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Salad Consumption in the U.S.

What We Eat in America, NHANES 2011-2014

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Highlights

- ▶ One out of 5 individuals (20%) consumed salad on the intake day. The percentage was higher among females (23%) than males (16%).
- ▶ Salad consumption was more common among those with higher household incomes, especially among middle-aged and older adults.
- ▶ The vast majority of salads were consumed at either dinner or lunch.
- ▶ The leading source of salads was a store ($\geq 50\%$), followed by a cafeteria among children age 6-11 years and teenagers and a full-service restaurant among adults.
- ▶ Most salads (86%) contained leafy greens. An equal percentage contained a dressing.
- ▶ On the day they were consumed, salads contributed 11% of total daily energy for adults and 9% for children, along with considerably greater proportions of some nutrients, notably vitamins A, C, E, and K and polyunsaturated fat.

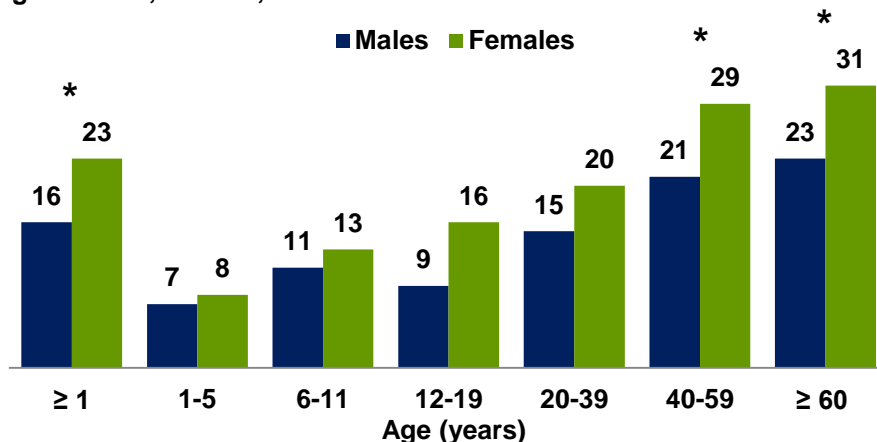
Intake of vegetables, and particularly raw vegetables, is associated with reduced risk of chronic diseases such as cancer (1,2), diabetes (3), and cardiovascular disease (3,4). Most individuals in the U.S. consume far less vegetables than recommended (5). One strategy proposed to boost their consumption is to include vegetable dishes, such as salads, in most meals and snacks (5). However, the most recently published information about nationwide salad intake was based on data from 1988-1994 (6). The purpose of this report is to describe current salad consumption by the U.S. population, based on one day of 24-hour recall data collected in What We Eat in America, NHANES 2011-2014 (7). The term “salad(s)” refers to raw vegetable-based salads and excludes items such as pasta salad, potato salad, and tuna salad (*see definition of “salad” on page 7*).

Who is consuming salads?

Overall, one fifth (20%) of individuals age 1 year and over in the U.S. consumed one or more salads on the intake day (*data not shown*). Among adults, a higher percentage of those age ≥ 40 years (26%) than of those age 20-39 years (18%) consumed a salad on the intake day.

As shown in figure 1, females age ≥ 1 year were significantly more likely than males to consume a salad (23% vs. 16%); the same was true in the subgroups age 40-59 years (29% vs. 21%) and ≥ 60 years (31% vs. 23%).

Figure 1. Percentage of individuals reporting salad(s) on the intake day, by age and sex, WWEIA, NHANES 2011-2014



*Within age group, percentage differs significantly ($p < 0.001$) by sex.



