Snacking Patterns of U.S. Adults

What We Eat in America, NHANES 2007-2008

Food Surveys Research Group
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Highlights

- Over the last 30 years, the average number of snacks consumed per day doubled, and the percentage of adults snacking on any given day rose from 59 to 90 percent (not counting snacks consisting of plain water only).
- Older adults (age 60 years and over) consume fewer calories both overall and at snacking occasions.
- Snacks provide on average about one-fourth of daily calories, greater proportions of alcohol, carbohydrates and total sugars, and lesser proportions of most other nutrients.
- Snacking more times in a day is associated with consuming more calories.
- The average daily number of snacks is not different for obese, overweight, and normal weight adults.
- Overall, the foods and beverages contributing the most calories at snacks are not the most nutritious options.

The high prevalence of overweight and obesity among the U.S. population (1) has led researchers to evaluate possible associations between specific dietary patterns and weight status. Snacking is one dietary pattern which has been analyzed in this context. Previous research has indicated that snacking may contribute to higher intakes of calories, which in turn could lead to obesity (2-4). However, other studies have demonstrated benefits of snacking (such as improved micronutrient and food group intake) in the population, including among subgroups who are at nutritional risk (5-6).

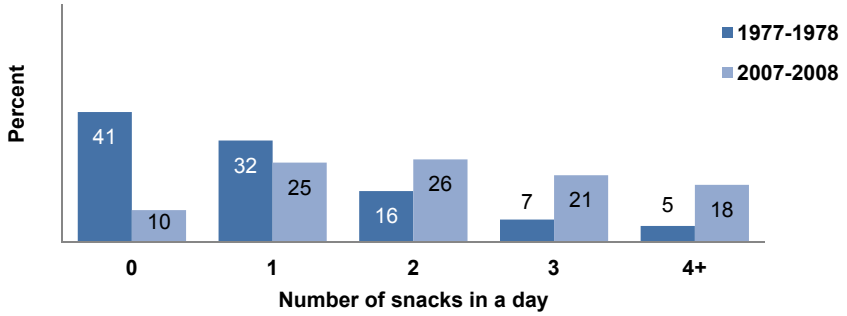
Definitions of snacking vary and have implications for study findings and conclusions (7). In What We Eat in America (WWEIA), NHANES 2007-2008, survey respondents designated the name of all eating occasions, including snacks (*see definition on page 6*). Respondents could report any food or beverage, whether consumed alone or with other items, as a snack.

Using data from 5,334 adults age 20 years and over, the study reported here examined associations between snacking, food and nutrient intakes, and weight status *(see definition on page 6)*.

Has snacking by adults changed in the past 30 years?

Yes. Between 1977-1978 and 2007-2008, significant increases ($p<0.01$) have occurred in both the mean frequency of snacking (up from 1.0 to 2.2 snacks in a day) and the percentage of adults snacking on any given day (up from 59 percent to 90 percent), as shown in figure 1. On any given day in 1977-1978, most adults (73 percent) snacked only once or not at all. In 2007-2008, about two-thirds of adults (65 percent) snacked two or more times in a day.

Figure 1. Percentages of adults age 20 years and over consuming specified number of snacks in a day, 1977-78 and 2007-2008



NOTE: Due to a change in collection of water intake data, this time comparison excludes occasions that were identified as a "snack" by the respondent but consisted of plain water unaccompanied by any other foods or beverages.
SOURCES: Nationwide Food Consumption Survey 1977-1978 and What We Eat in America, NHANES 2007-2008, Day 1 dietary intake data, weighted.

