

Food Sources of Energy and Nutrients of Public Health Concern and to Limit and the Contribution of Mixed Dishes to the Diets of Adults 19+ Years of Age: National Health and Nutrition Examination Survey, 2011 - 2014

Carol E O'Neil¹, Theresa A Nicklas^{2*} and Victor L Fulgoni III³

¹School of Nutrition and Food Science (Emeritus), Louisiana State University Agricultural Center, U.S.A

²USDA/ARS/CNRC, Baylor College of Medicine, U.S.A

³Nutrition Impact, LLC, U.S.A

*Corresponding Author: Theresa A Nicklas, Baylor College of Medicine, Texas, U.S.A.

Received: February 27, 2020

Published: March 11, 2020

© All rights are reserved by **Theresa A Nicklas, et al.**

Abstract

The aim of this study was to determine the food sources of energy, nutrients of public health concern and nutrients to limit using two approaches focusing on dairy foods. Twenty-four hour dietary recalls from adults 19 - 50 (n = 5,431) and 51+ years (n = 4,522) participating in NHANES 2011 - 2014 were analyzed. Energy and nutrients were sample-weighted and ranked on percentage contribution to the diet using specific food group intake (SFG) and disaggregated data (DD) for dairy foods. In those 19 - 50 years, cheese and milk were the top ranked food sources of calcium in the SFG and DD; for potassium, vegetables, excluding potatoes, and coffee and tea were top ranked in SFG data and milk and vegetables, excluding potatoes, were top ranked in the DD; for vitamin D, milk and seafood were the top ranked food sources in both analyses. For saturated fat (SFA), mixed dishes—Mexican and sweet bakery products were top ranked using SFG, and cheese and sweet bakery products were top ranked using DD. For those 51 - 99 years for calcium, milk and cheese were the top ranked food sources in both analyses; for potassium, coffee and tea and vegetables, excluding potatoes were the top two food sources for both analyses; for vitamin D, milk and seafood were top ranked. For SFA, fats and oils and sweet bakery products and cheese and fats/oils were top ranked using SFG and DD, respectively. For SFA, mixed dishes—fats/oils and sweet bakery products were top ranked for SFG analysis; cheese and fats/oils were top ranked for the DD. For sodium, bread, rolls, and tortillas and cured meats/poultry were also top ranked for both analyses. Identification of food sources of these important nutrients can help health professionals implement appropriate dietary recommendations and plan age-appropriate interventions to improve diet and health.

Keywords: NHANES; Nutrients; Nutrients of Public Health Concern; Nutrients to Limit; Adults; Food Sources; Dairy Foods

Abbreviations

AI: Adequate Intake; CVD: Cardiovascular Disease; DD: Disaggregated Data (Abstract Only); DGA: Dietary Guidelines for Americans; DGAC: Dietary Guidelines Advisory Committee; EAR: Estimated Average Requirement; Gram: g; KJ: Kilojoules; Microgram: mcg; Milligram: mg; NHANES: National Health and Nutrition Examination Survey; NFS: Not Further Specified; SE: Standard Error of the Mean; SFA: Saturated fatty acids; SPF: Specific Food Group; US: United States; WWEIA: What We Eat in America.

Introduction

Consumption of excess energy without a concomitant increase in physical activity is the major reason why there are extremely high obesity rates in the United States (US). Food availability data from 1970 to 2005 suggest, despite an overabundance of healthful foods, including whole grains, fruit, vegetables, low-fat dairy, and lean meats [1], too few of these nutrient-dense foods, and too many energy-dense, nutrient-poor foods/beverages are consumed in the US [2].

The typical diet in US adults, is energy-dense and nutrient poor [3] with corollary overall poor diet quality scores [4]. The 2015 - 2020 Dietary Guidelines for Americans (DGA) [2] determined that several nutrients: vitamins A, E, and C; folate; magnesium; and iron (in adolescent females) were under consumed relative to the Estimated Average Requirement (EAR) or Adequate Intake (AI) levels set by the Institute of Medicine and these were characterized as "shortfall nutrients" [2]. In addition, the DGA confirmed that dietary fiber, calcium, vitamin D, and potassium remained nutrients of public health concern since underconsumption has been linked to adverse health outcomes. Although the results of studies linking these nutrients to positive health outcomes can be inconsistent, the overwhelming evidence currently suggests that appropriate intake [2] of these nutrients through foods that are rich sources of them have been associated with decreased risk of some chronic diseases, including cardiovascular disease (CVD)/cardiovascular events [5-8], hypertension [9,10], stroke [9,11], type 2 diabetes [8,12], obesity [8,13,14], abdominal adiposity [14], some cancers [8], osteoma-

lacia [15], and osteoporosis [16]. Most Americans do not meet the recommendations for dietary fiber and these micronutrients [3].

Equally, the DGA identified nutrients to limit, including added sugars, saturated fatty acids (SFA), and sodium [2]. As with the nutrients of public health concern, information on health detriments to overconsumption of these nutrients, with the exception of excess sodium intake and its association with hypertension [10], is controversial. This is especially true of SFA, which has long been associated with a risk of cardiovascular disease [17]. Yet, O’Keefe and St-Onge [18] suggested “that not all SFA are created equal and the food sources of SFA, as well as individual characteristics of the SFA, such as chain length, should be considered in dietary recommendations”.

Due to low intake of nutrient-dense foods, many adults do not meet the recommendations for nutrients of public health concern and overconsume nutrients to limit [3]. There are several potential strategies to increase consumption of all shortfall nutrients, especially those of public health concern, while limiting nutrients that may be detrimental to long-term health. One way to increase intake of nutrients of public health concern and limit nutrients to limit is by consuming dairy products. These foods are rich in calcium, potassium, and vitamin D; while, moderate in SFA (if lower fat options selected), sodium, and unless flavored milk is consumed, contain no added sugars [19]. This has been a concern, especially for high-fat dairy products, such as whole milk. More recent evidence has suggested, however, that there is “no consistent benefit to all-cause mortality or CVD mortality from the reduction of saturated fat” [20], and that consumption of dairy products are generally associated with no effect on CVD [21]. Most adults do not meet [22] the three cup equivalents recommended daily by MyPlate [23,24], although older adults consume more milk than younger adults [22,25].

Identifying food sources of energy, nutrients of public health concern and nutrients to limit can help inform dietary guidelines that will assist nutrition educators in designing specific programs to help adults modify food and nutrient intake. Two approaches have been used to determine food sources of nutrients. The What We Eat In America (WWEIA) food categorization system [26] is typically used to examine the intake of foods and beverages commonly consumed and their nutrient contribution in the American diet. A second approach is to disaggregate certain foods to reassign nutrients in these foods to basic food groups. There is a major difference between the WWEIA and the disaggregation approach to food classification. WWEIA uses specific and broader food groups. For example, mixed dishes containing multiple ingredients are a major food group. WWEIA data show that Americans consume a substantial amount of foods in the form of mixed dishes. More specifically, 31% of vegetables, 45% of grains, 30% of dairy, and

45% of protein foods come from mixed dishes [27]. Mixed dishes (which include foods such as sandwiches, hamburgers, pizza, pasta or rice mixed dishes, stir-fries, soups, and meat or poultry mixed dishes) make up 28% of total energy intake [27]. Of note, only small amounts of fruits (1%) and fluid milk (3%) are consumed in mixed dishes—most are consumed as single food items, such as an apple or a glass of milk. The second approach disaggregates the ingredients in the mixed dishes and are added to the WWEIA single (non-mixed) food/beverage categories. For example when mixed dishes contribute to dairy foods, the majority of intake is in the form of cheese. Data show that approximately two-thirds of all cheese intake is from mixed dishes such as pizza, hamburgers, sandwiches, and casseroles. The purpose of this study was to determine the food sources of energy, nutrients of public health concern and nutrients to limit using these two approaches; dairy and dairy products are used as an example.

Materials and Methods

Study overview, study population, and analytic sample

Similar methods, including a description of the purpose and overview of the National Health and Nutrition Examination Survey (NHANES) have been published previously [28] and are available on line [29-32]. Data from adults 19+ years of age (years) participating in the NHANES from 2011 - 2014 were used for these analyses. The final analytic sample had 9,953 participants; adults were separated into two age groups: 19 - 50 years (n = 5431) and 51+ years (n = 4,522). The National Center for Health Statistics Research Ethics Review Board has approved the use of human subjects for NHANES studies [32]. Given that this study was a secondary data analysis which lacked personal identifiers, it did not require additional Institutional Review Board approval.

Dietary intake

Dietary intake data for the NHANES used in this study were obtained from the in-person 24-hour dietary recall interview conducted in the Mobile Examination Center [33] using an Automated Multiple-Pass Method [34]. Although a second, telephone interview, was also taken 3 to 10 days after the in-person interview, only the in-person interview was used because of the difference in the methodology for collecting the two recalls. A single 24-hour dietary recall administered in a large population can provide data to estimate adequately population mean intakes [35].

Food groupings and composition

The relevant WWEIA, the dietary component of NHANES, food category classification systems [26] were used to classify all foods. The WWEIA food categories are typically used to examine the intake of foods and beverages commonly consumed in the American diet. The WWEIA food categories contain 15 main groups: milk and dairy; protein foods; mixed dishes; grains; snacks and sweets; fruit; vegetables; beverages, nonalcoholic; alcoholic beverages; water;

fats and oils; condiments and sauces; sugars; infant formula and baby food; and other. They also consist of 47 subgroups; for example for the milk and dairy main group, the subgroups were milk, flavored milk, cheese, dairy drinks and substitutes, and yogurt. The

WWEIA food categories contain discrete items with no disaggregation of ingredients; pizza is a unique food category. For these analyses the WWEIA food categories (Supplemental Table 1) was one approach used for grouping foods.

Supplemental Table 1: What We Eat in America Food Categories—taken to the sub-category level¹.

¹Adapted from What We Eat in America Food Categories www.ars.usda.gov/nea/bhnrc/fsrg. These were chosen since they were the categories used in this manuscript; for additional details on food categories, consult the website

Milk and dairy	Grains	Beverages, non-alcoholic
Milk Flavored Milk Dairy Drinks and Substitutes Cheese Yogurt	Cooked Grains Breads, Rolls, Tortillas Quick Breads and Bread Products Ready-to-eat Cereals Cooked Cereals	100% Juice Diet Beverages Sweetened Beverages Coffee and Tea
Protein foods	Snacks and sweets	Alcoholic beverages
Meats Poultry Seafood Eggs Cured Meats/Poultry Plant-based Protein Foods	Savory Snacks Crackers Snack/Meal Bars Sweet Bakery Products Candy Other Desserts	Alcoholic Beverages
Mixed dishes	Fruit	Water
Mixed Dishes—Meat, Poultry, Seafood Mixed Dishes—Grain Based Mixed Dishes—Asian Mixed Dishes—Mexican Mixed Dishes—Pizza Mixed Dishes—Sandwiches Mixed Dishes--Soups	Fruits	Plain Water Flavored or Enhanced Water
	Vegetables	Fats and oils
	Vegetables, excluding Potatoes White Potatoes	Fats and Oils
		Condiments and sauces
		Condiments and Sauces
		Sugars
		Sugars
		Infant formula and baby food
		Baby Foods Baby Beverages Infant Formulas Human Milk
		Other
		Protein and nutritional powders Not included in a food category

A second approach was to disaggregate certain foods to reassign nutrients in these foods to basic food groups. The disaggregation approach provides a unique approach to evaluate intakes of individuals. Foods and beverages can be disaggregated to WWEIA food groups and then nutrients from these disaggregated components can be directly assigned to one of the WWEIA food groups. For example, pizza would be separated to grain, cheese, tomatoes,

etc. along with the nutrient content of each individual ingredients. For purposes of this study, the focus is on milk and dairy foods comparing the two approaches: WWEIA food categories and disaggregation approach. Using the relevant Food Pattern Equivalent Database [25] milk, cheese, and yogurt servings of non-dairy foods and especially mixed dishes were determined. The nutrient composition in the relevant Food and Nutrient Database for Dietary

Studies 2011-2012 and 2013-2014 [36] linked to SR 26 and SR 28 respectively [19] for Milk, NSF (not further specified), Cheese, NSF, and Yogurt, NFS was used to assess energy and nutrient contribution of dairy servings in non-dairy foods. The nutrients reported herein are the nutrients of public health concern [2]: dietary fiber, calcium, vitamin D, and potassium and nutrients to limit: SFA, added sugars, and sodium.

Data are reported as specific food group (SFG) intake based on WWEIA food categories, adjusted intake for disaggregation of dairy in other foods, and delta intake. SFG intake is intake from WWEIA food categories, e.g., the dairy food group (milk, cheese, and yogurt). Adjusted intake is the total daily intake after nutrients from dairy from non-dairy foods (e.g., mixed dishes) have been included, and reflect the disaggregation. Delta intake is the amount of nutrients from dairy in non-dairy foods that was added to or removed from the SFG intake to calculate the adjusted intake.

Statistical analyses

Data were analyzed using SAS 9.2 and SUDAAN release 11.0 (Research Triangle Institute, Research Triangle Park, NC) with survey parameters including strata, primary sampling units, and dietary sample weights [30]. Means and standard errors (SE) of energy and nutrient intakes from the total diet and from each food group were determined using PROC DESCRIPT of SUDAAN. Per-

centages of total energy and nutrient intakes from each food group were calculated from the average consumption of each food. Mean intakes were tabulated by ranked order; only foods providing 1% or more of consumption were added to the tables.

Results and Discussion

Contribution of foods to percent energy intake

Total energy (kJ ± SE) intake was 9745 ± 13 and 8272 ± 20 for age groups 19 - 50 and 51+ years, respectively. Table 1 shows the food sources contributing at least 1% of percent energy intake from the SFG and adjusted intake. There were 33 and 34 food sources that contributed at least 1% of SFG and adjusted energy intake among adults 19 - 50 and 51-99 years, respectively. Using SFG intake data (kJ; % of energy) for adults 19 - 50 years, sweetened beverages (709 kJ; 7.3% of energy); sweet bakery products (598 kJ; 6.2%); breads, rolls, and tortillas (580 kJ; 6.0%); alcoholic beverages (520 kJ; 5.4%); and mixed dishes-Mexican (490 kJ; 5.0%) were ranked as the top five food sources of total energy. Using SFG intake data for adults 51+ years, sweet bakery products (643 kJ; 6.8%); breads, rolls, and tortillas (627 kJ; 7.6%); plant-based protein foods (364 kJ; 4.4%); alcoholic beverages (359 kJ; 4.2%); and mixed dishes-Grain based (349 kJ; 4.2%) were ranked the top five food sources of total energy. Disaggregated data showed the same rank order with very small differences in energy intake and percent energy in the diet.

