Supplementary Online Content

Liu J, Rehm CD, Onopa J, Mozaffarian D. Trends in diet quality among youth in the United States, 1999-2016. *JAMA*. Published March 24, 2020. doi:10.1001/jama.2020.0878

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eReferences

This supplementary material has been provided by the authors to give readers additional information about their work.

eAppendix 1. Methods of Estimating American Heart Association (AHA) Dietary Scores and Healthy Eating Index (HEI) 2015 Scores

The American Heart Association (AHA) Diet Scores

To assess a summary diet score, we constructed a continuous diet score based on the AHA 2020 Strategic Impact Goal dietary targets, which have been significantly associated with cardiovascular and metabolic outcomes in multiple analyses.[1] The primary dietary targets are fruits/vegetables, whole grains, fish and shellfish, sodium, sugar-sweetened beverages and sodium; and the secondary targets: nuts/legumes/seeds, processed meat, and saturated fat (**eTable 1**). To best assess changes, we constructed a continuous score. Intake of each dietary item was scored from 0-10 or 10-0 depending on whether consumption was encouraged or discouraged, respectively. All dietary variables were energy-adjusted to 2000 kcal/d using the residual method prior to analysis. Optimal intake (i.e., at or greater than the target AHA level for encouraged foods/nutrients; or at or less than the target AHA level for discouraged foods/nutrients) was assigned a score of 10, and intermediate intake was scored linearly between 0 and 10. The scoring ranges were provided in **eTable 1**. The sum of the dietary components was used to create two scores, a primary score (5 primary dietary targets) ranging from 0 to 50; and the secondary score (5 primary and 3 secondary dietary targets) ranging from 0 to 80. Based on AHA 2020 targets, the proportion of US children with poor (<40% of optimal score), intermediate (40-79.9% of optimal score) or ideal (≥80% of optimal score) dietary quality were evaluated. Details regarding the AHA score was published elsewhere.[2]

The Healthy Eating Index (HEI) 2015

The HEI is a measure of diet quality, independent of quantity, that can be used to assess compliance with the US Dietary Guidelines for Americans (DGAs) and monitor changes in dietary patterns. The original HEI was released by the US Department of Agriculture's (USDA) Center for Nutrition Policy and Promotion in 1995 and since then it has been periodically updated through a collaboration with the USDA and National Cancer Institute (NCI).[3] The HEI-2015 is the latest iteration of the index and was designed to align with key dietary recommendations from the *2015-2020 DAGs*. The HEI-2015 contains 13 components that sum to a total maximum score of 100 points (**eTable 2**). Each of the components is scored on a density basis out of 1,000 calories, with the exception of Fatty Acids, which is a ratio of unsaturated to saturated fatty acid. Currently, several methods associated with SAS macros that have been developed for use with the HEI are available to the public, and details can be found on the NCI website: https://epi.grants.cancer.gov/hei/hei-scores-for-describing-dietary-intake.html.

Simple HEI Scoring Algorithm

The simple HEI scoring algorithm method is applied to calculate scores using computed amounts of each component in the HEI.[4] To use the simple HEI scoring method, first the ratio of the dietary constitutes to energy is constructed and scored according to the scoring standards. The component scores are summed to calculate the total score. The mean total score is the mean of the total scores across individuals. When more than one 24HR recall per person is available, the score is calculated by summing across all days per person before scoring.

Population Ratio Method

The population ratio method is used to calculate the mean intakes of dietary constituents and scoring standards are applied to arrive at scores at the level of a group of persons.[5] To apply the population ratio method, the intake of the relevant dietary constituents and energy are summed for all individuals in a population to obtain estimates of the population's total intake, and then the ratios of each constituent to energy are computed and scored. The total score is then the sum of the component scores. While this method does not estimate usual intake at the *individual* level, it may be used to estimate usual intake at the *population* level.

The MCMC Method on Estimating the distribution of the HEI scores

Markov chain Monte Carlo (MCMC) is a statistical method that is used when modeling complex distributions such as the modeling of the HEI score, which requires simultaneous estimation of the 21 latent variables (2 for each of the 6 episodically consumed constituents, 1 for probability of consumption and 1 for consumption day amount; 1 for each of the 8 daily consumed dietary constituents; and 1 energy).[6,7] It works by simulating the random variables 5000 times to estimate the distributions and uses an algorithm to ensure the correct distribution is estimated. In order to run the MCMC method, at least 2 24-hour recalls on a subset of participants are required to fit the MCMC model. Furthermore, a dietary component cannot be contained within another dietary component (e.g., whole fruit as part of total fruit). Therefore, the components fit in the MCMC macro are not each of the individual HEI components; instead the disaggregated component for each composite dietary variable. The details of dietary variables corresponding to each of HEI-2015 components were presented (**eTable 3**).

When running the MCMC method, it was suggested at least 50 people with 2 non-zero recalls for each of the dietary component per stratum. The *explore* macro provided the number of non-zero recalls by stratum.

eAppendix 2. Identification for Participation in Federal Nutrition Assistance Program and Harmonization Across NHANES Cycles

Household WIC participation

Participation in the Special Supplemental Nutrition Program for Women, Infant, and Children (WIC) in this study was assessed at the level of the household using household interview. The household-level question was asked differently across cycles. For the NHANES 1999-2000 "*In the last 12 months, did {you/you or any member of your household} receive benefits from the WIC program, that is, the Women, Infants and Children program*?" Household WIC participation was defined by a binary variable, with "no" responses to that question classified as household WIC non-participants, whereas "yes" to that question classified household WIC participants.

Household SNAP participation

Participation in Supplemental Nutrition Assistance Program (SNAP) in this study was assessed at the level of the household using a household interview. The available household-level question was asked differently across cycles. For the NHANES 1999-2000 and NHANES 2001-2002, the question was asked "*[In the last 12 months], how many people in your household were authorized to receive Food Stamps*?". For the NHANES 2003-2004 and NHANES 2005-2006, the question was asked "*[In the last 12 months], were {you/you or any members of your household} authorized to receive Food Stamps [which includes a food stamp card or voucher, or cash grants from the state for food]?*". For the NHANES 2007-2008, NHANES 2009-2010 and NHANES 2011-2012, the question was asked "*In the last 12 months, did {you/you or any member of your household} receive Food Stamp benefits?"* Household SNAP participation was defined by a binary variable, with positive numbers of people in household authorized for food stamps or "yes" responses to that question classified as household SNAP participants and otherwise classified as household SNAP nonparticipants.

NSLP/SBP participation

Household National School Lunch Program (NSLP) or School Breakfast Program (SBP) participant was defined with "Free" or "Reduced price" responses to the question "*{Do you/Does SP} get these lunches free, at a reduced price, or {do you/does he/she} pay full price?*" or "*{Do you/Does SP} get these breakfasts free, at a reduced price, or {do you/does he/she} pay full price?*"

eTable 1. Dietary Components of the American Heart Association (AHA) 2020 Strategic Impact Goals Scoring Standards

AHA Components	Points Range	Scoring Standard[a]	
		Max	**Min**
Primary Components[b]	0-50		
Fruits and vegetables[c]	0-10	≥4.5 cups equiv. per day	0
Fish and shellfish	0-10	≥1 oz equiv. per day	0
Whole grains	0-10	≥3 oz equiv. per day	0
Sugar-sweetened beverages	10-0	≤ 5.14 fl oz per day	>16 fl per day
Sodium	10-0	≤ 1500 mg per day	>4500 mg per day
Secondary Components[b]	0-80		
Nuts, seeds and legumes[d]	0-10	≥4 servings per day	0
Processed meat	10-0	≤ 0.5 oz equiv. per day	>1.764 oz equiv. per day
Saturated fat	10-0	≤7% energy	>15% energy

[a] Intakes between the minimum and maximum standards are scored proportionately.

[b] All AHA dietary variables were energy-adjusted to 2000kcal/d using the residual method prior to analysis.

[c] According to the AHA 2020 Goals, up to 3 cups/wk (0.42 cups/d) of starchy vegetables (e.g., potatoes, peas, corn) could be included; this maximum was incorporated into the analysis, with higher intake not contributing toward the score. 100% fruit juice could also be included; while its contribution was not capped in the original AHA 2020 Goals and thus not in our score, some organizations recommend no more than 1 serving/d of 100% fruit juice.

[d] A serving of nuts, seeds and legumes is 1-oz equivalent of nuts and seeds or ½ cup of legume.

eTable 2. Dietary Components of Healthy Eating Index (HEI)-2015 and Scoring Standards

HEI-2015 Components	Points Range	Scoring Standard[a]	
		Maximum	**Minimum**
Adequacy Components			
Total Fruits[b]	0-5	≥0.8 cup equiv. per 1,000 kcal	0
Whole Fruits[c]	0-5	≥0.4 cup equiv. per 1,000 kcal	0
Total Vegetables[d]	0-5	≥1.1 cup equiv. per 1,000 kcal	0
Greens and Beans[d]	0-5	≥0.2 cup equiv. per 1,000 kcal	0
Whole Grains	0-10	≥1.5 oz equiv. per 1,000 kcal	0
Dairy[e]	0-10	≥1.3 cup equiv. per 1,000 kcal	0
Total Protein Foods [f]	0-5	≥2.5 oz equiv. per 1,000 kcal	0
Seafood and Plant Proteins[e, g]	0-5	≥0.8 oz equiv. per 1,000 kcal	0
Fatty Acids[h]	0-10	(PUFAs + MUFAs)/SFAs ≥2.5	(PUFAs + MUFAs)/SFAs ≤1.2
HEI-2015 Moderation			
Refined Grains	10-0	≤1.8 oz equiv. per 1,000 kcal	≥4.3 oz equiv. per 1,000 kcal
Sodium	10-0	≤1.1 grams per 1,000 kcal	≥2.0 grams per 1,000 kcal
Added Sugars	10-0	≤6.5% of energy	≥26% of energy
Saturated Fats	10-0	≤8% of energy	≥16% of energy

[a] Intakes between the minimum and maximum standards are scored proportionately.
[b] Includes 100% fruit juice.
[c] Includes all forms except juice.
[d] Includes legumes (beans and peas)
[e] Includes all milk products, such as fluid milk, yogurt, and cheese, and fortified soy beverages.
[f] Includes legumes (beans and peas)
[g] Includes seafood, nuts, seeds, soy products (other than beverages), and legumes (beans and peas).
[h] Ratios of poly-and monosaturated fatty acids (PUFAs and MUFAs) to saturated fatty acids (SFAs).

eTable 3. The Disaggregated Dietary Components Modeled in Markov Chain Monte Carlo (MCMC) Method

HEI-2015 Components	MCMC variables (unit)	Type
Total Fruits	Whole fruit (cup eq.)	Episodic
	Fruit juice (cup eq.)	Episodic
Whole Fruits	Whole fruit (cup eq.)	Episodic
Total vegetables	Non-dark green vegetables (cup eq.)	Daily
	Dark green vegetables (cup eq.)	Episodic
	Legumes (cup eq.)	Episodic
Green and beans	Dark green vegetables (cup eq.)	Episodic
	Legumes (cup eq.)	Episodic
Whole grains	Whole grains (oz. eq.)	Episodic
Refined grains	Refined grains (oz. eq.)	Episodic
Dairy	Dairy (cup eq.)	Daily
Total protein foods	Meat, poultry and eggs (oz. eq.)	Daily
	Seafood, soy and nuts and seeds (oz. eq.)	Episodic
	Legumes (oz. eq.)	Episodic
Seafood and plant proteins	Seafood, soy and nuts and seeds (oz. eq.)	Episodic
	Legumes (oz eq.)	Episodic
Added sugars[a]	Added sugars (tsp. eq.)	Daily
Fatty acids[a,b]	Fatty acids (g)	Daily
Saturated fats	Saturated fats (g)	Daily
Sodium	Sodium (mg)	Daily
	Energy (kcal)	Daily

Abbreviations: cup eq.: cup equivalents; oz. eq.: ounce equivalents; tsp. eq.: teaspoon equivalents; g: grams; mg: milligrams.

[a] converted to energy in the scoring system. For added sugars, 1 tsp =4.2 grams

[b] refers to the sum of total monounsaturated fatty acids and total polyunsaturated fatty acids.

eTable 4. Trends in Estimated Percentage of US Children Aged 2-19 Years Old With Poor or Intermediate Diet Based on Primary and Secondary American Heart Association (AHA) Continuous Diet Score by NHANES Survey Cycles, 1999-2016

AHA Score Components	Survey-Weighted % (95% CI)[a]									*P* for trend
	1999-2000	2001-2002	2003-2004	2005-2006	2007-2008	2009-2010	2011-2012	2013-2014	2015-2016	
AHA Primary Score										
Poor Diet	76.8 (72.9-80.2)	74.5 (71.6-77.1)	72. 4 (68.1-76.3)	67.2 (61.1-72.8)	68.1 (64.6-71.4)	63.7 (60.8-66.6)	59.1 (55.3-62.8)	55.9 (52.8-59.0)	56.1 (51.4-60.7)	<.001
Intermediate Diet	23.2 (19.8-26.9)	25.4 (22.8-28.1)	27.4 (23.6-31.6)	32.7 (27.1-38.8)	31.7 (28.5-35.1)	36.1 (33.3-39.0)	40.4 (36.6-44.3)	43.6 (40.4-46.9)	43.7 (39.1-48.3)	<.001
Ideal Diet	0.07 (0.01-0.49)	0.15 (0.03-0.72)	0.19 (0.04, 0.95)	0.08 (0.02-0.30))	0.20 (0.06-0.69)	0.16 (0.06-0.44)	0.49 (0.28-0.87)	0.43 (0.16-1.15)	0.25 (0.10-0.62)	.03
AHA Secondary Score										
Poor Diet	61.0 (56.5-65.2)	57.7 (54.7-60.7)	58.2 (54.5-61.9)	53.3 (48.8-57.8)	53.8 (49.3-58.3)	48.2 (45.6-50.8)	48.3 (45.0-51.6)	46.6 (43.3-49.9)	49.1 (45.0-53.3)	<.001
Intermediate Diet	39.0 (34.7-43.4)	42.0 (39.1-45.1)	41.5 (38.0-45.0)	46.6 (42.1-51.1)	45.9 (41.4-50.4)	51.4 (48.7-54.0)	51.5 (48.2-54.8)	52.9 (49.5-56.1)	50.4 (46.3-54.4)	<.001
Ideal Diet	0.04 (0-0.27)	0.21 (0.07-0.66)	0.29 (0.08-1.05)	0.08 (0.02-0.30)	0.26 (0.09-0.75)	0.40 (0.16-0.98)	0.21 (0.06-0.73)	0.54 (0.32-0.93)	0.50 (0.13-1.83)	.03

Abbreviation: NHANES, National Health and Nutrition Examination Survey.

[a] Data were weighted to be nationally representative.

P for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted logistic regression model.

eTable 5. Sensitivity Analysis of the Healthy Eating Index (HEI)-2015 Total and Component Scores Estimated Using the Population Ratio Methods[a] Among US Children Aged 2-19 Years Old by NHANES Survey Cycles, 1999-2016[a]

HEI-2015	Survey-Weighted Mean (95% CI)								
	1999-2000	**2001-2002**	**2003-2004**	**2005-2006**	**2007-2008**	**2009-2010**	**2011-2012**	**2013-2014**	**2015-2016**
Total score (0-100)	**48.5 (46.2-50.7)**	**50.7 (49.2-52.1)**	**51.1 (49.4-52.9)**	**49.8 (48.7-50.9)**	**52.2 (50.0-54.4)**	**54.0 (52.5-55.6)**	**55.0 (53.5-56.4)**	**54.6 (53.2-55.9)**	**53.2 (51.2-55.1)**
Adequacy components									
Total fruits (0-5)	3.07 (2.80-3.34)	3.19 (2.94-3.43)	3.14 (2.85-3.43)	3.20 (2.99-3.42)	3.55 (3.13-3.97)	3.65 (3.32-3.99)	3.58 (3.19-3.98)	3.36 (3.10-3.62)	3.22 (2.95-3.49)
Whole fruits (0-5)	4.55 (4.01-5.10)	4.40 (3.99-4.82)	3.94 (3.56-4.31)	3.31 (3.01-3.61)	4.35 (3.65-5.06)	4.53 (4.07-5.00)	4.36 (3.83-4.90)	4.31 (3.96-4.66)	4.26 (3.75-4.77)
Total vegetables (0-5)	2.48 (2.28-2.69)	2.40 (2.30-2.49)	2.47 (2.35-2.58)	2.34 (2.24-2.43)	2.35 (2.17-2.52)	2.30 (2.19-2.41)	2.30 (2.15-2.44)	2.37 (2.24-2.51)	2.34 (2.22-2.47)
Greens and beans (0-5)	1.34 (1.04-1.65)	1.18 (1.00-1.37)	1.28 (1.06-1.50)	1.31 (1.07-1.54)	1.49 (1.06, 1.93)	1.45 (1.17-1.74)	1.60 (1.32-1.89)	1.86 (1.56-2.16)	1.67 (1.44-1.89)
Whole grains (0-10)	1.47 (1.27-1.68)	1.78 (1.65-1.91)	1.45 (1.31-1.59)	1.60 (1.36-1.83)	1.81 (1.58-2.05)	2.16 (2.03-2.30)	2.46 (2.26-2.67)	2.92 (2.59-3.25)	3.09 (2.82-3.35)
Total dairy (0-10)	7.53 (7.13-7.93)	8.14 (7.76-8.51)	8.30 (7.79-8.81)	8.14 (7.84-8.44)	8.21 (7.90-8.52)	8.95 (8.53-9.37)	8.78 (8.30-9.25)	8.55 (8.13-8.98)	7.97 (7.36-8.58)
Total protein foods (0-5)	4.20 (4.01-4.39)	4.20 (4.03-4.36)	4.30 (4.11-4.50)	4.42 (4.25-4.59)	4.65 (4.43-4.88)	4.70 (4.41-4.99)	4.61 (4.40-4.82)	4.82 (4.55-5.10)	4.72 (4.52-4.93)
Seafood and plant proteins (0-5)	2.57 (2.14-3.01)	2.57 (2.27-2.87)	2.84 (2.47-3.21)	2.65 (2.25-3.06)	2.65 (2.27-3.02)	2.96 (2.47-3.45)	3.13 (2.73-3.53)	3.10 (2.65-3.56)	3.22 (2.88-3.57)
(PUFAs + MUFAs)/SFAs (0-10)	3.04 (2.74-3.33)	3.18 (2.99-3.37)	3.22 (2.93-3.51)	3.03 (2.80-3.27)	3.05 (2.82-3.29)	3.20 (2.97-3.43)	3.49 (3.04-3.94)	3.03 (2.54-3.52)	2.96 (2.69-3.22)
Moderation components									
Refined grains (10-0)	4.69 (4.22-5.17)	4.66 (4.29-5.04)	4.83 (4.50-5.17)	4.85 (4.47-5.23)	5.02 (4.61, 5.43)	4.65 (4.22-5.08)	4.91 (4.53-5.29)	4.72 (4.38-5.05)	4.61 (4.21-5.01)
Sodium (10-0)	5.00 (4.65-5.36)	5.60 (5.39-5.77)	5.52 (5.25-5.78)	5.08 (4.69-5.48)	4.80 (4.35-5.26)	4.43 (4.08-4.77)	4.65 (4.30-5.00)	4.34 (3.97-4.71)	4.30 (4.09-4.52)
Added sugars (10-0)	3.00 (2.40-3.59)	3.67 (3.40-3.95)	4.45 (4.02-4.88)	4.71 (4.35-5.07)	4.92 (4.64-5.20)	5.22 (4.79-5.64)	5.47 (5.24-5.71)	5.94 (5.64-6.24)	6.29 (6.03-6.55)
Saturated fats (10-0)	5.52 (5.10-5.95)	5.72 (5.49-5.96)	5.43 (5.10-5.76)	5.17 (4.98-5.36)	5.30 (4.99-5.61)	5.83 (5.58-6.08)	5.62 (5.32-5.91)	5.24 (4.87-5.62)	4.52 (4.14-4.90)

Abbreviation: NHANES, National Health and Nutrition Examination Survey; MUFAs, monounsaturated fatty acids; PUFAs, polyunsaturated fatty acids; SFAs, saturated fatty acids.

[a] Data were weighted to be nationally representative. The details about the population ratio method were provided in eAppendix 2.

eTable 6. Sensitivity Analysis of the Healthy Eating Index (HEI)-2015 Total and Component Scores Estimated Using the Markov Chain Monte Carlo (MCMC) Method Among US Children Aged 2-19 Years Old by NHANES Survey Cycles, 2003-2016[a]

HEI-2015	Survey-Weighted Mean (95% CI)						
	2003-2004	2005-2006	2007-2008	2009-2010	2011-2012	2013-2014	2015-2016
Total score (0-100)	**51.1 (48.6-53.5)**	**49.7 (48.3-51.0)**	**51.0 (49.3-53.7)**	**52.3 (50.6-53.9)**	**51.9 (46.8-57.0)**	**52.7 (51.3-54.2)**	**52.3 (50.7-53.8)**
Adequacy components							
Total fruits (0-5)	3.61 (2.42-4.80)	3.06 (2.83-3.30)	3.34 (3.03-3.66)	3.37 (3.17-3.57)	2.56 (1.42-3.71)	3.16 (2.90-3.43)	3.17 (2.90-3.45)
Whole fruits (0-5)	3.84 (3.53-4.14)	3.07 (2.86-3.29)	3.48 (3.20-3.76)	3.55 (3.29-3.82)	2.88 (2.30-3.47)	3.46 (3.18-3.74)	3.54 (3.26-3.81)
Total vegetables (0-5)	2.57 (2.10-3.03)	2.47 (2.22-2.72)	2.39 (2.23-2.54)	2.33 (2.16-2.50)	2.66 (0.98-4.33)	2.38 (2.20-2.56)	2.42 (2.24-2.59)
Greens and beans (0-5)	1.43 (0.58-2.28)	1.64 (1.05-2.24)	1.49 (1.15-1.83)	1.55 (1.14-1.96)	2.19 (0-4.62))	1.90 (1.50-2.31)	1.72 (1.28-2.16)
Whole grains (0-10)	1.42 (1.22-1.62)	1.66 (1.42-1.90)	1.93 (1.69-2.17)	2.37 (2.25-2.49)	2.40 (1.84-2.94)	3.02 (2.63-3.41)	3.29 (2.98-3.60)
Total dairy (0-10)	7.53 (7.12-7.95)	7.59 (7.38-7.79)	7.76 (7.50-8.02)	8.25 (7.91-8.59)	7.53 (6.65-8.42)	7.93 (7.69-8.16)	7.61 (7.26-7.97)
Total protein foods (0-5)	4.26 (4.09-4.43)	4.20 (4.03-4.36)	4.26 (4.16-4.35)	4.27 (4.11-4.42)	4.63 (4.38-4.88)	4.34 (4.21-4.48)	4.32 (4.16-4.49)
Seafood and plant proteins (0-5)	2.93 (2.41-3.45)	2.70 (2.28-3.12)	2.55 (2.37-2.72)	2.76 (2.31-3.20)	3.34 (2.20-4.49)	2.88 (2.55-3.21)	2.93 (2.63-3.22))
(PUFAs + MUFAs)/SFAs (0-10)	3.43 (3.20-3.67)	3.21 (2.97-3.45)	3.17 (2.97-3.37)	3.33 (3.08-3.58)	4.08 (2.17-5.60)	3.20 (2.83-3.57)	3.21 (3.04-3.39)
Moderation components							
Refined grains (10-0)	4.73 (4.38-5.08)	4.81 (4.48-5.15)	5.21 (4.82-5.60)	4.78 (4.44-5.13)	4.82 (4.21-5.43)	4.71 (4.40-5.02)	4.64 (4.23-5.06)
Sodium (10-0)	5.43 (4.96-5.89)	5.11 (4.75-5.47)	5.07 (4.70-5.44)	4.57 (4.28-4.86)	4.03 (2.31-5.76)	4.42 (4.11-4.73)	4.38 (4.12-4.64)
Added sugars (10-0)	4.42 (3.92-4.92)	4.88 (4.57-5.20)	5.12 (4.86-5.39)	5.45 (5.15-5.76)	4.99 (4.50-5.48)	5.99 (5.69-6.29)	6.46 (6.23-6.68)
Saturated fats (10-0)	5.44 (4.86-6.03)	5.23 (5.03-5.43)	5.25 (5.01-5.50)	5.67 (4.38-5.97)	5.76 (3.60-7.92)	5.31 (5.04-5.58)	4.56 (4.34-4.78)

Abbreviation: NHANES, National Health and Nutrition Examination Survey; MUFAs, monounsaturated fatty acids; PUFAs, polyunsaturated fatty acids; SFAs, saturated fatty acids.

[a] Data were weighted to be nationally representative. The MCMC method is used for estimating usual intake and requires two or more recalls per person (on at least a subset of individuals), a method that distinguish day-to-day variation from variation between individuals ("usual intake methods"). The details about the MCMC method were provided in eAppendix 2.

eTable 7. Trends in Estimated Mean Consumption of Key Food Groups and Nutrients Among US Children Aged 2-19 Years Old by NHANES Survey Cycles, 1999-2016[a]

Foods/nutrients	Survey-Weighted Mean (95% CI)										Difference, 2015-2016 vs 1999-2000	
	1999-2000 (n=3833)	2001-2002 (n=4288)	2003-2004 (n=3825)	2005-2006 (n=4029)	2007-2008 (n=3109)	2009-2010 (n=3280)	2011-2012 (n=3132)	2013-2014 (n=3019)	2015-2016 (n=2901)	*P* for trend	Mean change (95% CI)	Percent change (95% CI)
Total fruits, servings/d	1.01 (0.93-1.09)	1.05 (0.96-1.14)	1.07 (0.97-1.17)	1.09 (1.03-1.16)	1.11 (1.01-1.21)	1.16 (1.05-1.26)	1.19 (1.10-1.28)	1.08 (1.00-1.17)	1.04 (0.96-1.13)	.12	0.03 (-0.08, 0.15)	3.40 (-7.99, 14.8)
Intact/whole fruit	0.46 (0.41-0.51)	0.48 (0.43-0.53)	0.48 (0.42-0.55)	0.58 (0.53-0.63)	0.67 (0.60-0.75)	0.71 (0.62-0.80)	0.73 (0.66-0.81)	0.68 (0.62-0.74)	0.68 (0.59-0.76)	<.001	0.22 (0.12, 0.32)	0.46 (0.41-0.51)
100% fruit juice	0.63 (0.56-0.70)	0.65 (0.59-0.70)	0.64 (0.59-0.70)	0.60 (0.54-0.66)	0.54 (0.49-0.60)	0.55 (0.49-0.61)	0.52 (0.47-0.56)	0.51 (0.45-0.58)	0.46 (0.39-0.53)	<.001	-0.17 (-0.27, -0.07)	-27.6 (-41.4, -13.9)
Total vegetables, servings/d	1.02 (0.95-1.09)	1.00 (0.96-1.04)	1.08 (1.03-1.13)	0.99 (0.95-1.03)	0.97 (0.91-1.02)	0.98 (0.93-1.03)	0.95 (0.91-0.99)	0.98 (0.93-1.02)	0.98 (0.94-1.02)	.02	-0.04 (-0.12, 0.04)	-4.06 (-11.8, 3.70)
Dark-green vegetables	0.04 (0.03-0.05)	0.04 (0.03-0.05)	0.04 (0.03-0.04)	0.05 (0.04-0.05)	0.05 (0.04-0.06)	0.05 (0.04-0.06)	0.06 (0.05-0.07)	0.07 (0.06-0.09)	0.06 (0.04-0.07)	<.001	0.02 (0, 0.04)	47.1 (-9.70, 104)
Tomatoes	0.24 (0.22-0.25)	0.27 (0.25-0.29)	0.30 (0.28-0.32)	0.24 (0.23-0.26)	0.22 (0.20-0.25)	0.23 (0.21-0.25)	0.23 (0.21-0.24)	0.22 (0.21-0.23)	0.21 (0.20-0.23)	<.001	-0.02 (-0.05, -0.003)	-10.4 (-19.0, -1.75)
Other red/orange vegetables	0.06 (0.04-0.07)	0.05 (0.04-0.06)	0.04 (0.03-0.05)	0.05 (0.05-0.06)	0.05 (0.04-0.06)	0.05 (0.05-0.06)	0.05 (0.05-0.06)	0.06 (0.05-0.08)	0.07 (0.06-0.08)	.03	0.01 (-0.01, 0.03)	17.9 (-23.8, 59.5)
White potatoes	0.35 (0.32-0.39)	0.32 (0.31-0.34)	0.35 (0.31-0.39)	0.30 (0.27-0.34)	0.31 (0.28-0.34)	0.29 (0.27-0.31)	0.28 (0.25-0.30)	0.27 (0.25-0.29)	0.32 (0.29-0.34)	<.001	-0.04 (-0.08, 0.008)	-10.8 (-22.7, 1.22)
Other starchy (e.g., corn)	0.06 (0.05-0.08)	0.06 (0.05-0.07)	0.06 (0.06-0.07)	0.07 (0.06-0.07)	0.06 (0.05-0.07)	0.06 (0.05-0.07)	0.06 (0.05-0.07)	0.05 (0.04-0.06)	0.06 (0.05-0.07)	.25	-0.007 (-0.02, 0.01)	-11.0 (-35.2,13.2)
Other vegetables	0.27 (0.24-0.29)	0.26 (0.23-0.29)	0.28 (0.26-0.30)	0.26 (0.24-0.29)	0.25 (0.22-0.29)	0.27 (0.24-0.31)	0.25 (0.23-0.27)	0.26 (0.24-0.28)	0.24 (0.21-0.26)	.16	-0.03 (-0.06, 0.008)	-10.1 (-22.6, 2.38)
Vegetables excluding potatoes/starchy	0.60 (0.56-0.64)	0.62 (0.58-0.65)	0.65 (0.62-0.69)	0.61 (0.58-0.64)	0.57 (0.51-0.63)	0.61 (0.57-0.65)	0.59 (0.56-0.62)	0.62 (0.59-0.65)	0.57 (0.54-0.61)	.13	-0.02 (-0.08, 0.03)	-3.79 (-12.9, 5.28)
Total grains, servings/d												
Whole grains	0.46 (0.39-0.52)	0.54 (0.49-0.58)	0.48 (0.43-0.53)	0.55 (0.47-0.63)	0.58 (0.51-0.65)	0.67 (0.64-0.71)	0.82 (0.76-0.88)	0.87 (0.79-0.95)	0.95 (0.88-1.03)	<.001	0.50 (0.40, 0.59)	109 (77.0, 141)
Refined grains	6.29 (6.09-6.49)	6.39 (6.22-6.57)	6.09 (5.96-6.22)	6.12 (5.97-6.27)	6.04 (5.92-6.17)	6.28 (6.16-6.41)	6.13 (6.01-6.26)	6.24 (6.14-6.35)	6.29 (6.14-6.44)	.75	0 (-0.25, 0.25)	-0.003 (-3.94, 3.94)
Nuts and seeds, servings/d	0.34 (0.26-0.42)	0.31 (0.25-0.36)	0.35 (0.29-0.41)	0.36 (0.31-0.41)	0.36 (0.31-0.40)	0.37 (0.31-0.43)	0.39 (0.32-0.46)	0.34 (0.29-0.39)	0.40 (0.34-0.46)	.11	0.06 (-0.04, 0.16)	17.0 (-15.0, 49.0)
Legumes, servings/d	0.07 (0.05-0.08)	0.06 (0.05-0.07)	0.06 (0.05-0.08)	0.06 (0.04-0.07)	0.06 (0.04-0.07)	0.07 (0.06-0.08)	0.07 (0.06-0.09)	0.07 (0.06-0.08)	0.08 (0.06-0.09)	.02	0.01 (-0.009, 0.03)	14.6 (-15.4, 44.5)
Total meat, serving/d												
Processed meat	0.25 (0.21-0.28)	0.24 (0.21-0.26)	0.25 (0.24-0.27)	0.25 (0.22-0.27)	0.26 (0.23-0.28)	0.25 (0.23-0.26)	0.26 (0.24-0.29)	0.25 (0.23-0.27)	0.27 (0.24-0.29)	.17	0.02 (-0.02, 0.07)	8.63 (-10.4, 27.7)
Unprocessed red meat	0.35 (0.31-0.39)	0.35 (0.31-0.39)	0.35 (0.31-0.39)	0.34 (0.31-0.36)	0.34 (0.30-0.37)	0.32 (0.29-0.36)	0.30 (0.27-0.33)	0.32 (0.30-0.35)	0.31 (0.28-0.34)	.01	-0.04 (-0.09, 0.01)	-10.6 (-24.1, 2.83)
Poultry	0.28 (0.24-0.33)	0.27 (0.24-0.31)	0.33 (0.31-0.35)	0.34 (0.31-0.37)	0.38 (0.35-0.42)	0.39 (0.36-0.42)	0.36 (0.31-0.41)	0.39 (0.34-0.44)	0.36 (0.32-0.39)	<.001	0.07 (0.02, 0.12)	25.0 (3.98, 46.0)
Fish and Shellfish	0.06 (0.04-0.07)	0.07 (0.05-0.08)	0.07 (0.05-0.08)	0.08 (0.05-0.10)	0.06 (0.05-0.07)	0.06 (0.05-0.08)	0.08 (0.06-0.10)	0.07 (0.05-0.10)	0.06 (0.05-0.07)	.47	0.004 (-0.02, 0.02)	7.15 (-29.3, 43.6)
High in omega-3 fatty acids[b]	0.01 (0.007-0.02)	0.01 (0.009-0.02)	0.01 (0.009-0.02)	0.02 (0.008-0.02)	0.01 (0.005-0.02)	0.01 (0.01-0.02)	0.01 (0.009-0.02)	0.01 (0.008-0.02)	0.02 (0.01-0.02)	.45	0.005 (-0.002, 0.01)	43.9 (-32.8, 121)
Low in omega-3 fatty acids[b]	0.04 (0.03-0.06)	0.05 (0.04-0.07)	0.05 (0.04-0.07)	0.06 (0.04-0.08)	0.05 (0.04-0.06)	0.05 (0.03-0.06)	0.07 (0.04-0.09)	0.06 (0.04-0.08)	0.04 (0.03-0.05)	.54	-0.001 (-0.02, 0.02)	-2.02 (-38.1, 34.0)
Eggs, servings/d	0.25 (0.23-0.27)	0.29 (0.25-0.32)	0.30 (0.26-0.33)	0.35 (0.33-0.38)	0.37 (0.34-0.41)	0.36 (0.32-0.4)	0.36 (0.32-0.39)	0.36 (0.34-0.38)	0.39 (0.36-0.43)	<.001	0.14 (0.10, 0.19)	57.2 (37.4, 77.0)
Total dairy, servings/d	1.99 (1.88-2.10)	2.18 (2.08-2.27)	2.22 (2.09-2.36)	2.20 (2.13-2.28)	2.19 (2.11-2.27)	2.38 (2.30-2.46)	2.35 (2.23-2.46)	2.29 (2.19-2.39)	2.13 (1.98-2.28)	.005	0.14 (-0.04, 0.33)	7.23 (-2.33, 16.8)
Milk	1.36	1.50	1.47	1.45	1.40	1.45	1.38	1.27	1.19	<.001	-0.17	-12.5

