



Trends in U.S. Whole-Grain Intakes 1994–2018: The Roles of Age, Food Source, and School Food

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What Is the Issue?

Since 2005, the Dietary Guidelines for Americans (DGA), the Federal Government's statement on what to eat to be healthy, has recommended that people eat at least half of their grain intake in the form of whole grains. This change has been encouraged via nutrition education, food product reformulation, and new product development—and through public policy changes such as the requirement, beginning in 2012, that whole grains be included in meals provided through the USDA's National School Lunch and School Breakfast Programs. This study examines trends in whole-grain intakes of U.S. residents by age and food source using national datasets spanning 1994–2018. Food sources include food at home (FAH)—food purchased at grocery stores and other retailers to be eaten either at home or away (as a brown bag lunch)—versus food away from home (FAFH), which includes food purchased at restaurants, fast-food establishments and similar sources, and at schools.



What Did the Study Find?

DGA-based guidance recommends whole grain intake amounts based on an individual's caloric intake. For example, the recommendation for a 2,000-calorie diet is 6-ounce equivalents of grains, with at least half being whole grains. Because caloric needs vary by age, gender, and physical activity, the authors assessed intakes using a density measure (whole-grain ounce equivalents per 1,000 calories). During the years studied, U.S. consumers 2 years old and over consumed an average of approximately 2,000 calories daily; therefore, the authors compared whole grain density of diets to a benchmark standard of 1.5-ounce equivalents of whole grains per 1,000 calories to represent the whole grain recommended amounts across all calorie levels. In 1994–98, whole-grain intakes by U.S. residents 2 years old and over were 0.4-ounce equivalents per 1,000 calories; in 2017–18, intakes were 0.43-ounce equivalents per 1,000 calories, an increase of less than 0.05-ounce equivalents per 1,000 calories over two decades.

Adults 65 years old and above consumed the most whole-grain-dense diets across all time periods. However, there was no upward intake trend, with a whole-grain density of approximately 0.6-ounce equivalents at the beginning

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(1994) and end (2018) of this period. Whole-grain densities of the diets of younger adults (20–64 years old) also did not change significantly (0.38 in 1994–98 and 0.37-ounce equivalents per 1,000 calories in 2017–18, respectively). A significant increase occurred only among children 2–19 years old; their diets were more whole-grain dense in 2015–16 and 2017–18, compared with 1994–98 (0.5 and 0.47 versus 0.34-ounce equivalents per 1,000 calories, respectively).

Further analysis of children’s diets revealed the role of school meals and other food obtained at school (school food) in the change in children’s whole-grain intakes. Comparing FAH with all FAFH, FAH was more whole-grain dense. However, when FAFH was disaggregated into restaurants, fast-food establishments, schools, and other sources after 2013, school food became the most whole grain-dense food source.

After 2013–14, more of the children who ate school food ate whole grains and ate larger amounts of them. Almost 50 percent of children who ate school food ate whole grains from school foods; previously, this figure had never topped 24 percent. Among children eating whole grains as part of their school food, amounts consumed in 2013–18 were more than double those of 1994–2010. A decomposition analysis indicated that 34 percent of schoolchildren’s increased whole-grain intake from school food between 2005–10 and 2013–18 could be attributed solely to children’s increased likelihood of consuming whole grains; 22 percent solely to increased amounts consumed by those consuming; and 43 percent to the interaction of the two effects.

There were age and ethnicity-related disparities in children’s consumption of whole grains from school foods. Groups less likely to consume whole grains from school food included older children compared with those children 5–10 and 11–14 years old and non-Hispanic-White children compared with non-Hispanic-Black and Hispanic children. Among those schoolchildren who did consume whole grains, non-Hispanic-White schoolchildren also consumed smaller amounts of whole grains from school food than other children.

How Was the Study Conducted?

Nationally representative food consumption survey datasets used include the USDA’s 1994–96 and 1998 Continuing Survey of Food Intakes by Individuals (CSFII) and the What We Eat in America component of the National Health and Nutrition Examination Survey (WWEIA/NHANES) conducted by USDA and the U.S. Department of Health and Human Services (HHS) over 2003–18. All analyses were conducted using methods that adjust for complex survey design effects and sample weights.

Descriptive analyses of grain consumption were conducted for the U.S. population 2 years old and above. Analyses were conducted for the total population for the following subgroups: a) adults 65 years old and above, b) adults 20–64 years old, and c) children 2–19 years old. Multivariate regression analyses examining the contribution of school food to children’s whole-grain intakes include children 5–19 years old who were attending school at the time of data collection.