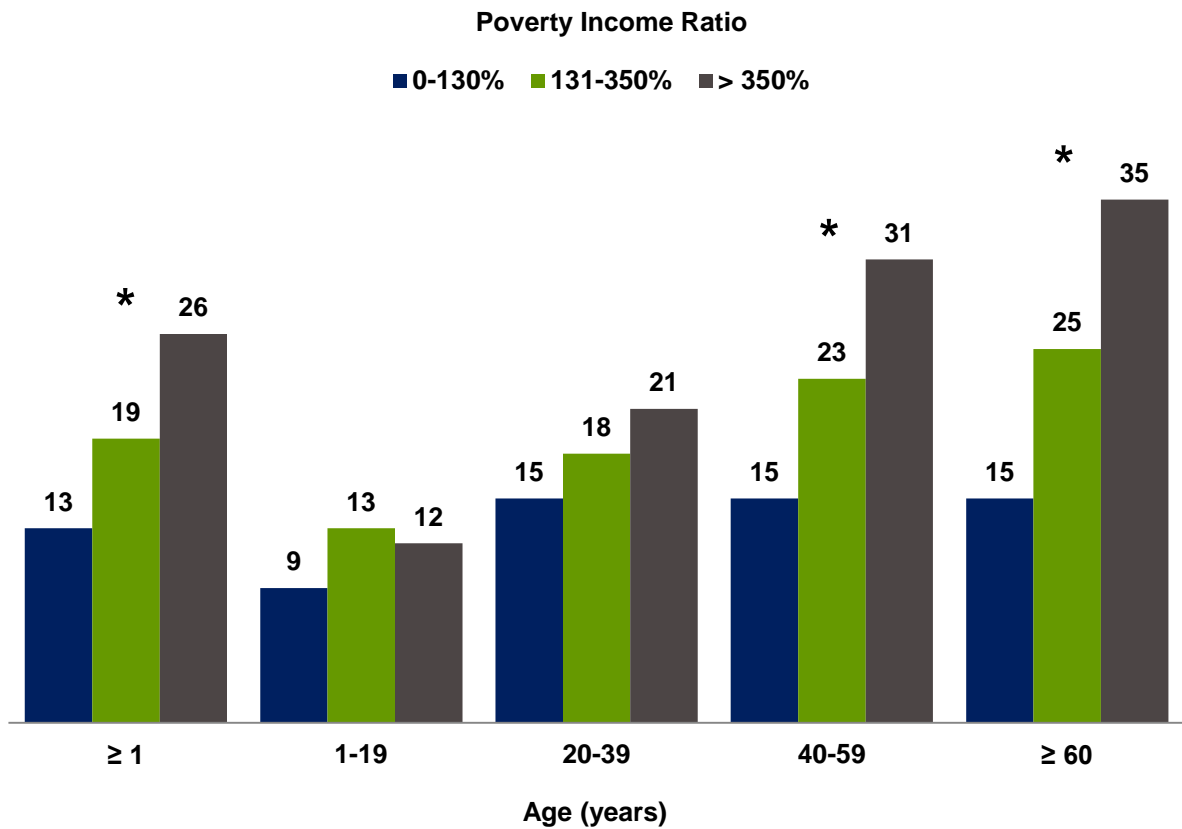
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Does salad consumption differ by income?

As shown in figure 2, salad consumption was related to household income expressed in terms of the Poverty Income Ratio among all individuals age ≥ 1 year and adults age 40-59 years and ≥ 60 years. In those age groups, the percentage who consumed salad(s) on the intake day was greater among those with higher household incomes than among those with lower household incomes. This relationship remained even after accounting for differences in sex, age, race/ethnicity, and energy intake between salad reporters and non-reporters (*data not shown*).

Figure 2. Percentage of individuals reporting salad(s) on the intake day, by age and family income (Poverty Income Ratio), WWEIA, NHANES 2011-2014