Table 1: Food/food group sources of mean energy (kJ) intake¹ among US adults 19 - 99 years (N = 9,953): National Health and Nutrition Examination Survey 2011-2014.

¹To a 1% contribution of daily intake of energy ²Nutrients from milk, cheese and yogurt for non-dairy foods are added to the nutrients in the milk, cheese, and yogurt food categories, respectively. For non-dairy foods the nutrients displayed are only for the milk, cheese, and yogurt in the non-dairy food.

Abbreviations: Cons: Consumers; M/P/F = Meat/Poultry/Fish.

Adults 19 - 50 years of age (n = 5,431)																	
WWEIA Food Groups	Specific Food Group Intake						Adjusted Intake ²						Delta Intake				
Sub Group Description	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons	Mean	SE	Pct	SE
Sweetened Beverages	3,080	1	709.2	5.6	7.3	0.2	3,080	1	701.7	5.5	7.2	0.2	123	-7.5	0.3	-0.1	0
Sweet Bakery Products	1,996	2	597.9	4.1	6.2	0.2	1,996	2	591.6	4.1	6.1	0.2	927	-6.3	0.1	-0.1	0
Bread, Rolls, Tortillas	2,925	3	580.3	4.2	6	0.2	2,925	3	579.0	4.2	6	0.2	165	-1.7	0.1	0	0
Alcoholic Beverages	1,375	4	520.4	9	5.4	0.4	1,375	5	520.4	9	5.4	0.4	3	0.0	0	0	0
Mixed Dishes—Mexican	800	5	489.9	7.3	5	0.3	800	7	406.1	6.1	4.2	0.3	751	-83.7	1.3	-0.9	0.1
Mixed Dishes—Pizza	741	6	475.6	6.1	4.9	0.3	741	10	359.2	4.8	3.7	0.2	741	-116.0	1.5	-1.2	0.1
Mixed Dishes—Sandwiches	1,036	7	467.2	5.7	4.8	0.3	1,036	6	422.0	5.1	4.3	0.2	601	-45.2	0.7	-0.5	0
Mixed Dishes—Grain-based	1,221	8	427.9	4.1	4.4	0.2	1,221	8	392.7	3.9	4	0.2	544	-35.2	0.7	-0.4	0
Poultry	1,592	9	363.8	6.2	3.7	0.3	1,592	9	363.0	6.1	3.74	0.3	392	-0.8	0	0	0
Savory Snacks	1,814	10	334.9	3.2	3.5	0.1	1,814	11	334.1	3.2	3.4	0.1	247	-1.3	0	0	0
Plant-based Protein Foods	1,354	11	314.4	4.9	3.2	0.2	1,354	13	314.4	4.9	3.2	0.2	5	0.0	0	0	0
White Potatoes	1,616	12	307.7	3.1	3.2	0.1	1,616	14	296.0	3.1	3.1	0.1	366	-11.7	0.3	0.1	0
Mixed Dishes—M/P/F	994	13	294.8	4.9	3	0.2	994	16	284.7	4.8	2.9	0.2	351	-10.0	0.3	0.1	0
Meats	1,314	14	288.1	3.7	3	0.2	1,314	15	288.1	3.7	3	0.2	19	0.0	0	0	0

Fats and Oils	2,734	15	276.7	2.3	2.9	0.1	2,734	17	274.2	2.3	2.8	0.1	404	-2.5	0.1	0	0
Cheese	1,907	16	220.2	3.5	2.3	0.1	3,738	4	526.3	3.8	5.4	0.2	2,829	306.5	2.1	3.2	0.1
Milk	1,614	17	210.2	2.9	2.2	0.1	4,194	12	321.5	3.2	3.3	0.1	3,732	111.4	1.5	1.1	0.1
Cured Meats/Poultry	1,548	18	203.9	2.4	2.1	0.1	1,548	18	203.5	2.4	2.1	0.1	3	0.0	0	0	0
Fruit	1,947	19	187.1	1.9	1.9	0.1	1,947	19	187.1	1.9	1.9	0.1	11	0.0	0	0	0
Eggs	1,138	20	183.4	1.9	1.9	0.1	1,138	21	167.9	1.7	1.7	0.1	608	-15.5	0.3	-0.2	0
Vegetables, Excluding Potatoes	2,757	21	180.5	2	1.9	0.1	2,757	20	176.3	1.9	1.8	0.1	128	-4.2	0.3	0	0
Coffee and Tea	3,047	22	178.8	2	1.8	0.1	3,047	26	156.6	2	1.6	0.1	282	-22.6	0.6	-0.2	0
Other Desserts	766	23	167.9	4.1	1.7	0.2	766	28	139.8	3.4	1.4	0.2	690	-28.1	0.7	-0.3	0
Ready-to-Eat Cereals	863	24	165.0	2.1	1.7	0.1	863	22	164.5	2.1	1.7	0.1	74	0.0	0	0	0
Mixed Dishes--Asian	506	25	164.5	2.5	1.7	0.1	506	23	164.5	2.5	1.7	0.1	20	0.0	0	0	0
Candy	1,201	26	163.3	2.5	1.7	0.1	1,201	25	156.6	2.4	1.6	0.1	669	-6.7	0.1	-0.1	0
Cooked Grains	1,026	27	157.8	2.1	1.6	0.1	1,026	24	157.8	2.1	1.6	0.1	0	0.0	0	0	0
Quick Bread & Bread Products	612	28	146.1	2.2	1.5	0.1	612	27	139.8	2	1.4	0.1	571	-6.3	0.2	-0.1	0
100% Juice	948	29	120.2	2.2	1.2	0.1	948	29	120.2	2.2	1.2	0.1	0	0.0	0	0	0
Mixed Dishes—Soups	698	30	116.8	2.4	1.2	0.1	698	31	108.9	2.3	1.1	0.1	90	-8.0	0.4	-0.1	0
Seafood	623	31	113.0	3.2	1.2	0.1	623	30	113.0	3.2	1.2	0.1	35	-0.4	0	0	0
Condiments and Sauces	2,547	32	107.2	1.7	1.1	0.1	2,547	33	101.3	1.5	1	0.1	136	-5.9	0.3	-0.1	0
Sugar	1,955	33	106.3	1.6	1.1	0.1	1,955	32	106.3	1.6	1.1	0.1	35	-0.4	0.1	0	0

Adults 51 - 99 years of age (n = 4,522)

WWEIA Food Groups	Specific Food Group Intake						Adjusted Intake²						Delta Intake				
Sub Group Description	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons	Mean	SE	Pct	SE
Sweet Bakery Products	1,845	1	642.7	6.8	7.8	0.3	1,845	1	637.2	6.1	7.7	0.3	833	-5.4	0.1	-0.1	0
Bread, Rolls, Tortillas	2,889	2	627.2	2.8	7.6	0.1	2,889	2	625.5	2.8	7.6	0.1	136	-1.7	0.1	0	0
Plant-based Protein Foods	1,410	3	364.3	5	4.4	0.3	1,410	3	364.3	5	4.4	0.3	0	0.0	0	0	0
Alcoholic Beverages	953	4	359.2	5.9	4.3	0.3	953	4	359.2	5.9	4.3	0.3	0	0.0	0	0	0
Mixed Dishes—Grain-based	866	5	348.8	6.7	4.2	0.3	866	9	322.8	6.1	3.9	0.3	316	-26.0	0.7	-0.3	0
Mixed Dishes—M/P/F	994	6	340.8	3.3	4.1	0.2	994	7	329.1	3.1	4	0.2	317	-11.7	0.4	-0.1	0
Sweetened Beverages	1,678	7	330.8	3.5	4	0.2	1,678	8	325.7	3.5	3.9	0.2	83	-5.0	0.3	-0.1	0
Fats and Oils	2,787	8	320.7	2.8	3.9	0.1	2,787	10	316.5	2.8	3.8	0.1	430	-4.2	0.2	-0.1	0
Fruit	2,330	9	262.1	2	3.2	0.1	2,330	11	262.1	2	3.2	0.1	4	0.0	0	0	0
White Potatoes	1,126	10	262.1	3.4	3.2	0.2	1,126	12	252.0	3.4	3.1	0.2	281	-9.6	0.4	-0.1	0
Mixed Dishes--Sandwiches	581	11	259.2	3.7	3.1	0.2	581	15	234.5	3.3	2.8	0.2	301	-24.7	0.6	-0.3	0
Poultry	1,155	12	251.6	3.2	3	0.2	1,155	13	251.2	3.1	3	0.2	240	-0.4	0	0	0
Savory Snacks	1,197	13	250.4	3	3	0.2	1,197	14	250.0	3.1	3	0.2	121	-0.4	0	0	0
Milk	1,808	14	232.4	3.3	2.8	0.2	3,772	5	339.5	3.3	4.1	0.2	3,275	107.6	0.9	1.3	0.04
Vegetables, Excluding Potatoes	2,695	15	229.4	2.6	2.8	0.1	2,695	16	224.4	2.5	2.7	0.1	108	-5.0	0.2	-0.1	0
Mixed-Dishes—Mexican	358	16	226.9	5.1	2.7	0.3	358	20	186.7	4.3	2.3	0.2	329	-40.2	1	-0.5	0.1
Other Desserts	902	17	219.8	3.2	2.7	0.2	902	21	184.2	2.5	2.2	0.1	796	-35.6	0.9	-0.4	0.1
Meats	1,074	18	215.2	3.3	2.6	0.2	1,074	17	215.2	3.3	2.6	0.2	17	0.0	0	0	0
Cured Meats/Poultry	1,454	19	204.3	2.6	2.5	0.1	1,454	18	204.3	2.6	2.5	0.1	2	0.0	0	0	0
Ready-to-Eat Cereals	970	20	194.7	2.6	2.4	0.1	970	19	194.7	2.6	2.4	0.1	46	-0.4	0	0	0
Mixed Dishes—Pizza	262	21	187.6	7.6	2.3	0.4	262	24	143.6	6	1.7	0.3	261	-43.5	1.6	-0.5	0.1
Cheese	1,400	22	183.8	2.4	2.2	0.1	2,434	6	338.7	3.9	4.1	0.2	1,546	154.9	2	1.9	0.1

Eggs	1,118	23	171.2	2.5	2.1	0.1	1,118	22	160.8	2.2	1.9	0.1	504	-10.5	0.4	-0.1	0
Candy	951	24	167.5	2.9	2	0.2	951	23	159.9	2.8	1.9	0.1	572	-8.0	0.1	-0.1	0
Quick Bread & Bread Products	583	25	132.7	3.2	1.6	0.2	583	26	127.3	3.1	1.5	0.2	560	-5.4	0.1	-0.1	0
Seafood	611	26	129.8	3.3	1.6	0.2	611	25	129.4	3.3	1.6	0.2	55	-0.4	0	0	0
Mixed Dishes—Soups	713	27	129.4	2	1.6	0.1	713	28	120.6	1.9	1.5	0.1	80	-8.8	0.3	-0.1	0
Coffee and Tea	3,465	28	127.7	2.7	1.5	0.1	3,465	30	116.4	2.7	1.4	0.1	126	-10.9	0.5	-0.1	0
100% Juice	1,000	29	126.0	1.7	1.5	0.1	1,000	27	126.0	1.7	1.5	0.1	0	0.0	0	0	0
Cooked Grains	819	30	120.6	2.5	1.5	0.1	819	29	120.2	2.5	1.5	0.1	3	0.0	0	0	0
Sugars	2,269	31	113.0	1.5	1.4	0.1	2,269	31	113.0	1.4	1.4	0.1	23	0.0	0	0	0
Mixed Dishes—Asian	295	32	108.4	3.7	1.3	0.2	295	32	108.0	3.7	1.3	0.2	9	0.0	0	0	0
Crackers	789	33	95.5	1.5	1.2	0.1	789	33	95.0	1.5	1.2	0.1	125	-0.4	0	0	0

Contribution of foods to percent dietary fiber intake

Daily total dietary fiber intake (g ± SE) was 17.6 ± 0.23 and 17.4 ± 0.33 for the two respective age groups. Table 2 shows the food sources contribution at least 1% of dietary fiber intake from the WWEIA sub-categories. There were 20 and 22 food sources that contributed at least 1% of SFG fiber intake of adults 19 - 50 and 51+ years, respectively. Using SFG intake data (g; % of fiber) for adults 19 - 50 years, bread, rolls, and tortillas (1.9 g; 10.7%); vegetables, excluding potatoes (1.9 g; 10.6%); plant-based protein foods (1.6 g; 9.3%); fruit (1.5 g; 8.6%); and mixed dishes-Mexican (1.2 g; 7.0%) were the top five food sources of dietary fiber. Using SFG intake data, food sources of dietary fiber for adults 51+ years, vegetables, excluding potatoes (2.4 g; 13.6%); breads, rolls and tortillas (2.1 g; 12.0%); fruit (2.0 g; 11.7%); plant-based protein foods (1.7g; 9.7%); and ready-to-eat cereals (1.2g; 6.7%) were the top five food sources of dietary fiber. Disaggregated data showed the same rank order with very small differences in fiber intake and percent fiber in the diet.

Contribution of foods to percent calcium intake

Total calcium intake (mg ± SE) was 1040 ± 14 and 902 ± 16 for adults 19 - 50 and 51+ years, respectively. There were 27 and 25 food sources that contributed at least 1% of SFG calcium intake of adults for the two respective age groups. For adults, 19 - 50 years, using SFG intake, cheese (134 mg; 12.9%); milk (122 mg; 11.7%); mixed dishes—Mexican (76 mg; 7.3%); plain water (75 mg; 7.3%); and mixed dishes-Pizza (72 mg; 6.9%) were the top five food sources of calcium in the diet (Table 3). When disaggregated data were examined, cheese remained the top source of calcium in the diet (318 mg; 30.6%); followed by milk (185 mg; 17.8%), and plain water (75 mg; 7.3%); bread, rolls, tortillas (64 mg; 6.1%); and 100% juice (27 mg; 2.6%). Mixed dishes—Mexican, dropped to 9th (22 mg; 2.1%). For adults 51+ years, using SFG data, milk (142 mg; 15.7%); cheese (106 mg; 11.8%); breads, rolls, and tortillas (69 mg; 7.7%); plain water (56 mg; 6.2%); and mixed dishes-Mexican (36 mg; 4.0%) were the top five food contributors to calcium in-

Table 2: Food/food group sources of mean dietary fiber (grams) intake¹ among US adults 19 - 99 years (N = 9,953): National Health and Nutrition Examination Survey 2011 - 2014.

¹To a 1% contribution of daily intake of dietary fiber ²Nutrients from milk, cheese and yogurt for non-dairy foods are added to the nutrients in the milk, cheese, and yogurt food categories, respectively. For non-dairy foods the nutrients displayed are only for the milk, cheese, and yogurt in the non-dairy food.

