



Snack Patterns of U.S. Adolescents: What We Eat in America, NHANES 2005–2006¹

USDA ARS

Beltsville Human Nutrition Research Center

Food Surveys Research Group
Beltsville, MD

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 (1,3,6). Rising rates of overweight and obesity among children and adults in recent years (4,7) 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 (2). Although some studies have shown that eating patterns that 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 (5,8,9). Data on the prevalence of snacking among adolescents and its association with body mass index (BMI) and food and nutrient intakes are presented in this report.

Has Snacking by Adolescents Changed Since the Late 1970s?

Yes. The percentage of adolescents snacking on any given day increased from 61% in 1977–1978 to 83% in 2005–2006, and the mean snacking frequency increased significantly from 1.0 to 1.7 snacks in a day ($P < 0.001$) (Fig. 1). The percentage of adolescents who consumed three or more snacks in a day rose more than two-fold (from 9 to 23%) during the same time period.

- Snacking by adolescents has increased markedly in recent decades.
- Snacking more times per day is associated with higher intakes of total calories but not with BMI in adolescents.
- Many of the foods that make the largest contributions to adolescents' MyPyramid intakes as snacks are also high in added sugars, solid fats, or both.

Note: An “eating occasion” is a distinct time when a respondent reported consuming at least one food or beverage item, including water. Snacks included eating occasions designated by the respondent as “snack,” “drink,” or “extended consumption,” or the Spanish equivalents “merienda,” “entre comida,” “botana,” “bocadillo,” “tentempie,” or “bebida.” Water was the only item reported for ≈25% of snacking occasions. Water-only occasions were not included in the comparison of snacking

frequency between 1977–1978 and 2005–2006 but were included in all other analyses.

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—during eating occasions they identified as snacks. In 1977–1978, snacks provided only 300 calories, accounting for 14% of the day's total intake. Relative to their caloric contribution (23%), 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 (Fig. 2).

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 four or more snacks in a day consumed more than 1.5 times as many calories as did ado-

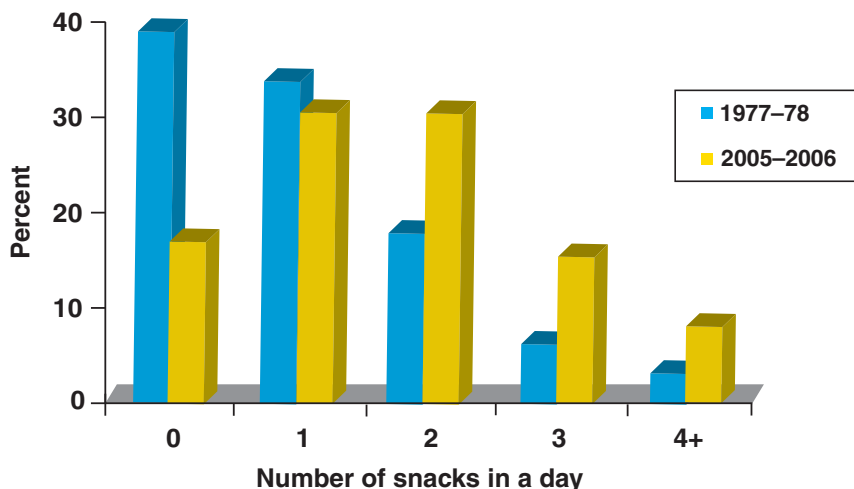


Fig. 1. Percentage of adolescents age 12–19 years consuming a specified number of snacks in a day in 1977–1978 versus 2005–2006. Excludes snacks consisting of plain water only. Snack frequency and survey year were significantly related using the χ^2 test ($P < 0.001$). Sources: Nationwide Food Consumption Survey 1977–1978 and What We Eat in America, NHANES 2005–2006, day 1 dietary intake data, weighted.

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lescents who reported consuming no snacks (Fig. 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.

Notes: Percentage of poverty level is based on family income, family size, and

composition using U.S. Census Bureau poverty thresholds. Poverty threshold categories are related to Federal Nutrition Assistance Programs (www.fns.usda.gov). 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 their minutes of reported moderate physical activity per

week: sedentary: <150 min; moderately active: 150–300 min; and active: >300 min. Each minute of vigorous activity was considered to be the equivalent of 2 min of moderate activity (11). 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).

Since Higher Snacking Frequency Is Associated with Higher Calorie Intakes, Is It Also Related to a Higher BMI?