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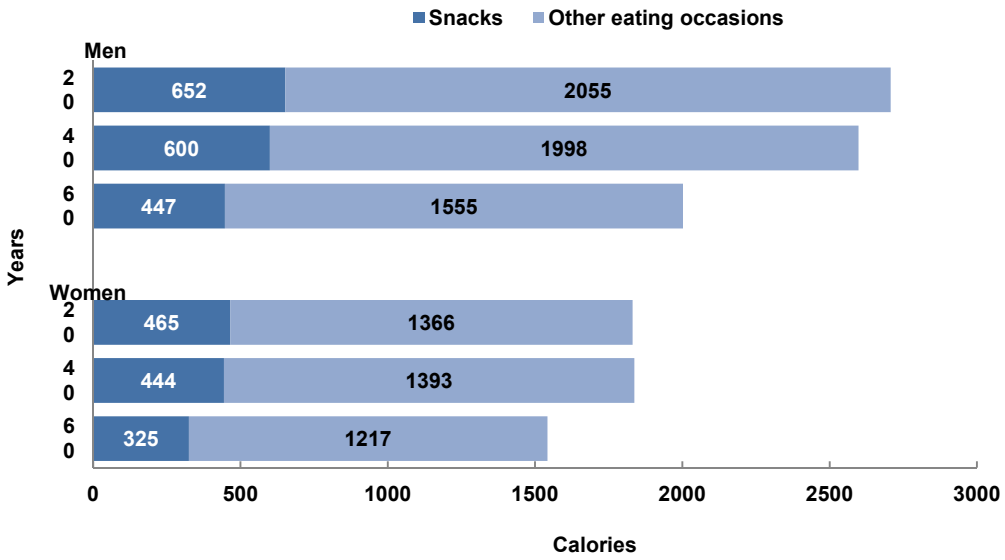
How many calories do adults obtain from snacks in a day?

Based on the WWEIA 2007-2008 survey, foods and beverages consumed at snacking occasions now contribute a daily average of 586 calories for men and 421 calories for women. Adults age 60 years and over consume fewer calories overall, and calories consumed at snacking occasions are lower for people in this age group than for younger groups *(see figure 2)*. In addition, the proportion of daily calories provided by snacks is significantly smaller for older women (but not men) than for their younger counterparts (p<.01).

Figure 2. Mean calorie intake in a day from snacks and other eating occasions, adults, by age group, WWEIA, NHANES 2007-2008



SOURCE: What We Eat in America, NHANES 2007-2008, Day 1 dietary intake data, weighted.

What proportion of adults' daily calorie intakes come from snacks?

On average, 24 percent of adults' total daily calories are consumed at snacking occasions. However, for some individuals, snacks provide a substantially larger proportion of daily calorie intake. Nearly 1 in 6 adults (16 percent) obtain over 40 percent of their total daily calories from foods and beverage they report as being consumed as snacks (*see table 1*).

Table 1. Percentages of adults age 20 years and over with specified level of total calorie intake from snacks, WWEIA, NHANES 2007-2008

