



Food Surveys Research Group
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Drinking Water Intake in the U.S.

What We Eat In America, NHANES 2005-2008

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Highlights

- ▶ On any given day, 76 percent of individuals age 2 years and over in the U.S. drink some plain water. The average daily intake is 3.9 cups per individual.
- ▶ The majority of plain drinking water is consumed at home. Tap water accounts for two-thirds of the water consumed at home but only one-half of the water consumed away from home.
- ▶ About three-quarters of total plain, tap, and bottled water is consumed at snacks. Over one-half of all plain water is consumed at eating occasions for which no other food or beverage was reported.
- ▶ Adults who are physically active drink more plain water than do sedentary adults.
- ▶ In some age groups, including all adults age 20 years and over, tap water intake is higher for non-Hispanic whites than for non-Hispanic blacks and Hispanics.
- ▶ Among adults age 20 years and over, the higher the income level, the higher the group's intake of bottled water.

The water that is essential for human life – referred to as "total water" or "moisture" – may be consumed as plain drinking water or as the hidden water contained in foods and non-water beverages (1; *see definitions on page 7*). In the United States, plain drinking water provides about one-third of total water intake, more than food (2-3) or any other beverage group (4).

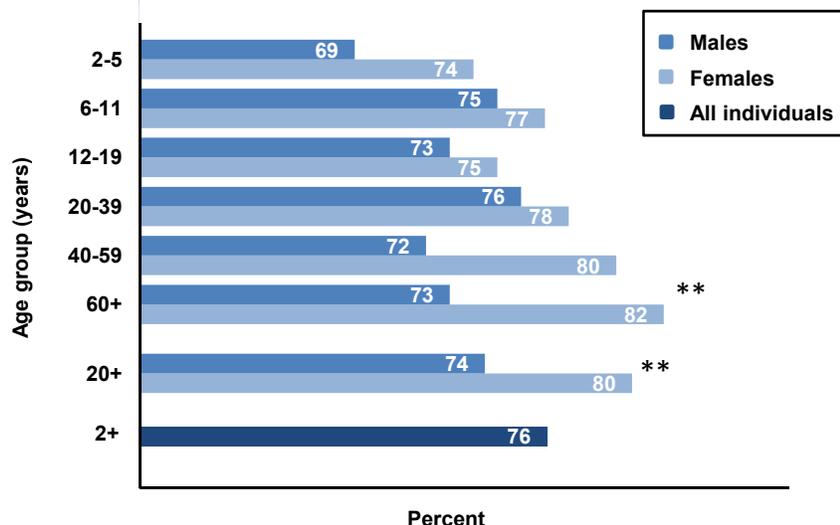
Data on plain water intake are used for many purposes. For some research studies, the source of water (tap or bottled) is relevant (5-6).

This report provides nationally representative estimates (*see "Data Source" on page 7*) of total plain drinking, tap, and bottled water intakes and examines selected factors related to water consumption, including gender, age, place of drinking, eating occasions at which water is consumed, physical activity level, race/ethnicity, and income level.

Who drinks water?

On any given day, 76 percent of individuals age 2 years and over drink some plain water. In many age groups, percentages of males and females reporting water are comparable. However, women age 20 years and over are more likely to report water than men, with the greatest difference in percentages of women and men reporting water among those age 60 years and over.

Figure 1. Percentages of individuals reporting plain drinking water in a day by gender and age, WWEIA, NHANES 2005-2008



NOTE: ** Within age group, percentages of individuals reporting plain drinking water differ significantly by gender ($p < 0.001$).

SOURCE: What We Eat in America, NHANES 2005-2008, Day 1 dietary intake data, weighted.