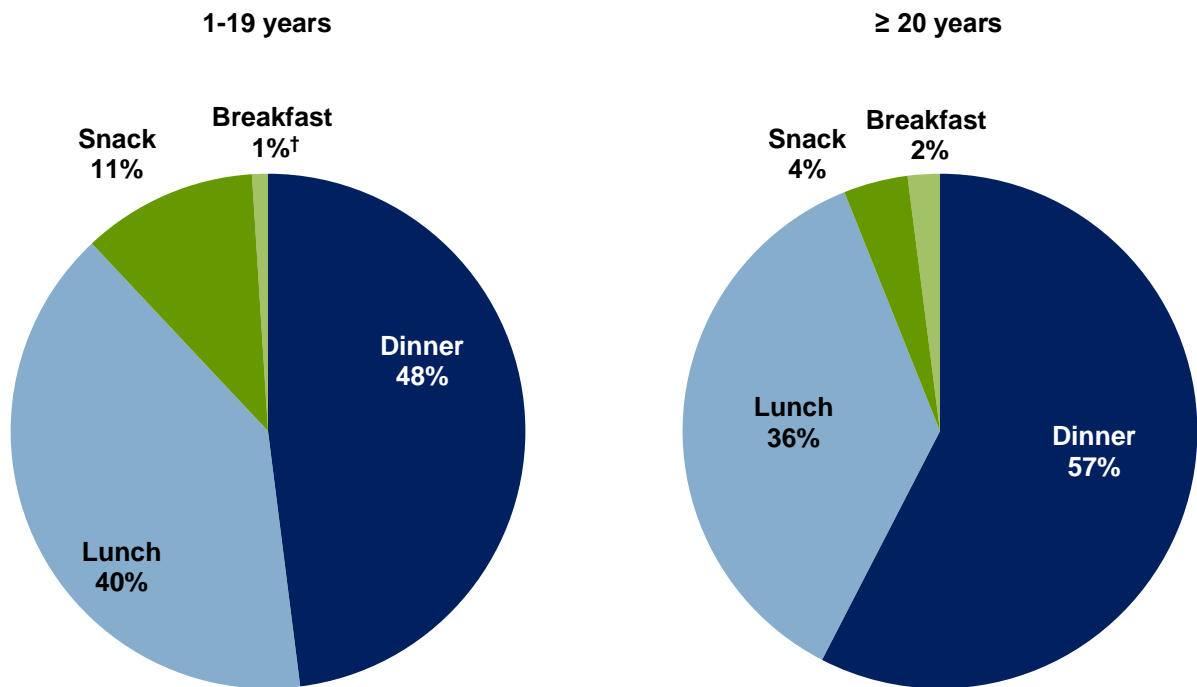


*Positive linear trend ($p < 0.001$) between salad reporting status and Poverty Income Ratio modeled as a continuous variable.

At what eating occasions are salads consumed?

As illustrated by figure 3, most of the salads reported were eaten at either dinner or lunch. Though consumption of salads at snacks was relatively low in all age groups, the percentage of salads consumed at snacks by children and teenagers age 1-19 years (11%) was more than double that by adults age ≥ 20 years (4%). As expected, intake of salads at breakfast was low in all age groups.

Figure 3. Distribution of salad reports by eating occasion, children 1-19 years and adults ≥ 20 years, WWEIA, NHANES 2011-2014