Abbreviations: Cons: Consumers, M/P/F : Meat/Poultry/Fish.

Adults 19 - 50 years of age (n = 5,431)															
WWEIA Food Group	Specific Food Group Intake						Adjusted Intake ²						Delta Intake		
Sub Group Description	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons	Mean	SE
Breads, Rolls, Tortillas	2,925	1	1.9	0.1	10.7	0.4	2,925	1	1.9	0.1	10.7	0.4	165	0.0	0.0
Vegetables, excluding Potatoes	2,757	2	1.9	0.1	10.6	0.5	2,757	2	1.9	0.1	10.6	0.5	128	0.0	0.0
Plant-based Protein Foods	1,354	3	1.6	0.1	9.3	0.4	1,354	3	1.6	0.1	9.3	0.4	5	0.0	0.0
Fruit	1,947	4	1.5	0.1	8.6	0.3	1,947	4	1.5	0.1	8.6	0.3	11	0.0	0.0
Mixed Dishes—Mexican	800	5	1.2	0.1	7.0	0.5	800	5	1.2	0.2	7.0	0.5	751	0.0	0.0
Mixed Dishes—Grain-based	1,221	6	1.0	0.1	5.8	0.3	1,221	6	1.0	0.1	5.8	0.3	544	0.0	0.0
White Potatoes	1,616	7	0.9	0.0	5.2	0.2	1,616	7	0.9	0.0	5.2	0.2	366	0.0	0.0

Mixed Dishes—Pizza	741	8	0.9	0.1	5.0	0.3	741	8	0.9	0.1	5.0	0.3	741	0.0	0.0
Savory Snacks	1,814	9	0.8	0.0	4.7	0.2	1,814	9	0.8	0.0	4.7	0.2	247	0.0	0.0
Ready-to-Eat Cereals	863	10	0.8	0.1	4.5	0.3	863	10	0.8	0.1	4.5	0.3	74	0.0	0.0
Sweet Bakery Products	1,996	11	0.6	0.0	3.6	0.1	1,996	11	0.6	0.0	3.6	0.1	927	0.0	0.0
Mixed Dishes—M/P/F	994	12	0.5	0.1	3.0	0.3	994	12	0.5	0.1	3.0	0.3	351	0.0	0.0
Mixed Dishes—Sandwiches	1,036	13	0.5	0.0	3.0	0.2	1,036	13	0.5	0.0	3.0	0.2	601	0.0	0.0
Condiments and Sauces	2,547	14	0.5	0.0	2.6	0.2	2,547	14	0.5	0.0	2.6	0.2	136	0.0	0.0
Mixed Dishes—Soups	698	15	0.4	0.7	2.2	0.3	698	15	0.4	0.1	2.2	0.3	90	0.0	0.0
Cooked Grains	1,026	16	0.3	0.0	1.4	0.1	1,026	16	0.3	0.0	1.4	0.1	0	0.0	0.0
Snack/Meal Bars	317	17	0.3	0.0	1.4	0.2	317	17	0.3	0.0	1.4	0.2	96	0.0	0.0
Mixed Dishes—Asian	506	18	0.2	0.0	1.4	0.1	506	18	0.2	0.0	1.4	0.1	20	0.0	0.0
Sweetened Beverages	3,080	19	0.2	0.0	1.2	0.1	3,080	19	0.2	0.0	1.2	0.1	123	0.0	0.0
Quick Bread and Bread Products	612	20	0.2	0.0	1.2	0.1	612	20	0.2	0.0	1.2	0.1	571	0.0	0.0
Adults 51 - 99 years of age (n = 4,522)															
WWEIA Food Group	Specific Food Group Intake						Adjusted Intake						Delta Intake		
	Sub Group Description	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons	Mean
Vegetables, excluding Potatoes	2,695	1	2.4	0.1	13.6	0.4	2,695	1	2.4	0.1	13.6	0.4	108	0.0	0.0
Breads, Rolls, Tortillas	2,889	2	2.1	0.1	12.0	0.2	2,889	2	2.1	0.1	12.0	0.2	136	0.0	0.0
Fruit	2,330	3	2.0	0.1	11.7	0.3	2,330	3	2.0	0.1	11.7	0.3	4	0.0	0.0
Plant-based Protein Foods	1,410	4	1.7	0.1	9.7	0.4	1,410	4	1.7	0.1	9.7	0.4	0	0.0	0.0
Ready-to-Eat Cereals	970	5	1.2	0.1	6.7	0.4	970	5	1.2	0.1	6.7	0.4	46	0.0	0.0
Mixed Dishes—Grain-based	866	6	0.8	0.1	4.8	0.4	866	6	0.8	0.1	4.8	0.4	316	0.0	0.0
White Potatoes	1,126	7	0.8	0.0	4.6	0.3	1,126	7	0.8	0.0	4.6	0.3	281	0.0	0.0
Sweet Bakery Products	1,845	8	0.7	0.0	4.0	0.2	1,845	8	0.7	0.0	4.0	0.2	833	0.0	0.0
Savory Snacks	1,197	9	0.6	0.0	3.6	0.2	1,197	9	0.6	0.0	3.6	0.2	121	0.0	0.0
Mixed Dishes—M/P/F	994	10	0.6	0.0	3.4	0.2	994	10	0.6	0.0	3.4	0.2	317	0.0	0.0
Mixed Dishes—Mexican	358	11	0.6	0.1	3.3	0.3	358	11	0.6	0.1	3.3	0.3	329	0.0	0.0
Mixed Dishes—Soups	713	12	0.5	0.0	2.8	0.2	713	12	0.5	0.0	2.8	0.2	80	0.0	0.0
Cooked Cereal	540	13	0.4	0.1	2.3	0.2	540	13	0.4	0.1	2.3	0.2	287	0.0	0.0
Mixed Dishes—Pizza	262	14	0.4	0.1	2.0	0.4	262	14	0.3	0.1	2.0	0.4	261	0.0	0.0
Condiments and Sauces	1,815	15	0.3	0.0	2.0	0.1	1,815	15	0.3	0.0	2.0	0.1	64	0.0	0.0
Mixed Dishes—Sandwiches	581	16	0.3	0.0	1.6	0.1	581	16	0.3	0.0	1.6	0.1	301	0.0	0.0
100% Juice	1,000	17	0.2	0.1	1.4	0.3	1,000	17	0.2	0.1	1.4	0.3	0	0.0	0.0
Candy	951	18	0.2	0.0	1.2	0.1	951	18	0.2	0.0	1.2	0.1	572	0.0	0.0
Other Desserts	902	19	0.2	0.0	1.1	0.1	902	19	0.2	0.0	1.1	0.1	796	0.0	0.0
Crackers	789	20	0.2	0.0	1.1	0.1	789	20	0.2	0.0	1.1	0.1	125	0.0	0.0
Cooked Grains	819	21	0.2	0.0	1.1	0.1	819	21	0.2	0.0	1.1	0.1	3	0.0	0.0
Mixed Dishes—Asian	295	22	0.2	0.0	1.0	0.1	295	22	0.2	0.0	1.0	0.1	9	0.0	0.0

take. When disaggregated data were examined, milk remained the top food source of calcium (201 mg; 22.3%), followed by cheese (201 mg; 22.2%) breads, rolls, and tortillas (68 mg; 7.6%); plain water (56 mg; 6.2%); and vegetables excluding potatoes (31 mg; 3.4%) (Table 3).

Contribution of foods to percent vitamin D intake

Total vitamin D intake (mcg ± SE) was 4.7 ± 0.17 and 4.75 ± 0.13, for the respective age groups. There were 21 and 20 food sources that contributed at least 1% of SFG vitamin D intake for the age groups 19 - 50 and 51-99 years, respectively (Table 4). Using SFG data for adults 19 - 50 years, milk (1.3 mcg; 26.6%), seafood (0.7

Table 3: Food/food group sources of mean calcium (milligrams) intake¹ among US adults 19 - 99 years (N = 9,953): National Health and Nutrition Examination Survey 2011 - 2014.

¹To a 1% contribution of daily intake of calcium ²Nutrients from milk, cheese and yogurt for non-dairy foods are added to the nutrients in the milk, cheese, and yogurt food categories, respectively. For non-dairy foods the nutrients displayed are only for the milk, cheese, and yogurt in the non-dairy food.

Abbreviations: Cons: Consumers, M/P/F : Meat/Poultry/Fish.

Adults 19 - 50 years of age (n = 5,431)																	
WWEIA Food Group	Specific Food Group Intake						Adjusted Intake ²						Delta Intake				
Sub Group Description	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons	Mean	SE	Pct	SE
Cheese	1,907	1	133.8	7.8	12.9	0.6	3,738	1	318.4	8.4	30.6	0.6	2,829	184.6	5.4	17.8	0.6
Milk	1,614	2	122.0	6.5	11.7	0.6	4,194	2	184.5	7.4	17.8	0.6	3,732	62.5	3.6	6.0	0.4
Mixed Dishes—Mexican	800	3	75.8	4.6	7.3	0.5	800	9	21.5	1.3	2.1	0.1	751	-54.4	3.5	-5.2	0.4
Plain Water	4,434	4	75.4	2.4	7.3	0.2	4,434	3	75.4	2.4	7.3	0.3	0	0.0	0.0	0.0	0.0
Mixed Dishes—Pizza	741	5	71.6	3.7	6.9	0.4	741	35	4.8	0.4	0.5	0.0	741	-66.9	3.5	-6.4	0.3
Bread, Rolls, Tortillas	2,925	6	64.5	1.9	6.2	0.2	2,925	4	63.7	1.9	6.1	0.2	165	-0.8	0.1	-0.1	0.0
Mixed Dishes—Sandwiches	1,036	7	50.6	3.0	4.9	0.3	1,036	6	24.7	1.7	2.4	0.2	601	-25.9	1.6	-2.5	0.2
Mixed Dishes—Grain-based	1,221	8	31.8	1.9	3.1	0.2	1,221	16	11.7	0.7	1.1	0.1	544	-20.1	1.7	-1.9	0.2
Vegetables, excluding potatoes	2,757	9	27.1	1.6	2.6	0.2	2,757	7	24.6	1.3	2.4	0.1	128	-2.5	0.7	-0.2	0.1
100% Juice	948	10	26.5	3.6	2.6	0.3	948	5	26.5	3.6	2.6	0.3	0	0.0	0.0	0.0	0.0
Other Desserts	766	11	24.7	2.7	2.4	0.3	766	19	10.3	1.1	1.0	0.1	690	-14.3	1.7	-1.4	0.2
Sweetened Beverages	3,080	12	23.1	2.3	2.2	0.2	3,080	10	19.7	1.8	1.9	0.2	123	-3.4	0.6	-0.3	0.1
Coffee and Tea	3,047	13	21.7	1.8	2.1	0.2	3,047	23	8.7	0.5	0.8	0.1	282	-13.0	1.7	-1.3	0.2
Yogurt	360	14	20.3	1.8	2.0	0.2	552	8	23.3	2.0	2.2	0.2	226	3.0	0.5	0.3	0.1
Eggs	1,138	15	19.8	1.0	1.9	0.1	1,138	21	10.2	0.5	1.0	0.1	608	-9.6	0.7	-0.9	0.1
Dairy Drinks and Substitutes	252	16	18.0	2.0	1.7	0.2	252	11	18.1	2.0	1.7	0.2	0	0.0	0.0	0.0	0.0
Sweet Bakery Products	1,996	17	17.4	0.8	1.7	0.1	1,996	13	13.9	0.7	1.3	0.1	927	-3.4	0.2	-0.3	0.0
Mixed Dishes—M/P/F	994	18	17.1	1.3	1.6	0.1	994	17	11.3	0.9	1.1	0.1	351	-5.8	0.7	-0.6	0.1
Plant-based Protein Foods	1,354	19	16.2	1.0	1.6	0.1	1,354	12	16.2	0.9	1.6	0.1	5	-0.1	0.1	-0.0	0.0
Quick Bread and Bread Products	612	20	13.8	1.3	1.3	0.1	612	20	10.2	1.0	1.0	0.1	571	-3.7	0.4	-0.4	0.0
Ready-to-Eat Cereals	863	21	13.6	1.0	1.3	0.1	863	14	13.5	1.0	1.3	0.1	74	-0.1	0.0	0.0	0.0
Flavored Milk	155	22	13.3	1.9	1.3	0.2	155	15	13.3	1.9	1.3	0.2	0	0.0	0.0	0.0	0.0
White Potatoes	1,616	23	12.5	0.9	1.2	0.1	1,616	33	5.2	0.2	0.5	0.0	366	-7.3	0.8	-0.7	0.1
Alcoholic Beverages	1,375	24	10.8	0.8	1.0	0.1	1,375	18	10.8	0.8	1.0	0.1	3	-0.1	0.0	0.0	0.0
Mixed Dishes—Soups	698	25	10.5	1.2	1.0	0.1	698	30	6.0	0.7	0.6	0.1	90	-4.5	0.9	-0.4	0.1
Condiments and Sauces	2,547	26	10.5	1.1	1.0	0.1	2,547	27	7.2	0.5	0.7	0.0	136	-3.3	0.7	-0.3	0.1
Savory Snacks	1,814	27	10.5	0.5	1.0	0.1	1,814	22	9.8	0.6	1.0	0.1	247	-0.6	0.1	-0.1	0.0
Adults 51 - 99 years of age (n = 4,522)																	
WWEIA Food Group	Specific Food Group Intake						Adjusted Intake						Delta Intake				
Sub Group Description	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons	Mean	SE	Pct	SE
Milk	1,808	1	141.5	7.6	15.7	0.8	3,772	1	201.3	7.7	22.3	0.75	3,275	59.8	2.16	6.62	0.2
Cheese	1,400	2	106.2	5.7	11.8	0.6	2,434	2	200.5	9.7	22.2	0.85	1,546	94.3	5.32	10.46	0.5
Breads, Rolls, Tortillas	2,889	3	69.3	1.7	7.7	0.2	2,889	3	68.4	1.7	7.6	0.20	136	-0.9	0.16	-0.10	0.0
Plain Water	3,692	4	56.0	2.2	6.2	0.3	3,692	4	56.0	2.2	6.2	0.26	0	0.0	0.00	0.00	0.0
Mixed Dishes—Mexican	358	5	35.7	3.6	4.0	0.4	358	20	9.5	1.0	1.1	0.11	329	-26.2	2.84	-2.91	0.3
Vegetables, excluding Potatoes	2,695	6	33.9	1.8	3.8	0.2	2,695	5	30.8	1.6	3.4	0.19	108	-3.1	0.46	-0.35	0.1
Other Desserts	902	7	31.0	2.4	3.4	0.3	902	15	13.1	0.9	1.5	0.10	796	-17.9	1.63	-1.98	0.2
Mixed Dishes—Sandwiches	581	8	27.6	2.1	3.1	0.2	581	14	13.5	1.2	1.5	0.14	301	-14.1	1.41	-1.57	0.2