	(1.28-1.45)	(1.43-1.58)	(1.34-1.59)	(1.37-1.53)	(1.33-1.47)	(1.39-1.51)	(1.29-1.48)	(1.22-1.33)	(1.09-1.29)		(-0.30, -0.04)	(-21.6, -3.37)
Cheese	0.56 (0.51-0.61)	0.58 (0.53-0.62)	0.67 (0.62-0.72)	0.65 (0.62-0.67)	0.65 (0.62-0.68)	0.78 (0.73-0.83)	0.81 (0.76-0.86)	0.84 (0.80-0.88)	0.78 (0.72-0.84)	<.001	0.21 (0.14, 0.29)	38.0 (21.9, 54.2)
Yogurt	0.03 (0.02-0.04)	0.04 (0.03-0.06)	0.04 (0.03-0.05)	0.05 (0.04-0.05)	0.04 (0.03-0.05)	0.06 (0.05-0.07)	0.06 (0.05-0.08)	0.07 (0.06-0.08)	0.06 (0.05-0.07)	<.001	0.03 (0.02, 0.05)	122 (29.8, 215)
Sugar-sweetened beverages[c], servings/d	2.00 (1.80-2.20)	1.83 (1.70-1.97)	1.87 (1.72-2.03)	1.61 (1.46-1.76)	1.52 (1.39-1.64)	1.32 (1.22-1.42)	1.33 (1.24-1.43)	1.19 (1.05-1.32)	1.00 (0.90-1.10)	<.001	-1.0 (-1.22, -0.78)	-50.0 (-57.1, -43.0)
Added sugar, g./d	106 (99.9-112)	99.4 (95.7-103)	88.9 (84.2-93.6)	85.2 (82.4-88.0)	86.6 (83.7-89.4)	80.9 (77.5-84.3)	78.5 (76.5-80.5)	76.7 (73.9-79.6)	71.4 (69.0-73.9)	<.001	-34.4 (-40.8, -28.1)	-32.5 (-36.9, -28.1)
Macronutrients												
Total fat, %Energy (E)	32.2 (31.6-32.8)	32.0 (31.5-32.5)	32.9 (32.5-33.4)	33.1 (32.7-33.5)	33.1 (32.7-33.4)	32.5 (32.1-32.8)	32.7 (32.3-33.1)	32.9 (32.6-33.3)	34.5 (34.1-35.0)	<.001	2.34 (1.62, 3.06)	7.28 (4.96, 9.60)
Saturated fat, %E	11.5 (11.2-11.8)	11.3 (11.1-11.5)	11.6 (11.4-11.8)	11.8 (11.7-11.9)	11.6 (11.4-11.8)	11.3 (11.1-11.5)	11.3 (11.1-11.5)	11.5 (11.3-11.7)	12.1 (11.9-12.4)	.047	0.65 (0.23, 1.07)	5.66 (1.90, 9.42)
Monounsaturated fat, %E	14.8 (14.2-15.3)	14.5 (13.9-15.0)	13.4 (12.8-14.0)	14.0 (13.5-14.4)	15.0 (14.6-15.4)	13.7 (13.3-14.1)	13.4 (13.1-13.8)	13.9 (13.5-14.4)	15.1 (14.6-15.6)	.82	0.32 (-0.44, 1.08)	2.17 (-2.99, 7.34)
Polyunsaturated fat, %E	6.17 (6.03-6.32)	5.94 (5.80-6.09)	6.46 (6.35-6.56)	6.41 (6.23-6.59)	6.53 (6.43-6.64)	6.84 (6.72-6.97)	7.41 (7.28-7.55)	7.29 (7.10-7.47)	7.58 (7.47-7.69)	<.001	1.41 (1.23, 1.58)	22.8 (19.5, 26.1)
Seafood omega-3 fat, mg/d	51 (42-60)	50 (43-56.9)	63.5 (52.6-74.4)	65.1 (49.1-81)	58 (40.6-75.4)	49.9 (43.2-56.6)	46.9 (35.7-58.2)	43.2 (35.1-51.2)	42.3 (35.8-48.7)	.002	-8.74 (-19.8, 2.33)	-17.1 (-36.3, 2.02)
Plant omega-3 fat, mg/d	116 (112-120)	115 (111-120)	122 (120-124)	117 (112-121)	117 (114-121)	127 (124-130)	143 (139-146)	145 (140-149)	146 (144-148)	<.001	29.7 (24.9, 34.6)	25.6 (20.6, 30.6)
Protein, %E	13.5 (13.1-13.8)	13.7 (13.5-13.9)	14.2 (13.8-14.5)	14.3 (14.1-14.5)	14.6 (14.4-14.8)	14.8 (14.6-15)	14.7 (14.5-14.8)	15.1 (14.8-15.5)	14.8 (14.6-15)	<.001	1.29 (0.90, 1.69)	9.62 (6.47, 12.8)
Carbohydrate, %E	55.4 (54.8-56)	55.2 (54.7-55.8)	53.9 (53.3-54.4)	53.6 (53.1-54)	53.4 (52.9-53.9)	53.8 (53.3-54.3)	53.8 (53.3-54.2)	53.0 (52.6-53.5)	51.9 (51.3-52.4)	<.001	-3.52 (-4.34, -2.69)	-6.35 (-7.78, -4.92)
Other nutrients												
Sodium, mg/d	3166 (3089-3242)	3148 (3111-3184)	3193 (3154-3232)	3263 (3205-3322)	3302 (3261-3343)	3307 (3252-3362)	3241 (3180-3303)	3387 (3287-3486)	3326 (3285-3367)	<.001	160 (73.8, 247)	5.07 (2.25, 7.89)
Cholesterol, mg/d	218 (212-224)	222 (214-229)	229 (222-236)	231 (223-240)	245 (237-252)	231 (221-240)	230 (222-238)	245 (237-254)	254 (245-263)	<.001	36.0 (24.8, 47.2)	16.5 (11.1, 21.9)
Fiber, g/d	12.4 (12.0-12.9)	12.3 (12.0-12.7)	12.5 (12.1-12.9)	13.1 (12.6-13.5)	13.6 (13.2-14)	14.7 (14.3-15.1)	15.2 (14.9-15.5)	15.2 (14.8-15.5)	15.6 (15.2-16)	<.001	3.14 (2.53, 3.76)	25.3 (19.6, 30.9)
Potassium, mg/d	2260 (2191-2329)	2236 (2180-2292)	2281 (2214-2349)	2265 (2227-2303)	2260 (2214-2306)	2367 (2322-2412)	2362 (2324-2400)	2351 (2310-2391)	2291 (2251-2330)	.001	30.6 (-49.0, 110)	1.35 (-2.17, 4.88)
calcium, mg/d	875 (844-907)	963 (934-993)	987 (944-1030)	1006 (981-1031)	1042 (1017-1068)	1120 (1093-1146)	1107 (1075-1139)	1098 (1063-1133)	1061 (1017-1105)	<.001	186 (132, 240)	21.2 (14.6, 27.8)

Abbreviation: NHANES, National Health and Nutrition Examination Survey.

[a] Data were weighted to be nationally representative. All analyses (except for macronutrients) were energy-adjusted to 2000 kcal/d using the residual method. Macronutrients were reported as % of total energy.

[b] Cooked fish and shellfish containing 500 mg or more of omega-3 fatty acids (EPA and DHA) per 3 ounces were included in the high omgega-3 fatty acids category.

[c] Serving of sugar-sweetened beverage defined as 8 fl oz or 237 grams. Sugar-sweetened beverages include soft drinks, fruit drinks, sports drinks, presweetened teas and energy drinks with more than 50 kcal per 8 fl oz.

P for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted linear regression model.

eTable 8. Impact of Adjusting for Demographic Changes in Age, Sex, and Race/Ethnicity on Observed Trends for Selected Dietary Factors Among US Children Aged 2-19 Years Old From 1999 to 2016[a]

Dietary factors	18-year change in mean consumption (95% CI), estimated from linear trend model		% change in trend coefficient after adjusting for age, sex and race/ethnicity (95% CI)[b]
	Unadjusted change	Change adjusted for age, sex and race/ethnicity	
Legumes, servings/d	0.02 (0.003, 0.03)	0.01 (-0.005, 0.02)	-53.2 (-138, -31.3)
Cholesterol, mg/d	32.3 (23.0, 41.6)	27.4 (18.6, 36.3)	-15.1 (-21.6, -10.4)
Eggs, servings/d	0.14 (0.10, 0.17)	0.12 (0.09, 0.15)	-11.0 (-15.7, -7.67)
Milk, servings/d	-0.23 (-0.33, -0.13)	-0.21 (-0.30, -0.12)	-8.68 (-18.7, -1.11)
Potassium	109 (46.7, 171)	100 (38.8, 161)	-8.34 (-17.6, -1.10)
Poultry, servings/d	0.11 (0.07, 0.15)	0.11 (0.06, 0.14)	-7.40 (-12.2, -3.39)
Protein, %E	1.62 (1.31, 1.93)	1.54 (1.23, 1.86)	-4.84 (-7.01, -2.89)
Sodium, mg/d	224 (150, 297)	217 (143, 290)	-3.27 (-7.66, 0.28)
Added sugar, g/d	-34.6 (-39.3, -29.8)	-33.5 (-38.1, -28.8)	-13.4 (-18.9, -7.81)
Fiber, g/d	4.20 (3.74, 4.66)	4.09 (3.63, 4.54)	-2.72 (-3.84, -1.63)
White potatoes, servings/d	-0.07 (-0.10, -0.03)	-0.07 (-0.10, -0.03)	-2.15 (-6.84, 2.21)
Plant omega3 fat, mg/d	39.0 (34.8, 43.2)	38.2 (34.0, 42.5)	-1.93 (-3.13, -0.76)
Carbohydrate, %E	-3.11 (-3.76, -2.45)	-3.05 (-3.72, -2.38)	-1.84 (-4.07, 0.40)
Polyunsaturated fat, % E	1.80 (1.64, 1.96)	1.79 (1.63, 1.94)	-0.75 (-2.04, 0.51)
Sugar-sweetened beverages, servings/d	-1.10 (-1.26, -0.93)	-1.09 (-1.25, -0.93)	-0.62 (-3.34, 2.24)
Whole fruit, servings/d	0.32 (0.24, 0.39)	0.32 (0.24, 0.39)	-0.23 (-2.67, 2.54)
Red/orange vegetable, servings/d	0.01 (0.001, 0.03)	0.02 (0.001, 0.03)	0.71 (-6.26, 7.32)
Dark green vegetables, serving/d	0.03 (0.02, 0.05)	0.03 (0.02, 0.05)	0.73 (-2.44, 3.24)
Whole grain, servings/d	0.57 (0.50, 0.65)	0.59 (0.51, 0.66)	2.57 (1.53, 3.86)
Cheese, servings/d	0.31 (0.25, 0.36)	0.32 (0.26, 0.37)	2.98 (1.23, 5.04)
Total fat, %energy	1.68 (1.11, 2.24)	1.73 (1.13, 2.32)	3.0 (0.35, 6.20)
Calcium, mg/d	224 (182, 266)	231 (194, 269)	3.1 (0.42, 5.84)
Tomatoes, servings/d	-0.06 (-0.08, -0.04)	-0.06 (-0.08, -0.05)	4.7 (0.76, 9.29)
Yogurt, servings/d	0.04 (0.02, 0.05)	0.04 (0.03, 0.05)	5.6 (1.7, 10.9)
100% fruit juice, servings/d	-0.21 (-0.28, -0.13)	-0.22 (-0.29, -0.15)	6.6 (-0.68, 16.2)
Total vegetables, servings/d	-0.07 (-0.13, -0.01)	-0.08 (-0.14, -0.02)	10.5 (1.6, 35.9)
Unprocessed red meat	-0.05 (-0.09, -0.01)	-0.06 (-0.10, -0.02)	13.7 (2.3, 42.1)
Seafood omega-3 fat, mg/d	-15.6 (-25.6, -5.72)	-17.9 (-27.3, -8.49)	14.5 (6.9, 33.3)
Saturated fat, %energy	0.32 (0.008, 0.63)	0.37 (0.06, 0.67)	14.6 (7.2, 45.4)
Dairy, servings/d	0.20 (0.06, 0.34)	0.23 (0.11, 0.35)	14.7 (2.9, 32.2)

[a] Data are weighted to nationally representative. The dietary factors were selected with *P*-value of trend less than 0.05 in unadjusted models (details appear in eTable 4).

[b] The value represents the percent change in the estimated trend coefficient after adjustment for age group, sex and race/ethnicity, suggesting that some of the observed trend was due to demographic changes. Positive values indicated that the trend strengthened after adjustment for age, sex and race/ethnicity, suggesting that the trend strengthened after accounting for changes in the age, sex and race/ethnicity distribution. The estimated 95% confidence interval (CI) of the estimated percent change in trend coefficient was estimated from bias-corrected bootstrap with 2,500 resampling. If the 95% CI did not overlap with zero, there was statistically significant attenuation or de-attenuation following adjustment for demographics.

eTable 9. Trends in Estimated Primary and Secondary American Heart Association (AHA) Diet Scores by Age Group, Sex, Race/Ethnicity, Parental Education, Household Income, Food Security Status, and Participation of Food Assistance Programs by NHANES Survey Cycles, 1999-2016

	Survey-Weighted Mean (95% CI)										
	1999-2000	**2001-2002**	**2003-2004**	**2005-2006**	**2007-2008**	**2009-2010**	**2011-2012**	**2013-2014**	**2015-2016**	***P* for trend**	***P* for interaction**
AHA primary score											
Age group, y											
2-5	17.8 (16.5-19.0)	18.1 (17.4-18.8)	18.9 (17.6-20.3)	19.9 (18.9-20.9)	19.7 (18.8-20.5)	21.2 (20.4-22.0)	21.4 (20.8-22.0)	21.7 (21.0-22.5)	21.4 (20.7-22.1)	<.001	
6-11	14.9 (14.1-15.6)	15.9 (15.0-16.7)	16.5 (15.7-17.3)	18.0 (16.5-19.6)	16.9 (16.0-17.8)	18.2 (17.7-18.6)	19.5 (18.5-20.6)	19.7 (18.8-20.5)	19.4 (18.5-20.2)	<.001	.15
12-19	13.2 (12.3-14.0)	13.9 (13.4-14.5)	13.7 (13.0-14.5)	14.2 (13.4-14.9)	14.8 (13.8-15.8)	15.5 (14.8-16.2)	16.0 (15.1-16.8)	16.3 (15.5-17.1)	17.2 (16.3-18)	<.001	
Sex											
Female	15.2 (14.6-15.8)	15.8 (15.4-16.2)	16.1 (15.3-16.9)	16.9 (15.9-18.0)	16.9 (15.9-17.8)	17.7 (17.0-18.4)	18.6 (18.0-19.2)	18.8 (17.8-19.7)	19.0 (18.3-19.7)	<.001	.24
Male	14.3 (13.5-15.2)	15.2 (14.3-16)	15.4 (14.6-16.2)	16.4 (15.4-17.4)	16.3 (15.5-17.1)	17.5 (17-18)	18.1 (17.2-18.9)	18.4 (17.5-19.3)	18.7 (17.8-19.5)	<.001	
Race/ethnicity											
Non-Hispanic white	15.1 (14.2-16.0)	15.7 (14.9-16.5)	15.5 (14.5-16.5)	16.7 (15.3-18.1)	16.4 (15.3-17.4)	17.7 (16.8-18.5)	18.2 (17.4-19.1)	18.3 (17.1-19.5)	18.9 (18.1-19.8)	<.001	.04
Non-Hispanic black	13.8 (13.3-14.3)	14.6 (13.9-15.3)	15.4 (14.6-16.1)	15.7 (15.0-16.4)	15.8 (15.2-16.3)	16.9 (15.9-17.9)	17.4 (16.3-18.4)	17.5 (16.9-18.1)	17.5 (16.6-18.4)	<.001	
Mexican American	15.3 (14.7-15.8)	15.9 (15.0-16.8)	16.5 (15.2-17.7)	17.2 (16.8-17.7)	16.6 (15.6-17.5)	17.5 (16.4-18.5)	18.5 (17.9-19.1)	18.5 (17.7-19.3)	18.2 (16.8-19.6)	<.001	
Parental education											
<High school	13.3 (12.1-14.6)	14.0 (13.5-14.5)	15.9 (14.6-17.3)	16.4 (15.5-17.3)	16.1 (15.1-17.0)	16.9 (16.2-17.6)	16.9 (15.8-17.9)	17.5 (16.5-18.5)	18.1 (16.8-19.4)	<.001	.38
High school graduate or GED	14.3 (13.6-15.1)	14.7 (13.8-15.6)	14.9 (14.2-15.5)	15.9 (15.0-16.8)	15.1 (14.6-15.7)	16.0 (15.4-16.7)	17.5 (16.4-18.6)	17.5 (16.4-18.7)	17.5 (16.1-18.8)	<.001	
Some college	14.3 (13.4-15.2)	16.0 (15.3-16.8)	15.2.0 (14.6-15.9)	16.6 (15.3-17.9)	15.8 (15.1-16.5)	18.0 (16.9-19.1)	17.3 (16.5-18.1)	17.8 (16.7-18.9)	18.4 (17.8-19)	<.001	
≥ College	17.1 (15.7-18.5)	17.2 (16.4-18.0)	18.2 (16.7-19.8)	18.0 (16.2-19.8)	19.6 (18.5-20.7)	18.9 (17.9-19.9)	21.5 (20.3-22.6)	21.0 (19.9-22.2)	20.8 (19.8-21.9)	<.001	
Ratio of family income to poverty level											
<1.30	14.5 (13.5-15.5)	14.7 (14.1-15.4)	15.9 (15.1-16.8)	16.7 (15.7-17.6)	16.1 (14.8-17.5)	16.5 (15.8-17.2)	17.2 (16.3-18.1)	17.8 (16.8-18.9)	17.5 (16.5-18.5)	<.001	
1.30-1.849	13.3 (12.1-14.6)	15.1 (14.0-16.2)	15.3 (14.1-16.6)	17.0 (15.5-18.4)	15.2 (14.1-16.2)	17.3 (16.2-18.4)	17.8 (16.5-19.1)	17.8 (16.4-19.2)	17.5 (16.6-18.5)	<.001	.06
1.85-2.99	15.1 (14.0-16.1)	14.8 (14.2-15.4)	15.2 (14.2-16.3)	16.6 (14.8-18.4)	15.9 (14.8-17.0)	17.9 (16.7-19.2)	16.6 (15.3-17.8)	19.0 (17.6-20.4)	19.2 (18.3-20.2)	<.001	
≥3.00	15.4 (14.5-16.3)	16.6 (15.8-17.5)	15.8 (14.8-16.9)	16.5 (15.5-17.5)	17.5 (16.6-18.4)	18.3 (17.5-19.1)	20.7 (19.5-22)	19.4 (18.0-20.8)	20.1 (19.0-21.3)	<.001	
Food Security Status											
Very low food security	13.5 (12.2-14.9)	16.2 (14.5-17.8)	15.7 (14.0-17.3)	15.3 (14.3-16.3)	14.5 (13.2-15.7)	16.9 (15.3-18.5)	17.1 (15.2-19)	17.7 (16.7-18.7)	-	<.001	

Low food security	13.7 (12.0-15.5)	14.8 (13.7-15.9)	16.1 (14.3-17.8)	16.6 (15.6-17.7)	16.1 (14.9-17.4)	16.5 (15.4-17.5)	17.5 (16.8-18.3)	16.9 (15.9-17.9)	-	<.001	.35
Marginal food security	15.2 (13.7-16.7)	13.6 (12.7-14.5)	14.4 (13.4-15.3)	17.1 (15.8-18.5)	14.8 (13.8-15.8)	17.0 (16.1-18.0)	18.0 (17.0-19.1)	18.2 (16.9-19.4)	-	<.001	
Food secure	14.9 (14.3-15.6)	15.7 (15.1-16.3)	15.8 (15.1-16.6)	16.7 (15.6-17.8)	17.0 (16.2-17.9)	17.8 (17.1-18.4)	18.7 (17.9-19.6)	19.1 (18.2-20.1)	-	<.001	
Participation of Federal Nutrition Programs											
SNAP											
Yes	14.3 (13.1-15.6)	14.8 (14.0-15.6)	16.1 (15.0-17.3)	16.1 (15.1-17.0)	15.5 (14.4-16.6)	16.6 (15.9-17.4)	16.9 (16.1-17.7)	18.0 (17.4-18.6)	-	<.001	.21
No	14.8 (14.1-15.5)	15.6 (15.1-16.1)	15.7 (15.0-16.4)	16.8 (15.7-17.8)	16.9 (16.1-17.7)	17.9 (17.3-18.6)	19.0 (18.2-19.7)	18.8 (17.9-19.7)	-	<.001	
WIC									-		.39
Yes	16.0 (14.3-17.8)	15.7 (14.9-16.6)	17.0 (15.7-18.4)	17.7 (17.1-18.4)	17.0 (16.4-17.7)	18.0 (17.0-19.1)	18.9 (17.5-20.3)	18.8 (17.4-20.2)	-	<.001	
No	14.5 (13.9-15.2)	15.5 (15.0-15.9)	15.6 (14.8-16.3)	16.5 (15.4-17.6)	16.5 (15.7-17.3)	17.6 (17.0-18.1)	18.2 (17.5-18.9)	18.5 (17.7-19.3)	-	<.001	
NSLP/SBP											.02
Yes	14.0 (12.7-15.2)	14.6 (14.0-15.3)	15.6 (14.9-16.4)	16.5 (15.7-17.2)	15.2 (14.3-16.1)	16.3 (15.6-16.9)	17.2 (16.6-17.9)	17.7 (17.0-18.4)	17.5 (16.7-18.3)	<.001	
No	15.1 (14.4-15.9)	15.8 (15.3-16.3)	15.8 (15.0-16.6)	16.7 (15.6-17.8)	17.1 (16.3-17.9)	18.3 (17.7-18.8)	18.9 (18.2-19.7)	19.0 (18.1-19.9)	19.7 (18.9-20.4)	<.001	
AHA secondary score											
Age group, y											
2-5	32.6 (30.3-34.8)	32.8 (31.7-33.9)	33.3 (31.5-35.0)	35.3 (33.8-36.9)	34.2 (32.9-35.6)	36.6 (35.4-37.9)	36.6 (34.9-38.3)	36.7 (35.4-38.1)	36.0 (35.0-37.0)	<.001	
6-11	28.7 (27.4-30)	30.3 (29-31.5)	31.3 (30.4-32.2)	32.4 (30.6-34.1)	31.3 (30.0-32.6)	33.5 (32.6-34.5)	34.2 (32.7-35.7)	34.2 (32.8-35.5)	33.3 (31.9-34.7)	<.001	.28
12-19	28.0 (26.5-29.4)	28.6 (27.7-29.4)	27.8 (26.7-29.0)	28.6 (27.2-30.0)	29.3 (27.9-30.7)	30.4 (29.4-31.3)	31.3 (30.2-32.4)	30.9 (30.1-31.6)	31.3 (30.1-32.4)	<.001	
Sex											
Female	30.1 (29.0-31.2)	30.9 (30.2-31.6)	30.6 (29.3-31.8)	31.8 (30.3-33.2)	31.9 (30.5-33.2)	33.1 (32.2-34.0)	33.9 (32.9-34.9)	33.9 (33.0-34.8)	33.5 (32.5-34.5)	<.001	.51
Male	28.4 (27.0-29.8)	29.2 (28.0-30.4)	29.7 (28.8-30.6)	30.8 (29.5-32.2)	30.3 (29.0-31.5)	32.5 (31.7-33.3)	33.0 (31.8-34.2)	32.5 (31.5-33.5)	32.4 (31.1-33.7)	<.001	
Race/ethnicity											.05
Non-Hispanic white	29.8 (28.4-31.3)	30.2 (29.0-31.4)	29.8 (28.5-31.2)	31.5 (29.6-33.4)	30.9 (29.4-32.5)	32.8 (31.8-33.9)	33.6 (32.4-34.9)	32.5 (31.2-33.8)	32.8 (31.6-34.1)	<.001	
Non-Hispanic black	27.2 (26.0-28.3)	28.1 (26.8-29.3)	28.9 (27.8-29.9)	29.0 (27.9-30.1)	28.9 (28.1-29.6)	31.3 (30.0-32.5)	31.1 (29.5-32.6)	31.9 (30.6-33.1)	31.4 (29.9-32.9)	<.001	
Mexican American	30.0 (29.0-30.9)	31.0 (30.1-31.8)	31.4 (29.6-33.2)	32.9 (32.5-33.4)	31.8 (30.6-33.0)	33.2 (31.4-35.1)	33.8 (32.9-34.7)	33.6 (32.6-34.6)	32.5 (30.7-34.4)	<.001	
Parental education											
<High school	27.1 (24.9-29.4)	27.8 (27.0-28.5)	30.0 (28.3-31.7)	31.0 (29.8-32.3)	29.8 (28.5-31.2)	32.0 (31.1-32.8)	31.9 (30.3-33.6)	32.0 (30.7-33.4)	32.3 (30.1-34.4)	<.001	.46
High school graduate or GED	28.0 (26.4-29.6)	29.1 (27.9-30.3)	28.9 (27.5-30.3)	30.4 (29.1-31.6)	29.1 (28.4-29.7)	30.7 (29.8-31.5)	32.0 (30.6-33.4)	32.2 (30.7-33.8)	31.0 (29.3-32.7)	<.001	
Some college	29.3	30.4	29.5	31.3	30.3	33.3	32.0	32.8	32.3	<.001	

	(28-30.7)	(29.4-31.3)	(28.7-30.2)	(29.5-33.2)	(29.1-31.6)	(31.7-34.9)	(31.0-33.1)	(31.4-34.1)	(31.5-33.1)		
≥ College	32.6 (30.9-34.2)	32.7 (31.7-33.7)	33.4 (31.4-35.4)	32.6 (30.1-35.1)	34.8 (33.1-36.5)	34.3 (32.9-35.6)	37.4 (35.5-39.2)	35.4 (33.7-37.1)	35.7 (34.1-37.3)	<.001	
Ratio of family income to poverty level											
<1.30	28.4 (26.8-29.9)	28.9 (27.8-30)	30.5 (29.0-31.9)	31.3 (29.6-32.9)	30.5 (29-32.1)	30.8 (29.9-31.8)	31.9 (30.7-33.1)	32.7 (31.2-34.2)	30.9 (29.5-32.4)	<.001	
1.30-1.849	27.3 (25.1-29.4)	28.6 (26.9-30.4)	28.5 (26.6-30.3)	31.5 (29.5-33.4)	29.4 (28.3-30.6)	33.0 (31.4-34.7)	32.2 (30.9-33.5)	33.3 (31.6-34.9)	31.7 (29.9-33.5)	<.001	.24
1.85-2.99	29.7 (27.9-31.4)	29.9 (28.6-31.1)	30.0 (28.4-31.5)	31.2 (28.5-33.9)	30.1 (28.8-31.4)	33.1 (31.5-34.8)	31.5 (29.6-33.4)	32.9 (31.2-34.6)	33.2 (32.3-34.2)	<.001	
≥3.00	30.8 (29.3-32.3)	31.5 (30.5-32.5)	30.3 (29.1-31.5)	31.2 (29.9-32.6)	32.1 (30.8-33.5)	33.9 (32.9-34.9)	36.6 (34.7-38.4)	33.8 (32-35.6)	34.8 (32.9-36.7)	<.001	
Food Security Status											
Very low food security	27.3 (24.6-30)	31.1 (28.6-33.5)	29.7 (27.3-32.1)	28.4 (26.7-30.0)	28.0 (26.2-29.9)	30.9 (28.8-33)	31.6 (28.9-34.3)	31.8 (30.2-33.4)	-	.03	
Low food security	28.1 (26.5-29.8)	29.0 (27.3-30.7)	30.8 (28.0-33.7)	31.4 (29.9-32.9)	31.0 (29.6-32.3)	30.7 (29.0-32.5)	32.3 (31.3-33.4)	31.3 (29.9-32.6)	-	<.001	.10
Marginal food security	28.7 (27.3-30.2)	27.1 (25.7-28.6)	28.7 (26.8-30.6)	31.6 (29.7-33.5)	29.3 (28.0-30.6)	32.4 (31.2-33.5)	33.5 (31.7-35.3)	33.1 (31.2-34.9)	-	<.001	
Food secure	29.5 (28.4-30.6)	30.4 (29.6-31.2)	30.3 (29.3-31.2)	31.4 (29.9-33.0)	31.5 (30.2-32.8)	33.2 (32.6-33.7)	33.9 (32.8-35.0)	33.8 (32.7-34.9)	-	<.001	
Participation of Federal Nutrition Programs											
SNAP											
Yes	27.3 (25.6-28.9)	28.5 (27.0-29.9)	30.4 (28.5-32.3)	29.7 (28.0-31.5)	29.4 (27.6-31.1)	31.3 (30.2-32.5)	31.0 (29.7-32.4)	32.9 (31.8-33.9)	-	<.001	.27
No	29.6 (28.4-30.8)	30.3 (29.5-31.1)	30.1 (29.2-30.9)	31.6 (30.1-33.0)	31.5 (30.4-32.6)	33.3 (32.4-34.1)	34.5 (33.4-35.6)	33.3 (32.3-34.2)	-	<.001	
WIC									-		.05
Yes	30.2 (27.6-32.8)	29.3 (27.8-30.8)	32.0 (30.0-34.0)	32.5 (31.4-33.6)	31.2 (30.0-32.3)	33.0 (31.7-34.4)	34.2 (32.2-36.1)	33.3 (31.4-35.2)	-	<.001	
No	29.0 (27.8-30.3)	30.2 (29.4-30.9)	29.8 (29.0-30.7)	31.1 (29.6-32.6)	31.0 (29.8-32.3)	32.8 (32.0-33.5)	33.3 (32.2-34.3)	33.1 (32.3-34.0)	-	<.001	
NSLP/SBP											.16
Yes	27.3 (25.3-29.4)	28.8 (27.7-29.9)	29.8 (28.6-31.0)	30.5 (29.0-31.9)	28.9 (27.4-30.5)	31.0 (30.3-31.7)	31.3 (30.3-32.4)	32.2 (31.1-33.3)	31.1 (30.2-32.1)	<.001	
No	30.1 (29.0-31.1)	30.5 (29.7-31.3)	30.3 (29.2-31.3)	31.6 (30.1-33.1)	31.9 (30.8-33.0)	33.6 (32.8-34.5)	34.5 (33.5-35.5)	33.7 (32.8-34.6)	34.1 (32.9-35.3)	<.001	

Abbreviations: GED, general equivalency diploma; NHANES, National Health and Nutrition Examination Survey; SNAP, Supplemental Nutrition Assistance Program; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children; NSLP, National School Lunch Program; SBP, School Breakfast Program; - indicated data not available.