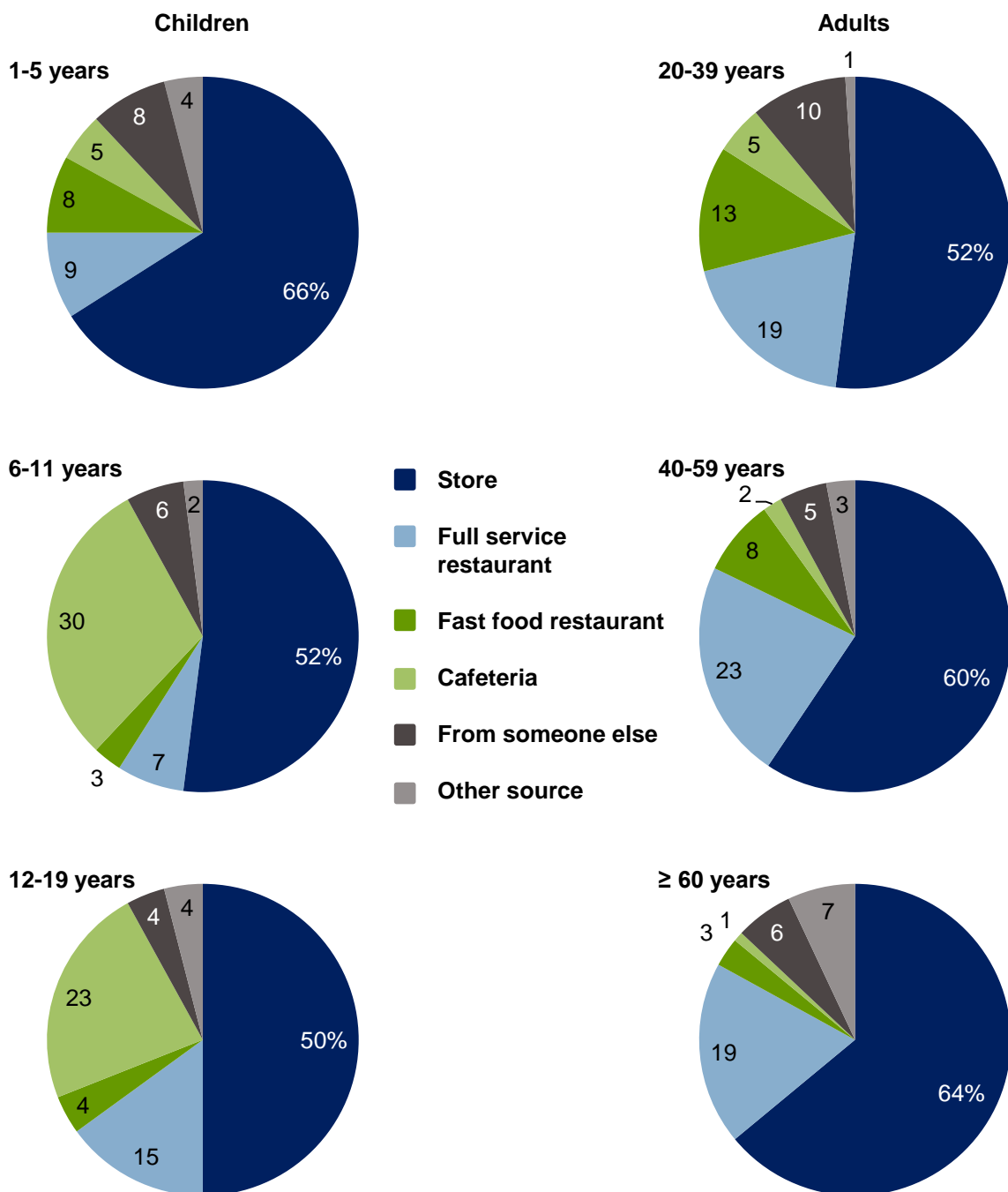


†Estimate is less precise than others presented due to small sample size.

From what sources are salads/salad ingredients obtained?

Survey participants were asked, “Where did you get this salad or most of the ingredients for this salad?” As shown in figure 4, in all age groups, the predominant source of salads or salad ingredients was a store. In nearly all cases, the store was a grocery store or supermarket (*data not shown*). Among children age 6-11 years and teenagers age 12-19 years, the next most common source was a cafeteria (mainly in a K-12 school); among adults age ≥ 20 years, a full-service restaurant.

Figure 4. Percentage of salads from specified source by age, WWEIA, NHANES 2011-2014



What ingredients are common in salads?

Since this study focused on raw vegetable-based salads, it is not surprising that the vast majority of salads in this study contained lettuce and/or other leafy greens (86% of salads), and the same percentage included a dressing (86%), as shown in table 1.

Most vegetables frequently reported as salad ingredients – such as leafy greens, tomato, carrot, onion, and cucumber – are inherently low in energy. Inclusion of other frequently reported ingredients such as dressing and meat, poultry, or fish can substantially increase the energy content of a salad.

Table 1. Common salad ingredients: Percentage of salads containing the specified ingredient and mean amount and energy contribution in salads containing it, individuals age ≥ 1 year, WWEIA, NHANES 2011-2014