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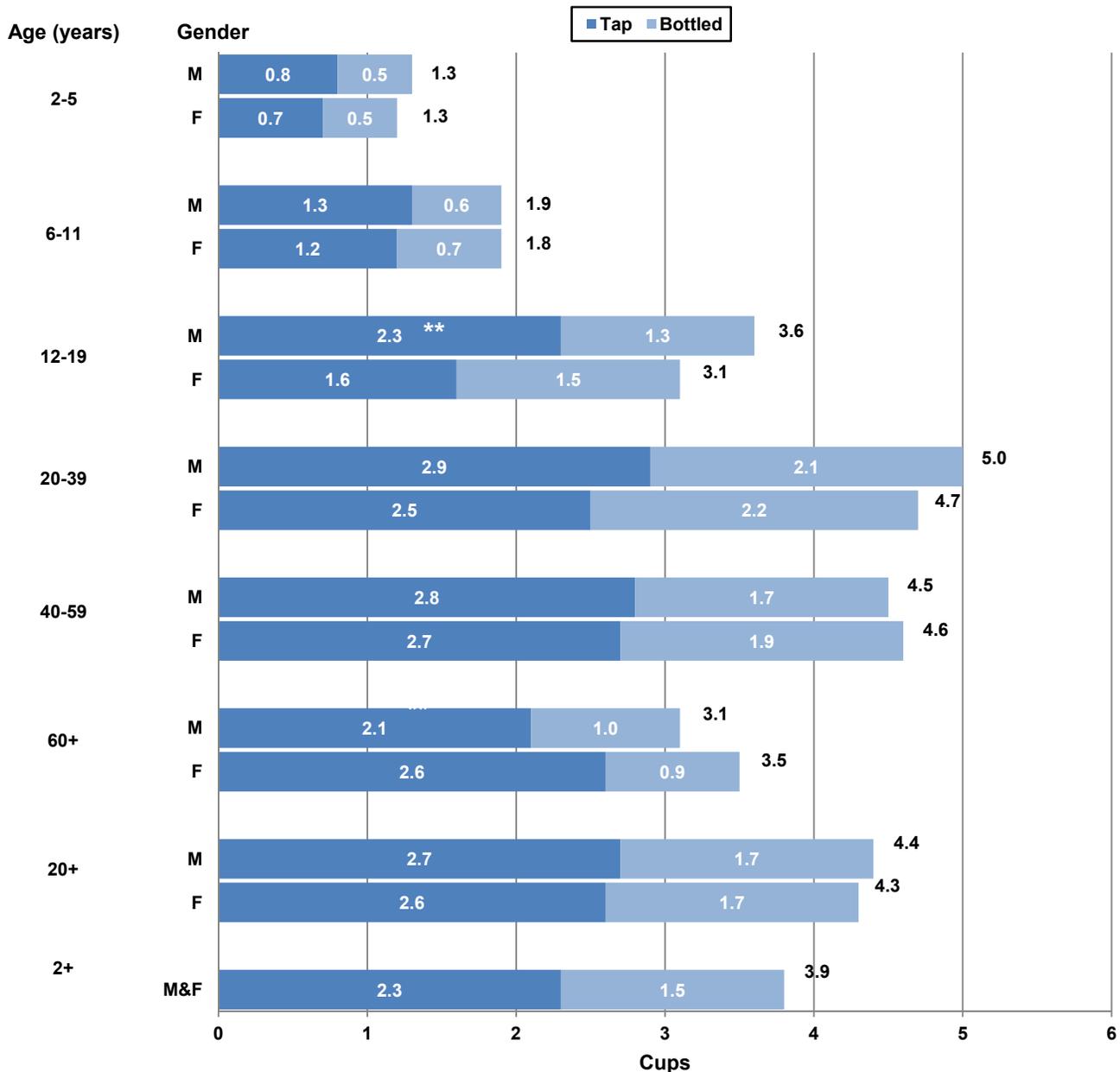


How much water do people drink, and do intakes differ between males and females?