[a] Data were weighted to be nationally representative.

P for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted logistic regression model. *P* for interaction was calculated using the Wald F test for an interaction term between survey-cycle and sociodemographic subgroups.

eTable 10. Trends in Estimated Healthy Eating Index (HEI)-2015 by Age Group, Sex, Race/Ethnicity, Parental Education, Household Income, Food Security Status, and Participation of Food Assistance Programs by NHANES Survey Cycles, 1999-2016[a]

	Survey-weighted Mean (95% CI)									*P* for trend	*P* for interaction
	1999-2000	2001-2002	2003-2004	2005-2006	2007-2008	2009-2010	2011-2012	2013-2014	2015-2016		
HEI-2015 score											
Age group, y											
2-5	49.4 (47.6-51.1)	50.0 (48.4-51.6)	52.4 (50.9-53.8)	53.3 (51.9-54.8)	53.4 (51.8-55)	55.3 (53.6-57.0)	56.0 (54.4-57.7)	55.0 (53.6-56.3)	55.0 (53.7-56.4)	<.001	
6-11	43.9 (42.5-45.2)	45.3 (43.9-46.8)	48.9 (47.2-50.6)	48.1 (46.8-49.5)	48.0 (46.6-49.3)	49.8 (48.9-50.7)	51.5 (50.3-52.8)	50.5 (48.8-52.2)	49.2 (47.9-50.6)	<.001	.06
12-19	42.9 (41.6-44.2)	44.6 (43.6-45.6)	46.4 (45.3-47.4)	44.9 (44.0-45.8)	45.8 (44.5-47.1)	46.5 (45.5-47.6)	48.8 (47.6-50.0)	47.3 (46.4-48.2)	47.4 (46.0-48.8)	<.001	
Sex											
Female	45.4 (44.3-46.4)	46.6 (45.4-47.9)	49.0 (47.6-50.4)	48.1 (47.1-49.2)	48.7 (47.1-50.3)	49.6 (48.6-50.6)	51.5 (50.5-52.5)	50.6 (49.5-51.7)	50.5 (49.6-51.5)	<.001	.93
Male	43.9 (42.7-45.2)	45.4 (44.0-46.8)	48.0 (46.9-49.1)	47.4 (46.4-48.3)	47.6 (46.5-48.8)	49.5 (48.4-50.6)	51.1 (49.9-52.3)	49.3 (48.0-50.6)	48.8 (47.2-50.4)	<.001	
Race/ethnicity											
Non-Hispanic white	44.8 (43.6-46.1)	45.7 (44.2-47.2)	47.5 (45.9-49.2)	47.2 (45.6-48.7)	47.6 (45.9-49.2)	48.9 (47.6-50.2)	51.0 (49.8-52.2)	49.1 (47.7-50.5)	49.3 (47.7-50.9)	<.001	.07
Non-Hispanic black	43.1 (42.2-44.0)	44.9 (43.8-46.0)	47.9 (46.8-48.9)	47.1 (46.2-48.1)	47.1 (46.1-48.2)	48.7 (46.8-50.7)	49.8 (48.6-50.9)	48.9 (47.9-50.0)	48.3 (46.9-49.7)	<.001	
Mexican American	47.6 (46.3-48.8)	48.3 (46.9-49.6)	51.4 (49.5-53.3)	50.9 (49.9-51.9)	49.9 (48.2-51.7)	51.2 (49.7-52.6)	52.3 (51.2-53.3)	51.6 (50.4-52.9)	50.4 (48.7-52.2)	<.001	
Parental education											
<High school	42.9 (40.9-45.0)	44.0 (42.6-45.5)	48.7 (47.1-50.3)	48.9 (47.4-50.4)	48.0 (46.7-49.4)	49.3 (48.3-50.2)	50.8 (49.2-52.4)	49.2 (47.8-50.6)	48.8 (46.5-51.2)	<.001	.39
High school graduate or GED	44.1 (42.6-45.6)	45.0 (43.4-46.6)	47.5 (45.9-49.0)	46.6 (45.5-47.6)	46.4 (45.3-47.6)	47.6 (46.7-48.5)	49.6 (48.4-50.9)	49.1 (47.6-50.7)	48.4 (46.3-50.4)	<.001	
Some college	44.4 (42.9-45.9)	46.1 (44.6-47.6)	48.0 (47.2-48.7)	47.8 (46.9-48.7)	47.0 (45.6-48.3)	50.2 (48.7-51.7)	49.8 (48.9-50.8)	48.8 (47.5-50.2)	49.4 (48.4-50.4)	<.001	
≥ College	46.6 (44.8-48.3)	48.6 (47.6-49.6)	50.7 (48.4-53.1)	48.4 (45.6-51.1)	51.9 (50.5-53.3)	50.4 (48.7-52.2)	54.7 (52.9-56.5)	52.6 (50.9-54.3)	51.2 (49.5-52.8)	<.001	
Ratio of family income to poverty level											
<1.30	44.5 (42.8-46.1)	44.9 (43.3-46.5)	49.4 (48.0-50.8)	49.3 (47.5-51.0)	48.1 (46.4-49.7)	48.6 (47.4-49.8)	50.0 (48.9-51.1)	49.6 (48.2-51.1)	48.3 (46.7-49.9)	<.001	.21
1.30-1.849	42.7 (40.8-44.5)	45.1 (42.9-47.3)	47.7 (46.3-49.1)	47.7 (45.8-49.6)	46.0 (44.6-47.4)	50.0 (47.6-52.5)	51.2 (49.7-52.7)	49.9 (48.2-51.7)	48.8 (47.2-50.4)	<.001	
1.85-2.99	45.4 (43.0-47.7)	45.0 (43.9-46.1)	47.1 (45.3-48.9)	47.3 (45.4-49.2)	47.0 (45.3-48.8)	49.4 (47.2-51.7)	50.1 (48.5-51.8)	49.3 (47.6-50.9)	50.7 (48.8-52.7)	<.001	
≥3.00	45.2 (44.1-46.3)	47.5 (45.9-49)	48.6 (47.3-49.9)	46.8 (45.9-47.7)	49.1 (47.7-50.5)	50.0 (48.9-51.1)	53.4 (51.6-55.2)	50.7 (48.7-52.8)	50.1 (48.3-51.9)	<.001	
Food Security Status											
Very low food security	43.4 (41.2-45.5)	47.5 (44.0-51.0)	47.6 (46.5-48.7)	47.5 (45.8-49.3)	46.2 (44.5-48.0)	47.1 (44.9-49.3)	51.4 (49.0-53.8)	49.5 (47.4-51.7)	-	<.001	.21
Low food security	44.5 (42.2-46.8)	45.3 (42.9-47.7)	49.7 (47.1-52.4)	48.6 (46.8-50.4)	47.5 (46.0-49.0)	48.4 (46.8-49.9)	50.9 (49.9-51.9)	47.8 (45.8-49.7)	-	.001	

Marginal food security	44.9 (43.9-45.9)	43.1 (40.8-45.4)	48.6 (47.0-50.2)	48.5 (46.0-51.0)	46.4 (44.9-47.8)	49.3 (47.5-51.1)	51.6 (49.7-53.5)	49.8 (47.8-51.7)	-	<.001	
Food secure	44.6 (43.5-45.7)	46.1 (44.9-47.3)	48.4 (47.2-49.5)	47.6 (46.5-48.6)	48.7 (47.4-50.0)	49.9 (48.7-51.2)	51.3 (50.4-52.2)	50.6 (49.4-51.7)	-	<.001	
Participation of Federal Nutrition Programs											
SNAP											.65
Yes	44.7 (42.9-46.6)	45.2 (43.4-47.1)	48.8 (47.1-50.6)	47.4 (46.2-48.7)	47.0 (45.4-48.6)	49.2 (48.1-50.2)	49.6 (48.7-50.5)	50.1 (48.9-51.2)	-	<.001	
No	44.6 (43.5-45.8)	46.1 (45.0-47.3)	48.4 (47.4-49.5)	47.8 (46.8-48.8)	48.5 (47.3-49.7)	49.7 (48.5-50.8)	52.0 (51.2-52.8)	49.9 (48.8-51.1)	-	<.001	
WIC											.62
Yes	47.2 (45.0-49.5)	45.9 (43.5-48.3)	51.7 (49.4-54.0)	50.4 (49.6-51.2)	49.7 (48.4-51.0)	51.5 (49.9-53.0)	52.8 (51.2-54.5)	51.3 (49.3-53.2)	-	<.001	
No	44.1 (42.9-45.4)	46.0 (45.0-47.0)	48.0 (46.9-49.1)	47.3 (46.3-48.4)	47.9 (46.7-49.1)	49.2 (48.2-50.2)	51.0 (50.1-51.8)	49.7 (48.8-50.6)	-	<.001	
NSLP/SBP											.02
Yes	43.5 (41.4-45.6)	44.8 (43.4-46.3)	48.5 (47.3-49.7)	47.7 (46.7-48.7)	46.4 (45.1-47.6)	48.2 (47.3-49)	49.2 (48.3-50.1)	49.2 (48-50.3)	47.9 (46.6-49.2)	<.001	
No	45.1 (44.2-46.1)	46.4 (45.4-47.5)	48.5 (47.4-49.6)	47.8 (46.7-48.9)	48.9 (47.6-50.2)	50.2 (49.1-51.4)	52.3 (51.4-53.3)	50.4 (49.2-51.5)	50.8 (49.5-52.1)	<.001	

Abbreviations: GED, general equivalency diploma; NHANES, National Health and Nutrition Examination Survey; SNAP, Supplemental Nutrition Assistance Program; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children; NSLP, National School Lunch Program; SBP, School Breakfast Program; - indicated data not available.

[a] Data were weighted to be nationally representative.

P for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted logistic regression model. *P* for interaction was calculated using the Wald F test for an interaction term between survey-cycle and sociodemographic subgroups.

eTable 11. Trends in Estimated Percentage of US Children With Poor or Intermediate Diet Based on Primary American Heart Association (AHA) Continuous Diet Score by Age Group, Sex, Race/Ethnicity, Parental Education, Household Income, Food Security Status, and Participation of Food Assistance Programs by NHANES Survey Cycles, 1999-2016[a]

	AHA Primary Diet Score, Survey-Weighted % (95% CI)									*P* for trend	*P* for interaction
	1999-2000	2001-2002	2003-2004	2005-2006	2007-2008	2009-2010	2011-2012	2013-2014	2015-2016		
Poor Diet											
Overall	76.8 (72.9-80.2)	74.5 (71.6-77.1)	72. 4 (68.1-76.3)	67.2 (61.1-72.8)	68.1 (64.6-71.4)	63.7 (60.8-66.6)	59.1 (55.3-62.8)	55.9 (52.8-59.0)	56.1 (51.4-60.7)	<.001	
Age group, y											
2-5	63.5 (55.2-71.7)	59.1 (53.4-64.9)	53.9 (45.4-62.5)	48.2 (42.1-54.4)	48.8 (43.9-53.6)	41.7 (36.4-47.1)	41.5 (36.9-46.2)	38.8 (34.8-42.8)	39.8 (35.1-44.5)	<.001	
6-11	75.2 (71.0-78.9)	73.5 (67.6-78.7)	70.2 (63.0-76.4)	62.0 (53.6-69.8)	68.9 (64.3-73.0)	61.6 (58.1-65.0)	54.3 (47.7-60.7)	49.1 (43.7-54.4)	52.5 (46.4-58.5)	<.001	.69
12-19	84.7 (80.1-88.4)	82.5 (79.0-85.4)	82.6 (79.3-85.5)	79.8 (74.2-84.4)	77.0 (72.2-81.1)	76.2 (72.3-79.7)	71.2 (66.7-75.3)	68.6 (65.4-71.6)	66.6 (61.4-71.4)	<.001	
Sex											
Female	75.5 (71.9-78.8)	73.9 (71.2-76.3)	71.0 (66.6-75.0)	66.5 (58.6-73.6)	66.9 (61.4-72.1)	64.4 (60.3-68.4)	59.1 (55.9-62.3)	54.3 (49.9-58.8)	55.7 (50.4-60.8)	<.001	.48
Male	77.9 (73.0-82.2)	75.1 (70.7-78.9)	73.8 (68.6-78.3)	67.9 (62.7-72.6)	69.2 (65.6-72.6)	63.1 (60.4-65.6)	59.1 (52.7-65.2)	57.4 (53.1-61.6)	56.5 (51.1-61.7)	<.001	
Race/ethnicity											
Non-Hispanic white	74.1 (68.5-78.9)	73.8 (69.5-77.6)	72.6 (65.9-78.4)	66.4 (58.0-73.9)	68.8 (63.2-73.8)	64.1 (60.4-67.6)	57.9 (52.4-63.1)	56.7 (51.6-61.7)	55.4 (49.7-61.0)	<.001	
Non-Hispanic black	82.3 (78.5-85.5)	80.3 (76.6-83.6)	76.4 (71.1-80.9)	74.1 (67.8-79.5)	71.7 (67.7-75.4)	66.8 (57.8-74.7)	65.9 (59.3-71.9)	64.5 (61.5-67.4)	60.3 (55.4-65.0)	<.001	.16
Mexican American	75.1 (71.6-78.3)	70.7 (64.4-76.2)	71.8 (65.8-77.1)	64.0 (60.4-67.5)	68.5 (64.1-72.7)	64.2 (56.8-70.9)	61.5 (57.9-65.0)	55.7 (50.2-61.1)	61.0 (52.5-68.8)	<.001	
Parental education											
<High school	81.6 (75.3-86.6)	80.5 (77.6-83.1)	71.4 (64.9-77.2)	68.7 (63.2-73.7)	70.3 (66.7-73.7)	67.2 (63.2-71.0)	65.9 (59.8-71.5)	63.5 (58.0-68.7)	64.4 (56.9-71.2)	<.001	
High school graduate or GED	79.3 (73.6-84.0)	78.5 (73.8-82.6)	79.7 (73.4-84.7)	69.6 (64.0-74.6)	75.3 (72.5-77.9)	71.7 (65.4-77.4)	65.0 (58.4-71.1)	60.5 (52.5-67.9)	62.7 (55.5-69.5)	<.001	
Some college	80.8 (76.0-84.8)	73.2 (68.2-77.7)	74.4 (70.2-78.2)	67.5 (58.3-75.5)	71.7 (67.7-75.4)	62.0 (56.5-67.2)	65.0 (59.3-70.2)	60.2 (55.9-64.4)	58.2 (53.5-62.7)	<.001	.96
≥ College	63.6 (54.4-71.9)	65.4 (58.8-71.5)	57.8 (46.3-68.6)	62.1 (52.1-71.2)	52.8 (45.4-60.0)	57.1 (51.6-62.4)	42.6 (35.3-50.3)	43.2 (37.8-48.8)	43.2 (36.0-50.7)	<.001	
Ratio of family income to poverty level											
<1.30	76.9 (72.2-81.0)	78.4 (74.2-82.1)	72.8 (67.3-77.7)	66.7 (60.4-72.5)	70.3 (64.0-75.8)	68.1 (63.3-72.5)	64.5 (59.4-69.2)	60.1 (54.1-65.7)	64.5 (59.5-69.1)	<.001	
1.30-1.849	83.3 (76.6-88.3)	76.0 (69.6-81.4)	76.0 (65.4-84.1)	68.3 (59.5-76.0)	77.1 (68.7-83.7)	63.9 (58.9-68.6)	60.9 (52.4-68.7)	55.9 (50.1-61.6)	60.2 (53.3-66.7)	<.001	
1.85-2.99	79.1 (72.1-84.7)	79.4 (75.2-83.0)	74.4 (67.5-80.4)	65.9 (54.9-)	72.9 (67.2-77.9)	64.0 (57.2-70.2)	68.5 (61.1-75.1)	55.2 (45.5)	57.1 (49.0-64.9)	<.001	.09
≥3.00	73.6 (66.3-79.8)	68.8 (62.6-74.4)	70.0 (63.4-75.8)	67.9 (61.5-73.6)	61.5 (56.1-66.6)	60.5 (56.5-64.4)	47.3 (38.8-55.9)	51.5 (43.9-59.0)	47.2 (39.4-55.3)	<.001	
Food Security Status											
Very low food security	84.0 (77.4-88.9)	73.0 (65.9-79.1)	75.4 (61.8-85.3)	78.2 (72.5-83.0)	81.9 (72.7-88.5)	62.1 (53.6-69.9)	67.6 (58.8-75.3)	60.9 (52.8-68.5)	-	.008	

Low food security	83.0 (71.5-90.5)	78.6 (69.4-85.5)	69.9 (60.0-78.3)	68.2 (61.0-74.6)	68.3 (62.3-73.7)	72.3 (65.8-78.1)	63.7 (57.9-69.1)	65.2 (58.7-71.1)	-	<.001	.72
Marginal food security	74.7 (63.4-83.4)	83.1 (78.5-86.8)	76.7 (68.3-83.4)	67.4 (61.5-72.7)	78.7 (73.4-83.2)	65.8 (60.5-70.8)	62.2 (55.1-68.9)	58.8 (50.6-66.5)	-	<.001	
Food secure	75.6 (71.4-79.3)	73.1 (69.9-76.1)	71.8 (67.0-76.2)	66.3 (59.3-72.7)	65.8 (61.4-69.9)	63.0 (59.9-66.0)	56.5 (50.4-62.3)	52.6 (48.6-56.6)	-	<.001	
Participation of Federal Nutrition Programs											
SNAP											
Yes	77.5 (69.9-83.6)	79.2 (73.1-84.2)	72.4 (65.2-78.6)	72.1 (64.1-78.8)	73.9 (67.8-79.2)	67.5 (62.0-72.6)	68.0 (63.3-72.2)	59.8 (54.7-64.7)	-	<.001	.54
No	76.6 (72.7-80.2)	73.6 (70.8-76.3)	72.4 (68.0-76.4)	66.3 (60.0-72.0)	66.5 (62.1-70.6)	62.6 (58.9-66.1)	55.1 (50.1-60.0)	54.4 (50.4-58.4)	-	<.001	
WIC											
Yes	67.7 (57.0-76.8)	72.7 (66.4-78.2)	67.0 (57.1-75.5)	61.6 (56.1-66.9)	65.4 (60.5-70.0)	60.1 (53.3-66.6)	55.6 (48.0-62.9)	54.4 (46.9-61.8)	-	<.001	.29
No	78.5 (74.6-82.0)	74.8 (72.0-77.3)	73.3 (68.5-77.6)	68.1 (61.3-74.2)	68.5 (64.3-72.5)	64.4 (61.4-67.3)	59.9 (55.1-64.5)	56.2 (52.6-59.7)	-	<.001	
NSLP/SBP											
Yes	79.7 (72.5-85.4)	79.6 (75.3-83.2)	76.7 (70.9-81.7)	67.7 (61.9-73.0)	75.5 (71.3-79.3)	71.2 (66.9-75.2)	66.3 (61.9-70.4)	58.9 (53.8-63.8)	64.7 (60.1-69.1)	<.001	.18
No	75.5 (70.9-79.6)	72.5 (69.2-75.7)	70.8 (66.0-75.2)	67.1 (60.3-73.1)	65.1 (61.0-69.0)	60.2 (56.6-63.7)	55.4 (50.6-60.2)	54.3 (49.9-58.7)	50.5 (45.5-55.5)	<.001	
Intermediate Diet											
Overall	23.2 (19.8-26.9)	25.4 (22.8-28.1)	27.4 (23.6-31.6)	32.7 (27.1-38.8)	31.7 (28.5-35.1)	36.1 (33.3-39.0)	40.4 (36.6-44.3)	43.6 (40.4-46.9)	43.7 (39.1-48.3)	<.001	
Age group, y											
2-5	36.2 (28.5-44.8)	40.8 (35.1-46.6)	45.5 (37.3-54.0)	51.7 (45.6-57.8)	51.0 (46.2-55.9)	58.1 (52.6-63.4)	58.2 (53.3-62.9)	59.9 (55.7-64.0)	60.2 (55.5-64.8)	<.001	.67
6-11	24.8 (21.1-29.0)	26.1 (21.4-31.5)	29.7 (23.4-36.8)	37.8 (30.0-46.3)	31.0 (26.9-35.4)	38.0 (34.5-41.6)	44.8 (38.6-51.3)	50.8 (45.4-56.1)	47.3 (41.2-53.5)	<.001	
12-19	15.3 (11.6-19.9)	17.5 (14.5-20.9)	17.3 (14.5-20.5)	20.2 (15.6-25.7)	22.8 (18.9-27.2)	23.8 (20.3-27.7)	28.5 (24.2-33.2)	31.2 (28.2-34.4)	33.0 (28.3-38.1)	<.001	
Sex											
Female	24.5 (21.2-28.0)	26.1 (23.6-28.8)	28.8 (24.9-33.0)	33.3 (26.2-41.3)	33.1 (27.9-38.6)	35.6 (31.6-39.7)	40.7 (37.5-43.9)	45.4 (40.8-50.0)	44.1 (39.0-49.3)	<.001	.52
Male	21.9 (17.7-26.7)	24.7 (20.9-28.8)	26.1 (21.6-31.2)	32.1 (27.3-37.3)	30.4 (27.1-33.8)	36.6 (34.2-39.1)	40.1 (34.0-46.5)	42.0 (37.6-46.5)	43.2 (38.0-48.6)	<.001	
Race/ethnicity											
Non-Hispanic white	25.8 (21.0-31.3))	26.0 (22.3-30.0)	27.4 (21.6-34.1)	33.5 (26.0-41.9)	31.0 (26.1-36.5)	35.6 (32.2-39.2)	41.7 (36.4-47.2)	42.7 (37.5-48.1)	44.5 (38.8-50.2)	<.001	.16
Non-Hispanic black	17.7 (14.5-21.5)	19.6 (16.4-23.3)	23.6 (19.0-28.8)	25.8 (20.4-32.1)	28.2 (24.5-32.1)	33.2 (25.3-42.1)	33.8 (27.7-40.4)	35.2 (32.4-38.2)	39.7 (35.0-44.5)	<.001	
Mexican American	24.9 (21.7-28.4)	29.3 (23.7-35.5)	27.0 (22.6-31.9)	35.6 (31.9-39.5)	31.5 (27.3-35.9)	35.8 (29.1-43.2)	37.6 (33.8-41.7)	44.0 (38.9-49.3)	38.7 (31.0-46.9)	.001	
Parental education											
<High school	18.4 (13.4-24.6)	19.5 (16.9-22.4)	27.9 (22.4-34.1)	31.3 (26.3-36.8)	29.6 (26.3-33.0)	32.8 (28.9-36.8)	33.5 (28.0-39.5)	36.0 (31.0-41.3)	35.0 (28.3-42.4)	<.001	
High school graduate or GED	20.7 (16.0-26.4)	21.4 (17.3-26.2)	20.2 (15.1-26.5)	30.2 (25.1-35.9)	24.7 (22.1-27.5)	28.3 (22.6-34.6)	34.9 (28.9-41.6)	39.2 (31.7-47.3)	37.3 (30.5-44.5)	<.001	.95

Some college	19.2 (15.2-24.0)	26.2 (21.8-31.2)	25.6 (21.8-29.8)	32.5 (24.5-41.7)	28.2 (24.6-32.2)	37.8 (32.8-42.9)	34.6 (29.2-40.4)	39.2 (35.1-43.4)	41.7 (37.2-46.4)	<.001	
≥ College	36.4 (28.0-45.6)	34.6 (28.5-41.2)	42.1 (31.4-53.6)	37.8 (28.7-47.7)	46.6 (39.5-53.7)	42.6 (37.3-48.1)	56.4 (48.8-63.7)	56.5 (50.8-61.9)	56.5 (49.1-63.5)	<.001	
Ratio of family income to poverty level											
<1.30	22.9 (18.9-27.4)	21.5 (17.8-25.7)	26.7 (22.0-31.9)	33.1 (27.2-39.5)	29.4 (24.3-35.0)	31.9 (27.5-36.7)	35.3 (30.4-40.5)	39.5 (33.6-45.8)	35.4 (30.8-40.2)	.004	
1.30-1.849	16.7 (11.7-23.3)	24.0 (18.5-30.4)	23.9 (15.8-34.4)	31.7 (24.0-40.5)	22.7 (16.1-30.9)	35.7 (30.6-41.1)	38.0 (30.1-46.7)	44.1 (38.4-49.9)	39.8 (33.2-46.7)	<.001	.11
1.85-2.99	20.8 (15.2-27.8)	20.5 (16.9-24.7)	25.5 (19.6-32.5)	34.0 (24.5-45.1)	26.7 (21.8-32.2)	36.0 (29.7-42.8)	31.4 (24.8-38.9)	43.6 (34.8-52.8)	42.4 (34.6-50.5)	.015	
≥3.00	26.4 (20.2-33.7)	30.8 (25.6-36.6)	30.0 (24.1-36.6)	32.0 (26.3-38.4)	38.5 (33.4-43.8)	39.3 (35.5-43.3)	51.8 (43.0-60.4)	48.4 (40.8-56.0)	52.5 (44.6-60.3)	<.001	
Food Security Status											
Very low food security	16.0 (11.1-22.6)	26.9 (20.9-33.9)	24.6 (14.6-38.2)	21.8 (17.0-27.5)	18.1 (11.5-27.3)	37.9 (30.0-46.3)	31.2 (23.4-40.2)	39.1 (31.5-47.2)	-	<.001	
Low food security	17.0 (9.47-28.5)	21.4 (14.4-30.6)	28.8 (20.8-38.3)	31.8 (25.4-38.9)	31.6 (26.2-37.5)	27.7 (21.9-34.2)	36.1 (30.5-42.0)	34.6 (28.8-40.8)	-	<.001	.76
Marginal food security	25.3 (16.6-36.6)	16.9 (13.2-21.5)	23.3 (16.6-31.7)	32.6 (27.2-38.5)	21.0 (16.4-26.5)	34.2 (29.2-39.5)	37.4 (30.7-44.5)	41.2 (33.4-49.4)	-	<.001	
Food secure	24.3 (20.6-28.4)	26.7 (23.9-29.7)	28.1 (23.7-32.9)	33.6 (27.2-40.6)	34.0 (30.0-38.3)	36.9 (33.8-40.0)	43.0 (37.1-49.1)	46.8 (42.8-50.9)	-	<.001	
Participation of Federal Nutrition Programs											
SNAP											.65
Yes	22.1 (16.1-29.5)	20.7 (15.6-26.8)	26.8 (20.8-33.7)	27.9 (21.2-35.8)	26.1 (20.7-32.2)	32.5 (27.4-38.0)	31.9 (27.6-36.5)	39.8 (34.5-45.3)	-	<.001	
No	23.4 (19.8-27.3)	26.2 (23.6-28.9)	27.5 (23.5-31.9)	33.6 (27.9-39.9)	33.3 (29.3-37.5)	37.2 (33.8-40.8)	44.2 (39.2-49.3)	45.1 (41.0-49.3)	-	<.001	
WIC											
Yes	31.9 (23.1-42.1)	27.2 (21.6-33.5)	31.9 (23.6-41.6)	38.0 (32.6-43.7)	34.2 (29.6-39.2)	39.9 (33.4-46.7)	43.5 (36.2-51.1)	44.8 (36.9-53.0)	-	<.001	.30
No	21.5 (18.0-25.4)	25.1 (22.6-27.8)	26.7 (222.4-31.5)	31.9 (25.7-38.7)	31.3 (27.5-35.4)	35.4 (32.6-38.3)	39.7 (35.2-44.4)	43.4 (39.9-47.0)	-	<.001	
NSLP/SBP											
Yes	20.3 (14.6-27.5)	20.4 (16.7-24.6)	23.2 (18.2-28.9)	32.1 (26.6-38.1)	24.5 (20.7-28.6)	28.8 (24.8-33.1)	33.2 (29.0-37.7)	40.9 (35.9-46.1)	34.9 (30.6-39.4)	<.001	.17
No	24.4 (20.3-29.0)	27.3 (24.3-30.5)	29.0 (24.6-33.7)	32.9 (26.8-39.6)	34.6 (30.8-38.6)	39.5 (36.1-43.0)	44.1 (39.3-49.0)	45.1 (40.7-49.6)	49.3 (44.4-54.3)	<.001	

Abbreviations: GED, general equivalency diploma; NHANES, National Health and Nutrition Examination Survey; SNAP, Supplemental Nutrition Assistance Program; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children; NSLP, National School Lunch Program; SBP, School Breakfast Program; - indicated data not available.

