



# Food Patterns Equivalents Intakes by Americans: What We Eat in America, NHANES 2003-2004 and 2015-2016

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Shanthy A Bowman, PhD; John C Clemens, MS; James E Friday, BS;  
Natalia Schroeder, PhD, RD; Miyuki Shimizu, MS, RD;  
Randy P LaComb, MS; and Alanna J Moshfegh, MS, RD

## Highlights

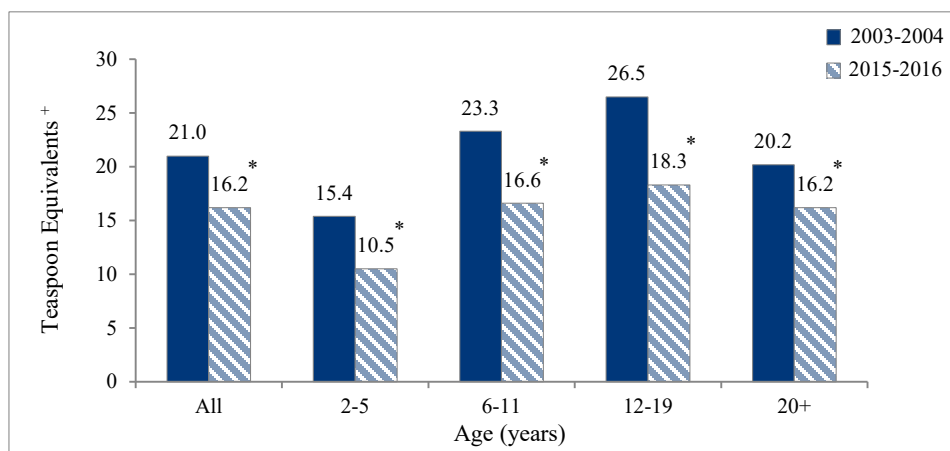
- Americans reduced their added sugars intake over a 12-year period. The estimated mean intakes of added sugars, per person per day, substantially decreased by 4.8 tsp. eq. (or, 20.2 grams) from 21 tsp. eq. in 2003-2004 to 16.2 tsp. eq. in 2015-2016.
- Other notable changes in the mean intakes between 2003-2004 and 2015-2016 were:
  - a 12.7-gram reduction in solid fats intake, from 47.6 grams in 2003-2004 to 34.9 grams 2015-2016.
  - a very small, but significant increase in the whole grains intake from 0.6 to 0.9 oz. eq.
- No changes were noted in the fruit; vegetables; dairy; and total meat, poultry, and seafood intakes between 2003-2004 and 2015-2016.

The 2015-2020 Dietary Guidelines for Americans (DGA) encourage Americans to increase their fruit, vegetables, and whole grains intakes and limit added sugars and solid fats intakes [1]. This report highlights the salient changes in the U.S. population's intake of selected USDA Food Patterns groups, including added sugars and solid fats, using What We Eat in America, NHANES 2003-2004 and 2015-2016 dietary data [2-4].

## Did the added sugars intakes change from 2003-2004 to 2015-2016?

The estimated mean intake of added sugars substantially decreased by 4.8 teaspoon equivalents (tsp. eq.) or 20.2 grams from 2003-2004 to 2015-2016, for all individuals ages 2 years and over. Substantial reductions from 2003-2004 were noted among each of the age groups studied: children ages 2-5, 6-11, and 12-19; and adults ages 20+ years (Figure 1). Although Americans continue to reduce their added sugars intake, the mean amounts consumed remain high across all age groups.