The average daily intake of plain drinking water (i.e., tap plus bottled) is 3.9 cups for individuals age 2 years and over, including both consumers and nonconsumers (see figure 2). For all individuals age 2 years and over, 61 percent of the overall intake of plain water is tap water and 39 percent is bottled water. There are no significant differences in the total intake of plain drinking water or the intake of bottled water between males and females in the same age group. Tap water intakes are significantly higher for teenage boys than for teenage girls, and for women age 60 years and over than for men the same age.

Though the average intakes are presented below, some individuals consume much more plain water and others consume much less. On any given day, nearly one-fourth (24 percent) of all individuals 2 years of age and older report no plain water at all, but one-fourth report 5.7 cups or more, and one in ten individuals reports 9.8 cups or more of plain drinking water on the intake day.

Figure 2. Intake of all plain drinking water (tap and bottled) in a day, by gender and age, WWEIA, NHANES 2005-2008



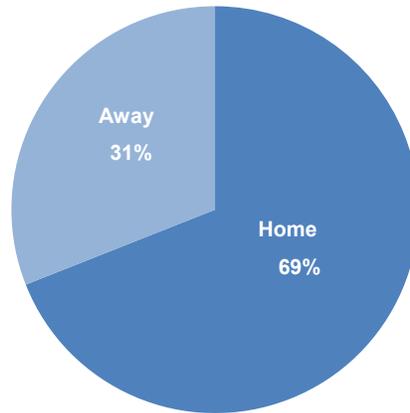
NOTES: ** Within age group, tap water intakes differ significantly by gender (p<0.001). For some age-gender groups, the total may not equal the sum of tap plus bottled water due to rounding. See definition on page 6 regarding conversion of grams to cups.

SOURCE: What We Eat in America, NHANES 2005-2008, Day 1 dietary intake data, weighted.

Is more plain drinking water consumed at home or away from home?

Among all individuals age 2 years and over, more than two-thirds of plain drinking water is consumed at home (see figure 3).

Figure 3: Percentages of plain drinking water consumed at home and away from home, all individuals age 2 years and over, WWEIA, NHANES 2005-2008



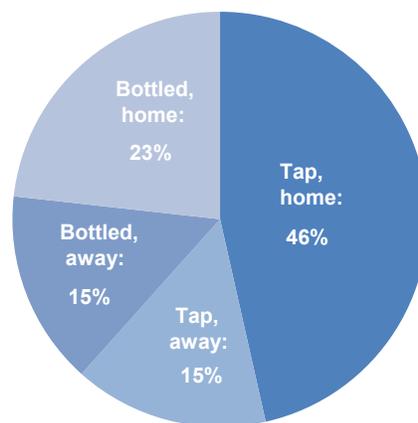
SOURCE: What We Eat in America, NHANES 2005-2008, Day 1 dietary intake data, weighted.

How much tap and bottled water is consumed at home and away from home?

A little less than one-half of the overall intake of plain drinking water is tap water consumed at home (1.8 cups), as shown in figure 4. Bottled water consumed at home accounts for nearly one-fourth of all plain drinking water (0.9 cups). Tap water and bottled water consumed away from home each provide about one-sixth of the total intake of plain drinking water (0.6 cups each).

Tap water accounts for two-thirds of the water consumed at home but only one-half of the water consumed away from home. The quantities of both tap and bottled water consumed at home are greater than the amounts consumed away from home.

Figure 4: Percentage of plain drinking water intake by type (tap and bottled) and place of consumption (at home and away from home), all individuals age 2 years and over, WWEIA, NHANES 2005-2008