[a] Data were weighted to be nationally representative.

P for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted logistic regression model. *P* for interaction was calculated using the Wald F test for an interaction term between survey-cycle and sociodemographic subgroups.

eTable 12. Trends in Estimated Percentage of US Children With Poor or Intermediate Diet Based on Secondary American Heart Association (AHA) Continuous Diet Score by Age Group, Sex, Race/Ethnicity, Parental Education, Household Income, Food Security Status, and Participation of Food Assistance Programs by NHANES Survey Cycles, 1999-2016[a]

	AHA Secondary Diet Score, Survey-Weighted % (95% CI)										
	1999-2000	2001-2002	2003-2004	2005-2006	2007-2008	2009-2010	2011-2012	2013-2014	2015-2016	*P* for trend	*P* for interaction
Poor Diet											
Overall	61.0 (56.5-65.2)	57.7 (54.7-60.7)	58.2 (54.5-61.9)	53.3 (48.8-57.8)	53.8 (49.3-58.3)	48.2 (45.6-50.8)	48.3 (45.0-51.6)	46.6 (43.3-49.9)	49.1 (45.0-53.3)	<.001	
Age group, y											
2-5	47.1 (38.3-56.0)	45.4 (40.4-50.4)	45.7 (40.0-51.8)	34.7 (28.7-41.3)	41.1 (35.7-46.8)	35.6 (31.3-40.2)	35.4 (30.8-40.2)	35.3 (30.3-40.8)	36.6 (31.2-42.3)	<.001	
6-11	61.7 (56.9-66.3)	55.3 (49.4-61.1)	55.1 (50.9-59.1)	49.0 (43.5-54.6)	55.1 (49.8-60.3)	44.6 (41.6-47.7)	46.2 (41.3-51.1)	42.4 (35.8-49.2)	48.5 (42.7-54.4)	<.001	.80
12-19	67.3 (61.7-72.5)	65.5 (61.9-68.9)	66.4 (61.9-70.6)	65.1 (60.0-70.0)	59.1 (52.6-65.4)	57.0 (52.6-61.3)	56.2 (51.4-60.8)	54.7 (50.9-58.4)	55.6 (50.4-60.6)	<.001	
Sex											
Female	57.5 (53.0-61.8)	54.4 (51.5-57.3)	57.2 (51.7-62.4)	51.9 (3.2)	50.8 (46.7-54.8)	47.5 (43.5-51.7)	45.8 (41.1-50.5)	42.5 (38.8-46.2)	47.0 (41.1-51.9)	<.001	.85
Male	64.3 (59.0-69.3)	61.1 (55.9-66.0)	59.3 (55.2-63.2)	54.8 (51.1-58.4)	56.9 (50.3-63.2)	48.8 (46.3-51.3)	50.7 (46.0-54.9)	50.5 (46.0-54.9)	51.2 (46.0-56.4)	.03	
Race/ethnicity											
Non-Hispanic white	59.2 (53.3-64.8)	57.4 (52.9-61.7)	60.3 (54.9-65.4)	53.7 (47.6-59.7)	54.1 (47.1-60.9)	49.1 (44.5-53.6)	49.0 (43.9-54.1)	49.6 (44.0-55.2)	49.8 (44.2-55.3)	<.001	
Non-Hispanic black	66.6 (60.0-69.6)	64.9 (60.0-69.6)	62.1 (58.2-65.8)	61.6 (55.4-67.4)	63.6 (59.9-67.2)	53.0 (48.5-57.5)	55.4 (48.8-61.8)	52.2 (47.4-56.9)	56.8 (50.8-62.6)	<.001	.68
Mexican American	57.6 (53.6-61.5)	55.1 (50.2-59.9)	52.7 (46.2-59.0)	43.9 (41.6-46.1)	50.3 (46.2-54.4)	46.7 (39.0-54.5)	45.4 (40.9-50.0)	42.6 (39.2-46.1)	49.1 (42.7-55.5)	.001	
Parental education											
<High school	69.4 (63.9-74.3)	65.5 (61.7-69.1)	58.6 (51.6-65.1)	52.4 (47.5-57.2)	57.9 (52.1-63.5)	48.2 (43.4-53.0)	52.9 (46.9-58.8)	50.1 (46.2-53.9)	51.5 (43.2-59.7)	<.001	
High school graduate or GED	65.6 (60.7-70.2)	61.7 (57.0-66.2)	65.1 (59.4-70.4)	55.3 (50.3-60.1)	61.1 (56.4-65.6)	55.0 (49.5-60.4)	56.1 (49.1-62.8)	49.9 (43.5-56.2)	58.2 (50.9-65.1)	<.001	.21
Some college	61.5 (55.1-67.5)	58.0 (53.6-62.3)	59.2 (55.2-63.1)	53.9 (45.3-62.4)	55.4 (49.0-61.7)	49.0 (42.4-55.6)	51.3 (46.7-55.8)	47.9 (43.2-52.8)	50.3 (46.0-54.6)	<.001	
≥ College	45.7 (40.7-50.9)	46.4 (41.0-51.8)	45.2 (36.4-54.4)	50.2 (40.6-59.8)	43.4 (35.9-51.1)	43.1 (38.6-47.6)	35.3 (28.7-42.4)	38.9 (31.3-47.1)	39.4 (32.3-46.9)	.006	
Ratio of family income to poverty level											
<1.30	64.9 (59.7-69.8)	62.7 (57.8-67.4)	57.9 (51.3-64.2)	52.0 (45.1-58.7)	56.6 (50.5-62.4)	54.8 (50.7-58.7)	52.6 (47.9-57.2)	46.8 (41.8-51.9)	56.2 (49.8-62.3)	<.001	
1.30-1.849	69.8 (62.5-76.3)	62.1 (55.4-68.4)	67.5 (58.6-75.3)	50.4 (42.1-58.7)	57.6 (51.4-63.4)	48.5 (43.3-53.8)	55.0 (49.7-60.1)	44.0 (37.8-50.4)	54.2 (47.1-61.0)	<.001	.34
1.85-2.99	58.2 (51.6)	59.4 (54.0-64.6)	60.3 (53.8-66.5)	52.6 (44.1-60.9)	57.1 (50.4-63.5)	45.9 (38.8-53.1)	57.5 (49.7-64.9)	50.1 (43.3-56.9)	49.6 (43.6-55.7)	.003	
≥3.00	54.3 (47.9-60.6)	51.1 (46.6-55.5)	55.6 (50.4-60.7)	55.4 (50.8-60.0)	49.0 (44.0-53.9)	45.0 (41.7-48.3)	36.6 (29.3-44.6)	44.7 (37.3-52.4)	42.3 (33.4-51.8)	<.001	
Food Security Status											

Very low food security	61.6 (51.1-71.1)	55.8 (43.6-67.4)	60.4 (51.0-69.1)	65.1 (56.0-73.1)	64.3 (54.5-73.1)	53.6 (46.0-61.0)	58.0 (50.1-65.5)	55.6 (48.2-62.7)	-	.40	
Low food security	68.0 (59.2-75.7)	61.8 (52.6-70.3)	57.7 (46.1-68.4)	51.2 (44.0-58.4)	54.8 (49.2-60.3)	55.2 (48.1-62.1)	52.4 (46.5-58.3)	52.6 (46.1-59.1)	-	.003	.008
Marginal food security	66.9 (58.4-74.4)	68.0 (60.4-74.7)	61.8 (51.9-70.8)	55.5 (47.9-62.7)	60.4 (52.8-67.6)	47.8 (42.2-53.4)	44.7 (38.0-51.5)	47.2 (40.4-54.1)	-	<.001	
Food secure	59.2 (55.0-63.2)	56.3 (53.2-59.3)	57.9 (54.3-61.4)	52.7 (47.3-58.0)	52.3 (46.7-57.8)	47.2 (44.5-50.0)	46.8 (42.4-51.2)	43.9 (39.2-48.7)	-	<.001	
Participation of Federal Nutrition Programs											
SNAP											
Yes	67.3 (60.1-73.8)	62.8 (54.5-70.4)	57.6 (51.3-63.6)	56.5 (47.9-64.7)	60.9 (3.2)	52.7 (48.4-57.0)	57.1 (51.5-62.6)	46.1 (41.0-51.2)	-	<.001	.31
No	59.7 (54.9-64.3)	56.9 (53.9-59.8)	58.4 (54.6-62.1)	52.7 (48.3-57.1)	51.9 (47.1-56.6)	46.8 (43.7-49.9)	44.3 (39.7-49.1)	46.8 (42.7-50.9)	-	<.001	
WIC											
Yes	59.0 (47.3-69.7)	58.3 (53.6-62.8)	52.5 (44.7-60.2)	44.2 (38.2-50.4)	54.5 (49.4-59.6)	45.3 (39.4-51.3)	45.2 (38.2-52.2)	44.8 (36.4-53.4)	-	.003	.61
No	61.4 (57.0-65.5)	57.6 (54.5-60.7)	59.2 (55.4-62.8)	54.8 (49.9-59.5)	53.7 (48.4-58.9)	48.7 (46.2-51.3)	49.0 (44.7-53.3)	46.9 (43.6-50.2)	-	<.001	
NSLP/SBP											
Yes	67.4 (62.2-72.2)	61.2 (55.5-66.5)	59.7 (53.7-65.5)	55.1 (49.3-60.8)	61.7 (56.0-67.0)	53.6 (49.9-57.2)	56.2 (51.7-60.6)	47.9 (43.7-52.1)	56.2 (52.1-60.2)	<.001	.22
No	58.1 (53.2-62.9)	56.5 (53.4-59.5)	57.7 (53.8-61.5)	52.7 (47.5-57.9)	50.7 (46.0-55.4)	45.7 (42.8-48.7)	44.2 (39.9-48.6)	45.9 (41.3-50.5)	44.6 (39.1-50.2)	<.001	
Intermediate Diet											
Overall	39.0 (34.7-43.4)	42.0 (39.1-45.1)	41.5 (38.0-45.0)	46.6 (42.1-51.1)	45.9 (41.4-50.4)	51.4 (48.7-54.0)	51.5 (48.2-54.8)	52.9 (49.5-56.1)	50.4 (46.3-54.4)	<.001	
Age group, y											.66
2-5	52.9 (43.9-61.6)	53.9 (49.4-58.4)	53.8 (47.9-59.7)	65.2 (58.6-71.2)	58.5 (52.8-64.1)	63.1 (58.9-67.2)	64.5 (59.1-69.6)	63.2 (58.6-67.5)	62.4 (56.2-68.2)	.001	
6-11	38.3 (33.6-43.1)	44.7 (38.9-50.5)	44.8 (40.8-48.8)	50.8 (45.2-56.4)	44.8 (39.5-50.1)	55.0 (52.0-57.9)	53.8 (48.9-58.6)	57.4 (50.6-64.0)	51.3 (45.4-57.1)	<.001	
12-19	32.6 (27.5-38.2)	34.4 (31.0-37.9)	33.3 (29.3-37.6)	34.8 (30.0-40.0)	40.5 (34.3-47.1)	43.0 (38.6-47.3)	43.4 (38.7-48.2)	44.9 (41.1-48.7)	43.9 (38.9-49.0)	<.001	
Sex											.99
Female	42.5 (38.2-46.9)	45.2 (42.2-48.2)	42.3 (37.5-47.2)	48.0 (41.7-54.3)	48.9 (44.8-53.0)	52.2 (48.0-56.3)	54.2 (49.5-58.8)	57.3 (53.4-61.0)	52.4 (47.4-57.3)	<.001	
Male	35.7 (30.6-41.0)	38.9 (34.0-44.1)	40.7 (36.8-44.7)	45.2 (41.6-48.9)	42.9 (36.7-49.4)	50.6 (48.0-53.2)	48.9 (44.1-53.7)	48.7 (44.3-53.0)	48.4 (43.4-53.4)	<.001	
Race/ethnicity											
Non-Hispanic white	40.7 (35.2-46.6)	42.3 (38.0-46.7)	39.5 (34.5-44.7)	46.3 (40.3-52.3)	45.8 (39.0-52.8)	50.3 (45.8-54.9)	50.9 (45.8-55.9)	49.9 (44.2-55.6)	49.5 (43.9-55.1)	<.001	.69
Non-Hispanic black	33.4 (28.7-38.4)	34.9 (30.3-39.8)	37.9 (34.2-41.8)	38.3 (32.5-44.5)	36.4 (32.8-40.1)	46.8 (42.4-51.3)	44.5 (38.2-51.1)	47.5 (42.7-52.2)	43.2 (37.4-49.2)	<.001	
Mexican American	42.4 (38.5-46.4)	44.9 (40.1-49.8)	46.3 (40.4-52.2)	55.7 (53.5-58.0)	49.3 (45.0-53.6)	53.0 (45.2-60.6)	54.5 (50.0-59.0)	57.0 (53.5-60.4)	50.7 (44.4-56.9)	.001	
Parental education											

<High school	30.6 (25.7-36.1)	34.5 (30.8-38.3)	40.8 (34.6-47.4)	47.6 (42.7-52.4)	41.8 (36.3-47.6)	51.6 (46.8-56.3)	47.1 (41.2-53.1)	49.3 (45.7-52.9)	48.1 (40.1-56.3)	<.001	.18
High school graduate or GED	34.4 (29.8-39.3)	37.7 (32.8-42.7)	34.7 (29.4-40.5)	44.5 (39.6-49.5)	38.9 (34.4-43.6)	44.9 (39.6-50.5)	43.8 (37.0-50.8)	50.0 (43.6-56.3)	41.8 (34.9-49.1)	<.001	
Some college	38.4 (32.4-44.8)	42.0 (37.7-46.4)	40.7 (36.8-44.8)	46.0 (37.6-54.7)	44.2 (38.0-50.6)	50.4 (43.3-57.4)	48.6 (44.1-53.2)	51.1 (46.7-55.6)	49.6 (45.3-53.9)	<.001	
≥ College	54.3 (49.1-59.3)	53.4 (47.8-58.9)	54.0 (44.8-62.9)	49.7 (40.1-59.2)	56.1 (48.3-63.7)	56.3 (51.9-60.6)	64.1 (56.7-70.8)	60.6 (52.5-68.2)	59.1 (51.9-65.9)	.01	
Ratio of family income to poverty level											
<1.30	35.0 (30.1-40.2)	37.3 (32.6-42.2)	41.7 (35.6-48.0)	47.8 (40.9-54.8)	43.3 (37.3-49.4)	45.2 (41.2-49.2)	47.3 (42.7-52.0)	52.8 (47.6-57.9)	43.7 (37.7-49.9)	<.001	.27
1.30-1.849	30.1 (23.6-37.4)	37.9 (31.6-44.6)	32.5 (24.7-41.4)	49.6 (41.2-57.9)	42.4 (36.5-48.5)	50.1 (44.3-55.9)	45.0 (39.9-50.2)	56.0 (49.6-62.2)	45.8 (39.0-52.9)	<.001	
1.85-2.99	41.8 (35.4-48.4)	40.6 (35.4-46.0)	39.6 (33.5-46.1)	47.4 (39.0-55.8)	42.1 (36.0-48.4)	54.0 (46.8-61.1)	42.5 (35.1-50.3)	48.4 (42.1-54.8)	49.6 (43.4-55.8)	.008	
≥3.00	45.7 (39.4-52.1)	48.4 (43.6-53.2)	44.0 (39.0-49.2)	44.5 (39.9-49.1)	50.8 (45.7-55.9)	54.5 (50.6-58.3)	62.8 (54.6-70.3)	54.9 (47.2-62.3)	56.7 (47.7-65.3)	<.001	
Food Security Status											
Very low food security	38.4 (28.9-48.9)	44.2 (32.6-56.4)	39.6 (30.9-49.0)	34.8 (26.8-43.8)	35.7 (26.9-45.5)	46.4 (39.0-54.0)	41.9 (34.4-49.8)	44.4 (37.2-51.8)	-	.40	
Low food security	32.0 (24.3-40.8)	38.2 (29.7-47.3)	41.3 (31.1-52.3)	48.8 (41.6-56.0)	44.4 (38.9-50.0)	44.8 (37.8-51.9)	47.5 (41.6-53.4)	46.9 (40.7-53.2)	-	<.001	.008
Marginal food security	33.1 (25.6-41.6)	31.8 (25.1-39.3)	38.2 (29.2-48.1)	44.5 (37.2-52.1)	38.9 (31.6-46.8)	51.8 (46.3-57.3)	55.3 (48.5-62.0)	52.1 (45.6-58.5)	-	<.001	
Food secure	40.7 (36.7-44.9)	43.4 (40.5-46.3)	41.9 (38.5-45.3)	47.2 (41.9-52.6)	47.6 (42.0-53.2)	52.2 (49.4-55.0)	52.9 (48.5-57.2)	55.6 (50.8-60.2)	-	<.001	
Participation of Federal Nutrition Programs											
SNAP											.26
Yes	32.5 (26.0-39.7)	37.1 (29.5-45.4)	41.7 (36.1-47.6)	43.5 (35.3-52.1)	39.1 (32.9-45.6)	47.1 (42.9-51.3)	42.8 (37.4-48.4)	53.6 (48.3-58.7)	-	<.001	
No	40.3 (35.7-45.1)	42.9 (40.0-45.9)	41.4 (37.8-45.1)	47.2 (42.7-51.6)	47.8 (43.0-52.6)	52.7 (49.6-55.9)	55.4 (50.7-60.0)	52.6 (48.5-56.7)	-	<.001	
WIC											
Yes	40.9 (30.2-52.5)	41.6 (37.1-46.2)	46.6 (39.0-54.3)	55.5 (49.1-61.6)	45.5 (40.4-50.6)	54.4 (48.5-60.2)	54.7 (47.6-61.6)	54.3 (45.7-62.6)	-	.003	.60
No	38.6 (34.4-43.0)	42.1 (39.0-45.3)	40.7 (37.2-44.2)	45.2 (40.5-50.0)	46.0 (40.7-51.2)	50.8 (46.5-55.1)	50.8 (46.5-55.1)	52.6 (49.3-55.8)	-	<.001	
NSLP/SBP											
Yes	32.6 (27.7-37.8)	38.8 (33.4-44.5)	40.1 (34.5-46.1)	44.7 (38.9-50.6)	38.3 (32.9-44.0)	46.4 (42.8-50.1)	43.8 (39.3-48.3)	51.8 (47.6-56.1)	43.6 (39.6-47.6)	<.001	.27
No	41.8 (37.1-46.7)	43.3 (40.3-46.3)	41.9 (38.3-45.7)	47.2 (42.1-52.4)	48.9 (44.2-53.6)	53.7 (50.7-56.7)	55.5 (51.1-59.7)	53.4 (48.7-58.0)	54.7 (49.3-60.0)	<.001	

Abbreviations: GED, general equivalency diploma; NHANES, National Health and Nutrition Examination Survey; SNAP, Supplemental Nutrition Assistance Program; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children; NSLP, National School Lunch Program; SBP, School Breakfast Program; - indicated data not available.

[a] Data were weighted to be nationally representative.

P for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted logistic regression model. *P* for interaction was calculated using the Wald F test for an interaction term between survey-cycle and sociodemographic subgroups.

eTable 13. Trends in Estimated Mean Consumption of Food Groups and Nutrients of Interest by Age Group among US Children by NHANES Survey Cycles, 1999-2004, 2005-2010 and 2011-2016[a]

Foods/nutrients	Age 2-5				Age 6-11				Age 12-19				*P* for interaction
	1999-2004 (n=2,284)	2005-2010 (n=2,595)	2011-2016 (n=2,180)	*P* for trend	1999-2004 (n=2,997)	2005-2010 (n=3,287)	2011-2016 (n= 3,233)	*P* for trend	1999-2004 (n=6,665)	2005-2010 (n= 4,536)	2011-2016 (n= 3,643)	*P* for trend	
Total fruits, servings/d	1.44 (1.34-1.53)	1.59 (1.52-1.66)	1.52 (1.45-1.59)	.18	0.99 (0.91-1.07)	1.13 (1.07-1.20)	1.16 (1.07-1.24)	.004	0.89 (0.83-0.95)	0.89 (0.83-0.95)	0.87 (0.81-0.93)	.60	.01
Intact/whole fruit	0.61 (0.55-0.67)	0.85 (0.79-0.91)	0.89 (0.82-0.95)	<.001	0.50 (0.44-0.56)	0.71 (0.66-0.77)	0.77 (0.70-0.84)	<.001	0.38 (0.35-0.42)	0.52 (0.47-0.56)	0.55 (0.51-0.60)	<.001	.06
100% fruit juice	1.12 (1.02-1.22)	1.03 (0.97-1.10)	0.90 (0.82-0.98)	.001	0.54 (0.48-0.59)	0.47 (0.44-0.51)	0.44 (0.40-0.48)	.008	0.49 (0.45-0.54)	0.40 (0.36-0.44)	0.35 (0.31-0.39)	<.001	.18
Total vegetables, servings/d	0.91 (0.87-0.95)	0.87 (0.83-0.91)	0.84 (0.79-0.89)	.02	0.99 (0.93-1.04)	0.93 (0.89-0.96)	0.94 (0.90-0.98)	.19	1.12 (1.08-1.17)	1.07 (1.02-1.12)	1.05 (1.01-1.09)	.01	.76
Dark-green vegetables	0.03 (0.03-0.04)	0.04 (0.03-0.05)	0.05 (0.04-0.06)	<.001	0.03 (0.02-0.04)	0.05 (0.04-0.06)	0.07 (0.05-0.08)	<.001	0.04 (0.03-0.05)	0.05 (0.04-0.06)	0.06 (0.05-0.08)	.002	.28
Tomatoes	0.21 (0.20-0.23)	0.20 (0.18-0.21)	0.18 (0.17-0.20)	.007	0.26 (0.24-0.28)	0.21 (0.20-0.23)	0.22 (0.21-0.23)	.002	0.30 (0.28-0.33)	0.27 (0.25-0.28)	0.23 (0.22-0.24)	<.001	.06
Other red/orange vegetables	0.05 (0.04-0.06)	0.05 (0.05-0.06)	0.07 (0.06-0.08)	.02	0.05 (0.04-0.07)	0.06 (0.05-0.07)	0.07 (0.06-0.08)	.03	0.04 (0.04-0.05)	0.05 (0.04-0.05)	0.05 (0.04-0.06)	.15	.61
White potatoes	0.31 (0.28-0.34)	0.25 (0.23-0.27)	0.23 (0.21-0.25)	<.001	0.32 (0.30-0.35)	0.29 (0.27-0.31)	0.27 (0.25-0.29)	.002	0.37 (0.34-0.39)	0.34 (0.31-0.36)	0.33 (0.31-0.35)	.02	.16
Other starchy (e.g., corn)	0.08 (0.07-0.09)	0.07 (0.06-0.08)	0.07 (0.06-0.07)	.07	0.07 (0.05-0.08)	0.07 (0.07-0.08)	0.06 (0.05-0.07)	.27	0.05 (0.04-0.05)	0.05 (0.04-0.06)	0.05 (0.04-0.06)	.46	.05
Other vegetables	0.19 (0.17-0.20)	0.20 (0.18-0.23)	0.19 (0.17-0.21)	.97	0.24 (0.22-0.27)	0.23 (0.20-0.25)	0.23 (0.21-0.25)	.47	0.33 (0.31-0.34)	0.32 (0.29-0.35)	0.30 (0.28-0.32)	.03	.26
Vegetables excluding potatoes/starchy	0.48 (0.45-0.51)	0.49 (0.46-0.53)	0.49 (0.46-0.52)	.82	0.59 (0.55-0.63)	0.54 (0.52-0.57)	0.59 (0.56-0.62)	.91	0.72 (0.68-0.75)	0.68 (0.64-0.73)	0.65 (0.61-0.68)	.003	.05
Total grains, servings/d													
Whole grains	0.54 (0.49-0.59)	0.66 (0.60-0.71)	0.91 (0.85-0.97)	<.001	0.54 (0.49-0.59)	0.61 (0.57-0.65)	0.94 (0.88-0.99)	<.001	0.43 (0.40-0.47)	0.57 (0.51-0.62)	0.83 (0.77-0.89)	<.001	.75
Refined grains	5.95 (5.78-6.12)	5.56 (5.44-5.69)	5.69 (5.54-5.84)	.03	6.48 (6.30-6.66)	6.26 (6.14-6.39)	6.38 (6.27-6.49)	.36	6.22 (6.12-6.33)	6.35 (6.23-6.46)	6.35 (6.24-6.46)	.09	.01
Nuts and seeds, servings/d	0.33 (0.27-0.38)	0.37 (0.32-0.42)	0.41 (0.34-0.47)	.06	0.38 (0.32-0.45)	0.37 (0.33-0.42)	0.36 (0.30-0.43)	.72	0.30 (0.26-0.33)	0.36 (0.30-0.42)	0.37 (0.33-0.41)	.008	.14
Legumes, servings/d	0.06 (0.05-0.07)	0.06 (0.05-0.07)	0.06 (0.05-0.07)	.60	0.06 (0.04-0.07)	0.06 (0.05-0.07)	0.08 (0.07-0.09)	.04	0.07 (0.06-0.08)	0.06 (0.05-0.07)	0.08 (0.06-0.09)	.23	.29
Total meat, serving/d													
Processed meat	0.22 (0.19-0.25)	0.22 (0.20-0.24)	0.25 (0.23-0.26)	.11	0.25 (0.23-0.27)	0.25 (0.24-0.27)	0.26 (0.24-0.28)	.56	0.25 (0.23-0.27)	0.26 (0.24-0.28)	0.27 (0.25-0.29)	.24	.65
Unprocessed red meat	0.22 (0.20-0.24)	0.23 (0.21-0.24)	0.18 (0.16-0.20)	.003	0.31 (0.29-0.34)	0.31 (0.28-0.34)	0.28 (0.26-0.30)	.05	0.44 (0.40-0.48)	0.40 (0.38-0.43)	0.40 (0.37-0.42)	.08	.81
Poultry	0.24 (0.21-0.27)	0.30 (0.28-0.32)	0.31 (0.28-0.34)	.001	0.28 (0.25-0.31)	0.34 (0.31-0.36)	0.32 (0.29-0.34)	.05	0.34 (0.31-0.36)	0.43 (0.40-0.46)	0.43 (0.39-0.47)	<.001	.04
Fish and Shellfish	0.05 (0.04-0.07)	0.05 (0.04-0.06)	0.05 (0.03-0.07)	.92	0.06 (0.05-0.08)	0.07 (0.05-0.09)	0.07 (0.05-0.09)	.47	0.07 (0.06-0.08)	0.07 (0.06-0.08)	0.08 (0.06-0.10)	.30	.70
High in omega-3 fatty acids[b]	0.009 (0.005-0.01)	0.008 (0.005-0.01)	0.008 (0.005-0.01)	.88	0.01 (0.008-0.02)	0.01 (0.006-0.02)	0.01 (0.008-0.02)	.77	0.02 (0.01-0.02)	0.02 (0.01-0.02)	0.02 (0.01-0.02)	.31	.56
Low in omega-3 fatty acids[b]	0.04 (0.03-0.06)	0.04 (0.03-0.05)	0.04 (0.02-0.06)	.93	0.05 (0.04-0.06)	0.06 (0.04-0.07)	0.06 (0.04-0.08)	.39	0.05 (0.04-0.06)	0.06 (0.05-0.06)	0.06 (0.04-0.08)	.39	.72

Eggs, servings/d	0.31 (0.27-0.34)	0.38 (0.35-0.41)	0.39 (0.35-0.43)	.004	0.26 (0.22-0.29)	0.37 (0.34-0.40)	0.36 (0.33-0.39)	<.001	0.29 (0.26-0.31)	0.35 (0.32-0.38)	0.37 (0.34-0.40)	<.001	.72
Total dairy, servings/d	2.70 (2.56-2.84)	2.85 (2.75-2.94)	2.71 (2.61-2.82)	.93	2.18 (2.07-2.29)	2.29 (2.23-2.36)	2.31 (2.22-2.39)	.06	1.83 (1.73-1.92)	1.95 (1.88-2.02)	2.00 (1.92-2.09)	.006	.23
Milk	1.89 (1.78-2.01)	1.90 (1.83-1.96)	1.66 (1.58-1.74)	.001	1.53 (1.45-1.61)	1.52 (1.47-1.58)	1.37 (1.31-1.43)	.002	1.17 (1.08-1.27)	1.14 (1.07-1.21)	1.04 (0.98-1.10)	.02	.57
Cheese	0.53 (0.48-0.58)	0.61 (0.56-0.66)	0.68 (0.63-0.74)	<.001	0.58 (0.54-0.63)	0.65 (0.62-0.68)	0.80 (0.76-0.83)	<.001	0.66 (0.62-0.69)	0.76 (0.73-0.80)	0.88 (0.83-0.92)	<.001	.22
Yogurt	0.08 (0.06-0.09)	0.08 (0.07-0.09)	0.11 (0.09-0.12)	.01	0.04 (0.02-0.05)	0.05 (0.04-0.06)	0.07 (0.06-0.09)	<.001	0.02 (0.02-0.03)	0.03 (0.02-0.04)	0.04 (0.03-0.04)	.006	.006
Sugar-sweetened beverages[c], servings/d	1.12 (1.02-1.22)	0.79 (0.74-0.83)	0.60 (0.54-0.66)	<.001	1.61 (1.51-1.71)	1.20 (1.13-1.27)	1.03 (0.97-1.10)	<.001	2.50 (2.36-2.63)	2.02 (1.90-2.14)	1.55 (1.46-1.64)	<.001	<.001
Added sugar, g/d	86.2 (82.4-90.1)	74.8 (72.6-77.1)	68.3 (66.2-70.3)	<.001	95.7 (91.8-99.6)	83.7 (81.6-85.8)	75.3 (73.5-77.0)	<.001	105 (101-109)	89.2 (86.3-92.0)	79.2 (76.7-81.8)	<.001	.03
Macronutrients													
Total fat, %Energy (E)	31.8 (31.3-32.3)	31.9 (31.5-32.2)	32.4 (31.9-32.8)	.08	32.8 (32.4-33.2)	33.1 (32.8-33.4)	33.4 (33.1-33.7)	.02	32.3 (31.8-32.7)	33.2 (32.8-33.6)	33.8 (33.5-34.2)	<.001	.03
Saturated fat, %E	11.8 (11.5-12.0)	11.6 (11.4-11.9)	11.6 (11.4-11.8)	.30	11.6 (11.4-11.8)	11.7 (11.5-11.8)	11.8 (11.6-12.0)	.16	11.2 (11.0-11.4)	11.5 (11.3-11.6)	11.5 (11.3-11.7)	.009	.01
Monounsaturated fat, %E	16.7 (16.2-17.2)	16.9 (16.4-17.3)	16.7 (16.2-17.2)	.99	13.9 (13.4-14.4)	13.7 (13.4-13.9)	13.2 (12.9-13.6)	.03	13.2 (12.8-13.7)	13.4 (12.9-13.8)	13.6 (13.2-14.1)	.22	.03
Polyunsaturated fat, %E	5.66 (5.52-5.81)	6.06 (5.92-6.21)	6.97 (6.85-7.09)	<.001	6.28 (6.14-6.42)	6.62 (6.50-6.73)	7.33 (7.23-7.44)	<.001	6.35 (6.22-6.48)	6.84 (6.68-7.0)	7.71 (7.56-7.86)	<.001	.05
Seafood omega-3 fat, mg/d	42.1 (35.4-48.9)	44.4 (37.9-50.9)	34.0 (26.5-41.6)	.11	52.6 (44.2-61.1)	55.0 (43.2-66.8)	44.8 (34.0-55.6)	.26	62.4 (53.2-71.7)	65.9 (53.5-78.3)	48.4 (42.0-54.8)	.01	.66
Plant omega-3 fat, mg/d	114 (111-118)	117 (114-120)	141 (138-144)	<.001	117 (113-120)	119 (115-123)	142 (139-144)	<.001	120 (117-123)	123 (120-126)	148 (144-152)	<.001	.63
Protein, %E	13.8 (13.5-14.0)	15.0 (14.2-14.7)	14.6 (14.3-14.8)	<.001	13.6 (13.4-13.8)	14.2 (14.1-14.4)	14.4 (14.2-14.6)	<.001	13.9 (13.7-14.2)	14.8 (14.6-15.0)	15.3 (15.1-15.5)	<.001	.02
Carbohydrate, %E	55.8 (55.3-56.4)	55.1 (54.6-55.5)	54.4 (53.9-55.0)	.001	54.8 (53.4-55.3)	53.8 (53.5-54.2)	53.5 (53.1-53.8)	<.001	54.3 (53.8-54.8)	52.6 (52.1-53.1)	51.7 (51.2-52.2)	<.001	.01
Other nutrients													
Sodium, mg/d	3131 (3088-3175)	3140 (3087-3193)	3081 (3042-3121)	.09	3203 (3136-3269)	3265 (3221-3309)	3232 (3192-3272)	.46	3157 (3114-3201)	3383 (3334-3431)	3491 (3410-3572)	<.001	<.001
Cholesterol, mg/d	234 (224-243)	244 (235-253)	245 (235-255)	.11	216 (209-224)	230 (223-238)	232 (224-239)	.004	224 (218-230)	235 (228-243)	251 (243-259)	<.001	.11
Fiber, g/d	12.8 (12.4-13.1)	14.5 (14.1-14.9)	15.7 (15.4-16.1)	<.001	12.7 (12.4-13.0)	14.1 (13.8-14.4)	15.7 (15.3-16.0)	<.001	12.0 (11.7-12.3)	13.2 (13.0-13.5)	14.8 (14.6-15.1)	<.001	.85
Potassium, mg/d	2497 (2446-2548)	2552 (2518-2586)	2511 (2470-2552)	.68	2226 (2171-2281)	2277 (2245-2309)	2314 (2280-2349)	.008	2169 (2125-2212)	2189 (2151-2226)	2266 (2232-2300)	<.001	.07
Calcium, mg/d	1094 (1051-1136)	1207 (1179-1235)	1199 (1171-1227)	<.001	960 (929-991)	1059 (1037-1081)	1107 (1082-1133)	<.001	862 (835-889)	981 (958-1004)	1023 (995-1052)	<.001	.15

Abbreviation: NHANES, National Health and Nutrition Examination Survey.