Mixed Dishes—Pizza	262	9	27.6	4.6	3.1	0.5	262	41	1.9	0.5	0.2	0.05	261	-25.6	4.16	-2.84	0.4
100% Juice	1,000	10	26.0	2.6	2.9	0.3	1,000	7	26.0	2.6	2.9	0.27	0	0.0	0.00	0.00	0.0
Mixed Dishes—Grain-based	866	11	24.8	2.6	2.8	0.3	866	21	9.4	0.9	1.0	0.11	316	-15.4	1.79	-1.70	0.2
Yogurt	340	12	23.4	2.5	2.6	0.3	484	6	27.1	2.6	3.0	0.28	164	3.7	1.01	0.41	0.1
Ready-to-Eat Cereals	970	13	20.7	1.9	2.3	0.2	970	8	20.6	1.9	2.3	0.20	46	-0.1	0.03	-0.01	0.0
Mixed Dishes—M/P/F	994	14	20.2	1.2	2.2	0.1	994	13	13.6	0.6	1.5	0.07	317	-6.6	0.98	-0.73	0.1
Sweetened Beverages	1,678	15	20.0	2.4	2.2	0.2	1,678	9	17.9	2.3	2.0	0.25	83	-2.1	0.44	-0.24	0.1
Sweet Bakery Products	1,845	16	19.2	1.2	2.1	0.1	1,845	12	16.3	1.0	1.8	0.11	833	-3.0	0.25	-0.33	0.0
Coffee and Tea	3,465	17	17.8	1.4	2.0	0.2	3,465	16	11.8	0.6	1.3	0.05	126	-6.0	1.24	-0.66	0.1
Dairy Drinks and Substitutes	211	18	17.4	2.2	1.9	0.2	211	10	17.4	2.2	1.9	0.24	0	0.0	0.0	0.0	0.0
Plant-based Protein Foods	1,410	19	17.1	1.1	1.9	0.1	1,410	11	17.1	1.1	1.9	0.12	0	0.0	0.0	0.0	0.0
Eggs	1,118	20	16.7	1.3	1.9	0.1	1,118	18	10.3	0.5	1.1	0.06	504	-6.4	1.0	-0.7	0.1
Cooked Cereals	540	21	14.2	1.5	1.6	0.2	540	22	8.2	1.2	0.9	0.14	287	-6.0	0.7	-0.7	0.1
Quick Bread and Bread Products	583	22	13.2	1.3	1.5	0.1	583	19	10.1	1.1	1.1	0.11	560	-3.1	0.3	-0.3	0.0
Mixed Dishes—Soups	713	23	12.4	1.0	1.4	0.1	713	24	7.3	0.5	0.8	0.06	80	-5.1	0.8	-0.6	0.1
Fruit	2,330	24	11.0	0.5	1.2	0.1	2,330	17	11.0	0.5	1.2	0.06	4	0.0	0.0	0.0	0.0
White Potatoes	1,126	25	10.8	1.1	1.2	0.1	1,126	31	5.0	0.3	0.6	0.04	281	-5.71	0.98	-0.6	0.1

mcg; 14.2%), eggs (0.4 mcg; 9.1%); cheese (0.4 mcg; 7.5%); and ready-to-eat cereals (0.3 mcg; 6.1%) were the top five food sources. When disaggregated data were examined, milk remained the top source of vitamin D (1.7 mcg; 35.7%); followed by seafood (0.7 mcg; 14.2%) cheese (0.5 mcg; 11.4%); eggs (0.4 mcg; 7.9%); and ready-to-eat cereals (0.3 mcg; 6.1%). Using SFG data for adults 51+ years, milk was the top contributor of vitamin D to the diet (1.4 mcg; 30.1%), followed by seafood (0.8 mcg; 17.4%), eggs (0.4 mcg; 8.5%); ready-to-eat cereals (0.3 mcg; 7.1%); and cheese (0.2 mcg; 4.7%). Disaggregated data showed that milk remained the top food source (1.8 mcg; 38.0%), followed by seafood (0.8 mcg; 17.3%); eggs (0.4 mcg; 7.6%); ready-to-eat cereals (0.3 mcg; 7.1%); and cheese (0.3 mcg; 6.9%).

Contribution of foods to percent potassium intake

Total potassium intake (mg ± SE) was 2727 ± 26 and 2718 ± 33 for those 19 - 50 and 51+ years, respectively. There were 27 and 28 food sources that contributed at least 1% of SFG potassium intake of adults for the age groups 19 - 50 and 51+ years, respectively (Table 5). Using SFG data for adults 19 - 50 years, vegetables, excluding potatoes (195 mg; 7.2%); coffee and tea (178 mg; 6.5%); white potatoes (162 mg; 5.9%); milk (145 mg; 5.3%); and fruit (138 mg; 5.1%) were the top five food sources. When disaggregated data were examined the top five food sources were milk (223 mg; 8.2%); vegetables excluding potatoes (194 mg; 7.1%); coffee and tea (161 mg; 5.9%); white potatoes (158 mg; 5.8%); and

Table 4: Food/food group sources of mean vitamin D (micrograms) intake¹ among US adults 19 - 99 years (N = 9,953): National Health and Nutrition Examination Survey 2011 - 2014.

¹To a 1% contribution of daily intake of vitamin D ²Nutrients from milk, cheese and yogurt for non-dairy foods are added to the nutrients in the milk, cheese, and yogurt food categories, respectively. For non-dairy foods the nutrients displayed are only for the milk, cheese, and yogurt in the non-dairy food.

Abbreviations: Cons: Consumers, M/P/F : Meat/Poultry/Fish.

Adults 19 - 50 years of age (n = 5,431)													
WWEIA Food Group	Specific Food Group Intake						Adjusted Intake ²						Delta Intake
Sub Group Description	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons
Milk	1,614	1	1.3	0.1	26.6	0.8	4,194	1	1.7	0.1	35.7	1.0	3,732
Seafood	623	2	0.7	0.1	14.2	1.6	623	2	0.7	0.1	14.2	1.6	35
Eggs	1,138	3	0.4	0.0	9.1	0.4	1,138	4	0.4	0.0	7.9	0.4	608
Cheese	1,907	4	0.4	0.0	7.5	0.5	3,738	3	0.5	0.0	11.4	0.5	2,829
Ready-to-Eat Cereals	863	5	0.3	0.0	6.1	0.4	863	5	0.3	0.0	6.1	0.4	74
Mixed Dishes—Sandwiches	1,036	6	0.1	0.0	3.0	0.3	1,036	9	0.1	0.0	1.9	0.2	601

Cured Meats/Poultry	1,548	7	0.1	0.0	3.0	0.2	1,548	6	0.1	0.0	3.0	0.2	3
Coffee and Tea	3,047	8	0.1	0.0	2.9	0.4	3,047	25	0.0	0.0	0.2	0.0	282
Flavored Milk	155	9	0.1	0.0	2.7	0.4	155	7	0.1	0.0	2.7	0.4	0
Mixed Dishes—M/P/F	994	10	0.1	0.0	2.5	0.3	994	11	0.1	0.0	1.8	0.2	351
100% Juice	948	11	0.1	0.0	2.0	0.3	948	8	0.1	0.0	2.0	0.3	0
Sweetened Beverages	3,080	12	0.1	0.0	1.9	0.4	3,080	13	0.1	0.0	1.4	0.3	123
Dairy Drinks and Substitutes	252	13	0.1	0.0	1.9	0.3	252	10	0.1	0.0	1.9	0.3	0
Mixed Dishes—Grain-based	1,221	14	0.1	0.0	1.7	0.1	1,221	20	0.0	0.0	0.6	0.1	544
Meats	1,314	15	0.1	0.0	1.6	0.1	1,314	12	0.1	0.0	1.5	0.1	19
Mixed Dishes—Mexican	800	16	0.1	0.0	1.4	0.1	800	27	0.0	0.0	0.2	0.0	751
Yogurt	360	17	0.1	0.0	1.3	0.2	552	14	0.1	0.0	1.4	0.2	226
Mixed Dishes—Asian	506	18	0.1	0.0	1.2	0.4	506	15	0.1	0.0	1.2	0.4	20
Mixed Dishes—Soups	698	19	0.1	0.0	1.0	0.2	698	23	0.0	0.0	0.3	0.0	90
Other Desserts	766	20	0.1	0.0	1.0	0.2	766	31	0.0	0.0	0.1	0.0	690
White Potatoes	1,616	21	0.1	0.0	1.0	0.1	1,616	21	0.0	0.0	0.4	0.1	366
Adults 51-99 years of age (n = 4,522)													
WWEIA Food Group	Specific Food Group Intake						Adjusted Intake						Delta Intake
Sub Group Description	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons
Milk	1,808	1	1.4	0.1	30.1	1.5	3,772	1	1.8	0.1	38.0	1.6	3,275
Seafood	611	2	0.8	0.1	17.4	2.2	611	2	0.8	0.1	17.3	2.2	55
Eggs	1,118	3	0.4	0.0	8.5	0.5	1,118	3	0.4	0.0	7.6	0.5	504
Ready-to-Eat Cereals	970	4	0.3	0.0	7.1	0.4	970	4	0.3	0.0	7.1	0.4	46
Cheese	1,400	5	0.2	0.0	4.7	0.3	2,434	5	0.3	0.0	6.9	0.4	1,546
Mixed Dishes—M/P/F	994	6	0.2	0.0	3.3	0.5	994	8	0.1	0.0	2.4	0.5	317
Cured Meats/Poultry	1,454	7	0.1	0.0	2.9	0.2	1,454	6	0.1	0.0	2.9	0.2	2
Sweetened Beverages	1,678	8	0.1	0.0	2.7	0.5	1,678	7	0.1	0.0	2.4	0.5	83
Dairy Drinks and Substitutes	211	9	0.1	0.0	2.1	0.3	211	9	0.1	0.0	2.1	0.3	0
Yogurt	340	10	0.1	0.0	1.8	0.2	484	10	0.1	0.0	1.8	0.2	164
Mixed Dishes—Sandwiches	581	11	0.1	0.0	1.7	0.2	581	15	0.1	0.0	1.1	0.1	301
100% Juice	1,000	12	0.1	0.0	1.5	0.1	1,000	11	0.1	0.0	1.5	0.1	0
Meats	1,074	13	0.1	0.0	1.5	0.2	1,074	12	0.1	0.0	1.5	0.2	17
Coffee and Tea	3,465	14	0.1	0.0	1.4	0.3	3,465	25	0.0	0.0	0.2	0.1	126
Cooked Cereal	540	15	0.1	0.0	1.4	0.2	540	27	0.0	0.0	0.1	0.0	287
Flavored Milk	121	16	0.1	0.0	1.4	0.2	121	13	0.1	0.0	1.4	0.2	0
Mixed Dishes—Grain-based	866	17	0.1	0.0	1.3	0.2	866	18	0.0	0.0	0.5	0.1	316
Fats and Oils	2,787	18	0.1	0.0	1.3	0.1	2,787	14	0.1	0.0	1.2	0.1	430
White Potatoes	1,126	19	0.1	0.0	1.1	0.2	1,126	19	0.0	0.0	0.5	0.1	281
Other Desserts	902	20	0.1	0.0	1.0	0.1	902	32	0.0	0.0	0.0	0.0	796

fruit (138 mg; 5.1%). Using SFG data for adults 51+ years, coffee and tea (271 mg; 10.0%); vegetables excluding potatoes (246 mg; 9.1%); fruit (195 mg; 7.2%); milk (170 mg; 6.2%); and white potatoes (154 mg; 5.7%) were the top five food sources. Disaggregated data showed the similar rank order except that milk replaced fruit as the third highest source with very small differences in percent potassium intake.

Contribution of foods to percent added sugars intake

Total added sugars intake (tsp eq ± SE) was 20.4 ± 0.4 tsp eq and 24.4 ± 0.4 tsp eq for those 19 - 50 and 51+ years, respectively. There were 15 and 14 food sources that contributed at least 1% of SFG added sugars intake of adults for the age groups 19 - 50 and 51+, respectively (Table 6). Using SFG data for adults 19 - 50 years, sweetened beverages (8.6 tsp eq 42.0%); sweet bakery products (2.4 tsp eq; 11.8%); coffee and tea (1.8 tsp eq; 8.8%);

Table 5: Food/food group sources of mean potassium (milligrams) intake¹ among US adults 19 - 99 years (N = 9,953): National Health and Nutrition Examination Survey 2011-2014.

¹To a 1% contribution of daily intake of potassium.

²Nutrients from milk, cheese and yogurt for non-dairy foods are added to the nutrients in the milk, cheese, and yogurt food categories, respectively. For non-dairy foods the nutrients displayed are only for the milk, cheese, and yogurt in the non-dairy food.

Abbreviations: Cons: Consumers, M/P/F : Meat/Poultry/Fish.

