



Food Surveys Research Group  
Dietary Data Brief No. 2  
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# Snacking Patterns of U.S. Adolescents

*What We Eat In America, NHANES 2005-2006*

Rhonda S. Sebastian, MA; Joseph D. Goldman, MA; and  
Cecilia Wilkinson Enns, MS, RD, LN

## Highlights

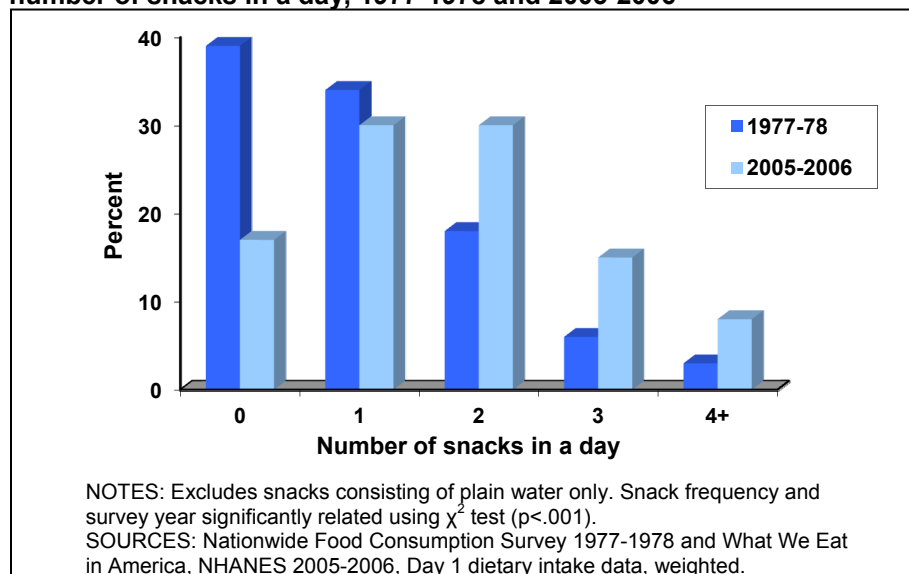
- ▶ Snacking by adolescents has increased markedly in recent decades. Eighty-three percent of teens consumed at least one snack on any given day in 2005-2006.
- ▶ Snacks provided 23 percent of daily calories, 31 percent of total sugars, and lesser proportions of most vitamins and minerals.
- ▶ Snacking more times per day was associated with higher intakes of total calories.
- ▶ Despite its relationship with higher total calorie intakes, snacking more frequently was not related to body mass index (BMI) in adolescents.
- ▶ Snacks provided 11 to 38 percent of daily intakes from the MyPyramid grains, fruits, vegetables, milk, meat/beans, and oils groups, 27 percent of discretionary calories, 34 percent of added sugars, and 20 percent of solid fats.
- ▶ Many of the foods that made the largest contributions to adolescents' MyPyramid intakes at snacks were also high in added sugars, solid fats, or both.

Dietary patterns established during childhood and adolescence often persist into adulthood, and therefore have implications for the risk of developing chronic diseases, not only in the near term but also in the future (1-3). Rising rates of overweight and obesity among children and adults in recent years (4-5) have led researchers to evaluate associations between various eating patterns and weight status. One pattern that has received considerable attention is eating more frequently, particularly in the form of snacking (6). Although some studies have shown that eating patterns which include snacking may help people meet their nutrient needs, other studies indicate that snacking can lower the nutrient density (i.e., the amount of nutrients per calorie) of the total diet (7-9). Data on the prevalence of snacking among adolescents and its association with body mass index (*see page 3*) and with food and nutrient intakes are presented in this report.

## Has snacking by adolescents changed since the late 1970's?

Yes. The percentage of adolescents snacking (*see definition on page 5*) on any given day increased from 61 percent in 1977-1978 to 83 percent in 2005-2006, and the mean snacking frequency increased significantly from 1.0 to 1.7 snacks in a day ( $p < .001$ ). The percentage of adolescents who had three or more snacks in a day rose more than twofold (from 9 percent to 23 percent) during the same time period.