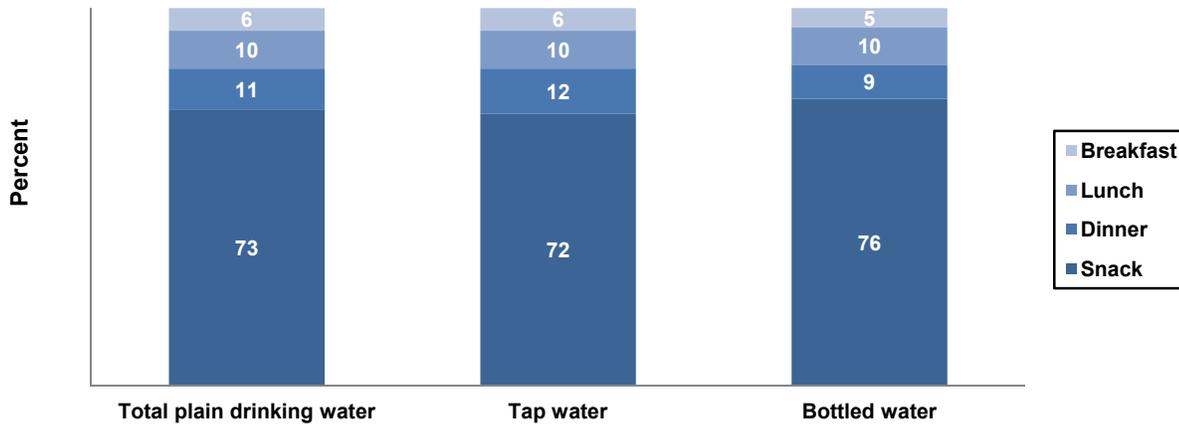
SOURCE: What We Eat in America, NHANES 2005-2008, Day 1 dietary intake data, weighted.

At what eating occasions is plain drinking water consumed?

By far the most plain drinking water (about three-fourths) is consumed at snacks (*see definitions of eating occasions on page 6*), as shown in figure 5. Lesser amounts are consumed at lunch and dinner, and the least is consumed at breakfast. This pattern holds true for both tap and bottled water.

One reason for snacks being the most common type of eating occasion for plain drinking water is that any eating occasion described by the respondent as a "drink" (or, in Spanish, "bebida") is classified as a snack. Over one-half of all plain water is consumed alone – i.e., at eating occasions with no other foods or beverages – and many of these eating occasions that include only water are described by survey participants as a "drink" or "bebida."

Figure 5: Percentages of plain drinking, tap, and bottled water consumed at specified eating occasions, all individuals age 2 years and over, WWEIA, NHANES 2005-2008

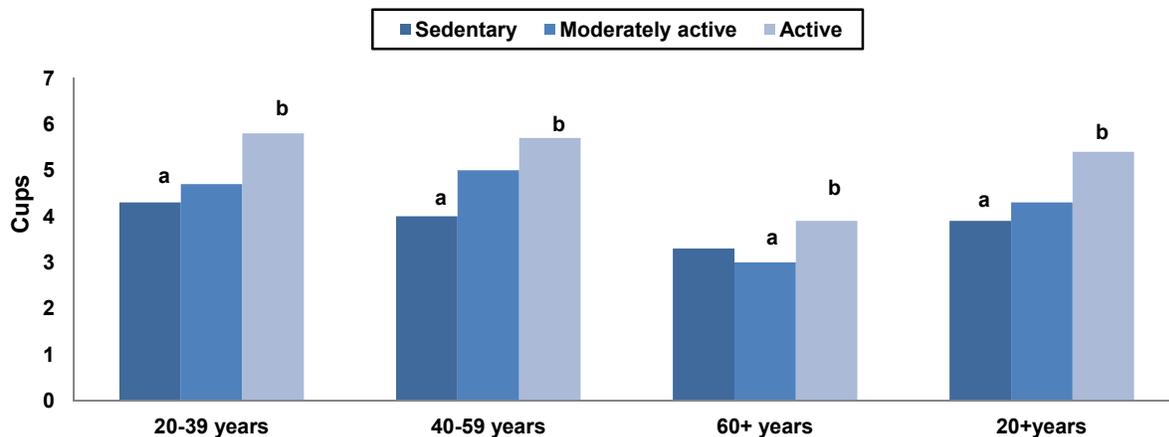


SOURCE: What We Eat in America, NHANES 2005-2008, Day 1 dietary intake data, weighted.