Ingredient	Salads containing ingredient (%)	Amount per salad containing the ingredient		
		Mean amount (g)	Approximate equivalent in household measures ¹	Mean energy contribution (kcal) ²
Lettuce and/or other leafy greens	86	70	2 C	22
Dressing, all types	86	33	2 TB	103
Tomato	43	62	1/3 C	14
Carrot	34	26	1/4 C	14
Onion	27	17	1-1/2 TB	9
Cheese	25	19	3 TB	64
Cucumber	20	50	3/8 C	9
Meat, poultry, fish	19	67	2-1/3 OZ	115
Croutons	10	9	1/4 C	41
Sweet peppers	9	44	3/8 medium	11
Nuts/seeds	8	14	1-1/2 TB	84
Olives	7	20	5 medium	25
Celery	7	34	1/4 C	6
Avocado	5	50	1/3 C	82
Egg	5	41	4/5 egg	58
Broccoli	5	48	1/2 C	26

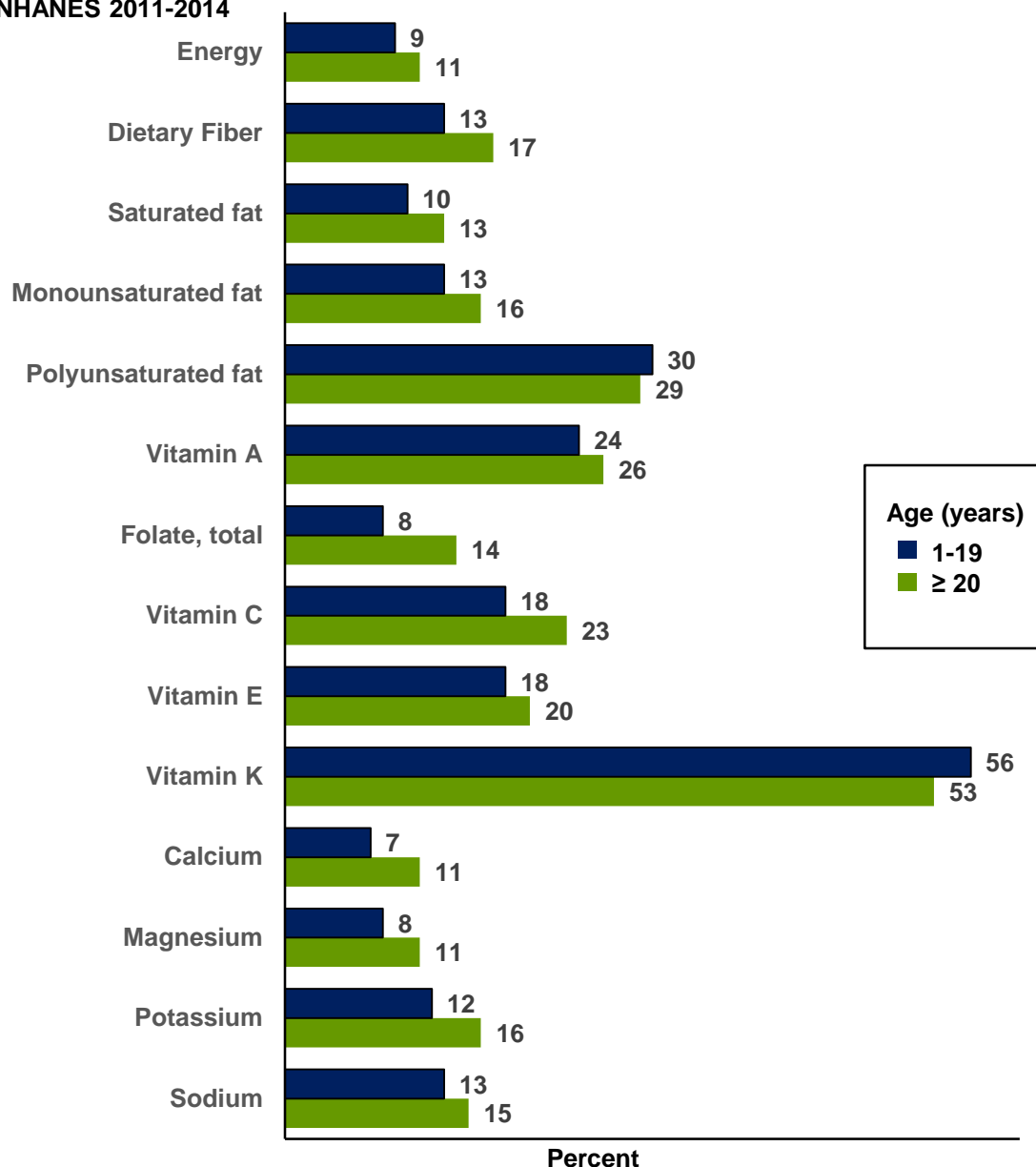
¹Measure abbreviations: C, cup; TB, tablespoon; OZ, ounce (by weight).