**Figure 1. Percent of adolescents age 12-19 years consuming specified number of snacks in a day, 1977-1978 and 2005-2006**



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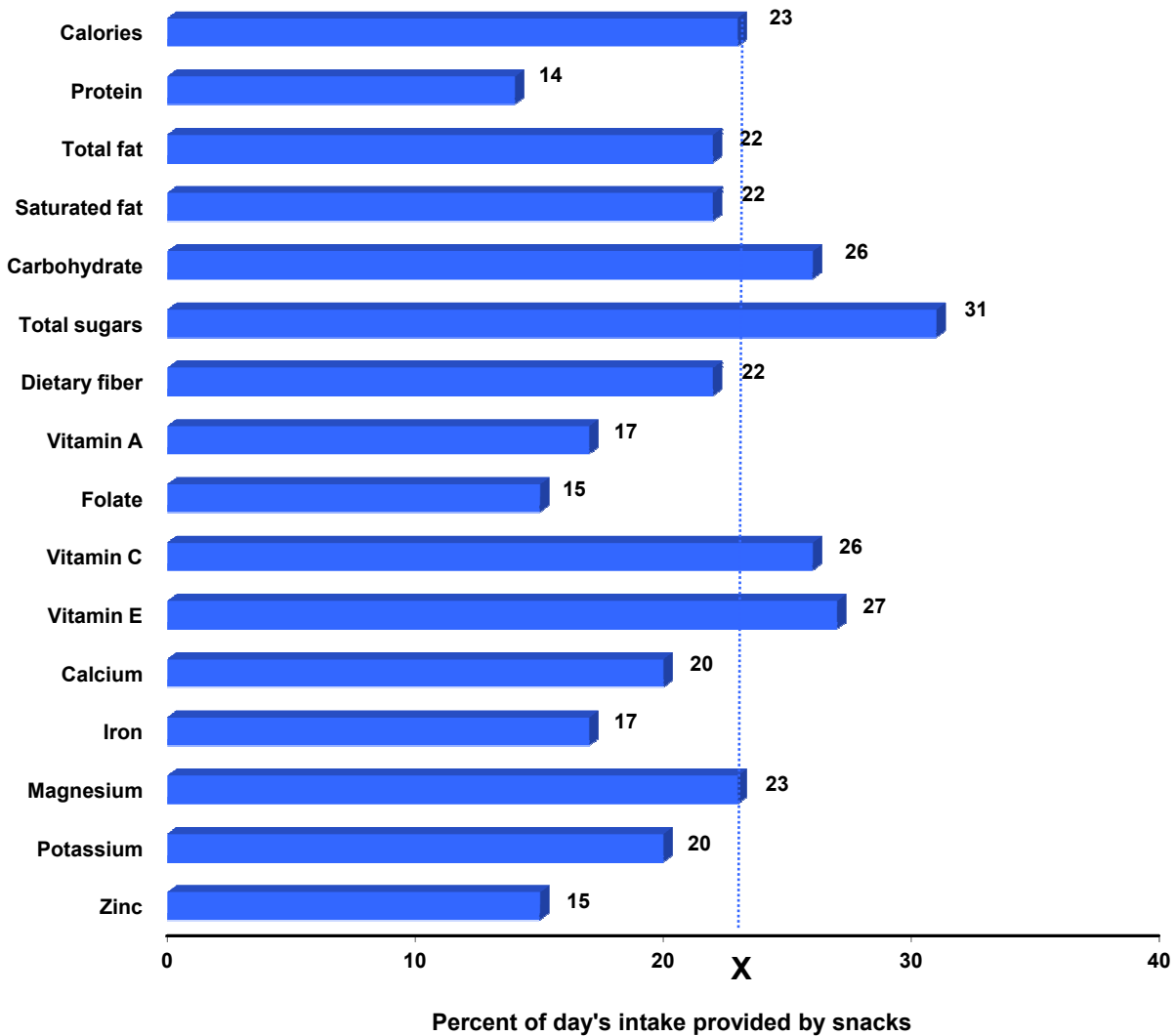