[a] Data were weighted to be nationally representative. All analyses (except for macronutrients) were energy-adjusted to 2000 kcal/d using the residual method. Macronutrients were reported as % of total energy.

[b] Cooked fish and shellfish containing 500 mg or more of omega-3 fatty acids (EPA and DHA) per 3 ounces were included in the high omgega-3 fatty acids category.

[c] Serving of sugar-sweetened beverage defined as 8 fl oz or 237 grams. Sugar-sweetened beverages include soft drinks, fruit drinks, sports drinks, presweetened teas and energy drinks with more than 50 kcal per 8 fl oz.

P for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted linear regression model. *P* for interaction was calculated using the Wald F test for an interaction term between survey-cycle and the categorical variable (age groups).

eTable 14. Trends in Estimated Mean Consumption of Food Groups and Nutrients of Interest by Sex Among US Children by NHANES Survey Cycles, 1999-2004, 2005-2010 and 2011-2016[a]

Foods/nutrients		Female		*P* for trend		Male			*P* for interaction
	1999-2004 (n=5,974)	2005-2010 (n=5,111)	2011-2016 (n=4,487)		1999-2004 (n=5,972)	2005-2010 (n=5,307)	2011-2016 (n=4,569)	*P* for trend	
Total fruits, servings/d	1.15 (0.99-1.11)	1.10 (1.04-1.17)	1.07 (1.02-1.12)	.64	1.03 (0.96-1.10)	1.14 (1.07-1.20)	1.14 (1.06-1.21)	.05	.14
Intact/whole fruit	0.48 (0.44-0.53)	0.64 (0.59-0.69)	0.69 (0.63-0.74)	<.001	0.46 (0.43-0.49)	0.67 (0.62-0.72)	0.71 (0.65-0.76)	<.001	.20
100% fruit juice	0.70 (0.65-0.74)	0.61 (0.57-0.64)	0.50 (0.46-0.55)	<.001	0.59 (0.53-0.64)	0.52 (0.48-0.57)	0.49 (0.44-0.54)	.007	.02
Total vegetables, servings/d	1.1 (1.0-1.1)	1.0 (0.99-1.1)	1.0 (0.97-1.0)	.07	1.0 (0.97-1.0)	0.94 (0.91-0.97)	0.93 (0.90-0.96)	.003	.48
Dark-green vegetables	0.04 (0.03-0.05)	0.05 (0.04-0.06)	0.07 (0.05-0.08)	.001	0.03 (0.03-0.04)	0.04 (0.04-0.05)	0.06 (0.05-0.07)	<.001	.96
Tomatoes	0.26 (0.24-0.27)	0.23 (0.22-0.25)	0.21 (0.20-0.22)	<.001	0.28 (0.27-0.30)	0.23 (0.22-0.24)	0.22 (0.21-0.24)	<.001	.30
Other red/orange vegetables	0.05 (0.04-0.06)	0.05 (0.04-0.05)	0.06 (0.05-0.07)	.03	0.05 (0.04-0.06)	0.06 (0.05-0.06)	0.06 (0.05-0.07)	.03	.88
White potatoes	0.34 (0.31-0.36)	0.30 (0.28-0.33)	0.29 (0.27-0.31)	.002	0.34 (0.32-0.37)	0.30 (0.28-0.32)	0.29 (0.27-0.31)	<.001	.61
Other starchy (e.g., corn)	0.07 (0.06-0.07)	0.07 (0.06-0.07)	0.06 (0.06-0.07)	.56	0.06 (0.05-0.07)	0.06 (0.05-0.07)	0.05 (0.04-0.06)	.32	.76
Other vegetables	0.28 (0.27-0.30)	0.27 (0.25-0.30)	0.27 (0.25-0.28)	.17	0.25 (0.23-0.28)	0.25 (0.23-0.27)	0.24 (0.22-0.25)	.20	.98
Vegetables excluding potatoes/starchy	0.63 (0.61-0.65)	0.61 (0.58-0.64)	0.61 (0.58-0.63)	.18	0.62 (0.58-0.65)	0.58 (0.56-0.61)	0.58 (0.56-0.60)	.08	.66
Total grains, servings/d									
Whole grains	0.47 (0.44-0.50)	0.56 (0.52-0.60)	0.84 (0.79-0.89)	<.001	0.51 (0.47-0.56)	0.64 (0.59-0.68)	0.92 (0.87-0.97)	<.001	.34
Refined grains	6.31 (6.15-6.47)	6.20 (6.09-6.32)	6.24 (6.14-6.34)	.49	6.2 (6.1-6.3)	6.1 (6.0-6.2)	6.2 (6.1-6.3)	.94	.54
Nuts and seeds, servings/d	0.34 (0.30-0.38)	0.35 (0.30-0.39)	0.38 (0.33-0.43)	.19	0.32 (0.27-0.37)	0.38 (0.34-0.42)	0.37 (0.33-0.41)	.15	.92
Legumes, servings/d	0.06 (0.05-0.07)	0.06 (0.05-0.07)	0.07 (0.07-0.08)	.01	0.06 (0.05-0.08)	0.06 (0.05-0.07)	0.07 (0.06-0.08)	.34	.41
Total meat, serving/d									
Processed meat	0.22 (0.21-0.24)	0.22 (0.21-0.23)	0.23 (0.21-0.24)	.61	0.27 (0.25-0.29)	0.28 (0.26-0.30)	0.29 (0.27-0.32)	.09	.21
Unprocessed red meat	0.31 (0.29-0.34)	0.30 (0.28-0.32)	0.28 (0.26-0.30)	.02	0.39 (0.35-0.42)	0.37 (0.34-0.39)	0.34 (0.32-0.37)	.04	.79
Poultry	0.29 (0.27-0.32)	0.36 (0.34-0.39)	0.36 (0.33-0.38)	<.001	0.30 (0.27-0.32)	0.38 (0.36-0.40)	0.38 (0.35-0.41)	<.001	.35
Fish and Shellfish	0.06 (0.05-0.07)	0.06 (0.05-0.08)	0.07 (0.06-0.08)	.39	0.06 (0.05-0.08)	0.07 (0.05-0.08)	0.07 (0.06-0.09)	.40	.82
High in omega-3 fatty acids[b]	0.01 (0.01-0.02)	0.01 (0.009-0.02)	0.01 (0.01-0.02)	.82	0.01 (0.009-0.02)	0.01 (0.01-0.02)	0.01 (0.01-0.02)	.56	.75
Low in omega-3 fatty acids[b]	0.05 (0.04-0.06)	0.05 (0.04-0.06)	0.05 (0.04-0.07)	.35	0.05 (0.04-0.06)	0.05 (0.04-0.06)	0.06 (0.04-0.08)	.44	.91
Eggs, servings/d	0.26 (0.24-0.29)	0.35 (0.32-0.37)	0.35 (0.33-0.38)	<.001	0.30 (0.28-0.32)	0.38 (0.35-0.41)	0.39 (0.36-0.41)	<.001	.92
Total dairy, servings/d	2.08 (2.01-2.16)	2.20 (2.14-2.27)	2.21 (2.12-2.30)	.03	2.18 (2.10-2.26)	2.31 (2.25-2.37)	2.30 (2.23-2.37)	.04	.86
Milk	1.35 (1.29-1.41)	1.34 (1.29-1.40)	1.20 (1.13-1.26)	<.001	1.54 (1.47-1.62)	1.52 (1.46-1.57)	1.36 (1.30-1.42)	<.001	.60
Cheese	0.60 (0.57-0.64)	0.68 (0.65-0.72)	0.80 (0.76-0.84)	<.001	0.61 (0.58-0.64)	0.70 (0.67-0.73)	0.81 (0.78-0.84)	<.001	.92
Yogurt	0.04 (0.03-0.05)	0.05 (0.04-0.05)	0.07 (0.06-0.08)	<.001	0.04 (0.03-0.05)	0.05 (0.04-0.06)	0.06 (0.05-0.07)	<.001	.36
Sugar-sweetened beverages[c], servings/d	1.75 (1.66-1.85)	1.34 (1.27-1.40)	1.10 (1.02-1.17)	<.001	2.05 (1.93-2.17)	1.62 (1.51-1.72)	1.25 (1.17-1.32)	<.001	.04
Added sugar, g/d	99.4 (96.2-103)	85.0 (83.0-87.1)	76.8 (74.9-78.7)	<.001	96.6 (93.3-100)	83.5 (81.1-85.8)	74.3 (72.5-76.2)	<.001	.91
Macronutrients									
Total fat, %Energy (E)	32.5 (32.0-32.9)	32.9 (32.6-33.2)	33.5 (33.2-33.8)	<.001	32.2 (31.9-32.5)	32.8 (32.5-33.0)	33.3 (32.9-33.6)	<.001	.87
Saturated fat, %E	11.4 (11.2-11.6)	11.6 (11.4-11.7)	11.6 (11.5-11.8)	.13	11.5 (11.3-11.6)	11.6 (11.5-11.7)	11.7 (11.5-11.8)	.12	.98
Monounsaturated fat, %E	15.8 (15.3-16.3)	15.6 (15.3-16.0)	15.5 (15.1-15.9)	.42	12.7 (12.3-13.0)	12.8 (12.6-13.1)	12.8 (12.5-13.1)	.54	.24

Polyunsaturated fat, %E	6.31 (6.21-6.42)	6.78 (6.68-6.87)	7.60 (7.49-7.72)	<.001	6.05 (5.96-6.15)	6.42 (6.30-6.54)	7.26 (7.13-7.38)	<.001	.43
Seafood omega-3 fat, mg/d	55.4 (49.6-61.1)	53.5 (46.0-61.0)	41.4 (36.6-46.1)	<.001	54.3 (47.2-61.3)	61.7 (49.7-73.7)	46.8 (38.6-55.0)	.17	.27
Plant omega-3 fat, mg/d	122 (119-124)	126 (124-129)	149 (146-153)	<.001	114 (111-117)	115 (112-118)	140 (137-142)	<.001	.43
Protein, %E	13.7 (13.5-13.8)	14.4 (14.2-14.5)	14.6 (14.4-14.8)	<.001	13.9 (13.7-14.1)	14.7 (14.6-14.9)	15.1 (14.9-15.2)	<.001	.23
Carbohydrate, %E	55.0 (54.5-55.5)	53.8 (53.4-54.1)	53.1 (52.8-53.4)	<.001	54.6 (47.2-55.0)	53.3 (53.0-53.6)	52.9 (52.2-53.1)	<.001	.94
Other nutrients				<.001					
Sodium, mg/d	3179 (3142-3215)	3316 (3270-3362)	3337 (3265-3408)	<.001	3156 (3118-3194)	3266 (3235-3297)	3299 (3253-3345)	<.001	.76
Cholesterol, mg/d	222 (216-227)	234 (228-240)	240 (233-247)	<.001	225 (220-231)	237 (230-244)	246 (240-252)	<.001	.63
Fiber, g/d	12.5 (12.3-12.8)	14.0 (13.7-14.3)	15.5 (15.2-15.7)	<.001	12.3 (11.9-12.6)	13.6 (13.3-13.8)	15.1 (14.8-15.4)	<.001	.72
Potassium, mg/d	2243 (2202-2283)	2280 (2248-2311)	2310 (2279-2340)	.01	2273 (2226-2320)	2315 (2280-2349)	2358 (2328-2389)	.003	.54
Calcium, mg/d	918 (896-941)	1034 (1014-1054)	1064 (1039-1089)	<.001	970 (943-996)	1078 (1059-1097)	1113 (1090-1136)	<.001	.86

Abbreviation: NHANES, National Health and Nutrition Examination Survey.

[a] Data were weighted to be nationally representative. All analyses (except for macronutrients) were energy-adjusted to 2000 kcal/d using the residual method. Macronutrients were reported as % of total energy.

[b] Cooked fish and shellfish containing 500 mg or more of omega-3 fatty acids (EPA and DHA) per 3 ounces were included in the high omgega-3 fatty acids category.

[c] Serving of sugar-sweetened beverage defined as 8 fl oz or 237 grams. Sugar-sweetened beverages include soft drinks, fruit drinks, sports drinks, presweetened teas and energy drinks with more than 50 kcal per 8 fl oz.

P for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted linear regression model. *P* for interaction was calculated using the Wald F test for an interaction term between survey-cycle and the dichotomous variable (sex).

eTable 15. Trends in Estimated Mean Consumption of Food Groups and Nutrients of Interest by Race/Ethnicity Among US Children by NHANES Survey Cycles, 1999-2004, 200 2010 and 2011-2016[a]

Foods/nutrients	Non-Hispanic White			*P* for trend	Non-Hispanic Black			*P* for trend	Mexican American			*P* for trend	*P* for interaction
	1999-2004 (n=3,231)	2005-2010 (n=3,167)	2011-2016 (n=2,333)		1999-2004 (n=3,686)	2005-2010 (n=2,693)	2011-2016 (n=2,344)		1999-2004 (n=3,990)	2005-2010 (n=3,030)	2011-2016 (n=1,923)		
Total fruits, servings/d	1.01 (0.94-1.07)	1.06 (0.98-1.14)	1.07 (1.0-1.15)	.17	1.05 (0.98-1.12)	1.09 (1.03-1.15)	1.01 (0.94-1.08)	.42	1.25 (1.16-1.34)	1.29 (1.22-1.36)	1.22 (1.16-1.29)	.59	.39
Intact/whole fruit	0.48 (0.44-0.53)	0.67 (0.60-0.74)	0.72 (0.66-0.78)	<.001	0.35 (0.32-0.39)	0.48 (0.45-0.52)	0.50 (0.45-0.55)	<.001	0.60 (0.54-0.65)	0.73 (0.69-0.77)	0.76 (0.70-0.82)	<.001	.13
100% fruit juice	0.59 (0.54-0.64)	0.47 (0.43-0.51)	0.41 (0.37-0.46)	<.001	0.78 (0.72-0.84)	0.75 (0.69-0.82)	0.65 (0.59-0.71)	.005	0.75 (0.70-0.80)	0.69 (0.64-0.74)	0.59 (0.55-0.64)	<.001	.39
Total vegetables, servings/d	1.0 (0.98-1.1)	0.98 (0.94-1.0)	0.94 (0.89-0.98)	.007	1.03 (0.99-1.07)	0.98 (0.94-1.02)	0.97 (0.92-1.03)	.08	1.08 (1.03-1.13)	0.93 (0.89-0.97)	1.02 (0.98-1.06)	.13	.88
Dark-green vegetables	0.03 (0.03-0.04)	0.05 (0.04-0.06)	0.06 (0.05-0.08)	<.001	0.05 (0.04-0.06)	0.06 (0.05-0.08)	0.07 (0.05-0.09)	.13	0.03 (0.02-0.03)	0.03 (0.02-0.03)	0.04 (0.03-0.05)	.03	.27
Tomatoes	0.27 (0.25-0.28)	0.24 (0.22-0.25)	0.21 (0.20-0.22)	<.001	0.26 (0.24-0.28)	0.20 (0.19-0.22)	0.22 (0.20-0.23)	.001	0.31 (0.29-0.34)	0.24 (0.23-0.26)	0.25 (0.24-0.26)	<.001	.69
Other red/orange vegetables	0.05 (0.04-0.06)	0.06 (0.05-0.06)	0.07(0.06-0.08)	.03	0.03 (0.03-0.03)	0.03 (0.03-0.04)	0.04 (0.03-0.05)	.004	0.05 (0.04-0.06)	0.05 (0.05-0.06)	0.06 (0.05-0.07)	.27	.83
White potatoes	0.33 (0.31-0.36)	0.30 (0.28-0.33)	0.29 (0.26-0.31)	.004	0.37 (0.34-0.39)	0.36 (0.34-0.38)	0.34 (0.32-0.37)	.14	0.32 (0.30-0.35)	0.26 (0.24-0.28)	0.27 (0.25-0.30)	.01	.23
Other starchy (e.g., corn)	0.06 (0.05-0.07)	0.06 (0.05-0.07)	0.05 (0.05-0.06)	.49	0.07 (0.06-0.08)	0.07 (0.06-0.08)	0.07 (0.06-0.08)	.88	0.06 (0.05-0.07)	0.05 (0.04-0.06)	0.05 (0.04-0.06)	.15	.88
Other vegetables	0.27 (0.25-0.29)	0.26 (0.24-0.29)	0.23 (0.21-0.25)	.008	0.24 (0.23-0.25)	0.23 (0.21-0.25)	0.21 (0.19-0.22)	.002	0.30 (0.28-0.31)	0.27 (0.25-0.29)	0.31 (0.29-0.34)	.20	.04
Vegetables excluding potatoes/starchy	0.62 (0.59-0.64)	0.60 (0.56-0.64)	0.57 (0.54-0.60)	.01	0.58 (0.55-0.61)	0.53 (0.50-0.56)	0.53 (0.49-0.57)	.05	0.68 (0.65-0.72)	0.60 (0.57-0.63)	0.66 (0.62-0.70)	.53	.77
Total grains, servings/d													
Whole grains	0.55 (0.50-0.60)	0.65 (0.59-0.71)	0.94 (0.89-1.0)	<.001	0.38 (0.35-0.40)	0.50 (0.46-0.54)	0.77 (0.71-0.84)	<.001	0.41 (0.37-0.44)	0.51 (0.48-0.54)	0.77 (0.70-0.83)	<.001	.60
Refined grains	6.2 (6.1-6.3)	6.1 (5.9-6.2)	6.1 (6.0-6.2)	.18	6.20 (6.06-6.33)	5.98 (5.88-6.08)	6.19 (6.08-6.30)	.94	6.22 (6.10-6.34)	6.62 (6.46-6.78)	6.60 (6.45-6.75)	<.001	<.001
Nuts and seeds, servings/d	0.39 (0.34-0.44)	0.45 (0.40-0.50)	0.47 (0.42-0.53)	.03	0.24 (0.20-0.28)	0.22 (0.19-0.26)	0.24 (0.21-0.27)	.95	0.22 (0.19-0.26)	0.22 (0.19-0.26)	0.25 (0.20-0.29)	.38	.51
Legumes, servings/d	0.04 (0.03-0.05)	0.04 (0.03-0.05)	0.05 (0.04-0.05)	.32	0.05 (0.04-0.07)	0.05 (0.04-0.06)	0.06 (0.04-0.07)	.62	0.16 (0.14-0.18)	0.14 (0.13-0.16)	0.15 (0.13-0.17)	.56	.61
Total meat, serving/d													
Processed meat	0.25 (0.23-0.27)	0.26 (0.25-0.28)	0.29 (0.26-0.31)	.02	0.29 (0.27-0.32)	0.27 (0.25-0.30)	0.26 (0.24-0.28)	.02	0.19 (0.18-0.21)	0.19 (0.17-0.20)	0.21 (0.19-0.23)	.12	<.001
Unprocessed red meat	0.33 (0.29-0.36)	0.33 (0.30-0.35)	0.30 (0.27-0.33)	.27	0.36 (0.33-0.39)	0.31 (0.29-0.34)	0.32 (0.29-0.34)	.04	0.41 (0.38-0.45)	0.36 (0.35-0.38)	0.33 (0.31-0.36)	<.001	.10
Poultry	0.27 (0.25-0.29)	0.34 (0.31-0.36)	0.32 (0.29-0.35)	.009	0.39 (0.36-0.41)	0.48 (0.45-0.51)	0.49 (0.45-0.52)	<.001	0.28 (0.26-0.30)	0.39 (0.37-0.42)	0.39 (0.35-0.43)	<.001	.16
Fish and Shellfish	0.05 (0.04-0.07)	0.06 (0.04-0.07)	0.05 (0.04-0.07)	.90	0.09 (0.07-0.10)	0.09 (0.07-0.10)	0.09 (0.06-0.12)	.92	0.07 (0.05-0.08)	0.06 (0.05-0.07)	0.07 (0.06-0.08)	.91	.94
High in omega-3 fatty acids[b]	0.01 (0.008-0.02)	0.01 (0.009-0.02)	0.01 (0.008-0.01)	.81	0.01 (0.008-0.02)	0.01 (0.007-0.02)	0.009 (0.006-0.01)	.22	0.01 (0.008-0.01)	0.01 (0.007-0.02)	0.01 (0.009-0.02)	.54	.31
Low in omega-3 fatty acids[b]	0.04 (0.03-0.05)	0.04 (0.03-0.05)	0.04 (0.03-0.06)	.82	0.08 (0.06-0.09)	0.08 (0.06-0.09)	0.08 (0.06-0.11)	.73	0.06 (0.04-0.07)	0.05 (0.04-0.06)	0.06 (0.05-0.07)	.92	.96

Eggs, servings/d	0.24 (0.22-0.27)	0.33 (0.31-0.36)	0.32 (0.30-0.35)	<.001	0.30 (0.27-0.32)	0.35 (0.31-0.39)	0.33 (0.30-0.37)	.08	0.43 (0.38-0.47)	0.46 (0.41-0.51)	0.49 (0.45-0.54)	.03	.26
Total dairy, servings/d	2.28 (2.19-2.37)	2.39 (2.32-2.45)	2.41 (2.33-2.50)	.03	1.58 (1.52-1.64)	1.77 (1.70-1.83)	1.72 (1.63-1.80)	.02	2.16 (2.07-2.25)	2.28 (2.18-2.37)	2.27 (2.19-2.35)	.10	.24
Milk	1.56 (1.48-1.64)	1.53 (1.47-1.59)	1.38 (1.31-1.45)	.001	0.98 (0.93-1.04)	1.03 (0.98-1.08)	0.90 (0.83-0.98)	.09	1.50 (1.43-1.57)	1.46 (1.38-1.53)	1.28 (1.21-1.35)	<.001	.04
Cheese	0.63 (0.60-0.67)	0.73 (0.70-0.76)	0.86 (0.82-0.91)	<.001	0.55 (0.52-0.58)	0.65 (0.61-0.69)	0.71 (0.65-0.76)	<.001	0.56 (0.52-0.60)	0.64 (0.61-0.68)	0.82 (0.78-0.87)	<.001	.05
Yogurt	0.05 (0.04-0.06)	0.05 (0.05-0.06)	0.07 (0.06-0.09)	.002	0.02 (0.01-0.02)	0.02 (0.01-0.02)	0.03 (0.02-0.04)	.005	0.03 (0.02-0.04)	0.05 (0.04-0.06)	0.06 (0.05-0.07)	<.001	.22
Sugar-sweetened beverages[c], servings/d	1.93 (1.81-2.04)	1.52 (1.40-1.64)	1.21 (1.09-1.32)	<.001	1.93 (1.83-2.03)	1.58 (1.48-1.68)	1.37 (1.26-1.47)	<.001	1.83 (1.72-1.94)	1.43 (1.33-1.54)	1.16 (1.05-1.28)	<.001	.24
Added sugar, g./d	100 (96.6-104)	86.5 (84.0-89.0)	79.0 (76.4-81.9)	<.001	100 (95.8-106)	86.9 (84.0-89.9)	79.4 (76.9-82.3)	<.001	90.3 (87.4-93.2)	78.1 (75.2-80.6)	67.6 (65.1-70.6)	<.001	.94
Macronutrients													
Total fat, %Energy (E)	32.2 (31.8-32.7)	32.9 (32.6-33.2)	33.4 (32.9-33.8)	<.001	33.3 (32.9-33.7)	34.0 (33.7-34.4)	33.9 (33.4-34.4)	.09	32.5 (32.1-32.8)	32.1 (31.8-32.5)	33.5 (33.2-33.9)	<.001	.38
Saturated fat, %E	11.5 (11.3-11.7)	11.7 (11.6-11.9)	11.9 (11.6-12.1)	.02	11.4 (11.2-11.5)	11.4 (11.3-11.6)	11.1 (10.9-11.4)	.16	11.6 (11.4-11.8)	11.3 (11.1-11.4)	11.6 (11.4-11.8)	.50	.05
Monounsaturated fat, %E	14.0 (13.5-14.4)	13.8 (13.4-14.2)	13.7 (13.3-14.1)	.38	15.6 (14.8-16.3)	15.5 (14.9-16.2)	15.1 (14.5-15.8)	.36	14.5 (14.0-15.1)	14.4 (14.1-14.7)	14.5 (13.9-15.1)	.89	.75
Polyunsaturated fat, %E	6.12 (6.0-6.24)	6.49 (6.36-6.62)	7.29 (7.16-7.42)	<.001	6.48 (6.35-6.61)	7.20 (7.05-7.34)	7.98 (7.85-8.11)	<.001	6.14 (6.05-6.23)	6.50 (6.38-6.61)	7.51 (7.38-7.63)	<.001	.008
Seafood omega-3 fat, mg/d	47.1 (39.4-54.8)	50.1 (39.4-60.7)	36.4 (29.5-43.2)	.05	76.4 (67.2-85.7)	79.9 (66.3-93.5)	44.0 (35.7-52.2)	<.001	56.6 (49.3-64.0)	58.5 (48.7-68.3)	46.8 (39.8-53.8)	.04	.006
Plant omega-3 fat, mg/d	116 (113-119)	118 (115-121)	141 (138-145)	<.001	119 (116-122)	125 (122-128)	149 (146-152)	<.001	122 (119-124)	118 (115-121)	148 (145-150)	<.001	.31
Protein, %E	13.6 (13.4-13.9)	14.5 (14.3-14.7)	14.7 (14.5-14.9)	<.001	13.6 (13.4-13.8)	14.1 (13.9-14.3)	14.3 (14.1-14.5)	<.001	14.3 (14.1-14.5)	15.0 (14.8-15.3)	15.4 (15.2-15.5)	<.001	.03
Carbohydrate, %E	55.1 (54.6-55.7)	53.6 (53.2-54.0)	53.1 (52.5-53.6)	<.001	54.0 (53.5-54.4)	52.7 (52.2-53.2)	52.8 (52.3-53.3)	.001	54.3 (54.0-54.7)	53.8 (53.3-54.3)	52.2 (51.8-52.6)	<.001	.04
Other nutrients													
Sodium, mg/d	3133 (3093-3173)	3288 (3244-3332)	3299 (3226-3371)	<.001	3281 (3229-3333)	3309 (3260-3358)	3331 (3265-3397)	.25	3098 (3047-3149)	3162 (3106-3218)	3313 (3258-3369)	<.001	.01
Cholesterol, mg/d	210 (204-216)	223 (216-229)	227 (220-233)	<.001	238 (231-244)	242 (232-252)	248 (240-255)	.05	262 (253-272)	265 (252-277)	275 (264-286)	.08	.25
Fiber, g/d	12.4 (12.0-12.7)	13.6 (13.2-14.0)	15.0 (14.7-15.4)	<.001	11.4 (11.2-11.7)	12.6 (12.4-12.9)	14.0 (13.7-14.4)	<.001	14.0 (13.7-14.4)	15.3 (15.0-15.6)	16.7 (16.3-17.1)	<.001	.99
Potassium, mg/d	2260 (2209-2311)	2291 (2252-2330)	2318 (2283-2353)	.07	2092 (2054-2130)	2142 (2109-2175)	2199 (2167-2230)	<.001	2418 (2372-2464)	2422 (2376-2468)	2436 (2392-2480)	.56	.05
Calcium, mg/d	991 (961-1021)	1088 (1066-1109)	1129 (1100-1157)	<.001	775 (758-793)	907 (884-931)	921 (895-947)	<.001	964 (934-995)	1085 (1055-1115)	1126 (1097-1154)	<.001	.80

Abbreviation: NHANES, National Health and Nutrition Examination Survey.