No. Snacking frequency was not associated with BMI. Even though adolescents who snacked more frequently consumed more calories than their nonsnacking counterparts, their BMIs were not significantly different (Fig. 4).

Note: BMI is based on an individual's height and weight (calculated by dividing a person's weight in kilograms by the square of their height in meters). This number is a reliable indicator of body fatness for most adolescents (10).

How Does Snacking Contribute to MyPyramid Food Group Intakes?

Snacks provided about one-third of MyPyramid intakes of fruits and oils and less than one-fifth of grains, milk, vegetables, and meat/beans. Adolescents obtained more than one-fourth of their intake of discretionary calories, more than one-third of added sugars, and one-fifth of added fats from snacks (Fig. 5).

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

What Foods Eaten as Snacks Contribute the Most to MyPyramid Intakes?

Many of the top food choices contributing to MyPyramid intakes (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 and pizza) or both (e.g., ice cream, cookies, and candy).

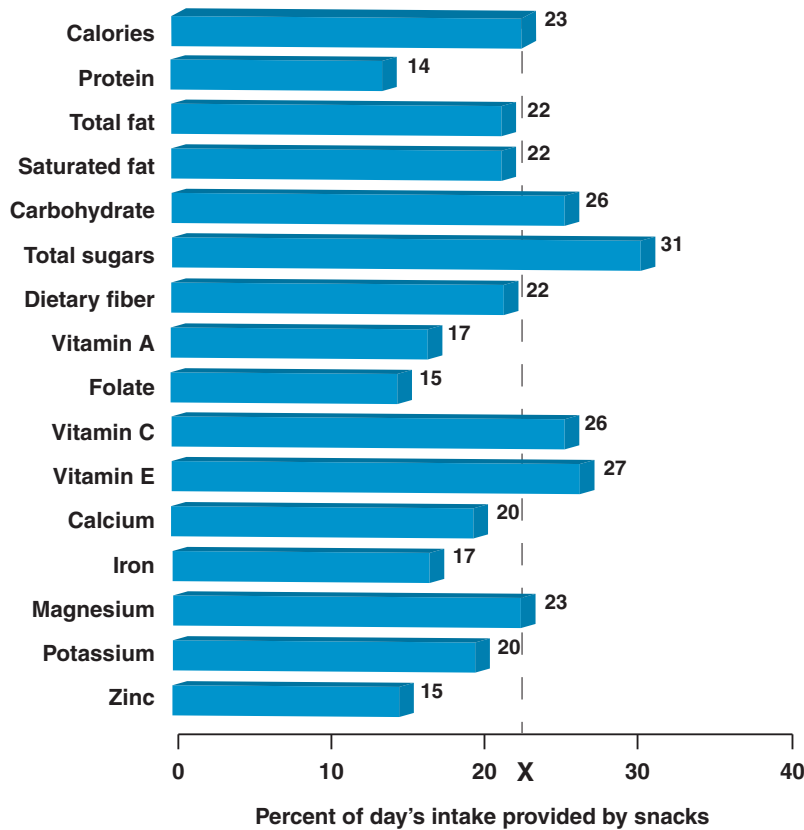


Fig. 2. Contributions of snacks to nutrient intakes by adolescents age 12–19 years in 2005–2006. At X (ratio of percentage of daily calorie intake provided by snacks to percentage of daily nutrient intake provided by snacks is equal to 1.00), snacks provided the same proportion of a nutrient as they did of calories. For example, snacks provided an equal percentage of total daily intake of 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.

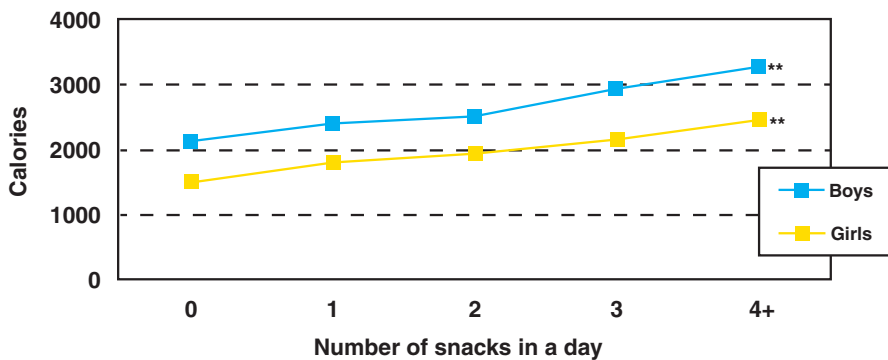


Fig. 3. Mean calorie intake by snacking frequency for adolescents age 12–19 years in 2005–2006. Adjusted for age, race/ethnicity, percentage of poverty threshold, consumption of three main meals, physical activity, and weight status. ** = statistically significant trend ($P < 0.001$). Source: What We Eat in America, NHANES 2005–2006, day 1 dietary intake data, weighted.