Adults 19 - 50 years of age (n = 5,431)																	
WWEIA Food Group	Specific Food Group Intake						Adjusted Intake ²						Delta Intake				
Sub Group Description	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons	Mean	SE	Pct	SE
Vegetables, excluding Potatoes	2,757	1	195.0	9.8	7.2	0.3	2,757	2	193.9	9.7	7.1	0.3	128	-1.1	0.2	0.0	0.0
Coffee and Tea	3,047	2	178.4	7.4	6.5	0.3	3,047	3	161.2	6.8	5.9	0.2	282	-17.2	2.0	-0.6	0.1
White Potatoes	1,616	3	161.8	6.7	5.9	0.3	1,616	4	158.1	6.6	5.8	0.2	366	-3.7	0.3	-0.1	0.0
Milk	1,614	4	145.1	7.6	5.3	0.3	4,194	1	222.8	8.8	8.2	0.3	3,732	77.7	4.4	2.9	0.2
Fruit	1,947	5	137.8	5.9	5.1	0.2	1,947	5	137.8	5.9	5.1	0.2	11	0.0	0.0	0.0	0.0
Mixed Dishes—Mexican	800	6	114.4	8.1	4.2	0.3	800	9	105.7	7.6	3.9	0.3	751	-8.7	0.6	-0.3	0.0
Poultry	1,592	7	114.1	7.2	4.2	0.3	1,592	6	113.6	7.2	4.2	0.3	392	-0.4	0.1	0.0	0.0
Plant-based Protein Foods	1,354	8	111.4	5.8	4.1	0.2	1,354	7	111.4	5.8	4.1	0.2	5	0.0	0.0	0.0	0.0
Mixed Dishes—M/P/F	994	9	110.1	8.4	4.0	0.3	994	8	105.8	8.1	3.9	0.3	351	-4.3	0.6	-0.2	0.0
Meats	1,314	10	100.8	5.1	3.7	0.2	1,314	10	100.7	5.1	3.7	0.2	19	0.0	0.0	0.0	0.0
Mixed Dishes—Grain-based	1,221	11	96.4	4.9	3.5	0.2	1,221	13	89.5	4.8	3.3	0.2	544	-6.9	0.5	-0.3	0.0
Cured Meats/Poultry	1,548	12	92.9	4.8	3.4	0.2	1,548	11	92.9	4.8	3.4	0.2	3	0.0	0.0	0.0	0.0
100% Juice	948	13	92.3	7.9	3.4	0.3	948	12	92.3	7.9	3.4	0.3	0	0.0	0.0	0.0	0.0
Mixed Dishes—Sandwiches	1,036	14	92.0	4.9	3.4	0.2	1,036	15	86.3	4.6	3.2	0.2	601	-5.6	0.4	-0.2	0.0
Savory Snacks	1,814	15	87.6	3.2	3.2	0.1	1,814	14	87.3	3.2	3.2	0.1	247	-0.3	0.1	0.0	0.0
Sweetened Beverages	3,080	16	82.2	6.5	3.0	0.2	3,080	16	78.0	6.1	2.9	0.2	123	-4.2	0.8	-0.2	0.0
Mixed Dishes—Pizza	741	17	78.7	4.4	2.9	0.2	741	19	66.7	3.7	2.5	0.2	741	-12.0	0.6	-0.4	0.0
Bread, Rolls, Tortillas	2,925	18	77.8	2.6	2.9	0.1	2,925	17	77.3	2.6	2.8	0.1	165	-0.4	0.1	0.0	0.0
Alcoholic Beverages	1,375	19	76.0	5.2	2.8	0.2	1,375	18	75.9	5.2	2.8	0.2	3	-0.0	0.0	0.0	0.0
Condiments and Sauces	2,547	20	60.5	3.3	2.2	0.1	2,547	20	58.9	3.2	2.2	0.1	136	-1.6	0.3	-0.1	0.0
Mixed Dishes—Soups	698	21	57.1	5.6	2.1	0.2	698	22	52.7	5.2	1.9	0.2	90	-4.4	1.0	-0.2	0.0
Sweet Bakery Products	1,996	22	50.9	1.5	1.9	0.1	1,996	24	46.8	1.5	1.7	0.1	927	-4.1	0.2	-0.2	0.0
Seafood	623	23	49.4	5.6	1.8	0.2	623	23	49.3	5.6	1.8	0.2	35	-0.1	0.1	0.0	0.0
Mixed Dishes—Asian	506	24	41.3	2.8	1.5	0.1	506	25	41.2	2.8	1.5	0.1	20	-0.0	0.0	0.0	0.0
Eggs	1,138	25	40.5	1.7	1.5	0.1	1,138	26	35.2	1.5	1.3	0.1	608	-5.4	0.3	-0.2	0.0
Other Desserts	766	26	39.5	4.1	1.5	0.2	766	29	22.2	2.2	0.8	0.1	690	-17.4	2.0	-0.6	0.1
Ready-to-Eat Cereals	863	27	32.1	2.2	1.2	0.1	863	27	32.0	2.2	1.2	0.1	74	-0.1	0.0	0.0	0.0
Adults 51 - 99 years of age (n = 4,522)																	
WWEIA Food Group	Specific Food Group Intake						Adjusted Intake						Delta Intake				
Sub Group Description	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons	Mean	SE	Pct	SE
Coffee and Tea	3,465	1	271.0	11.8	10.0	0.4	3,465	1	261.8	12.4	9.6	0.4	126	-9.2	1.9	-0.3	0.1
Vegetables, excluding Potatoes	2,695	2	246.3	11.6	9.1	0.4	2,695	2	245.0	11.6	9.0	0.4	108	-1.3	0.2	-0.1	0.0
Fruit	2,330	3	195.1	6.3	7.2	0.2	2,330	4	195.1	6.3	7.2	0.2	4	0.0	0.0	0.0	0.0
Milk	1,808	4	169.5	9.1	6.2	0.3	3,772	3	244.4	9.4	9.0	0.3	3,275	74.9	2.6	2.8	0.1
White Potatoes	1,126	5	153.9	7.9	5.7	0.3	1,126	5	149.7	7.6	5.5	0.3	281	-4.2	0.7	-0.2	0.0
Mixed Dishes—M/P/F	994	6	123.6	6.7	4.6	0.2	994	7	118.2	6.6	4.4	0.2	317	-5.4	0.8	-0.2	0.0
Plant-based Protein Foods	1,410	7	119.8	5.5	4.4	0.2	1,410	6	119.8	5.5	4.4	0.2	0	0.0	0.0	0.0	0.0
100% Juice	1,000	8	108.8	8.7	4.0	0.3	1,000	8	108.8	8.7	4.0	0.3	0	0.0	0.0	0.0	0.0

Breads, Rolls, Tortillas	2,889	9	87.9	1.9	3.2	0.1	2,889	9	87.3	1.9	3.2	0.1	136	-0.6	0.1	0.0	0.0
Poultry	1,155	10	82.2	4.4	3.0	0.2	1,155	10	81.9	4.4	3.0	0.2	240	-0.3	0.0	0.0	0.0
Meats	1,074	11	81.1	5.1	3.0	0.2	1,074	11	81.1	5.1	3.0	0.2	17	0.0	0.0	0.0	0.0
Cured Meats/Poultry	1,454	12	79.9	4.1	2.9	0.2	1,454	12	79.9	4.1	2.9	0.2	2	0.0	0.0	0.0	0.0
Mixed Dishes—Grain-based	866	13	78.2	7.2	2.9	0.3	866	14	73.4	6.8	2.7	0.3	316	-4.8	0.7	-0.2	0.0
Mixed Dishes--Soups	713	14	77.7	5.1	2.9	0.2	713	13	73.5	4.7	2.7	0.2	80	-4.2	0.9	-0.2	0.0
Savory Snacks	1,197	15	72.8	5.5	2.7	0.2	1,197	15	72.6	5.5	2.7	0.2	121	-0.1	0.1	0.0	0.0
Alcoholic Beverages	953	16	59.3	3.7	2.2	0.2	953	16	59.3	3.7	2.2	0.2	0	0.0	0.0	0.0	0.0
Seafood	611	17	56.1	6.2	2.1	0.2	611	17	55.9	6.2	2.1	0.2	55	-0.2	0.1	0.0	0.0
Sweet Bakery Products	1,845	18	55.4	2.7	2.0	0.1	1,845	18	51.8	2.5	1.9	0.1	833	-3.6	0.3	0.1	0.0
Mixed Dishes—Mexican	358	19	53.1	5.1	2.0	0.2	358	19	48.9	4.8	1.8	0.2	329	-4.2	0.5	0.2	0.0
Other Desserts	902	20	52.2	4.0	1.9	0.1	902	27	30.8	2.1	1.1	0.1	796	-21.5	2.0	0.8	0.1
Sweetened Beverages	1,678	21	51.0	4.1	1.9	0.2	1,678	20	48.4	3.9	1.8	0.1	83	-2.6	0.6	0.1	0.0
Mixed Dishes—Sandwiches	581	22	49.4	3.3	1.8	0.1	581	22	46.1	3.0	1.7	0.1	301	-3.3	0.4	-0.1	0.0
Ready-to-Eat Cereals	970	23	47.3	2.8	1.7	0.1	970	21	47.2	2.8	1.7	0.1	46	-0.1	0.0	0.0	0.0
Condiments and Sauces	1,815	24	43.5	3.1	1.6	0.1	1,815	23	42.4	3.0	1.6	0.1	64	-1.1	0.5	0.0	0.0
Eggs	1,118	25	36.2	2.2	1.3	0.1	1,118	26	32.3	1.8	1.2	0.1	504	-3.9	0.4	-0.1	0.0
Mixed Dishes—Pizza	262	26	31.1	5.2	1.2	0.2	262	29	26.6	4.5	1.0	0.2	261	-4.5	0.7	-0.2	0.0
Yogurt	340	27	30.6	3.3	1.1	0.1	484	25	35.0	3.3	1.3	0.1	164	4.4	1.2	0.2	0.1
Mixed Dishes—Asian	295	28	30.4	4.4	1.1	0.2	295	28	30.4	4.4	1.1	0.2	9	-0.0	0.0	0.0	0.0

sugars (1.3 tsp eq; 6.4%); and candy (1.0 g; 4.9%) were the top five food sources. Disaggregated data showed the same rank order with very small differences in percent added sugars intake. Using SFG data for adults 51+ years, sweetened beverages (3.7 tsp eq; 25.0%) sweet bakery products (2.5 tsp eq; 17.1%); sugars (1.4 tsp eq; 9.1%); coffee and tea (1.2 tsp eq; 8.2%); and other desserts (1.1 tsp eq; 7.1%) were the top five food sources. Disaggregated data showed the same rank order with very small differences in percent added sugars intake.

Contribution of foods to percent saturated fatty acid intake

Total saturated fatty acid (SFA) intake (g ± SE) was 28.4 ± 0.3 g and 24.4 ± 0.4 g for those 19 - 50 and 51+ years, respectively. There were 24 food sources that contributed at least 1% of SFG SFA intake of adults for the two age groups (Table 7). Using SFG data for adults 19 - 50 years, mixed dishes-Mexican (2.4 g; 8.4%); sweet bakery products (2.3 g; 8.0%); cheese (2.3 g; 7.9%); mixed dishes-Pizza (2.1 g; 7.3%); and mixed dishes-Sandwiches (2.0 g; 7.0%) were the top five food sources. When disaggregated data were examined

Table 7: Food/food group sources of mean saturated fatty acids (grams) intake¹ among US adults 19 - 99 years (N = 9,953): National Health and Nutrition Examination Survey 2011 - 2014.

¹To a 1% contribution of daily intake of saturated fatty acids.

²Nutrients from milk, cheese and yogurt for non-dairy foods are added to the nutrients in the milk, cheese, and yogurt food categories, respectively. For non-dairy foods the nutrients displayed are only for the milk, cheese, and yogurt in the non-dairy food.

Abbreviations: Cons: Consumers, M/P/F : Meat/Poultry/Fish.

Adults 19 - 50 years of age (n = 5,431)																	
WWEIA Food Group	Specific Food Group Intake						Adjusted Intake ²						Delta Intake				
	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons	Mean	SE	Pct	SE
Mixed Dishes—Mexican	800	1	2.4	0.1	8.4	0.5	800	6	1.5	0.1	5.2	0.3	751	-0.9	0.1	-3.3	0.2
Sweet Bakery Products	1,996	2	2.3	0.1	8.0	0.2	1,996	2	2.2	0.1	7.9	0.2	927	0.0	0.0	-0.1	0.0
Cheese	1,907	3	2.3	0.1	7.9	0.4	3,738	1	5.6	0.2	19.7	0.4	2,829	3.3	0.1	11.8	0.3
Mixed Dishes—Pizza	741	4	2.1	0.1	7.3	0.4	741	15	0.8	0.1	2.8	0.2	741	-1.3	0.1	-4.5	0.2
Mixed Dishes—Sandwiches	1,036	5	2.0	0.1	7.0	0.4	1,036	5	1.5	0.1	5.3	0.3	601	-0.5	0.0	-1.6	0.1
Fats and Oils	2,734	6	1.8	0.1	6.3	0.2	2,734	3	1.8	0.1	6.2	0.2	404	0.0	0.0	-0.1	0.0
Meats	1,314	7	1.4	0.1	4.9	0.3	1,314	7	1.4	0.1	4.9	0.3	19	0.0	0.0	0.0	0.0