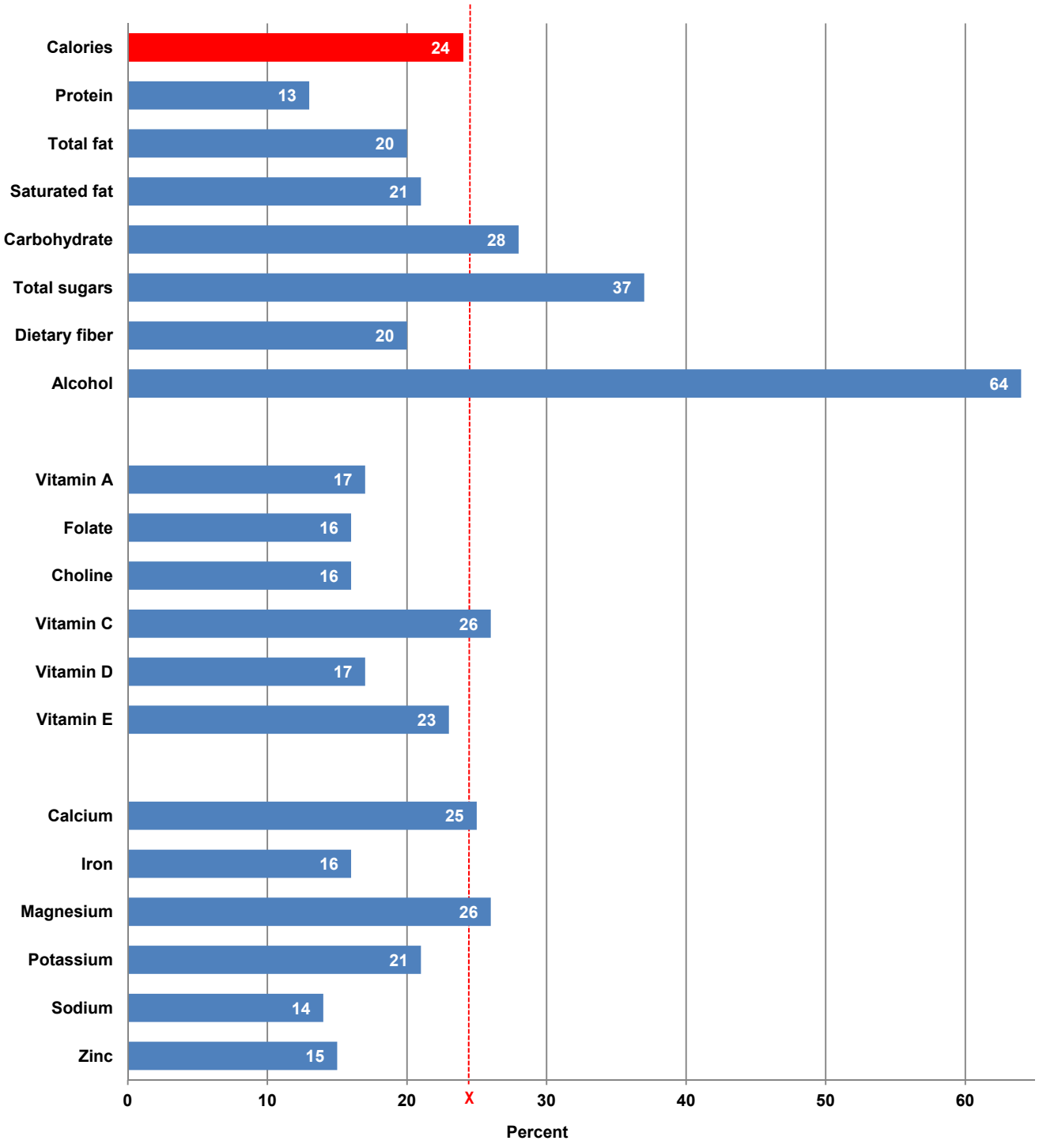
Snacks provide this level of total calories…	…for this percent of adults
0-10 percent	30
11-20 percent	22
21-30 percent	19
31-40 percent	13
41 percent or more	16

SOURCE: What We Eat in America, NHANES 2007-2008, Day 1 dietary intake data, weighted.

How much of their daily intake of nutrients and other food components do adults obtain from snacks?

Relative to their caloric contribution *(marked by line X in figure 3 below)*, snacks provide higher proportions of adults' daily intakes of alcohol, carbohydrate, and total sugars (a subgroup of carbohydrate); similar proportions of vitamin C, vitamin E, calcium, and magnesium; and lower proportions of most other nutrients.

Figure 3. Snacks' contributions to intakes of nutrients and other food components by adults age 20 years and over, WWEIA, NHANES 2007-2008

