



Food Surveys Research Group
Dietary Data Brief No. 15
September 2016

Phosphorus Intake of Americans

What We Eat In America, NHANES 2011-2012

Alanna J. Moshfegh, MS, RD; Arminda F. Kovalchik, BS;
and John C. Clemens, MS

Highlights

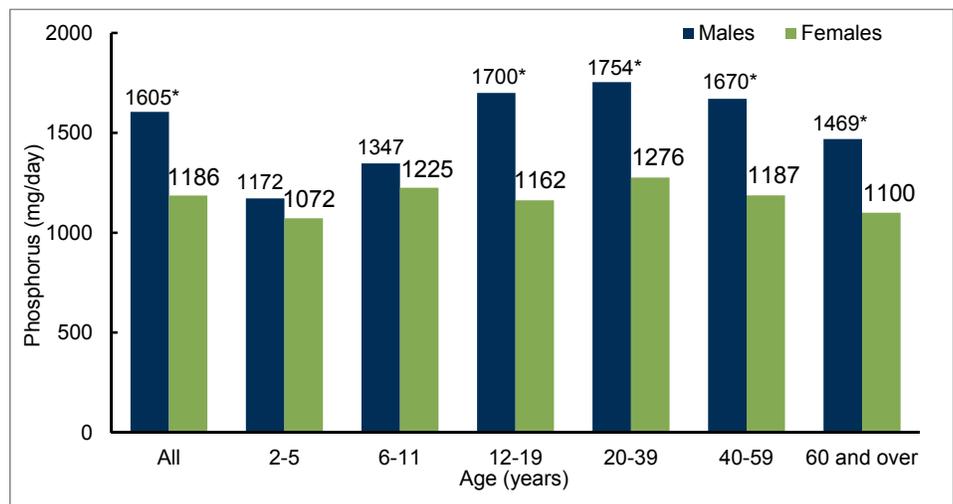
- The mean daily intake of phosphorus was 1393 mg.
- Adolescent and adult males had higher phosphorus intakes than their female counterparts.
- The diets of children 2-5 years had higher phosphorus density compared to those of children 6-11 years and adults up to 60 years.
- Phosphorus intake differed by race/ethnicity. Intakes were lower for blacks and Asians compared to whites and Hispanics.
- Dairy products were the largest contributor (20%) to daily intake of phosphorus, followed by breads and sweet bakery products at 10%.

Phosphorus is the second most abundant mineral in the body after calcium. The main role of phosphorus is formation of bones and teeth, but it is also needed for the growth, maintenance, and repair of cells and tissues. Phosphorus works in conjunction with the B vitamins to assist with kidney function, muscle contractions, maintaining a normal heartbeat, and nerve signaling (1). This report describes the dietary intake of phosphorus of the U.S. population as reported in What We Eat In America (WWEIA), NHANES 2011-2012.

How much phosphorus is the U.S. population consuming?

The mean daily intake of phosphorus for individuals 2 years of age and older was 1393 mg. Phosphorus intake has remained relatively consistent for the last 10 years: mean daily phosphorus intake in 2001-2002 was 1315 mg (2). As shown in Figure 1, intake of males was higher than females for adolescents and adults. Most (96%) Americans obtain recommended amounts of phosphorus from their diets with the exception of adolescent females. At least one-third of adolescent females do not meet their recommendation for phosphorus (3).

Figure 1. Mean daily phosphorus intake by age and gender, 2011-2012



*Significantly different from females ($p < 0.001$)