²kcal, kilocalories.

Among salad reporters, how much do salads contribute to intake of energy and nutrients?

The mean energy contribution from salads among salad reporters was 234 kcal for adults ≥ 20 years and 166 kcal for children 1-19 years, which accounted for 11% and 9%, respectively, of their total energy intake for the day. Salads' contributions to several nutrients whose intakes tend to be lower than recommended levels in the United States – such as dietary fiber, vitamin A, vitamin C, and vitamin E – were proportionally higher than their energy contribution (figure 5). One nutrient with a particularly high proportion contributed by salad for adults and children, namely vitamin K, is abundant in leafy green vegetables (8). The contribution of salads to intakes of mono- and polyunsaturated fats is largely due to the use of oils in dressings.

Figure 5. Percentage of total intake of energy and selected nutrients contributed by salads among children 1-19 years and adults ≥ 20 years who reported a salad on the intake day, WWEIA, NHANES 2011-2014



Definitions

Eating occasions: Eating occasions with the following English and Spanish names were grouped together: breakfast, desayuno, and almuerzo; lunch, brunch, and comida; dinner, supper, and cena; and snack, drink, merienda, entre comida, botana, bocadillo, tentempie, bebida, and items consumed over an extended period of time.

Kilocalories: Scientific unit used in reporting the energy content of food; shortened to “calories” in casual usage in the U.S.

Poverty Income Ratio (PIR): The ratio of family income to poverty expressed as a percentage. The poverty measure used in calculating the PIR was the Department of Health and Human Services’ poverty guidelines (9).

Reporter/non-reporter: An individual who ate a salad on the intake day was considered a “reporter,” whereas someone who did not eat a salad was considered a “non-reporter.” People classified as non-reporters in this analysis may consume salads on some days, even though they did not eat one on the intake day. Likewise, those classified as reporters do not necessarily eat salad every day.

Salad: For the purposes of this study, a salad was a mixture that was composed mainly of raw vegetables. Most raw vegetable-based salads in this analysis contained leafy greens (lettuce such as iceberg or romaine, or other raw greens such as spinach or cabbage) and/or a dressing, but neither leafy greens nor dressing was required in order to be considered a salad. Most salads analyzed contained at least two different raw vegetables; however, some contained only raw lettuce or other leafy greens consumed alone (i.e., not as part of a sandwich or another mixed food) or lettuce/greens with one or more common non-vegetable salad ingredients (such as dressing, croutons, or sunflower seeds). Some examples of raw vegetable-based salads without leafy greens include raw carrot salad, tomato & cucumber salad, and broccoli slaw. Other types of salads that did not have raw vegetables as their predominant ingredients (such as chicken salad, tuna salad, macaroni/pasta salad, fruit salad, and potato salad) were excluded from the analysis.

Source of salads/ingredients: For each food/beverage reported, survey participants were asked “Where did you get this (NAME OF FOOD) or most of the ingredients for this (NAME OF FOOD)?” Response options included store (store–grocery/supermarket, store–convenience type, and store–no additional information), full service restaurant (restaurant with waiter/waitress, bar/tavern/lounge, and restaurant–no additional information), fast food/pizza restaurant, cafeteria (cafeteria in a K-12 school and cafeteria NOT in a K-12 school), from someone else or as a gift, and 17 other options.

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 2011-2014 (7). Dietary data were collected in person using the 5-step USDA Automated Multiple-Pass Method (AMPM) for the 24-hour recall. A total of 16,392 individuals age ≥ 1 year (8,115 males and 8,277 females) provided complete and reliable dietary intake data. Sample weights were applied in all analyses to produce nationally representative estimates. USDA’s Food and Nutrient Database for Dietary Studies (FNDDS) was used in calculating intakes of energy and nutrients.

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