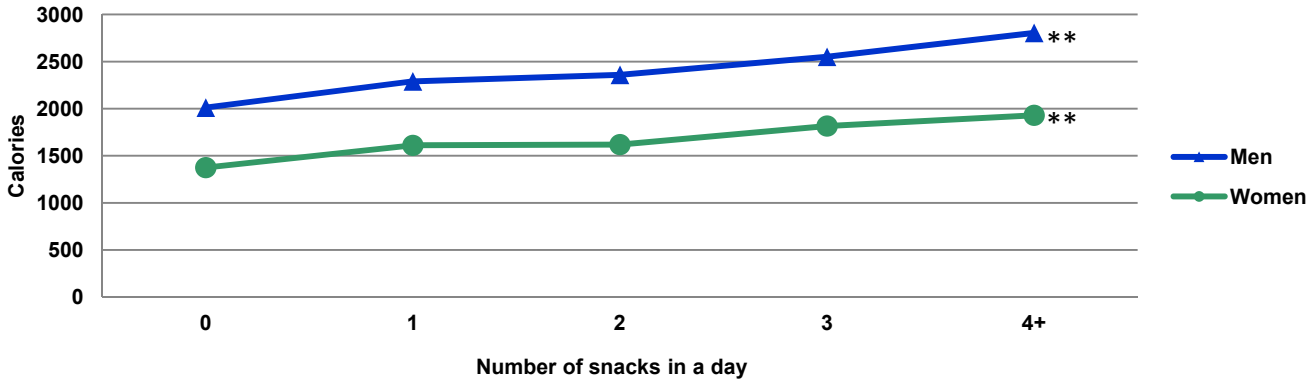


NOTES: Line X marks the proportion of total energy, or calories, that snacks provide. Bars that extend beyond line X represent nutrients that snacks provide at a higher proportion than calories. Bars that do not extend to line X represent nutrients that snacks provide at a lower proportion than calories.
SOURCE: What We Eat in America, NHANES 2007-2008, Day 1 dietary intake data, weighted.

Is higher snacking frequency associated with higher total calorie intake?

Yes. Higher snacking frequency is associated with higher total calorie intake, as shown in figure 4. Adults who have 4 or more snacks in a day consume almost one and one-half times as many calories as do adults who report no snacks.

Figure 4. Mean calorie intake by snacking frequency, adults 20 years of age and older, WWEIA, NHANES 2007-2008

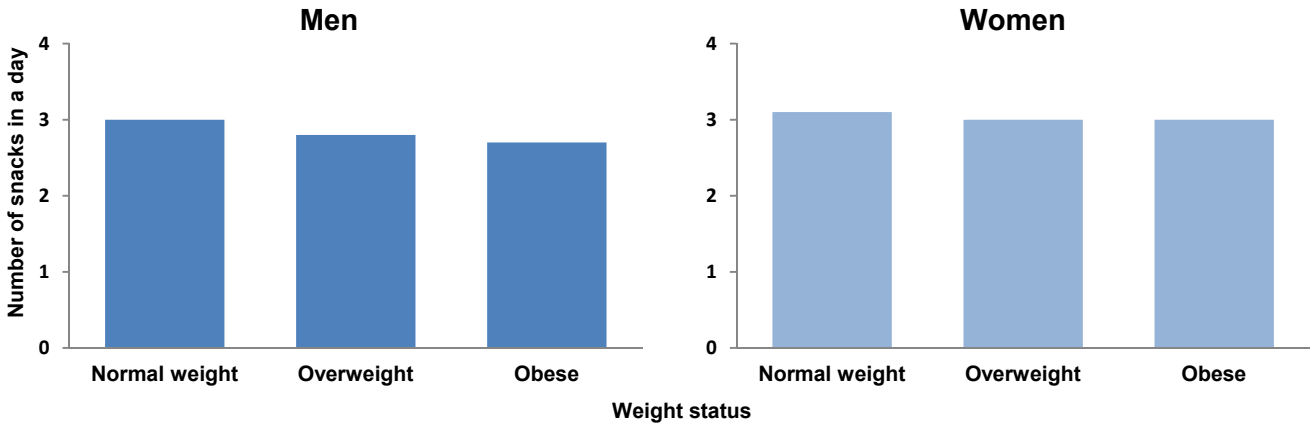


NOTES: Adjusted to remove the effects of age, race/ethnicity, percentage of poverty threshold, presence/absence of three-meal pattern, physical activity, and body mass index *(see definitions on page 6)*. **Statistically significant trend ($p<0.01$).
SOURCE: What We Eat in America, NHANES 2007-2008, Day 1 dietary intake data, weighted.

Does mean daily snacking frequency differ by weight status?

No. The mean number of snacks consumed in a day does not differ significantly by weight status *(see definition on page 6)* for either men or women (*see figure 5)*.