Do adults who exercise more drink more plain water?

As shown in figure 6, intakes of plain drinking water are higher for adults age 20 to 39 years and 40 to 59 years (as well as for the overall group age 20 years and over) who are active than for those who are sedentary (*see definition of "physical activity level" on page 7*). Among those age 60 years and over, active adults have higher water intakes than those who are moderately active.

Figure 6. Intake of plain water intake by activity level, adults 20 years of age and older, WWEIA, NHANES 2005-2008



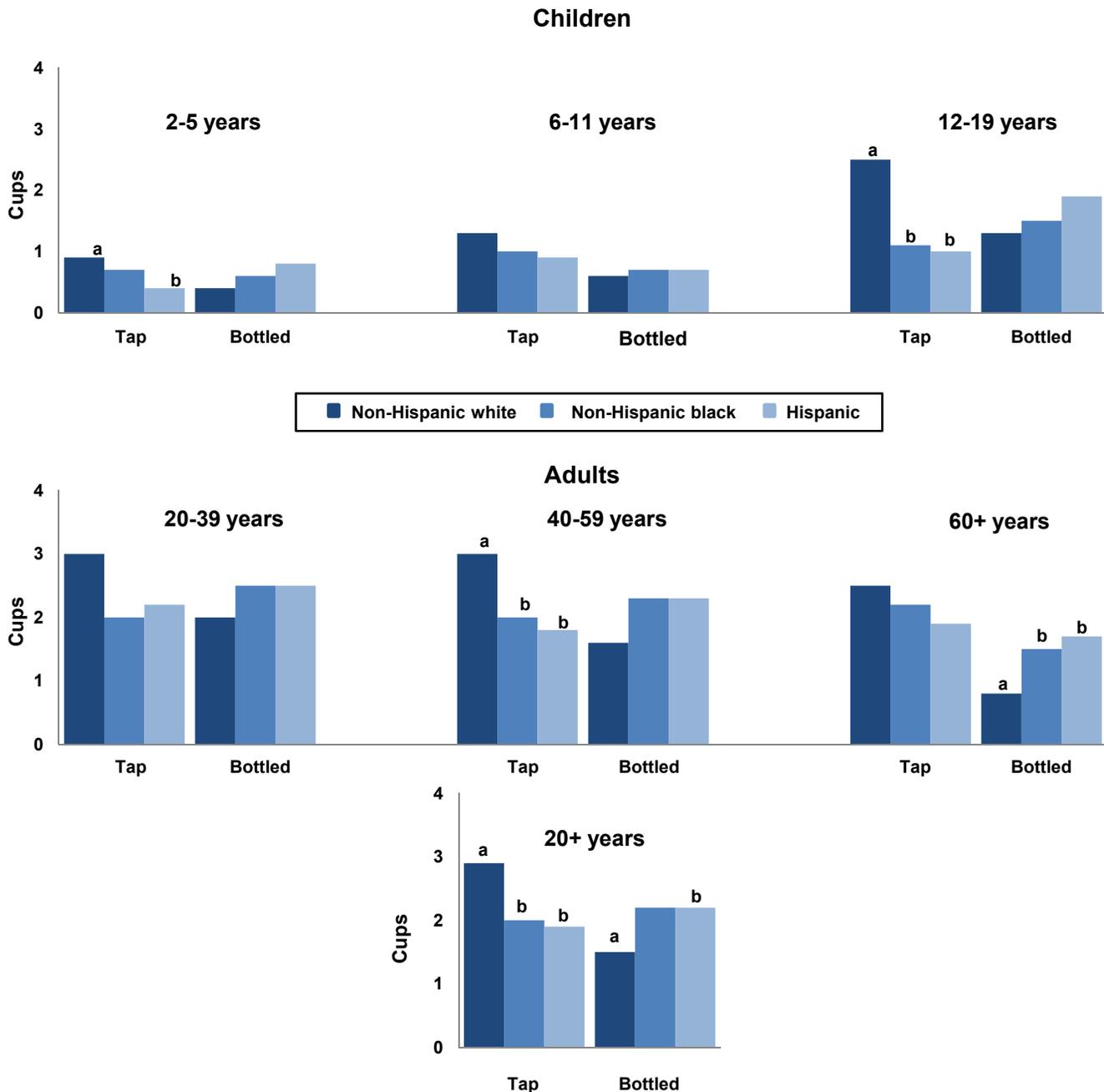
NOTES: Within age group and type of water, estimates with different superscript letters differ significantly by physical activity level (p<0.001). Adjusted to remove the effects of gender, age, income (percentage of poverty level), presence/absence of three-meal pattern, race/ethnicity, weight status, and educational status (*see definitions on pages 6 and 7*).