**How much of their daily nutrients do adolescents obtain from snacks?**

In 2005-2006, adolescents consumed on average 526 calories – nearly one-fourth of the day’s total – at eating occasions they identified as snacks. In 1977-1978, snacks provided only 300 calories, accounting for 14 percent of the day’s total intake.

Relative to their caloric contribution (23 percent), snacks provided higher proportions of adolescents' daily intakes of carbohydrate, total sugars (a subgroup of carbohydrate), vitamin C, and vitamin E, but lower proportions of most other nutrients (see figure 2).

**Figure 2. Snacks' contributions to nutrient intakes by adolescents age 12-19 years, 2005-2006**



NOTES: At X, [the ratio of the percent of daily calorie intake provided by snacks to the percent of daily nutrient intake provided by snacks is equal to 1.00] snacks provided the same proportion of a nutrient as they did of calories. For example, snacks provided an equal percentage of total daily intake of total daily intake of magnesium and calories, a higher percentage of vitamin E than calories, and a lower percentage of zinc than calories.

SOURCE: What We Eat in America, NHANES 2005-2006, Day 1 dietary intake data, weighted.

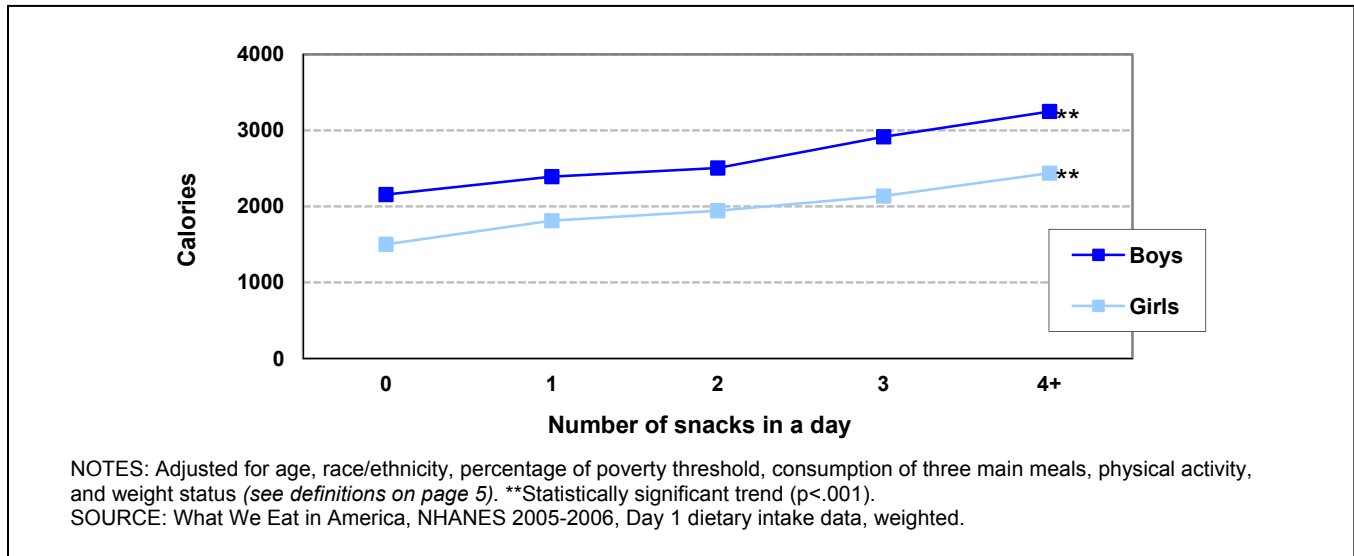
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### Is higher snacking frequency associated with higher total calorie intake?