**Figure 1. Estimated mean intakes of added sugars per day, by age, 2003-2004 and 2015-2016**



+ One teaspoon equivalent = 4.2 grams of sugar

\* Significantly different from 2003-2004 ( $p < 0.01$ )

DATA SOURCE: What We Eat in America, NHANES 2003-2004 and 2015-2016, day 1, individuals 2+ years



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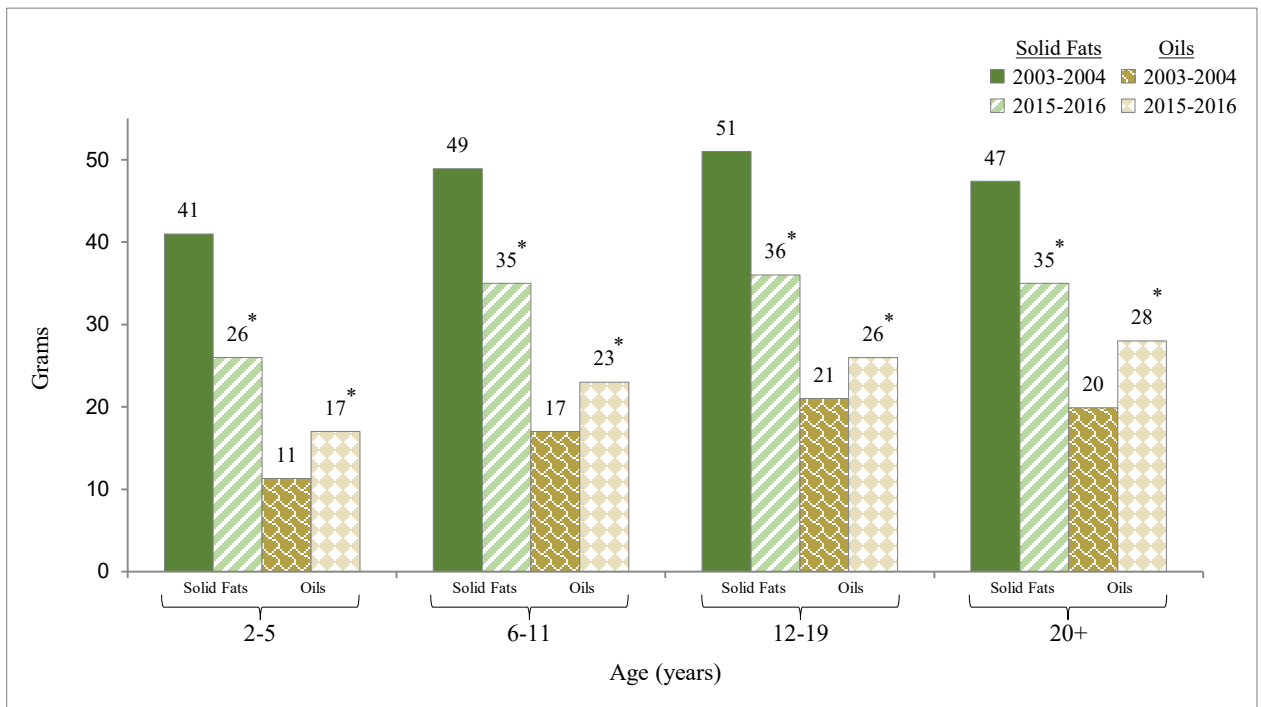
Did the solid fats and oils intakes change from 2003-2004 to 2015-2016?

Both solid fats and oils are included in total fat. The 2015-2020 DGA recommend choosing oils over solid fats, when making food choices [1]. Solid fats are fats that are inherently present in meat, poultry, eggs, dairy, and tropical oils. In addition, fully or partially hydrogenated oils and fats are defined as solid fats [1]. Solid fats are high in saturated fats and are abundant in the diets of Americans and may contribute to excess caloric intakes [1]. Oils consist of fats inherently present in seafood and foods of vegetable origin, except tropical oils and cocoa butter.

**Solid Fats:** Overall, for all individuals ages 2 years and over, the estimated mean intake of solid fats substantially decreased by 12.7 grams, from 47.6 to 34.9 grams (data not shown in Figure 2). Similarly, substantial reductions were noted across all of the age groups: children ages 2-5, 6-11, and 12-19; and adults ages 20+ years (Figure 2).

**Oils:** The estimated mean intake of oils for all individuals, ages 2 years and over, significantly increased by 7.9 grams, from 19.2 to 27.1 grams (data not shown in Figure 2). Similarly, significant increases were noted across all of the age groups: children ages 2-5, 6-11, and 12-19; and adults ages 20+ years (Figure 2).