SOURCE: What We Eat in America, NHANES 2005-2008, Day 1 dietary intake data, weighted.

Do plain drinking water intakes vary by race/ethnicity?

Total intakes of plain drinking water do not vary by race/ethnicity; however, tap and bottled water intakes do vary somewhat by race/ethnicity for some age groups. Non-Hispanic white teenagers (age 12-19 years), middle-aged adults (age 40-59 years), and adults overall (age 20 years and over) consume more tap water than non-Hispanic blacks and Hispanics the same ages (*see figure 7*). Among adults age 60 years and over, non-Hispanic blacks and Hispanics consume significantly more bottled water than non-Hispanic whites. Hispanic adults age 20 years and over drink more bottled water than non-Hispanic white adults.

Figure 7. Mean intake (cups) of tap and bottled water by race/ethnicity and age, WWEIA, NHANES 2005-2008



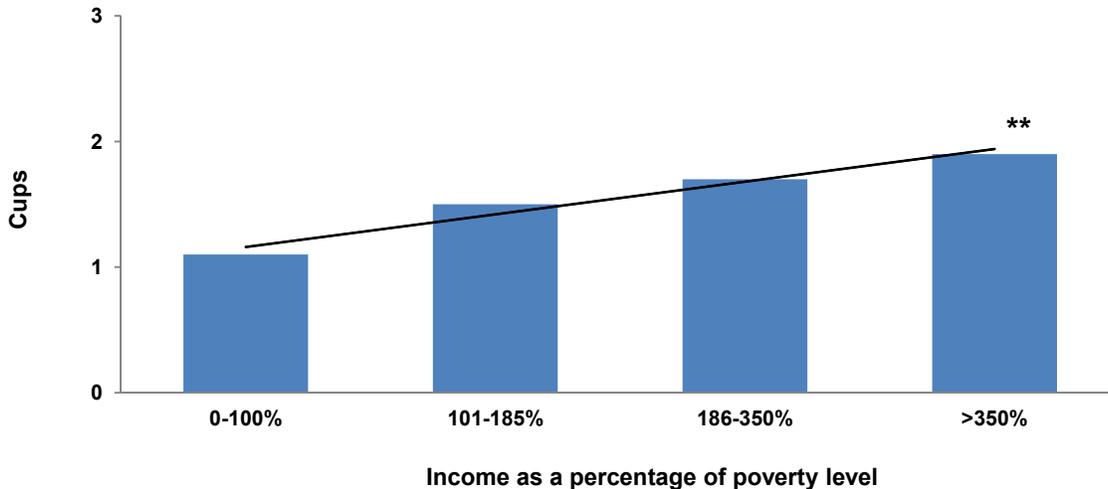
NOTES: Within age group and type of water, estimates with different superscript letters differ significantly by race/ethnicity ($p < 0.001$). Adjusted to remove the effects of gender, age, percentage of poverty threshold (income), presence/absence of three-meal pattern, weight status, and (for adults only) educational status and physical activity level (*see definitions on pages 6 and 7*).
SOURCE: What We Eat in America, NHANES 2005-2008, Day 1 dietary intake data, weighted.