Yes. In 2005-2006, higher snacking frequency was associated with higher total calorie intake. Adolescents who had 4 or more snacks in a day consumed over 1.5 times as many calories as did adolescents who reported no snacks (see figure 3).

Additionally, for both girls and boys, higher snacking frequency was associated with a higher proportion of the day's calories being provided by total sugars and a lower proportion of the day's calories being provided by protein.

**Figure 3. Mean calorie intake by snacking frequency, adolescents age 12-19 years, 2005-2006**

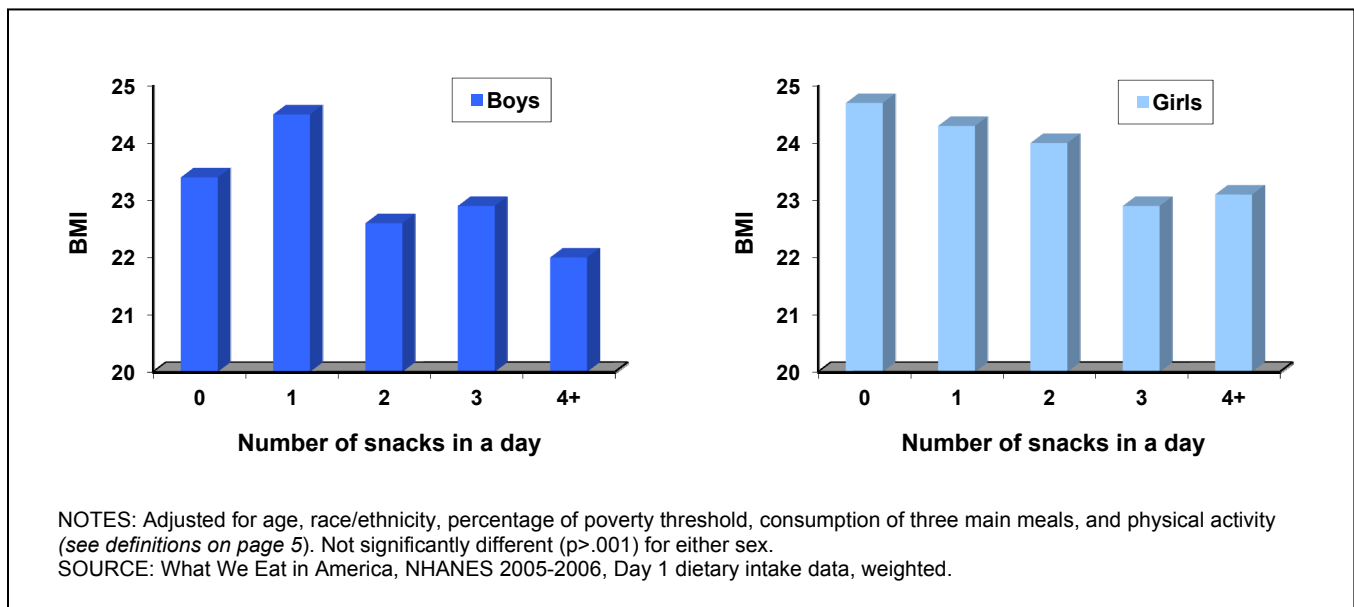


### Since higher snacking frequency is associated with higher calorie intakes, is it also related to a higher body mass index (BMI)?

No. Snacking frequency was not associated with BMI (see definition on page 5).

Even though adolescents who snacked more frequently consumed more calories than their non-snacking counterparts, their BMIs were not significantly different (see figure 4).