Mixed Dishes—Grain-based	1,221	8	1.3	0.1	4.4	0.2	1,221	11	0.9	0.1	3.2	0.2	544	-0.4	0.0	-1.2	0.1
Milk	1,614	9	1.2	0.1	4.1	0.3	4,194	4	1.7	0.1	6.1	0.3	3,732	0.6	0.0	2.1	0.1
Eggs	1,138	10	1.0	0.1	3.7	0.2	1,138	10	0.9	0.0	3.2	0.2	608	-0.1	0.0	-0.5	0.0
Other Desserts	766	11	1.0	0.1	3.6	0.4	766	13	0.9	0.1	3.1	0.3	690	-0.1	0.0	-0.5	0.1
Cured Meats/Poultry	1,548	12	1.0	0.1	3.5	0.2	1,548	8	1.0	0.1	3.5	0.2	3	0.0	0.0	0.0	0.0
Poultry	1,592	13	1.0	0.1	3.4	0.3	1,592	9	1.0	0.1	3.5	0.3	392	0.0	0.0	0.0	0.0
Mixed Dishes—M/P/F	994	14	1.0	0.1	3.4	0.3	994	12	0.9	0.1	3.1	0.3	351	-0.1	0.0	-0.3	0.0
Plant-based Protein Foods	1,354	15	0.8	0.1	2.8	0.2	1,354	14	0.8	0.1	2.8	0.2	5	0.0	0.0	0.0	0.0
Candy	1,201	16	0.7	0.1	2.5	0.2	1,201	17	0.7	0.1	2.4	0.2	669	0.0	0.0	-0.1	0.0
White Potatoes	1,616	17	0.7	0.0	2.5	0.1	1,616	18	0.6	0.0	2.1	0.1	366	-0.1	0.0	-0.3	0.0
Savory Snacks	1,814	18	0.7	0.0	2.4	0.1	1,814	16	0.7	0.0	2.4	0.1	247	0.0	0.0	0.0	0.0
Bread, Rolls, Tortillas	2,925	19	0.6	0.0	1.9	0.1	2,925	19	0.5	0.0	1.9	0.1	165	0.0	0.0	0.0	0.0
Vegetables, excluding Potatoes	2,757	20	0.4	0.0	1.2	0.1	2,757	20	0.3	0.0	1.1	0.1	128	0.0	0.0	-0.1	0.0
Condiments and Sauces	2,547	21	0.3	0.0	1.2	0.2	2,547	22	0.3	0.0	1.1	0.1	136	-0.1	0.0	-0.2	0.0
Mixed Dishes—Soups	698	22	0.3	0.0	1.2	0.1	698	23	0.3	0.0	1.0	0.1	90	-0.1	0.0	-0.2	0.0
Quick Bread and Bread Products	612	23	0.3	0.0	1.1	0.1	612	24	0.3	0.0	1.0	0.1	571	0.0	0.0	-0.1	0.0
Mixed Dishes—Asian	506	24	0.3	0.0	1.0	0.1	506	21	0.3	0.0	1.0	0.1	20	0.0	0.0	0.0	0.0
Adults 51-99 years of age (n = 4,522)																	
WWEIA Food Group	Specific Food Group Intake						Adjusted Intake						Delta Intake				
Sub Group Description	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons	Mean	SE	Pct	SE
Fats and Oils	2,787	1	2.3	0.1	9.5	0.4	2,787	2	2.3	0.1	9.4	0.4	430	0.0	0.0	-0.1	0.0
Sweet Bakery Products	1,845	2	2.3	0.1	9.2	0.4	1,845	3	2.2	0.1	9.1	0.4	833	0.0	0.0	-0.1	0.0
Cheese	1,400	3	1.9	0.1	7.9	0.4	2,434	1	3.6	0.2	14.8	0.6	1,546	1.7	0.1	6.9	0.3
Other Desserts	902	4	1.4	0.1	5.6	0.3	902	5	1.2	0.1	4.9	0.3	796	-0.2	0.0	-0.7	0.1
Milk	1,808	5	1.2	0.1	4.8	0.3	3,772	4	1.7	0.1	7.1	0.4	3,275	0.6	0.0	2.3	0.1
Mixed Dishes—Mexican	358	6	1.1	0.1	4.7	0.4	358	14	0.7	0.1	2.9	0.3	329	-0.5	0.1	-1.8	0.2
Mixed Dishes—M/P/F	994	7	1.1	0.1	4.6	0.2	994	7	1.0	0.1	4.2	0.2	317	-0.1	0.0	-0.4	0.1
Cured Meats/Poultry	1,454	8	1.1	0.1	4.5	0.3	1,454	6	1.1	0.1	4.5	0.3	2	0.0	0.0	0.0	0.0
Mixed Dishes—Sandwiches	581	9	1.1	0.1	4.5	0.3	581	11	0.9	0.1	3.5	0.2	301	-0.3	0.0	-1.0	0.1
Mixed Dishes—Grain-based	866	10	1.1	0.1	4.3	0.4	866	12	0.8	0.1	3.2	0.3	316	-0.3	0.0	-1.1	0.1
Plant-based Protein Foods	1,410	11	1.0	0.1	4.0	0.3	1,410	8	1.0	0.1	4.0	0.3	0	0.0	0.0	0.0	0.0
Meats	1,074	12	1.0	0.1	4.0	0.3	1,074	9	1.0	0.1	4.0	0.3	17	0.0	0.0	0.0	0.0
Eggs	1,118	13	1.0	0.1	3.9	0.3	1,118	10	0.9	0.1	3.6	0.2	504	-0.1	0.0	-0.4	0.1
Mixed Dishes—Pizza	262	14	0.8	0.1	3.4	0.6	262	20	0.3	0.1	1.4	0.3	261	-0.5	0.1	-2.0	0.3
Candy	951	15	0.8	0.1	3.3	0.2	951	13	0.8	0.1	3.2	0.2	572	0.0	0.0	-0.2	0.0
Poultry	1,155	16	0.6	0.0	2.6	0.2	1,155	15	0.6	0.0	2.6	0.2	240	0.0	0.0	0.0	0.0
White Potatoes	1,126	17	0.6	0.0	2.6	0.2	1,126	16	0.6	0.0	2.3	0.2	281	-0.1	0.0	-0.3	0.1
Bread, Rolls, Tortillas	2,889	18	0.6	0.0	2.2	0.1	2,889	17	0.5	0.0	2.2	0.1	136	0.0	0.0	-0.1	0.0
Savory Snacks	1,197	19	0.5	0.0	2.1	0.1	1,197	18	0.5	0.0	2.1	0.1	121	0.0	0.0	0.0	0.0
Vegetables, excluding Potatoes	2,695	20	0.4	0.0	1.8	0.2	2,695	19	0.4	0.0	1.6	0.1	108	-0.1	0.0	-0.2	0.0
Condiments and Sauces	1,815	21	0.3	0.1	1.3	0.2	1,815	21	0.3	0.1	1.2	0.2	64	0.0	0.0	-0.1	0.0
Mixed Dishes—Soups	713	22	0.3	0.0	1.3	0.1	713	24	0.2	0.0	1.0	0.1	80	-0.1	0.0	-0.3	0.0
Quick Bread and Bread Products	583	23	0.3	0.0	1.2	0.1	583	23	0.3	0.0	1.0	0.1	560	0.0	0.0	-0.1	0.0
Seafood	611	24	0.3	0.0	1.1	0.1	611	22	0.3	0.0	1.1	0.1	55	0.0	0.0	0.0	0.0

the top five food sources were cheese (5.6 g; 19.7%); sweet bakery products (2.2 g; 7.9%); fats and oils (1.8 g; 6.2%); milk (1.7 g; 6.1%); and mixed dishes-Sandwiches (1.5 g; 5.3%). Using SFG data for adults 51+ years, fats and oils (2.3 g; 9.5%); sweet bakery products (2.3 g; 9.2%); cheese (1.9 g; 7.9%); other desserts (1.4 g; 5.6%); and milk (1.2 g; 4.8%) were the top five food sources. When disaggregated data were examined the top five food sources were cheese (3.6 g; 14.8%); fats and oils (2.3 g; 9.4%); sweet bakery products (2.2 g; 9.1%); milk (1.7 g; 7.1%); and other desserts (1.2 g; 4.9%).

Contribution of foods to percent sodium intake

Total sodium intake (mg ± SE) was 3825 ± 25 mg and 3244 ± 31 mg for those 19 - 50 and 51+ years, respectively. There were 26 and 28 food sources that contributed at least 1% of SFG sodium intake for the age groups 19 - 50 and 51+ years, respectively (Table 8). Using SFG data for adults 19 - 50 years, cured meats/poultry (272 mg; 7.1%); mixed dishes-Mexican (259 mg; 6.8%); mixed dishes-Pizza (253 mg; 6.6%); mixed dishes-Sandwiches (250 mg; 6.5%); and breads, rolls, tortillas (235 mg; 6.1%) were the top five food

Table 8: Food/food group sources of mean sodium (mg) intake¹ among US adults 19 - 99 years (N = 9,953): National Health and Nutrition Examination Survey 2011 - 2014.

¹To a 1% contribution of daily intake of sodium.

²Nutrients from milk, cheese and yogurt for non-dairy foods are added to the nutrients in the milk, cheese, and yogurt food categories, respectively. For non-dairy foods the nutrients displayed are only for the milk, cheese, and yogurt in the non-dairy food.

Abbreviations: Cons: Consumers, M/P/F : Meat/Poultry/Fish.

Adults 19 - 50 years of age (n = 5,431)																	
WWEIA Food Group	Specific Food Group Intake						Adjusted Intake ²						Delta Intake				
	Sub Group Description	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons	Mean	SE	Pct
Cured Meats/Poultry	1,548	1	273.0	14.2	7.1	0.4	1,548	2	272.9	14.2	7.1	0.4	3	-0.1	0.1	0.0	0.0
Mixed Dishes—Mexican	800	2	258.9	16.7	6.8	0.4	800	5	209.9	14.0	5.5	0.4	751	-49.1	3.2	-1.3	0.1
Mixed Dishes—Pizza	741	3	252.5	14.7	6.6	0.4	741	8	184.4	11.4	4.8	0.3	741	-68.1	3.6	-1.8	0.1
Mixed Dishes—Sandwiches	1,036	4	250.2	13.2	6.5	0.4	1,036	4	224.3	11.8	5.9	0.3	601	-25.8	1.7	-0.7	0.0
Breads, Rolls, Tortillas	2,925	5	235.0	7.2	6.1	0.2	2,925	3	234.3	7.1	6.1	0.2	165	-0.6	0.1	0.0	0.0
Poultry	1,592	6	201.0	13.5	5.3	0.4	1,592	6	200.8	13.5	5.3	0.4	392	-0.1	0.0	0.0	0.0
Mixed Dishes—Grain-based	1,221	7	192.9	7.5	5.0	0.2	1,221	10	174.5	7.0	4.6	0.2	544	-18.4	1.7	-0.5	0.1
Condiments and Sauces	2,547	8	187.1	8.6	4.9	0.2	2,547	7	184.6	8.1	4.8	0.2	136	-2.6	0.6	-0.1	0.0
Mixed Dishes—M/P/F	994	9	180.4	14.5	4.7	0.4	994	9	176.6	14.4	4.6	0.4	351	-3.9	0.5	-0.1	0.0
Mixed Dishes—Soups	698	10	148.9	12.3	3.9	0.3	698	11	146.6	12.1	3.8	0.3	90	-2.4	0.4	-0.1	0.0
Cheese	1,907	11	140.4	10.0	3.7	0.3	3,738	1	319.9	10.3	8.4	0.2	2,829	179.5	5.3	4.7	0.1
Meats	1,314	12	129.9	7.1	3.4	0.2	1,314	12	129.8	7.1	3.4	0.2	19	0.0	0.0	0.0	0.0
Sweet Bakery Products	1,996	13	116.7	3.7	3.1	0.1	1,996	13	115.3	3.7	3.0	0.1	927	-1.3	0.2	0.0	0.0
Vegetables, excluding Potatoes	2,757	14	115.1	5.4	3.0	0.1	2,757	14	113.1	5.2	3.0	0.1	128	-2.0	0.6	-0.1	0.0
Eggs	1,616	15	109.0	5.1	2.9	0.1	1,616	15	103.6	5.1	2.7	0.1	366	-5.3	0.7	-0.1	0.0
Fats and Oils	1,138	16	105.5	4.8	2.8	0.1	1,138	16	98.7	4.4	2.6	0.1	608	-6.8	0.5	-0.2	0.0
Mixed Dishes—Asian	2,734	17	94.8	4.2	2.5	0.1	2,734	17	94.2	4.1	2.5	0.1	404	-0.7	0.1	0.0	0.0
Savory Snacks	506	18	93.7	6.0	2.5	0.2	506	18	93.7	6.0	2.5	0.2	20	0.0	0.0	0.0	0.0
Seafood	1,814	19	89.0	4.1	2.3	0.1	1,814	19	88.5	4.0	2.3	0.1	247	-0.6	0.1	0.0	0.0
Plant-based Protein Foods	623	20	74.2	8.0	1.9	0.2	623	20	74.1	8.0	1.9	0.2	35	0.0	0.0	0.0	0.0
Quick Bread and Bread Products	1,354	21	71.2	3.5	1.9	0.1	1,354	21	71.1	3.5	1.9	0.1	5	-0.1	0.0	0.0	0.0
Cooked Grains	612	22	65.7	4.9	1.7	0.1	612	24	64.3	4.7	1.7	0.1	571	-1.4	0.1	0.0	0.0
Sweetened Beverages	1,026	23	65.3	3.6	1.7	0.1	1,026	23	65.3	3.6	1.7	0.1	0	0.0	0.0	0.0	0.0
Milk	3,080	24	59.6	3.7	1.6	0.1	3,080	25	58.3	3.6	1.5	0.1	123	-1.3	0.2	0.0	0.0
Ready-to-Eat Cereals	1,614	25	45.9	2.4	1.2	0.1	4,194	22	69.8	2.8	1.8	0.1	3,732	24.0	1.4	0.6	0.0

WWEIA Food Group	Cons	Rank	Mean	SE	Pct	SE	Cons	Rank	Mean	SE	Pct	SE	Cons	Mean	SE	Pct	SE
Plain Water	863	26	44.2	2.8	1.2	0.1	863	26	44.1	2.8	1.2	0.1	74	0.0	0.0	0.0	0.0
Adults 51-99 years of age (n = 4,522)																	
Sub Group Description	Specific Food Group Intake						Adjusted Intake						Delta Intake				
Breads, Rolls, Tortillas	2,889	1	265.0	5.0	8.2	0.2	2,889	1	264.3	5.0	8.2	0.2	136	-0.7	0.2	0.0	0.0
Cured Meats/Poultry	1,454	2	246.1	13.3	7.6	0.4	1,454	2	246.1	13.3	7.6	0.4	2	0.0	0.0	0.0	0.0
Mixed Dishes—M/P/F	994	3	208.7	8.6	6.4	0.3	994	3	204.4	8.4	6.3	0.3	317	-4.3	0.7	0.1	0.0
Mixed Dishes--Soups	713	4	170.4	10.0	5.3	0.3	713	5	167.4	9.9	5.2	0.3	80	-3.0	0.4	-0.1	0.0
Mixed Dishes—Grain-based	866	5	155.0	13.4	4.8	0.4	866	7	141.8	12.2	4.4	0.4	316	-13.9	1.6	-0.4	0.1
Vegetables, excluding Potatoes	2,695	6	150.04	6.7	4.6	0.2	2,695	6	147.6	6.5	4.6	0.2	108	-2.5	0.4	-0.1	0.0
Poultry	1,155	7	140.4	7.1	4.3	0.2	1,155	8	140.4	7.1	4.3	0.2	240	-0.1	0.0	0.0	0.0
Condiments and Sauces	1,815	8	139.8	8.6	4.3	0.3	1,815	9	138.7	8.6	4.3	0.3	64	-1.2	0.2	0.0	0.0
Mixed Dishes--Sandwiches	581	9	135.9	8.7	4.2	0.3	581	11	122.0	7.7	3.8	0.2	301	-14.0	1.5	-0.4	0.0
Sweet Bakery Products	1,845	10	127.8	6.4	3.9	0.2	1,845	10	126.7	6.3	3.9	0.2	833	-1.1	0.1	0.0	0.0
Mixed Dishes—Mexican	358	11	114.5	11.1	3.5	0.3	358	15	90.9	9.2	2.8	0.3	329	-23.6	2.5	-0.7	0.1
White Potatoes	1,126	12	112.9	7.2	3.5	0.2	1,126	13	109.2	7.1	3.4	0.2	281	-3.6	0.8	-0.1	0.0
Fats and Oils	2,787	13	110.2	4.9	3.4	0.1	2,787	12	109.3	4.9	3.4	0.1	430	-1.0	0.2	0.0	0.0
Cheese	1,400	14	108.0	5.4	3.3	0.2	2,434	4	198.7	9.1	6.1	0.3	1,546	90.7	5.0	2.80	0.1
Meats	1,074	15	102.7	6.3	3.2	0.2	1,074	14	102.7	6.33	3.2	0.2	17	-0.0	0.0	0.00	0.00
Mixed Dishes—Pizza	262	16	100.4	17.0	3.1	0.5	262	19	74.9	13.2	2.3	0.4	261	-25.5	3.8	-0.79	0.1
Eggs	1,118	17	91.8	5.0	2.8	0.2	1,118	16	87.5	4.4	2.7	0.1	504	-4.3	0.8	-0.13	0.0
Seafood	611	18	81.5	8.3	2.5	0.3	611	17	81.4	8.3	2.5	0.3	55	-0.1	0.0	0.0	0.0
Plant-based Protein Foods	1,410	19	73.4	3.7	2.3	0.1	1,410	20	73.4	3.7	2.3	0.1	0	0.0	0.0	0.0	0.0
Savory Snacks	1,197	20	71.7	4.8	2.2	0.2	1,197	21	71.4	4.8	2.2	0.2	121	-0.3	0.1	0.0	0.0
Mixed Dishes—Asian	295	21	61.3	7.2	1.9	0.2	295	22	61.3	7.2	1.9	0.2	9	0.0	0.0	0.0	0.00
Quick Bread and Bread Products	583	22	57.2	5.9	1.8	0.2	583	23	56.0	5.8	1.7	0.2	560	-1.2	0.1	0.0	0.0
Milk	1,808	23	53.5	3.0	1.7	0.1	3,772	18	76.5	3.0	2.4	0.1	3,275	23.0	0.8	0.7	0.0
Ready-to-Eat Cereals	970	24	52.2	2.8	1.6	0.1	970	24	52.2	2.8	1.6	0.1	46	0.0	0.0	0.0	0.0
Cooked Grains	819	25	49.0	4.1	1.5	0.1	819	25	48.9	4.1	1.5	0.1	3	0.0	0.0	0.0	0.0
Crackers	789	26	38.4	2.7	1.2	0.1	789	26	38.2	2.7	1.2	0.1	125	-0.3	0.1	0.0	0.0
Cooked Cereals	540	27	35.1	3.3	1.1	0.1	540	28	32.7	3.2	1.0	0.1	287	-2.4	0.3	-0.1	0.0
Plain Water	3,692	28	33.3	1.1	1.0	0.0	3,692	27	33.3	1.1	1.0	0.0	0	0.0	0.0	0.0	0.0