SOURCE: What We Eat in America, NHANES 2011-2012, day 1, individuals 2+ years



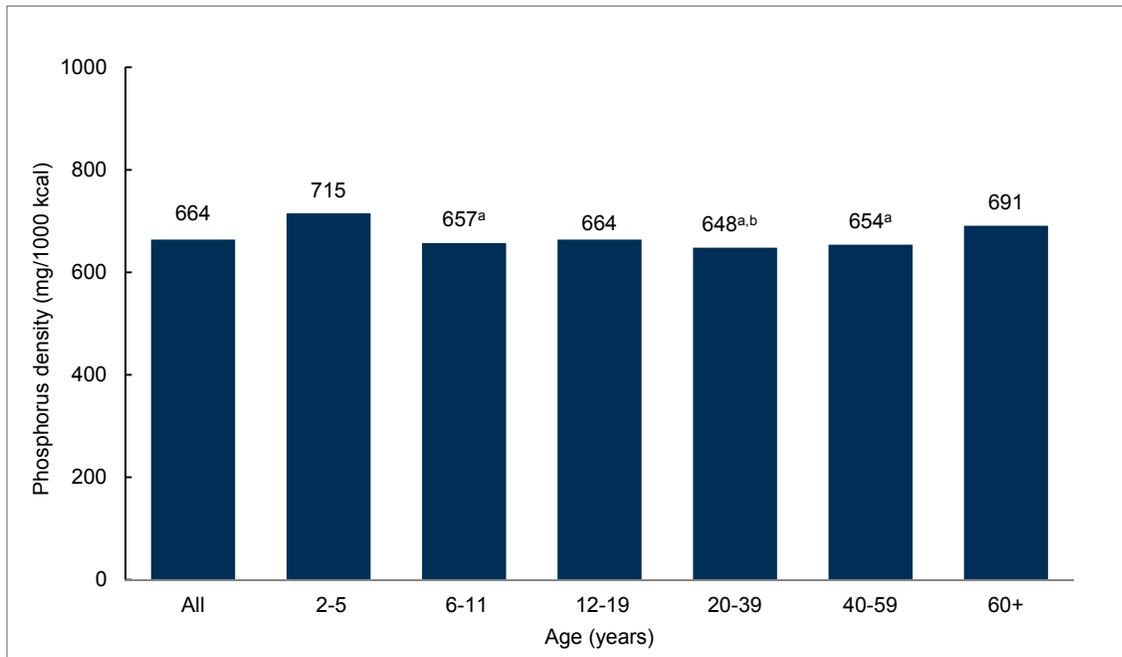
U.S. DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Beltsville Human Nutrition Research Center
Food Surveys Research Group

www.ars.usda.gov/nea/bhnrc/fsrg

Is phosphorus intake influenced by energy intake?

When mean daily phosphorus intake was adjusted by energy intake (mg per 1000 kcal), there were no differences between males and females within age groups (data not shown). However, as seen in Figure 2, when examined across age groups irrespective of gender, children 2-5 years of age had diets of greater phosphorus density compared to children aged 6-11 and adults up to 60 years old.

Figure 2. Phosphorus density (mg per 1000 kcal) by age, 2011-2012



^aSignificantly different from 2-5 age group ($p < 0.001$)

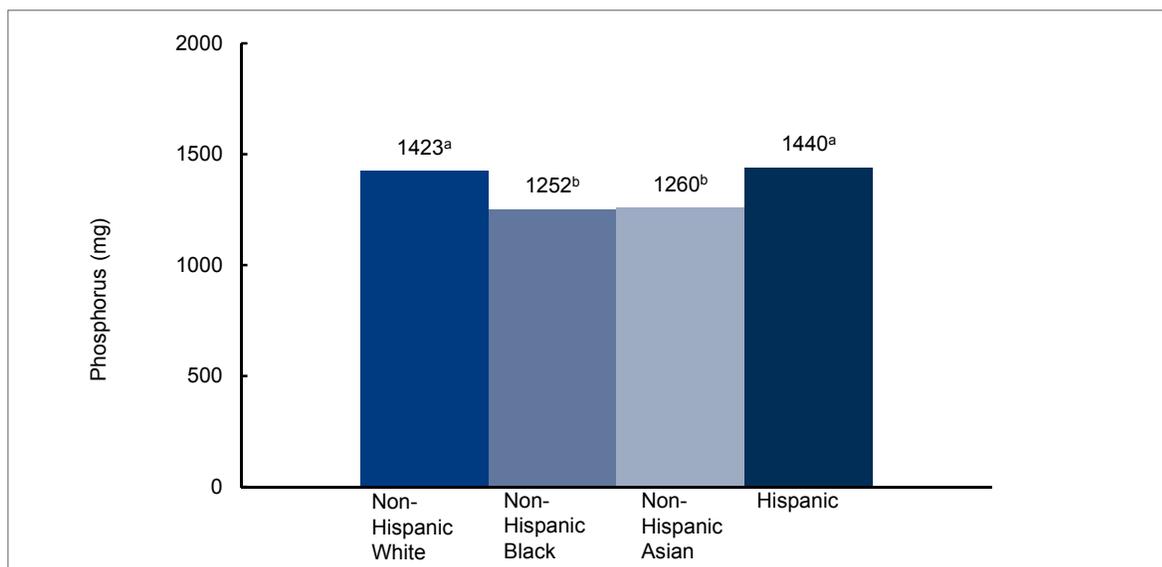
^bSignificantly different from 60+ age group ($p < 0.001$)

SOURCE: What We Eat in America, NHANES 2011-2012, day 1, individuals 2+ years

Does phosphorus intake differ by race/ethnicity or income status?