**Figure 4. Mean BMI by snacking frequency, adolescents age 12-19 years, 2005-2006**

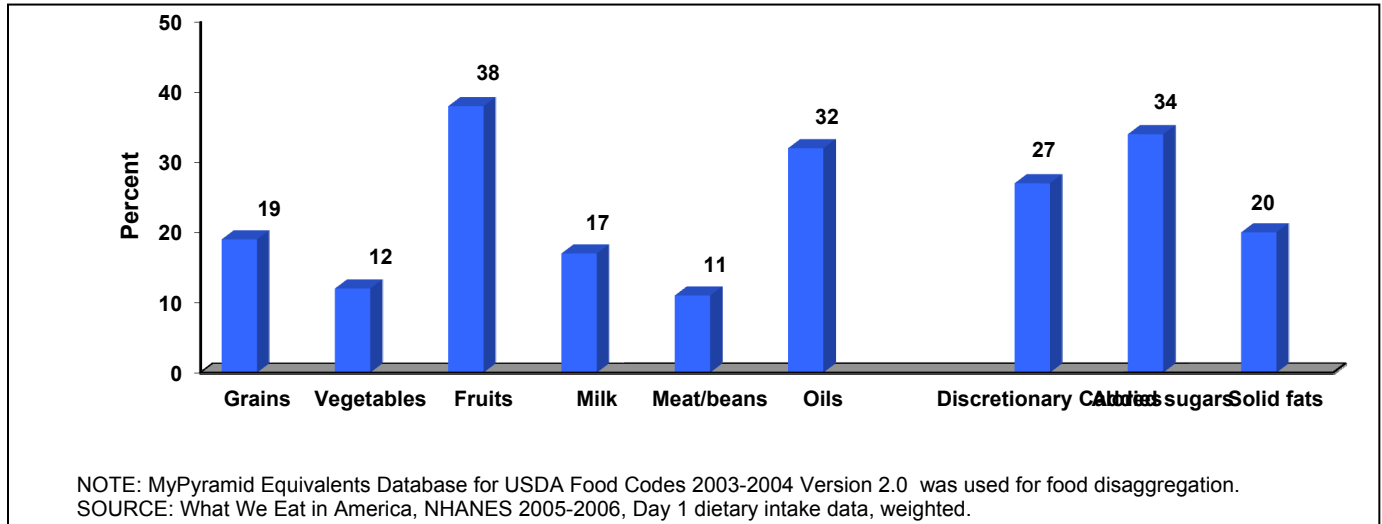


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### How does snacking contribute to MyPyramid food group intakes?

Snacks provided about one-third of MyPyramid (*see definition on page 5*) intakes of fruits and oils and less than one-fifth of grains, milk, vegetables, and meat/beans. Adolescents obtained over one-fourth of their intakes of discretionary calories, over one-third of added sugars, and one-fifth of added fats from snacks (see Figure 5).

**Figure 5. Snacks' contributions to MyPyramid food group intakes by adolescents age 12-19 years, 2005-2006**



### What foods eaten as snacks contribute the most to MyPyramid intakes?

The table below lists the foods eaten at snacking occasions that made the largest contributions to the MyPyramid food groups. Many of the top food choices contributing to intakes of grains, vegetables, milk, meat/beans, and oils were also high in discretionary calories from added sugars (e.g., catsup) or solid fats (e.g., crackers, pizza) or both (e.g., ice cream, cookies, candy).

**Table 1. Top foods/drinks (in rank order) contributing to MyPyramid intakes by adolescents age 12-19 years, 2005-2006**