Figure 5. Mean snacking frequency by weight status, adults 20 years of age and older, WWEIA, NHANES 2007-2008



NOTES: Adjusted to remove the effects of race/ethnicity, percentage of poverty threshold, presence/absence of three-meal pattern, and physical activity *(see definitions on page 6)*. Normal weight category includes a small number of underweight adults (<2% of the population).
SOURCE: What We Eat in America, NHANES 2007-2008, Day 1 dietary intake data, weighted.

What foods and beverages contribute the most calories at snacks?

Together, the food groupings listed in table 2 below account for approximately three-fourths of the total calories consumed at snacks by men and women age 20 years and older. Some of these food groups are good sources of nutrients – for example, milk and milk drinks, nuts and seeds, and fruits and fruit juices. However, many of adults' food and beverage choices at snacks are energy-dense (high in fat and/or sugars) but nutrient-poor.

Table 2. Contribution of selected foods and beverages to total snack calories, WWEIA, NHANES 2007-2008

Food/beverage group	Percentage of snack calories contributed by food/beverage group	
	Men	Women
Alcoholic beverages	16	7
Sugar-sweetened beverages	14	14
Savory snacks (such as pretzels, tortilla and potato chips, crackers)	10	12
Candies	7	9
Cakes, pastries, pies	7	7
Fruits and fruit juices	6	7
Dairy desserts (such as ice cream, pudding)	5	6
Nuts and seeds	5	5
Cookies	4	6
Milk and milk drinks	4	4
All groups listed above	**78**	**77**

SOURCE: What We Eat in America, NHANES 2007-2008, Day 1 dietary intake data, weighted.

Definitions

BMI (body mass index): Based on an individual's height and weight, this number is a reliable indicator of body fatness for most people (8). Calculated by dividing a person's weight (in kilograms) by the square of his/her height (in meters). The equation for calculating BMI based on weight in pounds and height in inches is the following: weight (lb) / [height (in)]^2 x 703

Poverty thresholds: Percentage of poverty level is based on family income, family size, and composition using U.S. Census Bureau poverty thresholds. The poverty threshold categories are related to Federal Nutrition Assistance Programs. See www.fns.usda.gov.

Snack, snacking occasion: Snacking occasions were reported as distinct eating occasions during the dietary interview and consisted of one or more food and beverage items, including plain water. Survey respondents selected the name of all eating occasions from a fixed list that was provided during the interview. All reports of "snack," "drink," or "extended consumption" (items that were consumed over a long period of time) were included as snacking occasions. Spanish language interviewers used Spanish language snacking occasion names: "merienda," "entre comida," "bocadillo," "tentempie," and "bebida." Water was the only item reported for approximately 23 percent of snacking occasions. Because of a change in the method of collecting data on water consumption, it is not possible to include water-only occasions in the time comparison of snacking frequency between 1977-1978 and 2007-2008, but such occasions were included in all other analyses.

Three-meal pattern: This pattern was present when an individual's dietary intake included at least one eating occasion from each of three categories (including both English and equivalent Spanish names for these meals): (1) breakfast, desayuno, or almuerzo; (2) lunch, brunch, or comida; and (3) dinner, supper, or cena.

Weight status: Adults were assigned to weight status categories based upon their calculated body mass index (BMI; *see definition above*). As defined by the National Institutes of Health (9), weight status categories and their associated BMI ranges are the following: Underweight, <18.5; normal weight, 18.5-24.9; overweight, 25.0-29.9; and obese, 30.0 and over.

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 2007-2008. A total of 5,420 men and women age 20 years and older provided complete and reliable dietary intake data. Pregnant and lactating females (n=86) were excluded, yielding a final sample of 5,334 adults (2,662 males and 2,672 females). Results presented for 1977-78 are based on Nationwide Food Consumption Survey data from 16,683 adults (6,963 males and 9,720 females). Sample weights were applied in all analyses to produce nationally representative estimates.

During the 24-hour dietary recall, the name of each eating occasion was reported by the respondent. Nutrient intakes were based only on intakes of foods and beverages and do not include nutrient contributions from supplements.

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