Figure 2. Estimated mean intakes of solid fats and oils per day, by age, 2003-2004 and 2015-2016



\*Significantly different from 2003-2004 (p<0.01)

Means rounded to integers.

DATA SOURCE: What We Eat in America, NHANES 2003-2004 and 2015-2016, day 1, individuals 2+ years

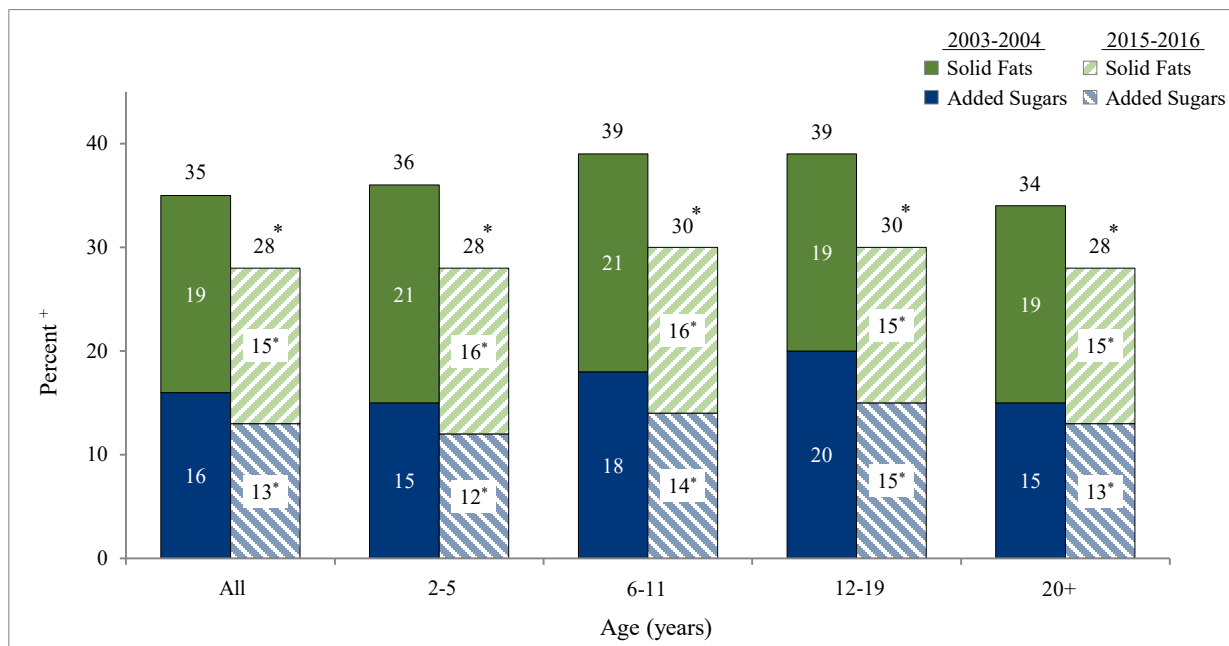
## Did the calories obtained from added sugars and solid fats change from 2003-2004 to 2015-2016?

The calories obtained from added sugars and solid fats often come with low nutritional benefits and make foods and beverages calorie-dense. The Dietary Guidelines encourage Americans to limit intakes of added sugars and solid fats and consume nutrient-dense foods and beverages that contain little or no added sugars and solid fats [1].

The estimated mean intakes of calories from added sugars and solid fats decreased significantly from 2003-2004 to 2015-2016. The differences in the percentage of total calories from added sugars were 2 to 5 percent, and the differences in the percentage of total calories from solid fats were 4 to 5 percent, across all age groups (Figure 3).

The combined percentage of calories from added sugars and solid fats decreased from 35 percent in 2003-2004 to 28 percent in 2015-2016, a difference of 7 percent, for all individuals ages 2 years and over (Figure 3). These differences were 8 percent in children ages 2-5, 9 percent each in 6-11, and 12-19, and 6 percent in adults.