sources. When disaggregated data were examined the top five food sources were cheese (320 mg; 8.4%); cured meats/poultry (273 mg; 7.1%); breads, rolls, tortillas (235 mg; 6.1%); mixed dishes-Sandwiches (224 mg; 5.9%); and mixed dishes-Mexican (210 mg; 5.5%). Using SFG data for adults 51+ years, breads, rolls, tortillas (265 mg; 8.2%); cured meats/poultry (246 mg; 7.6%); mixed dishes-Meat/Poultry/Fish (M/P/F) (209 mg; 6.4%); mixed dishes-Soups (170 mg; 5.3%); and mixed dishes-Grain based (155 mg; 4.8%) were the top five food sources. When disaggregated data were examined the top five food sources were bread, rolls, tortillas (264 mg; 8.2%); cured meats/poultry (246 mg; 7.6%); mixed dishes-M/P/F (204 mg; 6.3%); cheese (199 mg; 6.1%); and mixed dishes-Soups (167 mg; 5.2%).

The differences in energy and nutrients in SFG and in adjusted intake are substantial from the consumption of mixed dishes. Supplemental table 2 shows the change in energy and nutrients of public health concern in adults from SFG by age group; and Supplemental table 3 shows the percent energy and nutrients from mixed dishes in aggregated (SFG) and disaggregated intake of specific foods in adults.

This study showed that top food sources contributing to intake of energy, dietary fiber, calcium, vitamin D, potassium, SFA, added sugars, and sodium varied in the two adult age groups examined. In addition, food groups providing some of the major sources of nu-

Supplemental Table 2: Change in Nutrients of Public Health Concern in Adults from Specific Food Groups: NHANES 2011 - 2014¹.

¹Before and after disaggregation; ²Percent decrease when dairy ingredients are removed;

³Percent increase when dairy is removed and added to the dairy major categories.

	19 - 50 years			51 - 99 years	
	Decrease% ²	Increase% ³		Decrease % ²	Increase% ³
Kcal			Kcal		
Mixed Dishes-Mexican	17		Mixed Dishes-Sandwiches	9.5	
Mixed Dishes-Pizza	24.1		Mixed Dishes-Mexican	17.7	
Mixed Dishes-Grain based	8.2		Other Desserts	16.2	
Coffee and Tea	12.4		Mixed Dishes-Pizza	23.4	
Cheese		58.2	Cooked Cereals	11.8	
Milk		34.6	Milk		31.6
			Cheese		45.7
Calcium			Calcium		
Mixed Dishes-Mexican	71.6		Mixed Dishes-Mexican	73.4	
Mixed Dishes-Pizza	93.3		Other Desserts	57.7	
Mixed Dishes-Sandwiches	51.2		Mixed Dishes Sandwiches	51.1	
Mixed Dishes-Grain based	63.2		Mixed Dishes-Pizza	93.1	
Other Desserts	58.3		Mixed Dishes-Grain based	62.1	
Coffee and Tea	59.9		Mixed Dishes-M/P/F	32.7	
White Potatoes	58.4		Eggs	38.3	
Mixed Dishes-Soup	42.9		Cooked Cereals	42.3	
Savory Snacks	6.7		Mixed Dishes-Soup	41.1	
Cheese		58	White Potatoes	53.7	
Milk		33.9	Milk		29.7
			Cheese		47
Vitamin D			Vitamin D		
Milk		23.5	Milk		22.2
Potassium			Potassium		
Mixed Dishes-Mexican	7.6		White Potatoes	2.7	
Mixed Dishes-Grain Based	7.2		Mixed Dishes-Grain based	6.1	
Mixed Dishes-Sandwiches	6.2		Mixed Dishes-Mexican	9.7	
Mixed Dishes-Pizza	15.2		Other Desserts	41	
Eggs	13.1		Eggs	10.8	
Other Desserts	43.8		Mixed Dishes-Pizza	14.5	
Milk		34.9	Milk		30.6
			Yogurt		12.6
Saturated Fatty Acids			Saturated Fatty Acids		
Mixed Dishes-Mexican	37.5		Other Desserts	14.3	
Mixed Dishes-Pizza	61.9		Mixed Dishes-Mexican	36.4	
Mixed Dishes-Sandwiches	25		Mixed Dishes Sandwiches	18.2	
Mixed Dishes-Grain Based	30.8		Mixed Dishes-Grain based	27.3	
Cheese		58.9	Mixed Dishes-Pizza	62.5	
Milk		29.4	Cheese		47.2
			Milk		29.4
Sodium			Sodium		
Mixed Dishes-Mexican	18.9		Mixed Dishes-Grain based	8.5	
Mixed Dishes-Pizza	27		Vegetables, excluding Potatoes	1.6	
Mixed Dishes-Sandwiches	10.4		Mixed Dishes-Sandwiches	10.2	
Mixed Dishes-Grain Based	9.5		Mixed Dishes-Mexican	20.6	
Mixed Dishes-M/P/F	2.1		Mixed Dishes-Pizza	25.4	
Cheese		56.1	Cheese		45.6
			Milk		30.1

Supplemental Table 3: Percent of Energy and Nutrients from Mixed Dishes in Aggregated and Disaggregated Intake of Specific Foods in Adults: NHANES 2011 – 2014.

¹SFG: Specific Food Group.

²Adjusted intake is the total daily intake after nutrients from dairy from non-dairy foods (e.g. mixed dishes) have been included. ³M/F/PL. Meat/Fish/Poultry.

Mixed Dishes	Energy (%)			
	SFG ¹		Adjusted ²	
	19 - 50 years	51 - 99 years	19 - 50 years	51 - 99 years
Mexican	5.0	2.7	4.2	2.3
Pizza	4.9	2.3	3.7	1.7
Sandwiches	4.8	3.1	4.3	2.8
Grain based	4.4	4.2	4.0	3.9
M/P/F ³	3.0	4.1	2.9	4.0
Asian	1.7	1.3	1.7	1.3
Soups	1.2	1.6	1.1	1.5
	25%	19%	18%	18%
	Dietary Fiber (%)			
Mexican	7.0	3.3	7.0	3.3
Pizza	5.0	2.0	5.0	2.0
Sandwiches	3.0	1.6	3.0	1.6
Grain based	5.8	4.8	5.8	4.8
M/P/F	3.0	3.4	3.0	3.4
Asian	1.4	1.0	1.4	1.0
Soups	2.2	2.8	2.2	2.8
	27%	19%	27%	19%
	Calcium (%)			
Mexican	7.3	4.0	2.1	1.1
Pizza	6.9	3.1	0.5	0.2
Sandwiches	4.9	3.1	2.4	1.5
Grain based	3.1	2.8	1.1	1.0
M/P/F	1.6	2.2	1.1	1.5
Asian	--	--	--	--
Soups	10.5	1.4	6.0	0.8
	34%	17%	13%	6%
	Vitamin D (%)			
Mexican	1.4		0.2	
Pizza	--		--	
Sandwiches	3.0	1.7	1.9	1.1
Grain based	1.7	1.3	0.6	0.5
M/P/F	2.5	3.3	1.8	2.4
Asian	1.2		1.2	
Soups	1.0		0.3	
	11%	6%	6%	4%
	Potassium (%)			
Mexican	4.2	2.0	3.9	1.8
Pizza	2.9	1.2	2.5	1.0
Sandwiches	3.4	1.8	3.2	1.7
Grain based	3.5	2.9	3.3	2.7
M/P/F	4.0	4.6	3.9	4.4
Asian	1.5	--	1.5	--
Soups	2.1	2.9	1.9	2.7
	22%	15%	20%	14%
	Added Sugars (%)			

Mexican				
Pizza				
Sandwiches	1.2		1.2	
Grain based				
M/P/F				
Asian				
Soups				
	Saturated Fatty Acid (%)			
Mexican	8.4	4.7	5.2	2.9
Pizza	7.3	3.4	2.8	1.4
Sandwiches	7.0	4.5	5.3	3.5
Grain based	4.4	4.3	3.2	3.2
M/P/F	3.4	4.6	3.1	4.2
Asian	1.0		1.0	
Soups	1.2	1.3	1.0	1.0
	33%	23%	22%	16%
	Sodium (%)			
Mexican	6.8	3.5	5.5	2.8
Pizza	6.6	3.1	4.8	2.3
Sandwiches	6.5	4.2	5.9	3.8
Grain based	5.0	4.8	4.6	4.4
M/P/F	4.7	6.4	4.6	6.3
Asian	2.5	1.9	2.5	1.9
Soups	3.9	5.3	3.8	5.2
	36%	29%	32%	27%

trients of public health concern also contributed nutrients to limit in the diet. Mixed dishes, especially pizza and Mexican dishes, contributed to the intake of short fall nutrients in the diets of adults, but also contributed to nutrients to limit, notably SFA and sodium.

The DGA 2015-2010 [2] confirmed earlier committee reports that dietary fiber, calcium, vitamin D, and potassium were nutrients of public health concern. Although it is difficult to make direct comparisons with the findings of this study and that report, due to age and gender reporting differences, some parallels can be drawn. The Dietary Guidelines Advisory Committee (DGAC) Report 2015 - 2020, using WWEIA data from 2007 - 2010 [27], showed that the percentage of the population below the EAR for calcium and vitamin D were more than 40% and more than 90%, respectively. Additionally, the percentage of the population with intakes above the AI for dietary fiber and potassium were approximately 5% and less than 5%, respectively. Adult males and females exceeded the upper limit for sodium (>90 and >80%, respectively); and between 55% and 70% of adult males and females, respectively exceeded the recommendation for SFA.

The DGAC report [27] also showed that intake of whole grains, fruit, vegetables, and dairy, the principal contributors of nutrients of public health concern to the diet were also under consumed. These findings are reflected in the generally poor diet quality seen in US adults [4,37]. Using data from NHANES 2013-2014, older adults, 65+ years, had a higher Healthy Eating Index score (65.5/100 points) than younger adults, 18 - 64 years, (58/100

points) [4]. Although poor, these figures are numerically higher than the data from NHANES 2005-2006 [4]; care should be taken since the determination of scores may have been slightly different. These data are supported by another study [38] that found an improvement in “self-reported” intake from 1999-2012. These data support that American adults are capable of making improvements in diet. To help Americans improve their diet, however, it is important to determine current nutrient intake and the food sources that contribute to these nutrients. Determination of the contribution of food sources to nutrients in adults, using aggregated and disaggregated data, has not been assessed using NHANES data since the 2003-2006 data release [39]. Recently, however, another manuscript also explored foods consumed by adults using NHANES data from 2017-2012 [22]. That paper did not explore disaggregated foods or the effect of mixed dishes on nutrient intake.

Mixed dishes are those that are composed of several foods; for example, a typical pizza can be disaggregated into its component parts: tomatoes (vegetables), onions (vegetables), olive oil (fats and oils), flour (grains), cheese (dairy), pepperoni or other toppings (processed meats/meats/poultry/fish), and salt (sodium). While some consider pizza to be a food that is not healthful, it’s clear that many of the components that go into the product contribute important nutrients, including calcium, potassium, mono-unsaturated oils, and assorted vitamins and minerals. However, pizza also includes nutrients to limit, notably SFA and sodium. By showing the contribution of these mixed dishes to the intake of all

nutrients, many of the menu items, like pizza could be improved in order to increase the intake of under consumed food groups and limit the intake of SFA, sodium, and added sugars.

Mixed dishes contribute to the intake of energy, SFA, and sodium; however, they do provide vegetables, fiber, grains, and dairy [27]. Using NHANES data, it has been shown that 31% of vegetables, 45% of grains, 30% of dairy (usually cheese), and 45% of protein foods come from mixed dishes. Overall, mixed dishes make up 28% of total energy intake. The DGAC [27] has recommended that recipes for and portion sizes of mixed dishes could be modified to improve dietary intake.

Using the data from the SPG, for the nutrients of public health concern, dairy products, notably milk and cheese provided the top source of calcium. When the data were disaggregated, milk and cheese remained the top source of this nutrient but the percentage of total calcium in the diet provided by milk and cheese increased dramatically (in those 19 - 50 years from to 11.7 to 17.8% for milk and 12.9 to 30.6% for cheese). Surprisingly, this dramatic increase was not seen in the group of older adults, possibly because of the overall lower intake of calcium. The contribution of mixed dishes, especially Mexican foods and pizza were clearly shown by their shift in position in contributing calcium to the diet in both age groups. For example, in adults 19 - 50 years, mixed dishes—Mexican ranked third in the contribution of calcium to the diet when specific food groups were considered, but ranked ninth when nutrients from dairy ingredients were reassigned to the dairy group. The results are clearly different from those seen in children [28], where milk was the top source of calcium in all age groups using both specific food groups and disaggregated data. This finding underscores the importance of designing age specific messages geared to improve diet.