Do plain drinking water intakes vary by income level?

Although intakes of total plain drinking water do not vary by income as a percentage of poverty level (*see definition of "poverty thresholds" on page 7*), intakes of bottled water do vary by income level. Among the all-inclusive group of men and women age 20 years and over, there is a significant positive trend in intake of bottled water by income level, as shown in figure 8. In other words, the higher the income level, the higher the group's intake of bottled water.

Intakes of tap water do not vary by income level.

Figure 8. Mean intake (cups) of bottled water by income as a percentage of poverty level, adults 20 years of age and older, WWEIA, NHANES 2005-2008



NOTES: ** Indicates significant relationship between bottled water intake and income as a percentage of poverty level ($p < .001$). Estimates are adjusted to remove the effects of gender, age, presence/absence of three-meal pattern, race/ethnicity, weight status, educational status, and physical activity level (*see definitions on pages 6 and 7*).

SOURCE: What We Eat in America, NHANES 2005-2008, Day 1 dietary intake data, weighted.

Definitions

Body mass index (BMI): Based on an individual's height and weight, this number is a reliable indicator of body fatness for most people (7). BMI may be calculated using either metric system measurements or English measurements, using the formulae $\text{weight (kg)} / [\text{height (m)}]^2$ and $\text{weight (lb)} / [\text{height (in)}]^2 \times 703$, respectively.

Conversion of grams to cups: WWEIA, NHANES water intakes in grams were converted to cups using conversion factors of 1 milliliter/1 gram and 1 U.S. cup/237 milliliters.

Eating occasion: An occurrence of eating/drinking reported during the dietary interview, consisting of one or more food/beverage items, including plain water. The respondent selected the name of each eating occasion from a list provided during the interview. English and Spanish eating occasion names are grouped as follows:

- **Breakfast:** Includes breakfast, desayuno, and almuerzo.
- **Lunch:** Includes brunch, lunch, and comida.
- **Dinner:** Includes dinner, supper, and cena.
- **Snack:** Includes snack, drink, merienda, entre comida, botana, bocadillo, tentempie, bebida, and extended consumption (used when an item was consumed over a long period of time).

Educational status: Applied to adults (age 20 years and over) only, levels used in this analysis were less than high school completed, high school or equivalent (GED) completed, and any education beyond high school.

Physical activity level: Each adult age 20 years and over 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 (8).

Plain drinking water: Includes tap and non-carbonated bottled water without sweeteners or other additions. Does not include water naturally present in or added as an ingredient to other beverages or foods.

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.

Three-meal pattern: This pattern was present when an individual's dietary intake included at least one eating occasion from each of the categories breakfast, lunch, and dinner, as defined above.

Water, total: The sum of all water (moisture) from all sources, including plain water, other beverages, and food.

Weight status: Adults age 20 years and over were assigned to weight status categories based on the following ranges of BMI (*see definition on page 6*): Underweight, less than 18.5; normal weight, 18.5-24.9; overweight, 25.0-29.9; and obese, 30.0 and over (7). Children age 2 to 19 years were assigned to weight status categories based on the following ranges of BMI-for-age percentiles: Underweight, less than 5th percentile; healthy weight, 5th percentile to less than 85th percentile; overweight, 85th percentile to less than 95th percentile; and obese, equal to or greater than 95th percentile (9).

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 2005-2008. A total of 17,081 individuals age 2 years and older provided complete and reliable dietary intake data. Pregnant and lactating females (n = 512) and breastfed children (n = 3) were excluded, yielding a final sample of 16,566 individuals (8,420 males and 8,146 females). Sample weights were applied in all analyses to produce nationally representative estimates.

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