**Figure 3. Estimated mean intakes of calories from solid fats and added sugars as percent\* of total calories per day, by age, 2003-2004 and 2015-2016**



\*Significantly different from 2003-2004 (p<0.01)

+ Percentages rounded to integers. Total percentages of calories from solid fats and added sugars are shown above the respective bar charts.

DATA SOURCE: What We Eat in America, NHANES 2003-2004 and 2015-2016, day 1, individuals 2+ years

## Did the grain intakes change from 2003-2004 to 2015-2016?

There were no differences in the total grains intakes from 2003-2004 to 2015-2016 among children. The estimated mean intakes of whole grains increased for all age groups analyzed. However, these increases were very small, especially considering the Dietary Guidelines recommendation that half the total grains consumed be whole grains [1].

**Table 1. Estimated mean intakes of total grains, refined grains, and whole grains per day, by age, 2003-2004 and 2015-2016**

Age Group (years)	Grain Group	WWEIA, NHANES	
		2003-2004	2015-2016
2-5	Total Grains (oz. eq.)	5.3	4.9
	Whole Grains (oz. eq.)	0.4	0.7*
	Refined Grains (oz. eq.)	4.8	4.2*
6-11	Total Grains (oz. eq.)	7.2	7.2
	Whole Grains (oz. eq.)	0.6	1.0*
	Refined Grains (oz. eq.)	6.6	6.2
12-19	Total Grains (oz. eq.)	7.8	7.3
	Whole Grains (oz. eq.)	0.4	0.9*
	Refined Grains (oz. eq.)	7.4	6.5*
20+	Total Grains (oz. eq.)	6.9	6.3*
	Whole Grains (oz. eq.)	0.6	0.9*
	Refined Grains (oz. eq.)	6.2	5.4*
All	Total Grains (oz. eq.)	6.9	6.4*
	Whole Grains (oz. eq.)	0.6	0.9*
	Refined Grains (oz. eq.)	6.3	5.5*

\*Significantly different from 2003-2004 (p<0.01)

oz. eq. = ounce equivalents

Means rounded to the first decimal.

DATA SOURCE: What We Eat in America, NHANES 2003-2004 and 2015-2016, day 1, individuals 2+ years

**Did the vegetables; fruit; dairy; and meat, poultry, and seafood intakes change from 2003-2004 to 2015-2016?**

The estimated mean intake of total dairy decreased for 2-5 year old, and the total vegetables decreased for 12-19 year old children. No differences were noted in the mean intakes of total fruit; and total meat, poultry, and seafood, for all age groups studied. Overall, the estimated mean intakes of total vegetables and total fruit were below the 2015-2020 DGA recommendations.

**Table 2. Estimated mean intakes of total vegetables; total fruit; total dairy; and total meat, poultry, and seafood per day, by age, 2003-2004 and 2015-2016**

Age Group (years)	Food Patterns Group	WWEIA, NHANES	
		2003-2004	2015-2016
2-5	Total Vegetables (cup eq.)	0.8	0.7
	Total Fruit (cup eq.)	1.5	1.2
	Total Dairy (cup eq.)	2.4	1.9*
	Total Meat, Poultry, & Seafood (oz. eq.)	2.5	2.3
6-11	Total Vegetables (cup eq.)	1.0	0.9
	Total Fruit (cup eq.)	1.0	0.9
	Total Dairy (cup eq.)	2.4	2.0
	Total Meat, Poultry, & Seafood (oz. eq.)	3.2	3.2
12-19	Total Vegetables (cup eq.)	1.3	1.0*
	Total Fruit (cup eq.)	1.0	0.9
	Total Dairy (cup eq.)	2.2	1.9
	Total Meat, Poultry, & Seafood (oz. eq.)	4.3	3.9
20+	Total Vegetables (cup eq.)	1.6	1.6
	Total Fruit (cup eq.)	1.0	0.9
	Total Dairy (cup eq.)	1.6	1.5
	Total Meat, Poultry, & Seafood (oz. eq.)	4.8	4.8
All	Total Vegetables (cup eq.)	1.5	1.4
	Total Fruit (cup eq.)	1.0	0.9
	Total Dairy (cup eq.)	1.8	1.6
	Total Meat, Poultry, & Seafood (oz. eq.)	4.5	4.5