MyPyramid group	Foods/drinks consumed as snacks that contributed the most to the MyPyramid group
<b>Grains</b>	Tortilla chips and corn chips/twists/puffs, cookies, pizza, white breads and rolls, crackers
<b>Vegetables</b>	Potato chips, pizza, tomato salsa and catsup, French fries, lettuce
<b>Fruits</b>	Apples, orange and grapefruit juice, bananas, noncitrus juice (including apple juice, 100% juice blends), oranges
<b>Milk</b>	Fluid milk, cheese, ice cream, pizza, candy (mainly chocolate)
<b>Meat/beans</b>	Nut and nut butters, frankfurters and luncheon meats, fried chicken and chicken patties/nuggets, candy (mainly with nuts), tuna
<b>Oils</b>	Tortilla chips and corn chips/twists/puffs, potato chips, candy, popcorn, salad dressing
<b>Discretionary calories</b>	Carbonated soft drinks, candy, ice cream, cookies, fruit ades/drinks
<b>Added sugars</b>	Carbonated soft drinks, candy, fruit ades/drinks, ice cream, cookies
<b>Solid fats</b>	Ice cream, cookies, pizza, candy, cake

NOTE: MyPyramid Equivalents Database for USDA Food Codes 2003-2004 Version 2.0 was used for food disaggregation.  
SOURCE: What We Eat in America, NHANES 2005-2006, 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 adolescents (10). Calculated by dividing a person's weight (in kilograms) by the square of his/her height (in meters).

**MyPyramid:** Food guidance system developed by USDA. Based upon the *2005 Dietary Guidelines for Americans 2005*, it recommends amounts to eat each day from specific food groups/components (grains, fruits, vegetables, milk, meat/beans, oils) in order to meet nutrient needs. MyPyramid also puts limits on food components typically consumed in excess in the American diet – discretionary calories from solid fats, added sugars, and alcohol.

**Poverty thresholds:** Percent 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: [www.fns.usda.gov](http://www.fns.usda.gov).

**Physical activity:** Each adolescent in the What We Eat in America, NHANES 2005-2006 survey was assigned to one of the following physical activity levels based on his/her minutes of reported moderate physical activity per week: Sedentary – less than 150 minutes, moderately active – 150 to 300 minutes, and active – over 300 minutes. Each minute of vigorous activity was considered to be the equivalent of 2 minutes of moderate activity (11).

**Snacks, snacking occasion:** An “eating occasion” is a distinct time when a respondent reported at least one food or beverage item, including water. Snacks include eating occasions designated by the respondent as “snack,” “drink,” “extended consumption,” or the Spanish equivalents “merienda,” “entre comida,” “botana,” “bocadillo,” “tentempie,” and “bebida.” Water was the only item reported for approximately 25 percent of snacking occasions. Water-only occasions were not included in the comparison of snacking frequency between 1977-78 and 2005-2006, but were included in all other analyses.

**Weight status:** Each adolescent was assigned to a weight status category on the basis of the following Centers for Disease Control and Prevention criteria for BMI-for-age: Healthy weight – from the 5th percentile to less than the 85th percentile, overweight – from the 85th to less than the 95th percentile, and obese – equal to or greater than the 95th percentile (10).

### Data Source

Estimates for 2005-2006 are based on data from What We Eat in America (WWEIA), the dietary intake interview component of the National Health and Nutrition Examination Survey (NHANES). In 2005-2006, a total of 2,115 adolescents age 12-19 years provided complete and reliable dietary intake data. Pregnant females (n=43) were excluded, yielding a final sample of 2,072 adolescents (1,052 males and 1,020 females). Results presented for 1977-78 are based on Nationwide Food Consumption Survey data from 5,854 adolescents (2,897 males and 2,957 females). Sample weights were applied in all analyses to produce nationally representative estimates.

One 24-hour dietary recall was collected in person by a trained interviewer. The name of each eating occasion was reported by the respondent. Nutrient intakes were based only on intakes of foods and beverages, not supplements. The MyPyramid Equivalents Database for USDA Food Codes 2003-3004 Version 2.0 was used to disaggregate foods into their ingredients, assign the components to the appropriate MyPyramid food groups, and convert gram amounts to MyPyramid units of measure.

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### About the authors

Rhonda S. Sebastian, Joseph D. Goldman, and Cecilia Wilkinson Enns are with the Food Surveys Research Group, Beltsville Human Nutrition Research Center, Agricultural Research Service.

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