[a] Data were weighted to be nationally representative. All analyses (except for macronutrients) were energy-adjusted to 2000 kcal/d using the residual method. Macronutrients were reported as % of total energy.

[b] Cooked fish and shellfish containing 500 mg or more of omega-3 fatty acids (EPA and DHA) per 3 ounces were included in the high omgega-3 fatty acids category.

[c] Serving of sugar-sweetened beverage defined as 8 fl oz or 237 grams. Sugar-sweetened beverages include soft drinks, fruit drinks, sports drinks, presweetened teas and energy drinks with more than 50 kcal per 8 fl oz.

P for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted linear regression model. *P* for interaction was calculated using the Wald F test for an interaction term between survey-cycle and the categorical variable (race/ethnicity).

eTable 16. Trends in Estimated Mean Consumption of Food Groups and Nutrients of Interest by Parental Education Levels Among US Children by NHANES Survey Cycles, 1999-2004, 2005-2010 and 2011-2016[a]

Foods/nutrients	<High School				High school graduate/equivalent				Some College				College graduate				
	1999-2004 (n= 4,277)	2005-2010 (n= 3,101)	2011-2016 (n= 2,231)	*P* for trend	1999-2004 (n= 2,820)	2005-2010 (n= 2,408)	2011-2016 (n= 1,956)	*P* for trend	1999-2004 (n= 2,748)	2005-2010 (n= 2,815)	2011-2016 (n= 2,632)	*P* for trend	1999-2004 (n= 1,599)	2005-2010 (n= 1,711)	2011-2016 (n= 1,940)	*P* for trend	*P* for interaction
Total fruits, servings/d	0.96 (0.88-1.04)	1.15 (1.08-1.22)	1.08 (0.99-1.17)	.04	0.93 (0.84-1.02)	1.00 (0.93-1.07)	1.00 (0.90-1.09)	.31	1.03 (0.96-1.11)	1.13 (1.04-1.22)	1.02 (0.96-1.08)	.69	1.25 (1.14-1.36)	1.22 (1.13-1.31)	1.29 (1.20-1.39)	.51	.91
Intact/whole fruit	0.40 (0.36-0.45)	0.61 (0.56-0.65)	0.66 (0.58-0.74)	<.001	0.38 (0.34-0.43)	0.54 (0.50-0.58)	0.59 (0.50-0.67)	<.001	0.48 (0.43-0.54)	0.66 (0.59-0.73)	0.61 (0.57-0.65)	<.001	0.63 (0.55-0.71)	0.81 (0.73-0.89)	0.90 (0.82-0.98)	<.001	.32
100% fruit juice	0.64 (0.58-0.70)	0.67 (0.61-0.72)	0.53 (0.48-0.57)	.004	0.62 (0.54-0.70)	0.55 (0.49-0.62)	0.53 (0.46-0.59)	.09	0.61 (0.54-0.68)	0.58 (0.53-0.64)	0.50 (0.44-0.55)	.01	0.69 (0.61-0.77)	0.49 (0.44-0.55)	0.45 (0.39-0.50)	<.001	.05
Total vegetables, servings/d	1.02 (0.97-1.07)	0.96 (0.89-1.04)	0.95 (0.91-1.00)	.04	1.05 (1.00-1.11)	0.97 (0.93-1.01)	0.98 (0.94-1.03)	.04	1.04 (0.98-1.09)	0.95 (0.91-1.00)	0.95 (0.90-0.99)	.01	0.99 (0.92-1.05)	1.02 (0.96-1.09)	1.00 (0.93-1.06)	.86	.22
Dark-green vegetables	0.03 (0.02-0.03)	0.03 (0.03-0.04)	0.05 (0.04-0.06)	<.001	0.04 (0.03-0.05)	0.04 (0.03-0.05)	0.05 (0.03-0.06)	.22	0.03 (0.03-0.04)	0.05 (0.04-0.06)	0.06 (0.05-0.07)	<.001	0.05 (0.03-0.06)	0.06 (0.05-0.08)	0.09 (0.07-0.11)	.001	.03
Tomatoes	0.27 (0.25-0.28)	0.24 (0.22-0.27)	0.22 (0.21-0.24)	<.001	0.28 (0.25-0.31)	0.23 (0.21-0.25)	0.23 (0.21-0.25)	.005	0.27 (0.25-0.29)	0.22 (0.21-0.24)	0.21 (0.20-0.23)	<.001	0.27 (0.24-0.29)	0.24 (0.21-0.26)	0.21 (0.20-0.23)	<.001	.96
Other red/orange vegetables	0.04 (0.03-0.04)	0.04 (0.03-0.05)	0.05 (0.04-0.06)	.03	0.04 (0.03-0.05)	0.04 (0.03-0.05)	0.05 (0.04-0.06)	.49	0.05 (0.04-0.05)	0.05 (0.05-0.06)	0.06 (0.05-0.07)	.09	0.07 (0.06-0.09)	0.07 (0.06-0.08)	0.09 (0.08-0.10)	.08	.79
White potatoes	0.36 (0.33-0.39)	0.31 (0.28-0.34)	0.28 (0.25-0.31)	<.001	0.36 (0.34-0.39)	0.34 (0.31-0.36)	0.30 (0.27-0.32)	<.001	0.36 (0.32-0.40)	0.29 (0.27-0.32)	0.31 (0.28-0.34)	.06	0.26 (0.23-0.29)	0.26 (0.24-0.29)	0.26 (0.23-0.28)	.99	.28
Other starchy (e.g., corn)	0.06 (0.05-0.07)	0.06 (0.05-0.07)	0.06 (0.05-0.07)	.38	0.06 (0.05-0.07)	0.06 (0.06-0.07)	0.06 (0.05-0.08)	.88	0.07 (0.05-0.08)	0.05 (0.05-0.06)	0.06 (0.05-0.07)	.43	0.05 (0.04-0.06)	0.07 (0.06-0.09)	0.05 (0.04-0.06)	.97	.63
Other vegetables	0.26 (0.23-0.28)	0.25 (0.21-0.29)	0.26 (0.24-0.28)	.68	0.26 (0.24-0.29)	0.24 (0.22-0.26)	0.25 (0.23-0.28)	.51	0.27 (0.24-0.29)	0.27 (0.24-0.29)	0.23 (0.21-0.25)	.007	0.28 (0.25-0.31)	0.29 (0.26-0.32)	0.27 (0.24-0.30)	.45	.42
Vegetables excluding potatoes/starchy	0.58 (0.55-0.61)	0.57 (0.50-0.63)	0.58 (0.55-0.62)	.91	0.62 (0.58-0.67)	0.56 (0.52-0.59)	0.58 (0.55-0.62)	.10	0.61 (0.58-0.65)	0.59 (0.56-0.62)	0.56 (0.53-0.59)	.01	0.67 (0.62-0.72)	0.66 (0.61-0.71)	0.66 (0.60-0.71)	.77	.62
Total grains, servings/d																	
Whole grains	0.35 (0.31-0.40)	0.48 (0.44-0.52)	0.73 (0.67-0.79)	<.001	0.46 (0.41-0.52)	0.52 (0.47-0.57)	0.77 (0.69-0.84)	<.001	0.51 (0.48-0.55)	0.62 (0.57-0.68)	0.87 (0.82-0.93)	<.001	0.67 (0.61-0.73)	0.75 (0.68-0.82)	1.09 (1.02-1.17)	<.001	.39
Refined grains	6.34 (6.17-6.51)	6.30 (6.13-6.47)	6.43 (6.25-6.60)	.51	6.07 (5.89-6.26)	6.05 (5.92-6.18)	6.23 (6.10-6.36)	.19	6.17 (6.02-6.32)	6.05 (5.91-6.19)	6.14 (5.99-6.28)	.79	6.53 (6.36-6.70)	6.20 (6.05-6.36)	6.18 (6.01-6.35)	.006	.10
Nuts and seeds, servings/d	0.25 (0.17-0.33)	0.27 (0.19-0.34)	0.27 (0.20-0.34)	.67	0.33 (0.26-0.40)	0.31 (0.27-0.36)	0.27 (0.23-0.31)	.12	0.31 (0.26-0.36)	0.41 (0.35-0.47)	0.40 (0.35-0.46)	.02	0.44 (0.37-0.52)	0.41 (0.35-0.47)	0.50 (0.44-0.57)	.20	.01
Legumes, servings/d	0.09 (0.08-0.10)	0.10 (0.09-0.11)	0.12 (0.10-0.14)	.01	0.06 (0.05-0.07)	0.05 (0.04-0.06)	0.08 (0.06-0.09)	.07	0.05 (0.04-0.06)	0.05 (0.04-0.06)	0.06 (0.04-0.07)	.49	0.05 (0.03-0.06)	0.06 (0.04-0.07)	0.06 (0.05-0.07)	.21	.20
Total meat, serving/d																	
Processed meat	0.26 (0.22-0.29)	0.24 (0.22-0.26)	0.25 (0.22-0.27)	.53	0.26 (0.24-0.29)	0.26 (0.23-0.28)	0.24 (0.21-0.26)	.13	0.23 (0.21-0.26)	0.26 (0.24-0.28)	0.28 (0.24-0.31)	.04	0.22 (0.19-0.25)	0.25 (0.23-0.27)	0.27 (0.25-0.30)	.009	.03
Unprocessed red meat	0.39 (0.36-0.43)	0.36 (0.34-0.39)	0.32 (0.29-0.35)	.003	0.35 (0.32-0.39)	0.36 (0.33-0.39)	0.35 (0.31-0.39)	.92	0.36 (0.32-0.41)	0.32 (0.29-0.34)	0.32 (0.29-0.34)	.11	0.29 (0.25-0.33)	0.29 (0.25-0.34)	0.26 (0.23-0.29)	.20	.56
Poultry	0.29 (0.25-0.32)	0.37 (0.35-0.40)	0.37 (0.33-0.40)	.001	0.30 (0.27-0.33)	0.38 (0.35-0.42)	0.38 (0.34-0.42)	<.001	0.31 (0.28-0.35)	0.37 (0.33-0.40)	0.39 (0.35-0.42)	.008	0.29 (0.24-0.33)	0.36 (0.32-0.40)	0.33 (0.29-0.38)	.19	.61
Fish and Shellfish	0.06 (0.05-0.08)	0.07 (0.06-0.09)	0.08 (0.06-0.09)	.28	0.06 (0.05-0.08)	0.06 (0.05-0.08)	0.09 (0.05-0.12)	.22	0.05 (0.04-0.06)	0.06 (0.05-0.08)	0.05 (0.03-0.07)	.99	0.07 (0.05-0.09)	0.07 (0.05-0.09)	0.07 (0.05-0.09)	.99	.62
High in omega-3 fatty acids[b]	0.01 (0.006-0.02)	0.01 (0.008-0.02)	0.01 (0.008-0.02)	.54	0.009 (0.006-0.01)	0.009 (0.006-0.01)	0.02 (0.01-0.02)	.09	0.01 (0.007-0.02)	0.01 (0.008-0.02)	0.009 (0.006-0.01)	.45	0.02 (0.01-0.03)	0.02 (0.01-0.03)	0.02 (0.01-0.03)	.85	.33
Low in omega-3 fatty acids[b]	0.05 (0.04-0.07)	0.06 (0.05-0.07)	0.06 (0.05-0.08)	.26	0.05 (0.04-0.07)	0.05 (0.04-0.07)	0.07 (0.04-0.10)	.32	0.04 (0.03-0.05)	0.05 (0.03-0.07)	0.04 (0.03-0.06)	.77	0.05 (0.03-0.07)	0.05 (0.04-0.06)	0.05 (0.04-0.07)	.99	.71
Eggs, servings/d	0.31 (0.27-0.35)	0.39 (0.35-0.44)	0.41 (0.37-0.45)	.001	0.31 (0.26-0.35)	0.37 (0.33-0.41)	0.35 (0.31-0.38)	.19	0.27 (0.24-0.30)	0.33 (0.30-0.37)	0.35 (0.32-0.38)	<.001	0.23 (0.19-0.28)	0.36 (0.32-0.40)	0.38 (0.35-0.42)	<.001	.02

Total dairy, servings/d	1.94 (1.85-2.03)	2.22 (2.13-2.31)	2.25 (2.12-2.37)	<.001	2.09 (1.98-2.20)	2.17 (2.08-2.26)	2.17 (2.06-2.29)	.27	2.19 (2.09-2.29)	2.19 (2.12-2.27)	2.20 (2.11-2.29)	.86	2.38 (2.27-2.50)	2.48 (2.38-2.59)	2.41 (2.28-2.53)	.81	.63
Milk	1.35 (1.27-1.42)	1.41 (1.33-1.49)	1.26 (1.17-1.35)	.18	1.41 (1.31-1.50)	1.40 (1.31-1.49)	1.24 (1.14-1.33)	.01	1.49 (1.39-1.59)	1.36 (1.30-1.42)	1.23 (1.16-1.30)	<.001	1.61 (1.51-1.71)	1.59 (1.49-1.69)	1.40 (1.31-1.49)	.002	.06
Cheese	0.53 (0.49-0.56)	0.66 (0.63-0.69)	0.82 (0.76-0.87)	<.001	0.62 (0.58-0.67)	0.67 (0.63-0.71)	0.79 (0.72-0.85)	<.001	0.63 (0.59-0.68)	0.72 (0.68-0.76)	0.82 (0.78-0.87)	<.001	0.63 (0.58-0.68)	0.71 (0.66-0.75)	0.81 (0.76-0.87)	<.001	.69
Yogurt	0.02 (0.01-0.02)	0.03 (0.03-0.04)	0.06 (0.04-0.07)	<.001	0.03 (0.02-0.03)	0.03 (0.02-0.03)	0.04 (0.03-0.05)	.04	0.04 (0.03-0.04)	0.05 (0.04-0.06)	0.06 (0.05-0.07)	.001	0.08 (0.06-0.11)	0.08 (0.07-0.09)	0.10 (0.08-0.11)	.31	.63
Sugar-sweetened beverages[c], servings/d	2.09 (1.91-2.26)	1.49 (1.41-1.58)	1.42 (1.29-1.55)	<.001	2.02 (1.90-2.15)	1.70 (1.58-1.82)	1.28 (1.17-1.39)	<.001	1.96 (1.83-2.08)	1.57 (1.45-1.69)	1.27 (1.17-1.36)	<.001	1.46 (1.34-1.58)	1.14 (1.01-1.27)	0.81 (0.69-0.94)	<.001	.56
Added sugar, g/d	101 (96.2-105)	81.1 (78.5-83.6)	79.0 (74.3-83.2)	<.001	98.3 (94.5-102)	89.5 (86.1-92.8)	78.1 (75.2-81.1)	<.001	100 (95.3-104)	86.5 (83.6-89.5)	78.1 (75.6-80.6)	<.001	91.1 (87.4-94.9)	79.0 (75.6-82.3)	68.9 (66.4-71.4)	<.001	.39
Macronutrients																	
Total fat, %Energy (E)	33.0 (32.6-33.4)	32.8 (32.3-33.3)	33.2 (32.6-33.7)	.66	33.0 (32.5-33.5)	33.3 (32.8-33.7)	33.6 (33.0-34.1)	.15	32.0 (31.5-32.5)	33.0 (32.5-33.4)	33.4 (32.9-33.9)	<.001	31.4 (30.7-32.1)	32.3 (31.9-32.8)	33.3 (32.9-33.8)	<.001	.02
Saturated fat, %E	11.7 (11.5-11.9)	11.6 (11.3-11.8)	11.6 (11.3-11.8)	.45	11.6 (11.4-11.9)	11.7 (11.5-11.8)	11.5 (11.3-11.8)	.51	11.4 (11.2-11.6)	11.6 (11.4-11.8)	11.7 (11.4-11.9)	.09	11.1 (10.9-11.4)	11.5 (11.3-11.7)	11.7 (11.5-12.0)	<.001	.01
Monounsaturated fat, %E	15.5 (14.8-16.2)	15.0 (14.5-15.6)	14.5 (13.9-15.0)	.03	14.2 (13.7-14.7)	14.3 (13.9-14.7)	14.9 (14.2-15.7)	.11	13.7(13.2-14.2)	14.0(13.6-14.4)	14.0(13.6-14.4)	.36	13.4 (13.0-13.9)	13.9 (13.4-14.4)	13.4 (13.0-13.8)	.82	.40
Polyunsaturated fat, %E	6.18 (6.03-6.32)	6.57 (6.43-6.70)	7.31 (7.18-7.45)	<.001	6.34 (6.16-6.52)	6.67 (6.50-6.84)	7.70 (7.53-7.87)	<.001	6.10 (5.95-6.26)	6.63 (6.49-6.76)	7.38 (7.19-7.58)	<.001	6.09 (5.89-6.30)	6.46 (6.27-6.64)	7.36 (7.18-7.55)	<.001	.98
Seafood omega-3 fat, mg/d	48.6 (41.5-55.8)	56.9 (48.2-65.6)	47.7 (40.1-55.4)	.92	54.2 (42.9-65.6)	52.4 (43.1-61.8)	47.9 (31.2-64.6)	.54	46.7 (39.9-53.5)	54.4 (44.0-64.8)	38.5 (31.5-45.4)	.08	69.1 (53.5-84.8)	68.8 (46.8-90.7)	45.1 (37.5-52.7)	.004	.38
Plant omega-3 fat, mg/d	121 (117-124)	122 (119-125)	144 (140-147)	<.001	118 (114-122)	120 (117-124)	149 (145-153)	<.001	117 (113-121)	121 (117-124)	142 (138-145)	<.001	116 (110-122)	120 (115-124)	145 (141-149)	<.001	.78
Protein, %E	13.7 (13.4-14.0)	14.8 (14.6-15.0)	14.9 (14.6-15.1)	<.001	13.7 (13.4-13.9)	14.4 (14.1-14.6)	14.8 (14.6-15.1)	<.001	13.9 (13.5-14.1)	14.3 (14.0-14.5)	14.7 (14.4-15.0)	<.001	14.1 (13.8-14.3)	14.9 (14.6-15.2)	14.9 (14.7-15.1)	<.001	.38
Carbohydrate, %E	54.2 (53.7-54.6)	53.3 (52.7-53.8)	53.0 (52.4-53.7)	.004	54.1 (53.4-54.8)	53.4 (53.0-53.8)	52.7 (52.0-53.3)	.003	55.1 (54.5-55.8)	53.7 (53.1-54.4)	52.9 (52.3-53.6)	<.001	55.7 (55.1-56.4)	54.0 (53.3-54.6)	53.0 (52.5-53.5)	<.001	.04
Other nutrients																	
Sodium, mg/d	3172 (3116-3227)	3282 (3242-3322)	3286 (3218-3354)	.01	3181 (3116-3246)	3273 (3214-3332)	3365 (3302-3429)	<.001	3163 (3113-3213)	3292 (3240-3343)	3333 (3228-3438)	.006	3157 (3094-3220)	3322 (3270-3373)	3278 (3227-3330)	.008	.79
Cholesterol, mg/d	241 (231-250)	253 (243-263)	258 (248-269)	.02	229 (219-238)	241 (232-250)	244 (232-255)	.04	219 (212-226)	225 (217-234)	240 (232-247)	<.001	206 (195-216)	228 (217-238)	232 (222-242)	.001	.11
Fiber, g/d	12.2 (11.8-12.5)	14.0 (13.7-14.4)	15.6 (15.1-16.1)	<.001	12.0 (11.7-12.3)	13.0 (12.7-13.3)	14.6 (14.2-15.0)	<.001	12.2 (11.8-12.6)	13.6 (13.3-13.9)	14.7 (14.4-15.0)	<.001	13.4 (12.9-13.9)	14.6 (14.2-15.0)	16.3 (15.9-16.8)	<.001	.54
Potassium, mg/d	2209 (2155-2263)	2341 (2299-2383)	2347 (2299-2396)	<.001	2224 (2172-2277)	2239 (2192-2286)	2298 (2257-2338)	.04	2248 (2191-2305)	2241 (2203-2279)	2282 (2249-2315)	.29	2350 (2283-2417)	2398 (2341-2456)	2408 (2355-2460)	.19	.72
calcium, mg/d	873 (846-900)	1033 (1008-1059)	1086 (1049-1123)	<.001	921 (890-952)	1014 (987-1041)	1046 (1015-1077)	<.001	958 (923-992)	1041 (1017-1065)	1068 (1039-1096)	<.001	1046 (1010-1082)	1145 (1108-1181)	1154 (1116-1192)	<.001	.82

Abbreviation: NHANES, National Health and Nutrition Examination Survey.

[a] Data were weighted to be nationally representative. All analyses (except for macronutrients) were energy-adjusted to 2000 kcal/d using the residual method. Macronutrients were reported as % of total energy.

[b] Cooked fish and shellfish containing 500 mg or more of omega-3 fatty acids (EPA and DHA) per 3 ounces were included in the high omgega-3 fatty acids category.

[c] Serving of sugar-sweetened beverage defined as 8 fl oz or 237 grams. Sugar-sweetened beverages include soft drinks, fruit drinks, sports drinks, presweetened teas and energy drinks with more than 50 kcal per 8 fl oz.

P for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted linear regression model. *P* for interaction was calculated using the Wald F test for an interaction term between survey-cycle and the categorical variable (parental education levels).

eTable 17. Trends in Estimated Mean Consumption of Food Groups and Nutrients of Interest by Family Income to Poverty Ratio (PIR) Among US Children by NHANES Survey Cycles, 1999-2004, 2005-2010 and 2011-2016[a]

Foods/nutrients	PIR <1.30			*P* for trend	PIR 1.30-1.849			*P* for trend	PIR 1.85-2.99			*P* for trend	PIR ≥3.00			*P* for trend	*P* for interaction
	1999-2004 (n= 4,941)	2005-2010 (n= 4,298)	2011-2016 (n=3,829)		1999-2004 (n=1,479)	2005-2010 (n=1,228)	2011-2016 (n=1,106)		1999-2004 (n=1,869)	2005-2010 (n=1,660)	2011-2016 (n=1,358)		1999-2004 (n=2,665)	2005-2010 (n=2,523)	2011-2016 (n=2,071)		
Total fruits, servings/d	1.04 (0.95-1.12)	1.15 (1.08-1.22)	1.03 (0.97-1.10)	.88	0.97 (0.85-1.10)	1.01 (0.92-1.10)	1.04 (0.94-1.14)	.39	0.93 (0.84-1.02)	1.09 (0.97-1.21)	1.08 (0.97-1.19)	.04	1.12 (1.06-1.19)	1.12 (1.05-1.18)	1.21 (1.12-1.30)	.12	.22
Intact/whole fruit	0.43 (0.40-0.47)	0.62 (0.57-0.67)	0.60 (0.55-0.64)	<.001	0.42 (0.33-0.52)	0.54 (0.48-0.60)	0.62 (0.55-0.69)	.001	0.44 (0.36-0.52)	0.62 (0.51-0.72)	0.67 (0.58-0.75)	<.001	0.55 (0.50-0.61)	0.71 (0.65-0.77)	0.84 (0.76-0.92)	<.001	.15
100% fruit juice	0.68 (0.61-0.74)	0.64 (0.58-0.69)	0.55 (0.50-0.60)	.002	0.63 (0.55-0.71)	0.56 (0.50-0.63)	0.54 (0.45-0.63)	.14	0.54 (0.47-0.62)	0.58 (0.48-0.68)	0.47 (0.41-0.53)	.12	0.65 (0.59-0.70)	0.48 (0.44-0.52)	0.44 (0.39-0.49)	<.001	.10
Total vegetables, servings/d	1.10 (1.05-1.15)	0.98 (0.94-1.02)	0.95 (0.92-0.99)	<.001	1.03 (0.95-1.12)	0.99 (0.90-1.09)	1.01 (0.93-1.10)	.79	1.01 (0.96-1.06)	0.95 (0.88-1.01)	0.95 (0.90-1.01)	.13	0.97 (0.92-1.03)	0.98 (0.95-1.02)	0.97 (0.91-1.02)	.89	.02
Dark-green vegetables	0.04 (0.03-0.05)	0.04 (0.03-0.05)	0.06 (0.04-0.07)	.01	0.04 (0.02-0.05)	0.05 (0.03-0.07)	0.06 (0.04-0.08)	.10	0.03 (0.03-0.04)	0.05 (0.04-0.06)	0.05 (0.04-0.06)	.002	0.04 (0.03-0.05)	0.05 (0.05-0.06)	0.08 (0.06-0.09)	.001	.59
Tomatoes	0.28 (0.25-0.30)	0.24 (0.23-0.25)	0.23 (0.22-0.24)	<.001	0.28 (0.24-0.31)	0.22 (0.18-0.27)	0.24 (0.21-0.27)	.10	0.27 (0.24-0.31)	0.22 (0.20-0.24)	0.21 (0.19-0.23)	<.001	0.26 (0.24-0.28)	0.23 (0.22-0.25)	0.21 (0.19-0.22)	<.001	.84
Other red/orange vegetables	0.05 (0.04-0.06)	0.05 (0.04-0.05)	0.05 (0.04-0.05)	.85	0.05 (0.03-0.07)	0.04 (0.03-0.05)	0.06 (0.04-0.08)	.38	0.05 (0.03-0.06)	0.05 (0.04-0.06)	0.06 (0.04-0.07)	.33	0.05 (0.04-0.06)	0.07 (0.06-0.07)	0.08 (0.07-0.09)	.001	.03
White potatoes	0.39 (0.36-0.41)	0.32 (0.30-0.34)	0.29 (0.27-0.31)	<.001	0.35 (0.29-0.40)	0.32 (0.28-0.36)	0.30 (0.26-0.33)	.13	0.34 (0.30-0.37)	0.29 (0.25-0.33)	0.32 (0.28-0.36)	.64	0.29 (0.26-0.32)	0.27 (0.25-0.29)	0.26 (0.23-0.29)	.15	.02
Other starchy (e.g., corn)	0.07 (0.06-0.08)	0.06 (0.06-0.07)	0.06 (0.05-0.07)	.06	0.05 (0.03-0.07)	0.06 (0.05-0.08)	0.05 (0.04-0.07)	.92	0.06 (0.05-0.08)	0.06 (0.05-0.07)	0.05 (0.04-0.06)	.31	0.05 (0.04-0.07)	0.06 (0.05-0.07)	0.05 (0.04-0.06)	.89	.59
Other vegetables	0.27 (0.25-0.29)	0.24 (0.23-0.26)	0.24 (0.22-0.26)	.06	0.25 (0.22-0.28)	0.27 (0.22-0.32)	0.27 (0.23-0.30)	.58	0.25 (0.22-0.28)	0.26 (0.21-0.30)	0.23 (0.21-0.26)	.37	0.27 (0.25-0.30)	0.28 (0.26-0.30)	0.26 (0.23-0.28)	.35	.58
Vegetables excluding potatoes/starchy	0.63 (0.59-0.68)	0.57 (0.54-0.61)	0.58 (0.55-0.60)	.03	0.61 (0.56-0.66)	0.59 (0.51-0.67)	0.63 (0.56-0.70)	.76	0.61 (0.56-0.65)	0.57 (0.52-0.63)	0.55 (0.52-0.59)	.07	0.62 (0.59-0.65)	0.63 (0.60-0.66)	0.62 (0.58-0.66)	.90	.32
Total grains, servings/d																	
Whole grains	0.41 (0.36-0.46)	0.52 (0.47-0.58)	0.77 (0.71-0.84)	<.001	0.42 (0.36-0.48)	0.56 (0.50-0.62)	0.83 (0.74-0.92)	<.001	0.52 (0.45-0.59)	0.62 (0.54-0.70)	0.91 (0.82-0.99)	<.001	0.60 (0.54-0.66)	0.65 (0.60-0.70)	1.01 (0.94-1.09)	<.001	.85
Refined grains	6.19 (6.02-6.36)	6.12 (6.00-6.24)	6.33 (6.20-6.46)	.20	6.21 (5.92-6.50)	6.07 (5.84-6.30)	6.09 (5.88-6.30)	.40	6.15 (5.92-6.38)	5.97 (5.78-6.16)	6.10 (5.84-6.36)	.77	6.37 (6.24-6.50)	6.29 (6.12-6.45)	6.19 (6.06-6.33)	.06	.11
Nuts and seeds, servings/d	0.28 (0.22-0.35)	0.26 (0.22-0.30)	0.25 (0.21-0.28)	.34	0.24 (0.17-0.30)	0.36 (0.27-0.44)	0.40 (0.29-0.51)	.007	0.41 (0.30-0.52)	0.38 (0.30-0.45)	0.39 (0.30-0.48)	.81	0.37 (0.32-0.42)	0.45 (0.39-0.50)	0.51 (0.44-0.58)	.002	<.001
Legumes, servings/d	0.08 (0.07-0.09)	0.07 (0.06-0.08)	0.09 (0.08-0.11)	.12	0.06 (0.04-0.08)	0.07 (0.05-0.08)	0.08 (0.06-0.09)	.18	0.05 (0.04-0.07)	0.06 (0.04-0.07)	0.07 (0.05-0.09)	.24	0.04 (0.03-0.05)	0.05 (0.04-0.06)	0.05 (0.04-0.06)	.36	.74
Total meat, serving/d																	
Processed meat	0.25 (0.22-0.27)	0.25 (0.24-0.27)	0.24 (0.22-0.26)	.69	0.26 (0.22-0.29)	0.24 (0.21-0.27)	0.25 (0.22-0.28)	.84	0.23 (0.21-0.25)	0.25 (0.22-0.27)	0.28 (0.25-0.30)	.01	0.24 (0.22-0.27)	0.26 (0.24-0.28)	0.28 (0.26-0.31)	.04	.11
Unprocessed red meat	0.37 (0.34-0.40)	0.35 (0.33-0.37)	0.32 (0.30-0.34)	.03	0.33 (0.27-0.38)	0.34 (0.28-0.39)	0.31 (0.25-0.37)	.66	0.34 (0.31-0.37)	0.33 (0.29-0.36)	0.33 (0.29-0.38)	.84	0.33 (0.30-0.36)	0.33 (0.29-0.36)	0.28 (0.25-0.31)	.01	.41
Poultry	0.32 (0.29-0.35)	0.39 (0.36-0.41)	0.40 (0.36-0.43)	.001	0.30 (0.24-0.36)	0.36 (0.32-0.39)	0.38 (0.34-0.42)	.03	0.27 (0.23-0.30)	0.36 (0.31-0.40)	0.33 (0.28-0.38)	.04	0.29 (0.26-0.31)	0.35 (0.32-0.38)	0.34 (0.30-0.38)	.02	.91
Fish and Shellfish	0.07 (0.05-0.08)	0.06 (0.05-0.08)	0.06 (0.05-0.08)	.68	0.05 (0.03-0.07)	0.07 (0.05-0.09)	0.08 (0.04-0.13)	.24	0.06 (0.04-0.07)	0.07 (0.04-0.11)	0.07 (0.04-0.09)	.67	0.06 (0.05-0.08)	0.06 (0.05-0.07)	0.07 (0.05-0.09)	.55	.52
High in omega-3 fatty acids[b]	0.01 (0.008-0.02)	0.01 (0.008-0.01)	0.01 (0.008-0.01)	.78	0.006 (0.003-0.01)	0.01 (0.006-0.02)	0.01 (0.007-0.02)	.14	0.01 (0.007-0.02)	0.01 (0.005-0.02)	0.02 (0.008-0.02)	.45	0.02 (0.01-0.02)	0.02 (0.01-0.02)	0.02 (0.01-0.02)	.89	.54
Low in omega-3 fatty acids[b]	0.06 (0.04-0.07)	0.05 (0.04-0.06)	0.05 (0.04-0.07)	.72	0.05 (0.03-0.07)	0.06 (0.04-0.08)	0.07 (0.02-0.12)	.32	0.05 (0.03-0.06)	0.06 (0.03-0.09)	0.05 (0.02-0.07)	.79	0.05 (0.03-0.06)	0.04 (0.04-0.05)	0.06 (0.04-0.07)	.51	.62
Eggs, servings/d	0.32 (0.28-0.36)	0.38 (0.35-0.42)	0.39 (0.36-0.42)	.007	0.28 (0.22-0.35)	0.36 (0.31-0.41)	0.41 (0.36-0.47)	.002	0.25 (0.21-0.29)	0.36 (0.32-0.40)	0.35 (0.30-0.39)	.002	0.25 (0.22-0.28)	0.34 (0.31-0.38)	0.34 (0.31-0.37)	<.001	.59