\*Significantly different from 2003-2004 (p<0.01)

cup eq. = cup equivalents, oz. eq.= ounce equivalents

DATA SOURCE: What We Eat in America, NHANES 2003-2004 and 2015-2016, day 1, individuals 2+ years

## What are the implications of the study?

From 2003-2004 to 2015-2016:

- Americans reduced their added sugars intake. An increase in the availability of beverages and snacks that are relatively low in caloric sweeteners or contain sugar substitutes in the American food supply may be a reason for Americans choosing reduced, low, or no sugar options.
- Americans reduced their solid fats intake and increased their oils intake. These changes could partly be due to the replacement of hydrogenated oils with unhydrogenated vegetable oils in snacks, fried products and margarine; availability of low fat dairy products; and the increased availability of lean meat options.
- Although Americans increased their whole grains consumption, the estimated mean intakes are far below the Dietary Guidelines recommendation.
- Mean intakes of vegetables, fruit, and dairy continued to be low when compared to the Dietary Guidelines recommendations.

## Definitions Used in the Food Patterns Equivalents Databases

**USDA Food Patterns** include the five food groups, vegetables, fruits, grains, dairy, and protein foods; and oils, solid fats, added sugars, and alcoholic drinks.

**Added sugars** are defined as syrups and other caloric sweeteners such as sugars that are added to foods as ingredients during food preparation, processing, or at the table. Added sugars do not include naturally occurring sugars such as lactose present in milk and fructose present in fruit and 100% fruit juice.

**Oils** include all unhydrogenated vegetable oils, except tropical oils such as palm oil, palm kernel oil, and coconut oil; and fats that are naturally present in nuts, seeds, avocado, olives, and seafood.

**Solid fats** include fats that are naturally present in dairy products such as milk, cheese, butter, cream, cream cheese, and sour cream; fats naturally present in meat, poultry, and eggs; lard; fully or partially hydrogenated fats and shortenings; cocoa butter; coconut oil; palm oil; and other tropical oils.

**Units of measurements:** Details on the units of measurements such as ounce, cup, and gram equivalents for specific foods, see reference #3.

**Nutrient dense** means that the nutrients and other beneficial substances in a food have not been “diluted” by the addition of calories from added sugars, solid fats, or refined starches to food, or by the solid fats naturally present in the food [1].

## Data sources

(1) What We Eat in America, NHANES 2003-2004 and 2015-2016, day 1 dietary data were used to estimate Food Patterns equivalents intakes. Study sample included 8272 and 7918 individuals, aged 2 years and over (excluding breast-fed children) with complete and reliable intake records, in the 2003-2004 and 2015-2016 surveys, respectively. Sample weights were applied in the analyses to produce nationally representative estimates, (2) Food Patterns Equivalents Database 2015-2016, and (3) MyPyramid Equivalents Database 2.0 for USDA Survey Foods 2003-2004.

## References

1. U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015-2020 Dietary Guidelines for Americans. 8th Edition. December 2015. Available at: <http://www.health.gov/dietaryguidelines/2015/guidelines/>. Accessed date November 20, 2018.
2. U.S. Department of Agriculture, Agricultural Research Service, Beltsville Human Nutrition Research Center, Food Surveys Research Group, Beltsville, Maryland, Food Patterns Equivalents Databases and Datasets. Available at: <https://www.ars.usda.gov/fsrg>. Accessed date November 20, 2018.
3. Bowman SA, Clemens JC, Shimizu M, Friday JE, and Moshfegh AJ. 2018. Food Patterns Equivalents Database 2015-2016: Methodology and User Guide [Online]. Food Surveys Research Group, Beltsville Human Nutrition Research Center, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Maryland. September 2018. Available at: <https://www.ars.usda.gov/fsrg> Accessed date November 20, 2018.
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## About the authors

Shanthy A. Bowman, John C. Clemens, James E. Friday, Natalia Schroeder, Miyuki Shimizu, Randy P. LaComb, and Alanna J. Moshfegh are with Food Surveys Research Group, Beltsville Human Nutrition Research Center, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, MD.

## Suggested citation

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