Total vitamin D intake was 188 IU and 190 IU for adults 19 - 50 years and 51+ years, respectively. This falls far short of the EAR for vitamin D of 400 IU; moreover, the Institute of Medicine currently recommends 600 IU a day for adults through 70 years, and 800 IU a day for those over 70 years [40]. There are few food sources high in vitamin D, and this study suggested that seafood and eggs were the principal unfortified sources of vitamin D. The data clearly demonstrated, however, the importance of fortification of foods with vitamin D. In both age groups, using adjusted data, fortified foods, such as fluid milk, ready-to-eat cereals, and 100% fruit juice, contributed approximately 45% of vitamin D to the diet with milk contributing the highest amount to the diet. Fortification of foods, as well as consumption of other foods high in vitamin D, such as egg yolks and salmon, should be encouraged.

Overall intake of potassium was very low in both age groups, with approximately 2,700 mg in both age groups, or slightly over half of the recommended dietary amount. Food sources of potas-

sium in the diets of adults were one of the biggest surprises seen in this study, especially when compared with data from children, where milk was the top contributor of potassium for all age groups studied [28]. Coffee and tea ranked second in younger adults and first in older adults as a food source of potassium. Although moderate consumption of coffee [41] and tea [42] have recently been shown to have positive health benefits, it is questionable if these beverages are the most healthful choices for intake of potassium since they include few other nutrients. High potassium foods, including milk and other dairy foods, should continue to be encouraged, along with other high potassium foods, notably fruit and vegetables—including white potatoes [43].

Despite the contribution of both dairy foods and mixed dishes to the intake of nutrients of public health concern, there is also concern that they contribute to the high amounts of SFA and sodium in the American diet. In this study, both age groups of adults exceeded the recommendations for SFA and sodium; and the contribution of mixed dishes to SFA and sodium intake varied by age. In adults 19 - 50 years, mixed dishes contributed 33% and 36% of SFA and sodium, respectively; whereas in adults 51+ years, they contributed 23% and 29%, respectively. Milk and cheese, on the other hand, in each age group contributed a total only 5 - 7% of SFA and 2 - 4% of sodium to the diet via the SFG intake approach. However with the disaggregated approach milk and cheese provided 6-19% of SFA and 2-8% of sodium. These data suggest that when altering recipes for mixed dishes, while using lower fat and lower sodium forms of milk and cheese should be considered, modifying other ingredients may provide larger impacts.

This study had a number of strengths. The first is that it used a large, nationally representative sample. The study also demonstrated the differences in food sources of nutrients in two age groups of adults. The third is that disaggregated energy and nutrients from milk, cheese, yogurt, and non-dairy food groups were also considered which gives further insight into the relative contribution of milk, cheese, and yogurt to both nutrients to encourage and to limit. This approach can help health professionals create targeted education materials and help individuals make more informed food choices [44].

As previously reported, this study type of study has a number of limitations [28], and it is important to review the principal ones here. Cross-sectional studies cannot assess cause and effect. Although 24-hour dietary recalls have been recognized as appropriate for providing data to estimate adequately population mean intakes [35], their limitations are well recognized. Participants may under- or -over-report energy and foods. Mis-reporting can be unintentional; however, use of the Automated Multiple-Pass Method [34], helps eliminate reporting errors, including those resulting from forgotten foods. Mis-reporting can also be deliberate; under-

reported foods often include desserts, sweet baked goods, butter, and alcoholic beverages [45]. Many of these foods were reported in this study, especially as related to principal sources of added sugars and SFA. In addition, there is a tendency to underreport foods by those in different age groups, genders, weight status, and socio-economic standing [46].

Recent concerns about the validity of self-reported dietary intakes in NHANES has led to an ongoing debate about the validity of some 24-hour recall data. For example Archer and co-workers, believe strongly that the data are “virtually useless” [47-49] given the issues with misreporting, whereas others, including the DGA [2], the prestigious National Cancer Institute, and others [50] use the data recognizing any potential limitations and draw conclusions accordingly. According to Ahluwalia [50], the Nutrition Monitoring Advisor for the Division of Health and Nutrition Examination Surveys, National Center for Health Studies, Centers for Disease Control and Prevention, and coworkers “NHANES collects dietary data in the context of its broad, multipurpose goals”. Their recent review discusses further strengths and limitations of these data.

Due to the technical difficulties involved, only dairy was disaggregated from mixed dishes; further insights might be obtained if it had been possible to disaggregate other food groups (e.g., grains, and vegetables which are typically used in mixed dishes). Finally, for this study, the assumption was made that the milk, cheese, and yogurt components of a mixed food followed the nutrient profiles of Milk NFS, Cheese NFS, and Yogurt NFS, but this approach may not provide the best approximation for some foods. For example, some types of cheese in a mix dishes may deviate from having a nutrient content similar to ‘Cheese NFS’ for one or more nutrients.

Conclusion

This study showed that for adults in both age groups studied, mixed dishes contributed substantially to nutrients of public health concern, with dairy foods contributing significantly to intake of calcium and vitamin D, while providing some SFA and sodium in the diet. The importance of fortifying foods with vitamin D was also important since few foods naturally contain high levels of vitamin D. The surprising finding was the importance of coffee and tea to potassium intake and the clear need to encourage more nutrient dense foods, such as milk, and fruit and vegetables to increase potassium intake. Awareness of food and beverage sources of nutrients can help health professionals design and promote effective age-appropriate strategies to increase the nutrient density of the diet. In addition, this awareness can help the food industry to design and market foods frequently consumed by adults that are more nutrient dense while still maintaining acceptability, availability, and affordability.

Acknowledgement

This work is a publication of the USDA/ARS Children’s Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston, Texas. The contents of this publication do not necessarily reflect the views or policies of the USDA, nor does mention of trade names, commercial products, or organizations imply endorsement from the U.S. government. Partial support was received from the United States Department of Agriculture/ Agricultural Research Service (USDA/ARS) through specific cooperative agreement 58-3092-5-001. Partial support was also received from the National Dairy Council. The sponsors had no input into the design, analyses, or interpretation of the results; and did not read the final manuscript prior to submission.

Author Contributions

VLF was responsible for the principal analysis of the data. TAN and CO’N also reviewed the data. CO’N was responsible for drafting the initial manuscript. VLF and TAN reviewed the manuscript and their revisions were incorporated for the final draft. Aside from the information above on funding support, the authors declare no other conflicts of interest.

Bibliography

1. United States Department of Agriculture and Economic Research Service. “Food availability (per capita) data system” (2020).
2. U.S. Department of Health and Human Services and U.S. Department of Agriculture. “2015 – 2020 Dietary Guidelines for Americans” (2019).
3. USDA and Agricultural Research Service. “Usual nutrient intake from food and beverages, by gender and age, What We Eat In America, NHANES 2013-2016” (2019).
4. United States Department of Agriculture. “Healthy eating index-HEI scores for Americans” (2019).
5. Alexander DD, *et al.* “Dairy consumption and CVD: A systematic review and meta-analysis”. *British Journal of Nutrition* 115.4 (2016): 737-750.
6. Khan B, *et al.* “Higher dietary calcium intakes are associated with reduced risks of fractures, cardiovascular events, and mortality: A prospective cohort study of older men and women”. *Journal of Bone and Mineral Research* 30.10 (2015): 1758-1766.
7. Threapleton DE, *et al.* “Dietary fibre intake and risk of cardiovascular disease: Systematic review and meta-analysis”. *BMJ* 347 (2013): f6879.
8. Dahl WJ and ML Stewart. “Position of the Academy of Nutrition and Dietetics: Health implications of dietary fiber”. *Journal of the Academy of Nutrition and Dietetics* 115.11 (2015): 1861-1870.

9. Aburto NJ, *et al.* "Effect of increased potassium intake on cardiovascular risk factors and disease: Systematic review and meta-analyses". *BMJ* 346 (2013): f1378.
10. Adroque HJ and NE Madias. "The impact of sodium and potassium on hypertension risk". *Seminars on Nephrology* 34.3 (2014): 257-272.
11. Nazari SSH and Y Mokhayeri. "Associations between dietary risk factors and ischemic stroke: A comparison of regression methods using data from the multi-ethnic study of atherosclerosis". 40 (2018): e2018021.
12. Berridge MJ. "Vitamin D deficiency and diabetes". *Biochemistry Journal* 474.8 (2017): 1321-1332.
13. Wadolowska L, *et al.* "Dairy-related dietary patterns, dietary calcium, body weight and composition: A study of obesity in polish mothers and daughters, the modaf project". *Nutrients* 10.1 (2018).
14. Tamer G, *et al.* "Is vitamin D deficiency an independent risk factor for obesity and abdominal obesity in women?" *Endokrynologia Polska* 63.3 (2012): 196-201.
15. Uday S and W Hogler. "Nutritional rickets and osteomalacia in the twenty-first century: Revised concepts, public health, and prevention strategies". *Current Osteoporosis Reports* 15.4 (2017): 293-302.
16. Cano A, *et al.* "Calcium in the prevention of postmenopausal osteoporosis: Emas clinical guide". *Maturitas* 107 (2018): 7-12.
17. Lichtenstein AH, *et al.* "Dietary fat consumption and health". *Nutrition Reviews* 56.5 Pt 2 (1998): S3-19; discussion S19-28.
18. O'Keeffe M and MP St-Onge. "Saturated fat and cardiovascular disease: A review of current evidence". *Current Cardiovascular Risk Reports* 7 (2013): 154-162.
19. United States Department of Agriculture and Agriculture Research Service. "USDA food composition databases" (2018).
20. Gershuni VM. "Saturated fat: Part of a healthy diet". *Current Nutrition Report* 7.3 (2018): 85-96.
21. Lordan R, *et al.* "Dairy fats and cardiovascular disease: Do we really need to be concerned?" 7.3 (2018).
22. Eicher-Miller HA and CJ Boushey. "How often and how much? Differences in dietary intake by frequency and energy contribution vary among U.S. Adults in NHANES 2007-2012". *Nutrients* 9.1 (2017).
23. U.S. Department of Agriculture. "Choose my plate".
24. Chrisman M and LK Diaz Rios. "Evaluating my plate after 8 years: A perspective". *Journal of Nutrition Education and Behavior* 51.7 (2019): 899-903.
25. USDA and Agricultural Research Service. "Food patterns equivalent database".
26. U.S. Department of Agriculture, Agricultural Research Service. "What We Eat In America (WWEIA) food categories (2013-2014)".
27. U.S. Department of Health and Human Services. "Scientific Report of the 2015 Dietary Guidelines Advisory Committee".
28. O'Neil CE, *et al.* "Food sources of energy and nutrients of public health concern and nutrients to limit with a focus on milk and other dairy foods in children 2 to 18 years of age: National Health and Nutrition Examination Survey, 2011(-)2014". *Nutrients* 10.8 (2018).
29. Centers for Disease Control and Prevention and National Center for Health Statistics. "About the National Health and Nutrition Examination Survey".
30. Centers for Disease Control and Prevention. "Survey methods and analytic guidelines".
31. Centers for Disease Control and Prevention and National Center for Health Statistics. "National Health and nutrition Examination Survey. Questionnaires, datasets, and related documentation. Response rates".
32. Centers for Disease Control and Prevention. "NCHS research ethics review board (ERB) approval".
33. National Health and Nutrition Examination Survey. "MEC in-person dietary interviewers procedures manual pdf".
34. Moshfegh AJ, *et al.* "The US Department of Agriculture automated multiple-pass method reduces bias in the collection of energy intakes". *American Journal of Clinical Nutrition* 88.2 (2008): 324-332.
35. Naska A, *et al.* "Dietary assessment methods in epidemiological research: Current state of the art and future prospects". *F1000 Research* 6 (2017): 926.
36. U.S. Department of Agriculture. "Food and nutrient database for dietary studies (FNDDS)". Food Survey Research Group.
37. Wang DD, *et al.* "Trends in dietary quality among adults in the United States, 1999 through 2010". *JAMA Internal Medicine* 174.10 (2014): 1587-1595.
38. Rehm CD, *et al.* "Dietary intake among US adults, 1999-2012". *Journal of the American Medical Association* 315.23 (2016): 2542-2553.
39. O'Neil CE, *et al.* "Food sources of energy and nutrients among adults in the US: NHANES 2003-2006". *Nutrients* 4.12 (2012): 2097-2120.
40. Institute of Medicine Committee to Review Dietary Reference Intakes for Vitamin, D, and Calcium. "The national academies collection: Reports funded by national institutes of health". Dietary reference intakes for calcium and vitamin D. Eds. Ross, A. C., *et al.* Washington (DC): National Academies Press (US) National Academy of Sciences (2011).

41. O'Keefe JH., *et al.* "Coffee for cardio protection and longevity". *Progress in Cardiovascular Diseases* 61.1 (2018): 38-42.
42. Yang CS., *et al.* "Studies on prevention of obesity, metabolic syndrome, diabetes, cardiovascular diseases and cancer by tea". *Journal of Food and Drug Analysis* 26.1 (2018): 1-13.
43. Nicklas TA., *et al.* "Removing potatoes from children's diets may compromise potassium intake". *Advances in Nutrition* 7.1 (2016): 247S-253S.
44. Huth PJ and KM Park. "Influence of dairy product and milk fat consumption on cardiovascular disease risk: A review of the evidence". *Advances in Nutrition* 3.3 (2012): 266-285.
45. Lafay L., *et al.* "Does energy intake underreporting involve all kinds of food or only specific food items? Results from the fleurbaix laventie ville sante (FLVS) study". *International Journal of Obesity and Related Metabolic Disorders* 24.11 (2000): 1500-1506.
46. Kye S., *et al.* "Under-reporting of energy intake from 24-hour dietary recalls in the Korean National Health and Nutrition Examination Survey". *Osong Public Health and Research Perspectives* 5.2 (2014): 85-91.
47. Archer E. "The use of implausible data without caveats is misleading". *American Journal of Clinical Nutrition* 106.3 (2017): 949-950.
48. Archer E. "The NHANES dietary data are physiologically implausible and inadmissible as scientific evidence". *American Journal of Clinical Nutrition* 106.3 (2017): 951-952.
49. Archer E., *et al.* "The inadmissibility of What We Eat In America and NHANES dietary data in nutrition and obesity research and the scientific formulation of national dietary guidelines". *Mayo Clinic Proceedings* 90.7 (2015): 911-926.
50. Ahluwalia N., *et al.* "Update on NHANES dietary data: Focus on collection, release, analytical considerations, and uses to inform public policy". *Advances in Nutrition* 7.1 (2016): 121-134.

Assets from publication with us

- Prompt Acknowledgement after receiving the article
- Thorough Double blinded peer review
- Rapid Publication
- Issue of Publication Certificate
- High visibility of your Published work

Website: <https://www.actascientific.com/>

Submit Article: <https://www.actascientific.com/submission.php>

Email us: editor@actascientific.com

Contact us: +91 9182824667