There were differences in mean daily phosphorus intake when examined by race/ethnicity. Figure 3 illustrates blacks and Asians had lower mean daily phosphorus intakes compared to whites and Hispanics. However, intake did not differ by income level (data not shown).

Figure 3. Mean phosphorus intake of the U.S. population by race/ethnicity, 2011-2012



^{a,b} Race/ethnicity groups with different superscript letter significantly different from each other (p<0.001)

SOURCE: What We Eat in America, NHANES 2011-2012, day 1, individuals 2+ years

What foods and beverages contribute to phosphorus intake of the U.S. population?

Table 1 shows the contribution of WWEIA Food Categories (4) to phosphorus intake of the population. Dairy products including milk, cheese, ice cream and yogurt provided the highest contribution to the day's total intake of phosphorus (20%). Following dairy, bakery products contributed 10% of the day's intake; these included bread, rolls, tortillas, and sweet bakery products. Other categories that each contributed 5% were vegetables, chicken, Mexican dishes, and pizza.

Table 1. Top contributing WWEIA Food Categories to phosphorus intake of the U.S. population, 2011-2012

WWEIA Food Category*	Individuals reporting (%)‡	Contribution to phosphorus intake (%)
Dairy Products		
Milk and flavored milk	46	11
Cheese, ice cream, yogurt	49	9
Bakery Products		
Breads, rolls, tortillas	59	5
Sweet bakery products and quick breads	49	5
Vegetables	65	5
Chicken	26	5
Mexican dishes (burritos, tacos, nachos)	14	5
Pizza	13	5

* WWEIA Food Categories not shown that provided 3 to <5% of phosphorus intake: eggs; beef; cured meats; plant-based protein foods; cereals; meat, poultry, and seafood mixed dishes; grain-based mixed dishes; and sandwiches.

‡ Percentage of individuals reporting foods in the category at least once on the reporting day.

SOURCE: What We Eat in America, NHANES 2011-2012, day 1, individuals 2+ years

Definitions

Phosphorus density: Amount of phosphorus (mg) consumed per 1000 kcal of energy intake. This is a measure of the concentration of a nutrient in a daily dietary intake.

Data source

Estimates in this report are based on one day of dietary intake data of 7933 individuals age 2 years and older collected in *What We Eat in America* (WWEIA), the dietary interview component of the National Health and Nutrition Examination Survey (NHANES) in 2011-2012. Sample weights were applied in all analyses to produce nationally representative estimates.

References

1. Institute of Medicine (US) Standing Committee on the Scientific Evaluation of Dietary Reference Intakes. *Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride*. Washington (DC): National Academies Press (US); 1997.
2. U.S. Department of Agriculture, Agricultural Research Service. 2005. What We Eat in America, NHANES 2001-2002: Nutrient Intakes: Mean Amount Consumed per Individual, One Day. Available: http://www.ars.usda.gov/SP2UserFiles/Place/80400530/pdf/0102/Table_1_BIA.pdf
3. U.S. Department of Agriculture, Department of Health and Human Services. 2015. Scientific Report of the 2015 Dietary Guidelines Advisory Committee: Appendix E-2.1: Usual Intake Distributions, 2007-2010, by Age/Gender Groups. Available: https://health.gov/dietaryguidelines/2015-binder/meeting2/docs/refMaterials/Usual_Intake_072013.pdf
4. U.S. Department of Agriculture, Agricultural Research Service. 2015. What We Eat in America Food Categories 2011-2012. Available: www.ars.usda.gov/nea/bhnrc/fsrg

About the authors

Alanna J. Moshfegh and John C. Clemens are with the Food Surveys Research Group, Beltsville Human Nutrition Research Center, Agricultural Research Service, U.S. Department of Agriculture. Arminda F. Kovalchik is with the University of Maryland, College Park.

Suggested citation

Moshfegh AJ, Kovalchik AF, Clemens JC. Phosphorus Intake of the U.S. Population: *What We Eat in America*, NHANES 2011-2012. Food Surveys Research Group Dietary Data Brief No. 15. September 2016.

Copyright information

All material appearing in this report is in the public domain and may be reproduced or copied without permission. However, citation as to source is appreciated.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.



U.S. DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Beltsville Human Nutrition Research Center
Food Surveys Research Group

www.ars.usda.gov/nea/bhnrc/fsrg