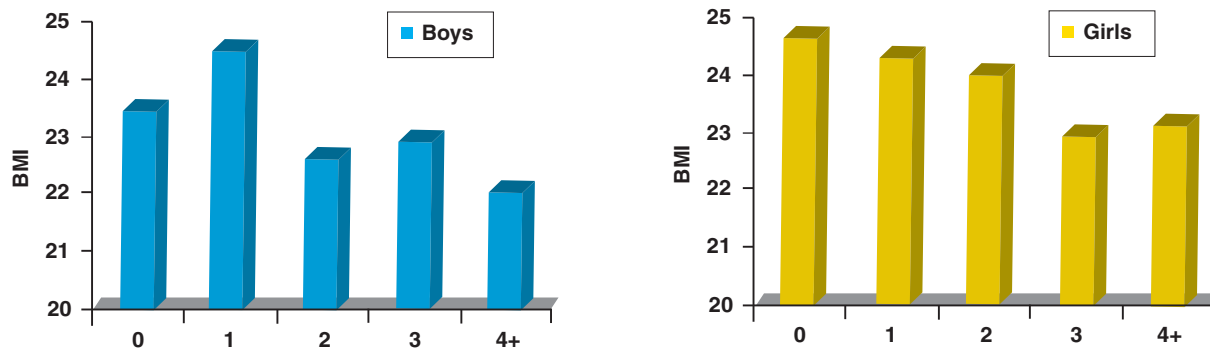


Fig. 4. Mean body mass index by snacking frequency for adolescents age 12–19 years in 2005–2006. Adjusted for age, race/ethnicity, percentage of poverty threshold, consumption of three main meals, and physical activity. Not significantly different ($P < 0.001$) for either sex. Source: What We Eat in America, NHANES 2005–2006, day 1 dietary intake data, weighted.

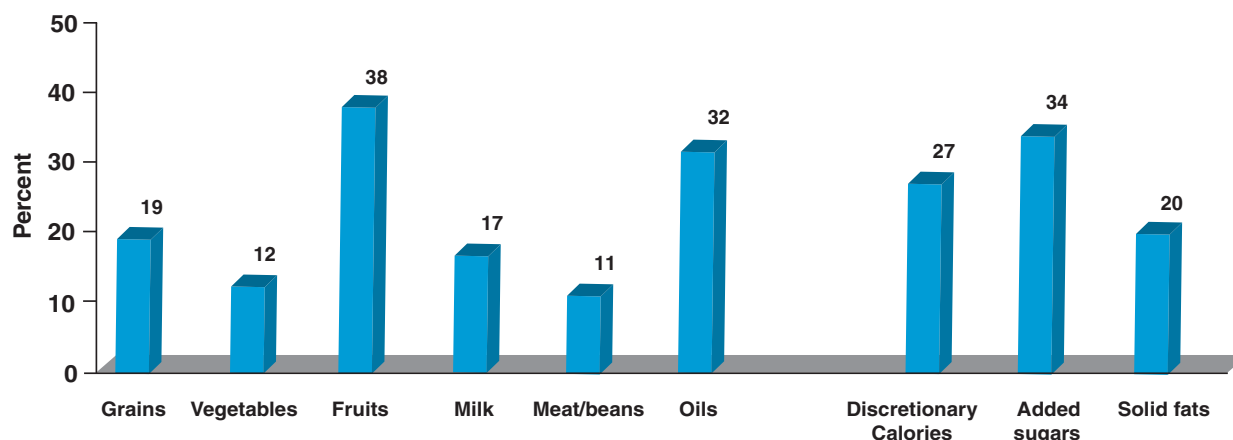


Fig. 5. Contributions of snacks to MyPyramid food group intakes by adolescents age 12–19 years in 2005–2006. MyPyramid Equivalents Database of USDA Food Codes 2003–2004 Version 2.0 was used for food disaggregation. Source: What We Eat in America, NHANES 2005–2006, day 1 dietary intake data, weighted.

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 1977–1978 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-hr 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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