	5.7	Grain desserts ^l	10.2	43	3.3	Regular cheese	7.9	34	2.2	Reduced fat milk	6.3	27	3.2	Pasta ^o	6.3	27	3.5	
Added Sugarsⁱ																					
NHW	Soda ^m	34.7	130	8.8	Fruit drinks	12.2	46	4.3	Grain desserts ^l	10.3	39	3.2	Dairy desserts	8.4	31	4.7	Cold cereals	6.5	24	2.1	
NHB	Fruit drinks	24.3	89	3.9	Soda ^m	21.8	80	6.5	Grain desserts ^l	12.1	45	3.7	Candy	9.4	35	4.9	Dairy desserts	7.2	26	4.4	
Mex-Am	Soda ^m	31.5	111	14.0	Fruit drinks	19.0	67	6.1	Grain desserts ^l	11.5	40	3.0	Candy	6.1	21	2.0	Dairy desserts	5.8	20	2.4	
<=130%	Soda ^m	30.4	110	6.0	Fruit drinks	15.0	54	4.2	Grain desserts ^l	11.4	41	4.2	Cold cereals	7.7	28	2.9	Dairy desserts	7.3	27	3.4	
131–185%	Soda ^m	32.7	110	8.7	Grain desserts ^l	12.3	41	4.9	Fruit drinks	11.9	40	6.8	Cold cereals	8.0	27	3.8	Dairy desserts	7.2	24	3.4	
>=186%	Soda ^m	32.6	122	9.2	Fruit drinks	15.5	58	4.4	Grain desserts ^l	10.2	38	2.3	Dairy desserts	8.5	32	4.7	Candy	6.8	25	3.1	

Data Source: Energy data from NHANES 2005–2006, Solid Fats and Added Sugars data from NHANES 2003–2004. NHANES 2005–2006: Sample size by group by group: Non-Hispanic Whites (n=1018), Non-Hispanic Blacks (n=1161), Mexican-Americans (n=1253), <=130% POV (n=1457), 131–185% POV (n=451), >=186% POV (n=1707).

NHANES 2003–2004: Sample size by group by group: Non-Hispanic Whites (n=980), Non-Hispanic Blacks (n=1229), Mexican-Americans (n=1062), <= 130% POV (n=1536), 131–185% POV (n=465), >= 186% POV (n=1401).

SE: Standard Error.

^aRace/Ethnicity groups being reported are: Non-Hispanic Whites (NHW), Non-Hispanic Blacks (NHB), and Mexican-Americans (Mex-Am). Family Income groups being reported on are: families with incomes at or below 130% of the poverty level, those between 131–185% of the poverty level, and those at or above 186% of poverty level.

^bEnergy mean intake (kcal) by group: Non-Hispanic Whites (2101), Non-Hispanic Blacks (1941), Mexican-Americans (1930), <= 130% POV (1923), 131–185% POV (2009), >= 186% POV (2087).

^cIncludes cakes, cookies, donuts, pies, crisps, cobblers, granola bars.

^dIncludes sodas, energy drinks, sports drinks, and sweetened bottled water including vitamin water.

^eIncludes chicken and chicken mixed dishes.

^fIncludes pasta and pasta dishes.

^gSolid fats mean intake (kcal) by group: Non-Hispanic Whites (442), Non-Hispanic Blacks (433), Mexican-Americans (430), <= 130% POV (444), 131–185% POV (433), >= 186% POV (425).

^hIncludes sausage, franks, bacon, and ribs.

ⁱAdded sugars mean intake (kcal) by group: Non-Hispanic Whites (376), Non-Hispanic Blacks (368), Mexican-Americans (351), <= 130% POV (361), 131–185% POV (336), >= 186% POV (374).