Total dairy, servings/d	2.00 (1.90-2.11)	2.18 (2.11-2.26)	2.20 (2.09-2.31)	.01	2.16 (1.98-2.34)	2.25 (2.16-2.34)	2.18 (2.04-2.32)	.83	2.20 (2.10-2.29)	2.26 (2.16-2.36)	2.26 (2.16-2.37)	.35	2.25 (2.14-2.36)	2.35 (2.28-2.42)	2.37 (2.24-2.50)	.16	.35
Milk	1.38 (1.28-1.48)	1.40 (1.33-1.46)	1.25 (1.17-1.34)	.06	1.42 (1.30-1.55)	1.42 (1.35-1.49)	1.25 (1.12-1.37)	.04	1.53 (1.44-1.62)	1.43 (1.34-1.53)	1.26 (1.17-1.35)	<.001	1.49 (1.40-1.59)	1.48 (1.42-1.55)	1.36 (1.26-1.45)	.04	.27
Cheese	0.56 (0.52-0.60)	0.66 (0.63-0.68)	0.79 (0.75-0.83)	<.001	0.65 (0.57-0.73)	0.70 (0.62-0.77)	0.78 (0.72-0.85)	.01	0.60 (0.55-0.65)	0.70 (0.65-0.76)	0.84 (0.79-0.89)	<.001	0.65 (0.61-0.69)	0.72 (0.68-0.76)	0.83 (0.78-0.89)	<.001	.13
Yogurt	0.02 (0.02-0.03)	0.04 (0.03-0.04)	0.05 (0.04-0.05)	<.001	0.03 (0.01-0.05)	0.03 (0.02-0.04)	0.06 (0.04-0.07)	.02	0.03 (0.02-0.04)	0.05 (0.04-0.06)	0.07 (0.05-0.08)	<.001	0.06 (0.05-0.08)	0.06 (0.05-0.07)	0.09 (0.07-0.10)	.04	.49
Sugar-sweetened beverages[c], servings/d	1.98 (1.85-2.12)	1.61 (1.50-1.71)	1.31 (1.19-1.42)	<.001	1.99 (1.81-2.18)	1.55 (1.32-1.78)	1.26 (1.14-1.38)	<.001	1.94 (1.77-2.11)	1.56 (1.40-1.72)	1.22 (1.08-1.35)	<.001	1.80 (1.69-1.91)	1.35 (1.24-1.45)	0.98 (0.85-1.12)	<.001	.74
Added sugar, g./d	96.2 (92.4-100)	85.3 (82.3-88.2)	76.9 (73.9-79.8)	<.001	101 (94.5-108)	86.9 (81.5-92.4)	77.7 (73.9-81.5)	<.001	104 (99.1-109)	87.4 (83.6-91.6)	77.3 (74.3-80.2)	<.001	95.8 (92.4-99.1)	81.9 (79.4-84.8)	73.1 (70.6-75.6)	<.001	.16
Macronutrients																	
Total fat, %Energy (E)	32.8 (32.4-33.3)	32.8 (32.4-33.1)	33.3 (32.9-33.7)	.13	32.4 (31.6-33.3)	33.0 (32.5-33.5)	33.3 (32.6-34.0)	.10	32.3 (31.7-32.9)	33.1 (32.5-33.7)	33.7 (33.1-34.3)	.001	31.9 (31.3-32.4)	32.9 (32.5-33.3)	33.4 (33.0-33.9)	<.001	.11
Saturated fat, %E	11.6 (11.4-11.8)	11.5 (11.3-11.6)	11.5 (11.3-11.7)	.71	11.6 (11.2-12.0)	11.6 (11.3-11.9)	11.5 (11.1-11.8)	.47	11.5 (11.2-11.8)	11.8 (11.6-12.0)	11.9 (11.5-12.2)	.09	11.2 (11.1-11.4)	11.6 (11.4-11.8)	11.8 (11.6-12.0)	.001	.03
Monounsaturated fat, %E	14.8 (14.3-15.3)	14.6 (14.2-15.0)	14.4 (14.0-14.8)	.26	14.7 (14.0-15.4)	14.6 (14.0-15.2)	14.6 (13.7-15.4)	.77	14.0 (13.4-14.6)	14.6 (13.9-15.3)	14.4 (13.6-15.2)	.40	13.6 (13.1-14.1)	13.7 (13.4-14.1)	13.5 (13.0-13.9)	.67	.49
Polyunsaturated fat, %E	6.28 (6.17-6.40)	6.61 (6.50-6.71)	7.46 (7.32-7.60)	<.001	6.00 (5.70-6.30)	6.65 (6.45-6.85)	7.56 (7.27-7.85)	<.001	6.18 (6.00-6.35)	6.52 (6.30-6.73)	7.42 (7.22-7.63)	<.001	6.16 (5.96-6.36)	6.57 (6.41-6.73)	7.35 (7.17-7.52)	<.001	.59
Seafood omega-3 fat, mg/d	58.1 (49.5-66.8)	54.3 (46.5-62.0)	40.3 (35.3-45.4)	.001	47.3 (38.6-56.0)	52.0 (39.3-64.6)	48.9 (21.2-76.7)	.92	50.3 (38.6-62.1)	57.8 (42.0-73.4)	48.9 (35.8-62.0)	.87	57.3 (45.3-69.4)	57.6 (45.7-69.5)	42.2 (35.2-49.3)	.03	.26
Plant omega-3 fat, mg/d	120 (117-123)	121 (119-124)	146 (144-148)	<.001	116 (110-122)	121 (116-126)	148 (140-156)	<.001	118 (114-122)	118 (113-123)	144 (139-148)	<.001	116 (111-121)	120 (117-123)	142 (138-146)	<.001	.90
Protein, %E	13.8 (13.5-14.1)	14.6 (14.4-14.8)	14.8 (14.6-15.0)	<.001	13.7 (13.3-14.1)	14.5 (14.1-14.9)	14.9 (14.6-15.2)	<.001	13.5 (13.2-13.8)	14.4 (14.2-14.6)	14.7 (14.4-15.0)	<.001	13.9 (13.6-14.2)	14.6 (14.4-14.9)	14.9 (14.6-15.1)	<.001	.69
Carbohydrate, %E	54.3 (53.9-54.8)	53.6 (53.2-54.0)	53.0 (52.5-53.4)	<.001	54.5 (53.5-55.5)	53.5 (52.7-54.3)	52.9 (52.1-53.8)	.02	55.3 (54.6-56.0)	53.4 (52.7-54.1)	52.6 (51.9-53.3)	<.001	55.2 (54.6-55.9)	53.6 (53.1-54.1)	52.9 (52.4-53.4)	<.001	.13
Other nutrients																	
Sodium, mg/d	3168 (3105-3230)	3288 (3243-3333)	3357 (3252-3463)	.003	3202 (3120-3285)	3262 (3179-3346)	3345 (3257-3434)	.02	3129 (3077-3181)	3241 (3174-3308)	3295 (3221-3369)	<.001	3161 (3110-3212)	3346 (3284-3408)	3279 (3227-3331)	.002	.65
Cholesterol, mg/d	237 (228-246)	246 (237-254)	251 (243-258)	.02	229 (213-245)	239 (226-253)	254 (242-266)	.02	211 (201-220)	235 (226-244)	241 (228-253)	<.001	211 (204-218)	224 (214-234)	230 (222-238)	<.001	.35
Fiber, g/d	12.4 (12.1-12.7)	13.6 (13.2-14.0)	15.1 (14.6-15.5)	<.001	12.1 (11.4-12.9)	13.5 (13.0-14.1)	15.1 (14.7-15.6)	<.001	12.1 (11.6-12.6)	13.4 (12.9-13.9)	15.1 (14.7-15.4)	<.001	12.7 (12.4-13.0)	14.0 (13.7-14.3)	15.7 (15.2-16.1)	<.001	.77
Potassium, mg/d	2274 (2221-2327)	2304 (2262-2347)	2318 (2283-2353)	.17	2213 (2125-2302)	2290 (2214-2367)	2316 (2267-2364)	.05	2214 (2158-2271)	2236 (2185-2288)	2319 (2262-2377)	.01	2270 (2218-2321)	2309 (2280-2338)	2364 (2315-2413)	.01	.34
Calcium, mg/d	896 (865-926)	1027 (1003-1052)	1061 (1031-1091)	<.001	949 (896-1002)	1035 (1004-1067)	1062 (1016-1108)	.002	950 (920-980)	1047 (1017-1078)	1087 (1056-1118)	<.001	998 (963-1033)	1094 (1070-1118)	1136 (1092-1179)	<.001	.47

Abbreviation: NHANES, National Health and Nutrition Examination Survey.

[a] Data were weighted to be nationally representative. All analyses (except for macronutrients) were energy-adjusted to 2000 kcal/d using the residual method. Macronutrients were reported as % of total energy.

[b] Cooked fish and shellfish containing 500 mg or more of omega-3 fatty acids (EPA and DHA) per 3 ounces were included in the high omgega-3 fatty acids category.

[c] Serving of sugar-sweetened beverage defined as 8 fl oz or 237 grams. Sugar-sweetened beverages include soft drinks, fruit drinks, sports drinks, presweetened teas and energy drinks with more than 50 kcal per 8 fl oz.

P for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted linear regression model. *P* for interaction was calculated using the Wald F test for an interaction term between survey-cycle and the categorical variable (family income to poverty ratio levels).

eTable 18. Trends in Estimated Mean Consumption of Food Groups and Nutrients of Interest by Household Food Security Status Among US Children by NHANES Survey Cycles, 1999-2004, 2005-2010 and 2011-2014[a]

Foods/nutrients	Very low food security				Low food security				Marginal food security				Food secure				
	1999-2004 (n=910)	2005-2010 (n=837)	2011-2014 (n=519)	*P* for trend	1999-2004 (n=1,861)	2005-2010 (n=1,771)	2011-2014 (n=1,125)	*P* for trend	1999-2004 (n=1,207)	2005-2010 (n=1,364)	2011-2014 (n=961)	*P* for trend	1999-2004 (n=7,485)	2005-2010 (n=6,348)	2011-2014 (n=3,518)	*P* for trend	*P* for interaction
Total fruits, servings/d	1.03 (0.83-1.22)	1.06 (0.96-1.17)	1.21 (1.03-1.38)	.19	1.01 (0.87-1.14)	1.10 (1.02-1.17)	1.05 (0.96-1.15)	.59	1.13 (1.02-1.24)	1.15 (1.04-1.26)	1.09 (0.94-1.23)	.60	1.04 (0.98-1.09)	1.12 (1.06-1.19)	1.16 (1.08-1.23)	.008	.29
Intact/whole fruit	0.46 (0.36-0.56)	0.52 (0.45-0.60)	0.75 (0.57-0.92)	.005	0.47 (0.40-0.55)	0.59 (0.54-0.65)	0.63 (0.56-0.69)	.003	0.41 (0.36-0.46)	0.62 (0.53-0.71)	0.63 (0.51-0.75)	.002	0.48 (0.45-0.52)	0.68 (0.62-0.74)	0.74 (0.68-0.80)	<.001	.25
100% fruit juice	0.67 (0.50-0.84)	0.58 (0.49-0.67)	0.58 (0.48-0.68)	.37	0.61 (0.53-0.70)	0.61 (0.56-0.67)	0.54 (0.46-0.61)	.20	0.79 (0.68-0.90)	0.64 (0.56-0.71)	0.56 (0.49-0.63)	.001	0.61 (0.58-0.65)	0.54 (0.50-0.58)	0.50 (0.45-0.55)	<.001	.28
Total vegetables, servings/d	1.06 (0.98-1.14)	1.09 (0.96-1.23)	1.03 (0.88-1.19)	.81	1.13 (1.04-1.21)	0.96 (0.88-1.04)	0.96 (0.89-1.04)	.005	1.02 (0.96-1.09)	0.93 (0.86-1.00)	0.93 (0.87-0.98)	.04	1.01 (0.97-1.05)	0.98 (0.94-1.01)	0.96 (0.92-1.00)	.08	.31
Dark-green vegetables	0.04 (0.02-0.06)	0.06 (0.04-0.08)	0.06 (0.03-0.09)	.32	0.04 (0.01-0.06)	0.04 (0.03-0.05)	0.05 (0.03-0.06)	.54	0.02 (0.01-0.03)	0.04 (0.03-0.05)	0.05 (0.04-0.07)	.002	0.04 (0.03-0.04)	0.05 (0.04-0.06)	0.07 (0.06-0.09)	<.001	.40
Tomatoes	0.25 (0.22-0.27)	0.25 (0.21-0.29)	0.24 (0.20-0.28)	.87	0.29 (0.26-0.33)	0.23 (0.21-0.25)	0.23 (0.21-0.25)	.001	0.27 (0.24-0.31)	0.23 (0.20-0.25)	0.22 (0.20-0.25)	.03	0.27 (0.26-0.28)	0.23 (0.22-0.24)	0.22 (0.21-0.23)	<.001	.22
Other red/orange vegetables	0.04 (0.02-0.06)	0.05 (0.04-0.07)	0.06 (0.04-0.08)	.21	0.07 (0.04-0.09)	0.05 (0.03-0.06)	0.05 (0.03-0.07)	.48	0.04 (0.03-0.06)	0.04 (0.03-0.05)	0.05 (0.04-0.07)	.21	0.05 (0.04-0.06)	0.06 (0.05-0.06)	0.06 (0.05-0.07)	.02	.55
White potatoes	0.37 (0.31-0.43)	0.36 (0.29-0.42)	0.26 (0.21-0.31)	.005	0.37 (0.31-0.43)	0.31 (0.28-0.34)	0.28 (0.25-0.32)	.009	0.37 (0.31-0.43)	0.30 (0.27-0.33)	0.26 (0.22-0.29)	.001	0.33 (0.31-0.35)	0.29 (0.27-0.31)	0.28 (0.25-0.30)	<.001	.32
Other starchy (e.g., corn)	0.06 (0.04-0.08)	0.06 (0.04-0.07)	0.06 (0.03-0.08)	.84	0.07 (0.06-0.09)	0.07 (0.06-0.08)	0.06 (0.04-0.07)	.18	0.05 (0.04-0.07)	0.06 (0.05-0.07)	0.06 (0.04-0.08)	.63	0.06 (0.05-0.07)	0.06 (0.06-0.07)	0.06 (0.05-0.07)	.63	.62
Other vegetables	0.28 (0.23-0.33)	0.30 (0.24-0.37)	0.32 (0.23-0.42)	.40	0.27 (0.24-0.30)	0.24 (0.21-0.27)	0.26 (0.22-0.30)	.61	0.25 (0.22-0.29)	0.25 (0.20-0.30)	0.26 (0.24-0.28)	.78	0.27 (0.25-0.28)	0.26 (0.24-0.28)	0.25 (0.23-0.27)	.27	.60
Vegetables excluding potatoes/starchy	0.61 (0.53-0.69)	0.66 (0.58-0.74)	0.69 (0.55-0.82)	.32	0.67 (0.60-0.74)	0.56 (0.50-0.62)	0.59 (0.53-0.64)	.06	0.59 (0.54-0.64)	0.55 (0.49-0.61)	0.59 (0.55-0.63)	.96	0.62 (0.59-0.64)	0.60 (0.57-0.63)	0.60 (0.57-0.63)	.41	.25
Total grains, servings/d																	
Whole grains	0.45 (0.33-0.57)	0.55 (0.44-0.66)	0.72 (0.59-0.85)	.003	0.39 (0.32-0.45)	0.52 (0.46-0.57)	0.66 (0.59-0.73)	<.001	0.36 (0.29-0.43)	0.48 (0.41-0.55)	0.88 (0.76-1.00)	<.001	0.53 (0.49-0.56)	0.63 (0.58-0.67)	0.90 (0.83-0.96)	<.001	.02
Refined grains	6.19 (5.85-6.53)	5.95 (5.66-6.24)	6.15 (5.84-6.46)	.82	6.16 (5.89-6.43)	6.28 (6.08-6.47)	6.34 (6.17-6.50)	.26	6.23 (5.98-6.48)	6.17 (5.97-6.37)	6.09 (5.90-6.28)	.38	6.27 (6.17-6.38)	6.14 (6.03-6.25)	6.17 (6.06-6.29)	.15	.35
Nuts and seeds, servings/d	0.23 (0.17-0.28)	0.22 (0.18-0.27)	0.25 (0.17-0.32)	.68	0.35 (0.17-0.52)	0.25 (0.21-0.30)	0.25 (0.19-0.31)	.30	0.21 (0.15-0.28)	0.29 (0.24-0.35)	0.37 (0.23-0.52)	.05	0.35 (0.31-0.39)	0.40 (0.36-0.44)	0.40 (0.36-0.45)	.05	.22
Legumes, servings/d	0.06 (0.05-0.07)	0.06 (0.04-0.08)	0.12 (0.07-0.17)	.03	0.10 (0.08-0.13)	0.08 (0.07-0.10)	0.09 (0.07-0.11)	.43	0.09 (0.06-0.11)	0.10 (0.07-0.13)	0.08 (0.07-0.10)	.87	0.05 (0.04-0.06)	0.05 (0.05-0.06)	0.06 (0.05-0.07)	.22	.16
Total meat, serving/d																	
Processed meat	0.22 (0.18-0.26)	0.30 (0.25-0.34)	0.26 (0.22-0.30)	.15	0.24 (0.21-0.27)	0.23 (0.21-0.25)	0.23 (0.21-0.25)	.62	0.25 (0.21-0.29)	0.26 (0.23-0.28)	0.25 (0.21-0.29)	.91	0.24 (0.23-0.26)	0.25 (0.24-0.27)	0.27 (0.24-0.29)	.12	.38
Unprocessed red meat	0.36 (0.28-0.43)	0.37 (0.31-0.42)	0.35 (0.30-0.40)	.89	0.34 (0.30-0.37)	0.36 (0.32-0.39)	0.34 (0.30-0.39)	.78	0.42 (0.32-0.52)	0.34 (0.31-0.38)	0.31 (0.26-0.36)	.05	0.35 (0.33-0.37)	0.32 (0.30-0.35)	0.30 (0.27-0.33)	.008	.19

Poultry	0.34 (0.28-0.41)	0.35 (0.30-0.40)	0.40 (0.32-0.47)	.31	0.33 (0.29-0.38)	0.38 (0.35-0.41)	0.38 (0.32-0.43)	.20	0.29 (0.24-0.34)	0.36 (0.31-0.40)	0.38 (0.31-0.45)	.04	0.28 (0.26-0.31)	0.37 (0.35-0.40)	0.37 (0.33-0.41)	<.001	.60
Fish and Shellfish	0.06 (0.04-0.09)	0.05 (0.03-0.07)	0.05 (0.03-0.06)	.25	0.07 (0.04-0.09)	0.08 (0.06-0.10)	0.06 (0.04-0.08)	.64	0.07 (0.02-0.12)	0.08 (0.05-0.11)	0.06 (0.04-0.09)	.78	0.06 (0.05-0.07)	0.06 (0.05-0.07)	0.09 (0.06-0.11)	.09	.22
High in omega-3 fatty acids[b]	0.01 (0.005-0.02)	0.007 (0.002-0.01)	0.005 (0.002-0.007)	.05	0.01 (0.005-0.02)	0.01 (0.008-0.02)	0.008 (0.004-0.01)	.67	0.02 (0.009-0.03)	0.01 (0.005-0.02)	0.01 (0.004-0.02)	.17	0.01 (0.009-0.02)	0.01 (0.01-0.02)	0.01 (0.01-0.02)	.50	.27
Low in omega-3 fatty acids[b]	0.05 (0.03-0.08)	0.05 (0.03-0.06)	0.04 (0.02-0.06)	.38	0.06 (0.03-0.08)	0.07 (0.05-0.09)	0.05 (0.04-0.07)	.72	0.05 (0.01-0.08)	0.07 (0.04-0.09)	0.05 (0.03-0.07)	.86	0.05 (0.04-0.06)	0.05 (0.04-0.05)	0.07 (0.05-0.09)	.08	.27
Eggs, servings/d	0.33 (0.26-0.39)	0.36 (0.29-0.42)	0.42 (0.30-0.53)	.19	0.29 (0.24-0.34)	0.36 (0.32-0.40)	0.37 (0.32-0.42)	.02	0.33 (0.23-0.43)	0.34 (0.30-0.37)	0.41 (0.34-0.48)	.18	0.27 (0.25-0.29)	0.36 (0.34-0.39)	0.34 (0.31-0.36)	<.001	.99
Total dairy, servings/d	2.14 (1.94-2.33)	2.15 (2.02-2.29)	2.21 (2.04-2.39)	.58	2.00 (1.89-2.11)	2.15 (2.05-2.25)	2.24 (2.13-2.36)	.003	1.96 (1.78-2.14)	2.12 (2.00-2.24)	2.28 (2.13-2.44)	.008	2.18 (2.10-2.26)	2.31(2.26-2.36)	2.36 (2.26-2.46)	.003	.39
Milk	1.51 (1.32-1.69)	1.33 (1.22-1.45)	1.28 (1.14-1.41)	.05	1.37 (1.26-1.49)	1.37 (1.27-1.46)	1.31 (1.19-1.43)	.45	1.35 (1.20-1.50)	1.34 (1.25-1.43)	1.28 (1.17-1.39)	.43	1.47 (1.40-1.54)	1.46 (1.41-1.51)	1.36 (1.28-1.44)	.04	.52
Cheese	0.55 (0.49-0.61)	0.72 (0.63-0.80)	0.81 (0.71-0.91)	<.001	0.55 (0.49-0.61)	0.67 (0.63-0.71)	0.76 (0.69-0.83)	<.001	0.55 (0.48-0.63)	0.66 (0.60-0.71)	0.84 (0.75-0.93)	<.001	0.62 (0.59-0.65)	0.70 (0.68-0.73)	0.83 (0.79-0.88)	<.001	.55
Yogurt	0.03 (0.01-0.04)	0.03 (0.02-0.04)	0.03 (0.02-0.04)	.76	0.02 (0.01-0.03)	0.03 (0.02-0.04)	0.05 (0.04-0.06)	.002	0.03 (0.007-0.05)	0.03 (0.02-0.04)	0.07 (0.04-0.10)	.01	0.04 (0.03-0.05)	0.05 (0.05-0.06)	0.07 (0.06-0.08)	<.001	.10
Sugar-sweetened beverages[c], servings/d	2.16 (1.91-2.41)	1.85 (1.61-2.09)	1.44 (1.27-1.61)	<.001	2.03 (1.80-2.26)	1.57 (1.40-1.74)	1.37 (1.22-1.52)	<.001	1.90 (1.71-2.08)	1.64 (1.49-1.79)	1.34 (1.16-1.52)	<.001	1.88 (1.78-1.97)	1.42 (1.34-1.51)	1.20 (1.08-1.31)	<.001	.80
Added sugar, g/d	98.3 (90.3-106)	87.8 (81.9-93.7)	79.4 (74.8-84.0)	<.001	100 (93.7-107)	84.4 (79.8-89.5)	81.1 (77.3-84.4)	<.001	94.1 (87.8-100)	89.5 (84.8-94.5)	79.0 (74.3-83.2)	<.001	98.3 (94.9-101)	83.2 (81.5-85.3)	76.4 (73.9-79.0)	<.001	.26
Macronutrients																	
Total fat, %Energy (E)	31.9 (30.7-33.1)	33.4 (32.6-34.3)	32.5 (31.5-33.5)	.39	32.8 (32.0-33.6)	32.7 (32.2-33.2)	32.7 (32.1-33.3)	.84	32.8 (31.7-33.8)	32.6 (32.1-33.1)	33.2 (32.3-34.0)	.51	32.3 (31.9-32.6)	32.9 (32.6-33.2)	32.8 (32.5-33.1)	.02	.66
Saturated fat, %E	11.3 (10.8-11.9)	11.8 (11.5-12.1)	11.3 (10.7-11.9)	.95	11.6 (11.2-11.9)	11.5 (11.3-11.7)	11.3 (11.0-11.5)	.22	11.6 (11.2-12.0)	11.4 (11.2-11.7)	11.5 (11.1-11.9)	.75	11.4 (11.3-11.6)	11.6 (11.5-11.7)	11.4 (11.3-11.6)	.97	.72
Monounsaturated fat, %E	14.8 (13.0-16.6)	14.5 (13.5-15.5)	14.2 (13.3-15.1)	.55	15.1 (14.4-15.8)	14.4 (13.9-14.9)	14.1 (13.5-14.8)	.04	14.1 (13.3-14.8)	13.9 (13.3-14.6)	14.1 (13.1-15.1)	.93	14.0 (13.6-14.5)	14.3 (13.9-14.6)	13.4 (13.1-13.7)	.07	.60
Polyunsaturated fat, %E	5.98 (5.68-6.28)	6.74 (6.46-7.02)	7.14 (6.77-7.51)	<.001	6.22 (5.98-6.46)	6.62 (6.44-6.80)	7.38 (7.19-7.56)	<.001	6.32 (5.91-6.73)	6.59 (6.35-6.83)	7.50 (7.19-7.82)	<.001	6.17 (6.07-6.28)	6.57 (6.47-6.68)	7.34 (7.19-7.50)	<.001	.99
Seafood omega-3 fat, mg/d	58.1 (45.2-71.1)	48.1 (35.1-61.1)	32.9 (26.4-39.5)	.001	58.2 (41.4-74.9)	64.0 (51.1-76.9)	38.9 (25.9-51.9)	.09	52.5 (39.6-65.3)	60.4 (45.3-75.5)	45.2 (31.6-58.8)	.42	54.9 (48.1-61.7)	56.8 (46.4-67.1)	47.5 (38.1-57.0)	.28	.26
Plant omge-3 fat, mg/d	117 (111-122)	124 (117-131)	142 (137-148)	<.001	120 (116-125)	123 (119-127)	146 (141-150)	<.001	118 (111-126)	120 (113-126)	144 (137-152)	<.001	117 (115-120)	120 (117-122)	143 (139-148)	<.001	.97
Protein, %E	13.9 (13.4-14.5)	14.3 (13.9-14.7)	14.9 (14.5-15.4)	.008	13.6 (13.2-14.1)	14.6 (14.2-14.9)	14.7 (14.4-15.1)	<.001	13.9 (13.3-14.5)	14.2 (13.9-14.6)	14.8 (14.3-15.3)	.02	13.8 (13.6-14.0)	14.6 (14.5-14.8)	14.9 (14.7-15.1)	<.001	.82
Carbohydrate, %E	55.0 (53.8-56.2)	53.2 (52.2-54.2)	53.8 (52.6-55.0)	.14	54.8 (53.9-55.6)	53.5 (52.8-54.3)	53.6 (53.0-54.3)	.04	54.3 (53.3-55.3)	54.1 (53.3-54.8)	53.1 (51.9-54.2)	.11	54.9 (54.4-55.3)	53.5 (53.2-53.9)	53.4 (53.0-53.8)	<.001	.86
Other nutrients																	
Sodium, mg/d	3051 (2934-3167)	3286 (3201-3371)	3399 (3264-3534)	<.001	3184 (3080-3288)	3235 (3175-3296)	3264 (3206-3322)	.19	3265 (3171-3359)	3185 (3133-3237)	3249 (3135-3363)	.85	3162 (3131-3193)	3317 (3279-3354)	3328 (3256-3400)	<.001	.02

Cholesterol, mg/d	236 (219-252)	244 (228-260)	253 (224-281)	.30	229 (216-242)	243 (232-255)	243 (231-255)	.11	238 (216-260)	227 (217-236)	250 (228-272)	.43	221 (216-225)	234 (228-240)	232 (225-238)	.002	.99
Fiber, g/d	12.4 (11.7-13.1)	13.4 (12.9-14.0)	15.9 (15.0-16.8)	<.001	13.1 (12.4-13.8)	13.7 (13.3-14.1)	15.0 (14.5-15.5)	<.001	12.0 (11.6-12.5)	13.9 (13.4-14.3)	15.1 (14.6-15.6)	<.001	12.3 (12.1-12.6)	13.8 (13.5-14.1)	15.2 (14.8-15.5)	<.001	.09
Potassium, mg/d	2270 (2170-2371)	2274 (2201-2347)	2387 (2305-2469)	.10	2294 (2211-2377)	2285 (2223-2347)	2334 (2288-2380)	.42	2262 (2186-2338)	2256 (2199-2314)	2331 (2256-2406)	.19	2249 (2208-2290)	2304 (2274-2334)	2365 (2334-2396)	<.001	.43
Calcium, mg/d	945 (880-1010)	1025 (978-1071)	1073 (1018-1129)	.003	888 (859-917)	1016 (987-1044)	1066 (1034-1098)	<.001	880 (825-935)	1008 (973-1044)	1096 (1046-1146)	<.001	962 (936-987)	1073 (1056-1090)	1118 (1089-1147)	<.001	.33

Abbreviation: NHANES, National Health and Nutrition Examination Survey.

[a] Data were weighted to be nationally representative. All analyses (except for macronutrients) were energy-adjusted to 2000 kcal/d using the residual method. Macronutrients were reported as % of total energy.

[b] Cooked fish and shellfish containing 500 mg or more of omega-3 fatty acids (EPA and DHA) per 3 ounces were included in the high omgega-3 fatty acids category.

[c] Serving of sugar-sweetened beverage defined as 8 fl oz or 237 grams. Sugar-sweetened beverages include soft drinks, fruit drinks, sports drinks, presweetened teas and energy drinks with more than 50 kcal per 8 fl oz.

P for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted linear regression model. *P* for interaction was calculated using the Wald F test for an interaction term between survey-cycle and the categorical variable (household food security status).

eTable 19. Trends in Estimated Mean Consumption of Food Groups and Nutrients of Interest by Participation of Supplemental Nutrition Assistance Program (SNAP) Among US Children by NHANES Survey Cycles, 1999-2004, 2005-2010 and 2011-2014[a]

Foods/nutrients	SNAP Participants				SNAP Non-Participants				
	1999-2004 (n=2,549)	2005-2010 (n=2,964)	2011-2014 (n=2,305)	*P* for trend	1999-2004 (n=9,397)	2005-2010 (n=7,454)	2011-2014 (n=3,850)	*P* for trend	*P* for interaction
Total fruits, servings/d	1.08 (0.97-1.19)	1.13 (1.06-1.20)	1.02 (0.94-1.10)	.35	1.04 (0.98-1.09)	1.12 (1.06-1.18)	1.12 (1.07-1.18)	.02	.02
Intact/whole fruit	0.42 (0.36-0.49)	0.60 (0.55-0.65)	0.58 (0.52-0.63)	.001	0.48 (0.45-0.51)	0.67 (0.62-0.72)	0.73 (0.68-0.78)	<.001	.03
100% fruit juice	0.75 (0.67-0.84)	0.66 (0.61-0.72)	0.57 (0.50-0.64)	.001	0.62 (0.58-0.65)	0.54 (0.50-0.58)	0.48 (0.44-0.52)	<.001	.42
Total vegetables, servings/d	1.05 (1.00-1.10)	0.96 (0.90-1.01)	0.95 (0.90-1.01)	.02	1.03 (1.00-1.06)	0.99 (0.96-1.02)	0.97 (0.95-1.00)	.01	.44
Dark-green vegetables	0.04 (0.02-0.06)	0.04 (0.03-0.05)	0.06 (0.04-0.07)	.25	0.04 (0.03-0.04)	0.05 (0.04-0.06)	0.06 (0.05-0.07)	<.001	.26
Tomatoes	0.24 (0.22-0.27)	0.23 (0.22-0.24)	0.23 (0.21-0.24)	.33	0.28 (0.26-0.29)	0.23 (0.22-0.25)	0.22 (0.21-0.22)	<.001	.001
Other red/orange vegetables	0.05 (0.03-0.06)	0.04 (0.03-0.05)	0.05 (0.04-0.06)	.76	0.05 (0.04-0.06)	0.06 (0.05-0.06)	0.06 (0.06-0.07)	.002	.32
White potatoes	0.36 (0.33-0.40)	0.33 (0.31-0.35)	0.28 (0.26-0.31)	<.001	0.34 (0.32-0.35)	0.29 (0.28-0.31)	0.29 (0.27-0.31)	<.001	.14
Other starchy (e.g., corn)	0.08 (0.06-0.09)	0.06 (0.05-0.07)	0.07 (0.06-0.08)	.32	0.06 (0.05-0.07)	0.06 (0.06-0.07)	0.05 (0.05-0.06)	.39	.62
Other vegetables	0.25 (0.23-0.27)	0.23 (0.21-0.25)	0.23 (0.21-0.26)	.29	0.27 (0.25-0.29)	0.27 (0.25-0.29)	0.26 (0.24-0.27)	.19	.89
Vegetables excluding potatoes/starchy	0.59 (0.54-0.63)	0.54 (0.51-0.58)	0.57 (0.52-0.62)	.67	0.63 (0.61-0.65)	0.61 (0.58-0.64)	0.60 (0.58-0.62)	.06	.64
Total grains, servings/d									
Whole grains	0.40 (0.35-0.46)	0.52 (0.47-0.57)	0.77 (0.70-0.84)	<.001	0.51 (0.48-0.54)	0.62 (0.58-0.66)	0.91 (0.86-0.96)	<.001	.67
Refined grains	6.15 (5.96-6.34)	6.05 (5.92-6.18)	6.21 (6.09-6.33)	.52	6.27 (6.16-6.38)	6.17 (6.08-6.27)	6.22 (6.14-6.31)	.49	.31
Nuts and seeds, servings/d	0.25 (0.20-0.30)	0.25 (0.22-0.28)	0.24 (0.19-0.28)	.78	0.35 (0.31-0.39)	0.39 (0.35-0.43)	0.41 (0.37-0.45)	.03	.11
Legumes, servings/d	0.07 (0.05-0.09)	0.06 (0.05-0.08)	0.09 (0.08-0.11)	.04	0.06 (0.05-0.07)	0.06 (0.05-0.07)	0.07 (0.06-0.08)	.18	.18
Total meat, serving/d									
Processed meat	0.27 (0.24-0.29)	0.27 (0.24-0.29)	0.25 (0.23-0.27)	.25	0.24 (0.22-0.26)	0.25 (0.23-0.26)	0.26 (0.25-0.28)	.06	.04
Unprocessed red meat	0.34 (0.30-0.38)	0.34 (0.31-0.36)	0.32 (0.29-0.34)	.30	0.35 (0.33-0.38)	0.33 (0.31-0.35)	0.31 (0.29-0.33)	.01	.56
Poultry	0.32 (0.28-0.36)	0.37 (0.35-0.40)	0.37 (0.34-0.41)	.05	0.29 (0.27-0.31)	0.37 (0.35-0.39)	0.37 (0.34-0.39)	<.001	.51
Fish and Shellfish	0.06 (0.05-0.08)	0.06 (0.05-0.07)	0.09 (0.05-0.12)	.26	0.06 (0.05-0.07)	0.07 (0.06-0.08)	0.07 (0.06-0.08)	.58	.37
High in omega-3 fatty acids[b]	0.01 (0.007-0.02)	0.008 (0.005-0.01)	0.01 (0.006-0.01)	.55	0.01 (0.01-0.02)	0.02 (0.01-0.02)	0.01 (0.01-0.02)	.38	.30
Low in omega-3 fatty acids[b]	0.05 (0.04-0.07)	0.05 (0.04-0.06)	0.08 (0.04-0.11)	.20	0.05 (0.04-0.06)	0.05 (0.04-0.06)	0.05 (0.04-0.06)	.71	.26
Eggs, servings/d	0.30 (0.26-0.35)	0.36 (0.32-0.40)	0.36 (0.32-0.39)	.09	0.28 (0.26-0.29)	0.36 (0.34-0.38)	0.37 (0.35-0.39)	<.001	.14
Total dairy, servings/d	2.10 (1.98-2.22)	2.19 (2.10-2.28)	2.24 (2.15-2.34)	.06	2.14 (2.07-2.22)	2.28 (2.23-2.32)	2.26 (2.18-2.34)	.03	.78
Milk	1.47 (1.36-1.57)	1.40 (1.32-1.48)	1.30 (1.22-1.38)	.01	1.44 (1.38-1.51)	1.44 (1.40-1.49)	1.28 (1.22-1.34)	<.001	.99
Cheese	0.55 (0.50-0.61)	0.67 (0.64-0.70)	0.80 (0.75-0.84)	<.001	0.61 (0.58-0.64)	0.70 (0.67-0.73)	0.81 (0.78-0.84)	<.001	.22
Yogurt	0.02 (0.01-0.02)	0.03 (0.02-0.04)	0.04 (0.03-0.05)	<.001	0.04 (0.04-0.05)	0.05 (0.05-0.06)	0.07 (0.06-0.08)	<.001	.71
Sugar-sweetened beverages[c], servings/d	1.79 (1.66-1.92)	1.63 (1.51-1.75)	1.37 (1.22-1.53)	<.001	1.93 (1.83-2.02)	1.44 (1.37-1.52)	1.13 (1.05-1.20)	<.001	.001
Added sugar, g/d	96.2 (91.1-101)	87.4 (84.8-89.9)	81.1 (76.9-84.8)	<.001	98.3 (95.3-101)	83.6 (81.5-85.3)	74.3 (72.7-76.0)	<.001	.01
Macronutrients									
Total fat, %Energy (E)	32.9 (32.2-33.6)	32.9 (32.5-33.3)	32.9 (32.5-33.3)	.98	32.3 (31.9-32.6)	32.9 (32.6-33.1)	33.5 (33.2-33.8)	<.001	.01
Saturated fat, %E	11.7 (11.4-12.0)	11.6 (11.4-11.7)	11.3 (11.1-11.5)	.05	11.4 (11.2-11.6)	11.6 (11.5-11.7)	11.7 (11.6-11.9)	.009	.003

Monounsaturated fat, %E	15.3 (14.7-15.9)	14.7 (14.2-15.3)	14.3 (13.9-14.7)	.006	14.0 (13.6-14.3)	14.1 (13.8-14.4)	14.1 (13.8-14.4)	.60	.004
Polyunsaturated fat, %E	6.18 (5.99-6.37)	6.58 (6.45-6.71)	7.46 (7.28-7.64)	<.001	6.18 (6.09-6.27)	6.60 (6.50-6.70)	7.42 (7.32-7.52)	<.001	.70
Seafood omega-3 fat, mg/d	58.3 (47.9-68.8)	49.8 (41.9-57.7)	51.6 (33.7-69.6)	.56	54.1 (48.4-59.9)	59.7 (49.8-69.6)	42.3 (38.0-46.6)	.002	.62
Plant omega-3 fat, mg/d	122 (118-126)	120 (117-123)	146 (141-152)	<.001	117 (114-119)	121 (118-123)	144 (142-146)	<.001	.71
Protein, %E	13.8 (13.5-14.2)	14.3 (14.1-14.5)	14.6 (14.4-14.9)	<.001	13.8 (13.6-14.0)	14.6 (14.5-14.8)	14.9 (14.7-15.1)	<.001	.19
Carbohydrate, %E	54.3 (53.5-55.2)	53.8 (53.3-54.3)	53.6 (53.1-54.0)	.11	54.9 (54.5-55.3)	53.5 (53.2-53.8)	52.7 (52.3-53.1)	<.001	.01
Other nutrients									
Sodium, mg/d	3235 (3155-3315)	3283 (3237-3329)	3333 (3278-3389)	.04	3154 (3123-3184)	3293 (3258-3328)	3313 (3267-3360)	<.001	.24
Cholesterol, mg/d	238 (228-249)	241 (231-251)	240 (231-249)	.80	220 (216-225)	234 (229-240)	244 (237-250)	<.001	.01
Fiber, g/d	12.2 (11.7-12.7)	13.3 (12.9-13.7)	14.9 (14.5-15.4)	<.001	12.5 (12.2-12.7)	13.9 (13.6-14.2)	15.4 (15.1-15.6)	<.001	.70
Potassium, mg/d	2266 (2207-2325)	2266 (2221-2310)	2313 (2274-2352)	.17	2257 (2216-2297)	2306 (2280-2332)	2340 (2314-2365)	.001	.38
Calcium, mg/d	916 (881-951)	1022 (996-1048)	1070 (1042-1098)	<.001	950 (926-974)	1065 (1049-1081)	1093 (1068-1118)	<.001	.77

Abbreviation: NHANES, National Health and Nutrition Examination Survey.

[a] Data were weighted to be nationally representative. All analyses (except for macronutrients) were energy-adjusted to 2000 kcal/d using the residual method. Macronutrients were reported as % of total energy.

[b] Cooked fish and shellfish containing 500 mg or more of omega-3 fatty acids (EPA and DHA) per 3 ounces were included in the high omgega-3 fatty acids category.

[c] Serving of sugar-sweetened beverage defined as 8 fl oz or 237 grams. Sugar-sweetened beverages include soft drinks, fruit drinks, sports drinks, presweetened teas and energy drinks with more than 50 kcal per 8 fl oz.

P for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted linear regression model. *P* for interaction was calculated using the Wald F test for an interaction term between survey-cycle and the indicator variable (participation of SNAP).

eTable 20. Trends in Estimated Mean Consumption of Food Groups and Nutrients of Interest by Participation of Women, Infants, & Children (WIC) Nutrition Program Among US Children by NHANES Survey Cycles, 1999-2004, 2005-2010 and 2011-2014[a]

Foods/nutrients	WIC Participants				WIC Non-Participants				
	1999-2004 (n=2,421)	2005-2010 (n=2,297)	2011-2014 (n=1,341)	*P* for trend	1999-2004 (n=9,525)	2005-2010 (n=8,121)	2011-2014 (n=4,814)	*P* for trend	*P* for interaction
Total fruits, servings/d	1.30 (1.18-1.43)	1.35 (1.28-1.43)	1.25 (1.14-1.36)	.56	1.00 (0.94-1.05)	1.08 (1.03-1.14)	1.09 (1.03-1.14)	.02	.10
Intact/whole fruit	0.53 (0.46-0.61)	0.67 (0.62-0.72)	0.69 (0.63-0.74)	<.001	0.46 (0.42-0.50)	0.65 (0.60-0.70)	0.70 (0.65-0.75)	<.001	.22
100% fruit juice	0.94 (0.84-1.03)	0.87 (0.81-0.93)	0.72 (0.62-0.82)	.003	0.59 (0.56-0.63)	0.51 (0.48-0.55)	0.47 (0.43-0.51)	<.001	.21
Total vegetables, servings/d	1.02 (0.95-1.08)	0.93 (0.89-0.97)	0.91 (0.85-0.98)	.02	1.04 (1.00-1.07)	0.99 (0.96-1.02)	0.98 (0.95-1.00)	.008	.33
Dark-green vegetables	0.02 (0.01-0.03)	0.03 (0.02-0.04)	0.05 (0.03-0.07)	.04	0.04 (0.03-0.04)	0.05 (0.04-0.06)	0.06 (0.05-0.07)	<.001	.77
Tomatoes	0.26 (0.24-0.29)	0.23 (0.22-0.25)	0.24 (0.22-0.25)	.10	0.27 (0.26-0.28)	0.23 (0.22-0.24)	0.22 (0.21-0.22)	<.001	.14
Other red/orange vegetables	0.04 (0.03-0.05)	0.05 (0.04-0.05)	0.05 (0.04-0.06)	.18	0.05 (0.04-0.06)	0.05 (0.05-0.06)	0.06 (0.06-0.07)	.01	.73
White potatoes	0.37 (0.33-0.41)	0.31 (0.28-0.33)	0.25 (0.22-0.28)	<.001	0.34 (0.32-0.36)	0.30 (0.28-0.32)	0.29 (0.28-0.31)	.001	.01
Other starchy (e.g., corn)	0.07 (0.06-0.08)	0.07 (0.06-0.08)	0.06 (0.05-0.07)	.09	0.06 (0.05-0.07)	0.06 (0.06-0.07)	0.06 (0.05-0.06)	.54	.23
Other vegetables	0.24 (0.21-0.26)	0.23 (0.21-0.24)	0.24 (0.21-0.27)	.87	0.27 (0.26-0.29)	0.27 (0.25-0.29)	0.25 (0.24-0.27)	.05	.22
Vegetables excluding potatoes/starchy	0.56 (0.51-0.61)	0.53 (0.50-0.56)	0.57 (0.53-0.62)	.83	0.63 (0.61-0.66)	0.61 (0.58-0.63)	0.60 (0.58-0.62)	.02	.23
Total grains, servings/d									
Whole grains	0.42 (0.35-0.49)	0.52 (0.47-0.56)	0.84 (0.76-0.93)	<.001	0.51 (0.48-0.54)	0.61 (0.57-0.65)	0.89 (0.84-0.93)	<.001	.60
Refined grains	6.18 (5.93-6.42)	5.97 (5.83-6.11)	6.11 (5.90-6.31)	.58	6.26 (6.16-6.37)	6.18 (6.09-6.27)	6.24 (6.16-6.31)	.69	.71
Nuts and seeds, servings/d	0.22 (0.17-0.27)	0.22 (0.19-0.25)	0.24 (0.18-0.29)	.67	0.35 (0.31-0.39)	0.39 (0.35-0.42)	0.39 (0.36-0.43)	.14	.59
Legumes, servings/d	0.09 (0.07-0.11)	0.09 (0.08-0.11)	0.12 (0.09-0.15)	.11	0.06 (0.05-0.07)	0.06 (0.05-0.06)	0.07 (0.06-0.07)	.06	.34
Total meat, serving/d									
Processed meat	0.23 (0.20-0.26)	0.23 (0.21-0.25)	0.23 (0.20-0.26)	.93	0.25 (0.23-0.26)	0.25 (0.24-0.27)	0.26 (0.25-0.28)	.12	.48
Unprocessed red meat	0.38 (0.31-0.44)	0.30 (0.28-0.33)	0.31 (0.26-0.35)	.07	0.35 (0.32-0.37)	0.34 (0.32-0.36)	0.31 (0.29-0.33)	.03	.34
Poultry	0.29 (0.25-0.33)	0.38 (0.36-0.41)	0.39 (0.34-0.43)	.002	0.30 (0.28-0.32)	0.37 (0.35-0.39)	0.37 (0.34-0.39)	<.001	.31
Fish and Shellfish	0.07 (0.04-0.09)	0.06 (0.04-0.07)	0.06 (0.04-0.08)	.76	0.06 (0.05-0.07)	0.07 (0.06-0.08)	0.07 (0.06-0.09)	.27	.46
High in omega-3 fatty acids[b]	0.01 (0.004-0.02)	0.009 (0.006-0.01)	0.01 (0.008-0.02)	.88	0.01 (0.01-0.02)	0.01 (0.01-0.02)	0.01 (0.01-0.02)	.64	.97
Low in omega-3 fatty acids[b]	0.05 (0.03-0.07)	0.05 (0.04-0.06)	0.05 (0.03-0.06)	.66	0.05 (0.04-0.06)	0.05 (0.04-0.06)	0.06 (0.05-0.07)	.26	.36
Eggs, servings/d	0.38 (0.31-0.44)	0.40 (0.36-0.44)	0.38 (0.33-0.44)	.87	0.26 (0.25-0.28)	0.36 (0.33-0.38)	0.37 (0.35-0.39)	<.001	.03
Total dairy, servings/d	2.14 (2.00-2.28)	2.41 (2.30-2.52)	2.38 (2.27-2.49)	.007	2.13 (2.06-2.20)	2.23 (2.18-2.28)	2.24 (2.16-2.32)	.04	.12
Milk	1.50 (1.38-1.62)	1.60 (1.50-1.69)	1.44 (1.32-1.55)	.56	1.44 (1.38-1.50)	1.40 (1.36-1.45)	1.26 (1.21-1.32)	<.001	.12
Cheese	0.53 (0.48-0.57)	0.62 (0.59-0.66)	0.75 (0.67-0.83)	<.001	0.62 (0.59-0.65)	0.71 (0.68-0.73)	0.82 (0.78-0.85)	<.001	.58
Yogurt	0.03 (0.02-0.03)	0.05 (0.04-0.05)	0.06 (0.04-0.07)	<.001	0.04 (0.03-0.05)	0.05 (0.04-0.05)	0.07 (0.06-0.07)	<.001	.48
Sugar-sweetened beverages[c], servings/d	1.67 (1.53-1.81)	1.35 (1.24-1.46)	1.18 (1.00-1.35)	<.001	1.94 (1.85-2.04)	1.50 (1.42-1.59)	1.17 (1.11-1.24)	<.001	.02
Added sugar, g/d	90.3 (86.1-94.1)	80.2 (77.7-83.2)	71.8 (66.4-77.3)	<.001	99.1 (96.2-102)	84.8 (82.7-86.9)	76.0 (74.8-77.3)	<.001	.16
Macronutrients									
Total fat, %Energy (E)	32.3 (31.8-32.9)	32.2 (31.8-32.6)	32.3 (31.5-33.1)	.89	32.4 (32.0-32.7)	33.0 (32.8-33.2)	33.5 (33.2-33.8)	<.001	.03
Saturated fat, %E	11.6 (11.3-11.9)	11.4 (11.3-11.6)	11.3 (10.9-11.7)	.22	11.4 (11.3-11.6)	11.6 (11.5-11.7)	11.7 (11.5-11.8)	.02	.03
Monounsaturated fat, %E	15.4 (14.7-16.0)	14.8 (14.4-15.1)	14.3 (13.6-14.9)	.02	14.0 (13.7-14.4)	14.2 (13.9-14.4)	14.1 (13.8-14.4)	.58	.01

Polyunsaturated fat, %E	6.03 (5.87-6.20)	6.38 (6.27-6.50)	7.09 (6.87-7.31)	<.001	6.21 (6.11-6.31)	6.63 (6.54-6.73)	7.47 (7.38-7.56)	<.001	.16
Seafood omega-3 fat, mg/d	49.0 (38.1-60.0)	56.8 (46.9-66.6)	36.8 (31.1-42.4)	.10	55.8 (49.9-61.7)	57.8 (48.4-67.2)	45.0 (39.4-50.7)	.009	.99
Plant omega-3 fat, mg/d	119 (116-122)	119 (116-121)	141 (136-147)	<.001	117 (115-120)	121 (118-123)	145 (143-147)	<.001	.09
Protein, %E	14.1 (13.7-14.4)	14.6 (14.3-14.8)	14.9 (14.6-15.3)	.001	13.8 (13.6-13.9)	14.6 (14.4-14.7)	14.8 (14.7-15.0)	<.001	.49
Carbohydrate, %E	54.8 (54.1-55.4)	54.3 (53.8-54.8)	53.9 (52.9-54.9)	.14	54.8 (54.4-55.2)	53.5 (53.1-53.8)	52.8 (52.4-53.1)	<.001	.07
Other nutrients									
Sodium, mg/d	3177 (3114-3239)	3194 (3135-3254)	3408 (3139-3677)	.10	3166 (3132-3199)	3307 (3273-3341)	3306 (3276-3337)	<.001	.54
Cholesterol, mg/d	256 (242-270)	251 (241-262)	248 (233-263)	.45	218 (213-222)	233 (228-238)	243 (237-248)	<.001	.004
Fiber, g/d	12.6 (12.1-13.2)	14.0 (13.6-14.3)	15.6 (15.0-16.3)	<.001	12.4 (12.1-12.6)	13.8 (13.5-14.0)	15.3 (15.0-15.5)	<.001	.87
Potassium, mg/d	2377 (2288-2467)	2422 (2381-2464)	2449 (2392-2506)	.19	2237 (2199-2276)	2277 (2249-2304)	2320 (2295-2345)	<.001	.85
Calcium, mg/d	932 (894-970)	1087 (1060-1114)	1114 (1079-1148)	<.001	947 (924-969)	1051 (1034-1068)	1086 (1062-1110)	<.001	.07

Abbreviation: NHANES, National Health and Nutrition Examination Survey.

[a] Data were weighted to be nationally representative. All analyses (except for macronutrients) were energy-adjusted to 2000 kcal/d using the residual method. Macronutrients were reported as % of total energy.

[b] Cooked fish and shellfish containing 500 mg or more of omega-3 fatty acids (EPA and DHA) per 3 ounces were included in the high omgega-3 fatty acids category.

[c] Serving of sugar-sweetened beverage defined as 8 fl oz or 237 grams. Sugar-sweetened beverages include soft drinks, fruit drinks, sports drinks, presweetened teas and energy drinks with more than 50 kcal per 8 fl oz.

[d] *P* for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted linear regression model. *P* for interaction was calculated using the Wald F test for an interaction term between survey-cycle and the indicator variable (participation of WIC).

eTable 21. Trends in Estimated Mean Consumption of Food Groups and Nutrients of Interest by Participation of National School Lunch Program (NSLP)/ School Breakfast Program (SBP) Among US Children by NHANES Survey Cycles, 1999-2004, 2005-2010 and 2011-2016[a]

Foods/nutrients	NSLP/SBP Participants				NSLP/ SBP Non-Participants				
	1999-2004 (n=4,569)	2005-2010 (n=4,185)	2011-2016 (n=4,115)	*P* for trend	1999-2004 (n=7,377)	2005-2010 (n=6,233)	2011-2016 (n=4,941)	*P* for trend	*P* for interaction
Total fruits, servings/d	0.99 (0.92-1.07)	1.05 (1.00-1.11)	0.98 (0.92-1.04)	.66	1.06 (1.00-1.12)	1.15 (1.09-1.21)	1.18 (1.12-1.23)	.008	.01
Intact/whole fruit	0.44 (0.40-0.48)	0.58 (0.54-0.61)	0.59 (0.55-0.63)	<.001	0.48 (0.44-0.52)	0.68 (0.63-0.74)	0.75 (0.70-0.81)	<.001	.005
100% fruit juice	0.60 (0.55-0.65)	0.56 (0.51-0.60)	0.46 (0.42-0.49)	<.001	0.66 (0.62-0.70)	0.57 (0.53-0.61)	0.52 (0.47-0.56)	<.001	.51
Total vegetables, servings/d	1.09 (1.04-1.15)	0.97 (0.92-1.01)	0.97 (0.93-1.01)	<.001	1.01 (0.98-1.04)	0.99 (0.96-1.02)	0.97 (0.94-1.00)	.08	.04
Dark-green vegetables	0.03 (0.02-0.04)	0.04 (0.04-0.05)	0.05 (0.04-0.06)	.02	0.04 (0.03-0.04)	0.05 (0.04-0.06)	0.07 (0.06-0.08)	<.001	.29
Tomatoes	0.28 (0.26-0.30)	0.23 (0.21-0.25)	0.24 (0.22-0.25)	.003	0.27 (0.25-0.28)	0.23 (0.22-0.25)	0.21 (0.20-0.22)	<.001	.23
Other red/orange vegetables	0.05 (0.04-0.06)	0.04 (0.03-0.05)	0.05 (0.04-0.06)	.89	0.05 (0.04-0.06)	0.06 (0.05-0.06)	0.07 (0.06-0.08)	<.001	.02
White potatoes	0.38 (0.34-0.42)	0.32 (0.30-0.34)	0.29 (0.27-0.31)	.001	0.33 (0.31-0.34)	0.29 (0.27-0.31)	0.29 (0.27-0.31)	.01	.06
Other starchy (e.g., corn)	0.07 (0.06-0.08)	0.06 (0.06-0.07)	0.06 (0.05-0.06)	.12	0.06 (0.05-0.07)	0.06 (0.06-0.07)	0.06 (0.05-0.06)	.62	.40
Other vegetables	0.27 (0.25-0.29)	0.25 (0.22-0.27)	0.25 (0.24-0.27)	.41	0.27 (0.25-0.28)	0.27 (0.25-0.29)	0.25 (0.23-0.27)	.12	.71
Vegetables excluding potatoes/starchy	0.63 (0.60-0.66)	0.56 (0.52-0.60)	0.60 (0.56-0.63)	.18	0.62 (0.60-0.64)	0.61 (0.58-0.64)	0.59 (0.57-0.62)	.11	.84
Total grains, servings/d									
Whole grains	0.39 (0.34-0.43)	0.50 (0.47-0.53)	0.80 (0.76-0.84)	<.001	0.53 (0.50-0.57)	0.64 (0.59-0.69)	0.93 (0.87-0.98)	<.001	.43
Refined grains	6.36 (6.18-6.53)	6.32 (6.21-6.42)	6.46 (6.35-6.58)	.25	6.21 (6.11-6.32)	6.08 (5.98-6.18)	6.09 (5.99-6.18)	.16	.06
Nuts and seeds, servings/d	0.24 (0.20-0.29)	0.25 (0.21-0.28)	0.22 (0.20-0.25)	.51	0.37 (0.32-0.41)	0.41 (0.37-0.45)	0.46 (0.42-0.51)	.03	.03
Legumes, servings/d	0.08 (0.07-0.09)	0.08 (0.06-0.09)	0.09 (0.08-0.11)	.12	0.05 (0.05-0.06)	0.05 (0.05-0.06)	0.06 (0.06-0.07)	.22	.41
Total meat, serving/d									
Processed meat	0.26 (0.23-0.28)	0.25 (0.24-0.27)	0.25 (0.24-0.27)	.56	0.24 (0.22-0.26)	0.25 (0.23-0.27)	0.27 (0.25-0.29)	.046	.06
Unprocessed red meat	0.38 (0.34-0.42)	0.35 (0.33-0.37)	0.35 (0.33-0.37)	.17	0.34 (0.32-0.36)	0.33 (0.30-0.35)	0.29 (0.27-0.31)	.002	.29
Poultry	0.32 (0.29-0.36)	0.41 (0.38-0.43)	0.40 (0.37-0.42)	.002	0.29 (0.27-0.31)	0.36 (0.33-0.38)	0.35 (0.32-0.38)	.001	.87
Fish and Shellfish	0.06 (0.05-0.08)	0.07 (0.06-0.08)	0.08 (0.06-0.10)	.27	0.06 (0.05-0.07)	0.06 (0.05-0.08)	0.07 (0.05-0.08)	.82	.82
High in omega-3 fatty acids[b]	0.01 (0.009-0.01)	0.01 (0.007-0.01)	0.01 (0.008-0.01)	.96	0.01 (0.01-0.02)	0.02 (0.01-0.02)	0.02 (0.01-0.02)	.47	.62
Low in omega-3 fatty acids[b]	0.05 (0.04-0.06)	0.06 (0.05-0.07)	0.07 (0.05-0.09)	.13	0.05 (0.04-0.06)	0.05 (0.04-0.06)	0.05 (0.04-0.06)	.94	.21
Eggs, servings/d	0.30 (0.26-0.34)	0.35 (0.32-0.39)	0.35 (0.33-0.37)	.05	0.27 (0.25-0.29)	0.37 (0.34-0.39)	0.38 (0.36-0.40)	<.001	.02
Total dairy, servings/d	2.03 (1.93-2.13)	2.15 (2.08-2.21)	2.20 (2.12-2.29)	.009	2.18 (2.10-2.25)	2.30 (2.25-2.36)	2.28 (2.20-2.37)	.05	.36
Milk	1.41 (1.32-1.50)	1.37 (1.31-1.43)	1.26 (1.19-1.34)	.01	1.46 (1.40-1.52)	1.46 (1.41-1.51)	1.29 (1.23-1.36)	<.001	.71
Cheese	0.57 (0.54-0.61)	0.67 (0.64-0.70)	0.82 (0.78-0.86)	<.001	0.62 (0.58-0.65)	0.70 (0.68-0.73)	0.80 (0.76-0.84)	<.001	.08
Yogurt	0.02 (0.01-0.02)	0.03 (0.02-0.03)	0.04 (0.04-0.05)	<.001	0.05 (0.04-0.06)	0.05 (0.05-0.06)	0.08 (0.07-0.09)	<.001	.26
Sugar-sweetened beverages[c], servings/d	1.86 (1.73-2.00)	1.55 (1.45-1.64)	1.30 (1.21-1.40)	<.001	1.92 (1.82-2.02)	1.45 (1.37-1.54)	1.10 (1.03-1.18)	<.001	.01
Added sugar, g/d	96.2 (92.4-100)	86.1 (83.2-88.6)	77.3 (74.8-79.4)	<.001	98.7 (95.8-102)	83.6 (81.5-85.7)	74.8 (73.1-76.4)	<.001	.04
Macronutrients									
Total fat, %Energy (E)	32.9 (32.4-33.4)	33.1 (32.8-33.5)	33.5 (33.2-33.8)	.05	32.1 (31.8-32.5)	32.8 (32.5-33.0)	33.3 (33.0-33.7)	<.001	.12
Saturated fat, %E	11.6 (11.4-11.8)	11.6 (11.4-11.7)	11.6 (11.5-11.8)	.80	11.4 (11.2-11.6)	11.6 (11.5-11.7)	11.6 (11.5-11.8)	.04	.19
Monounsaturated fat, %E	14.4 (13.9-15.0)	14.4 (14.1-14.8)	14.0 (13.6-14.5)	.25	14.1 (13.8-14.5)	14.2 (13.9-14.5)	14.2 (13.9-14.5)	.68	.19

Polyunsaturated fat, %E	6.29 (6.14-6.44)	6.73 (6.61-6.85)	7.50 (7.39-7.61)	<.001	6.14 (6.04-6.24)	6.54 (6.44-6.64)	7.39 (7.27-7.50)	<.001	.73
Seafood omega-3 fat, mg/d	58.6 (50.3-66.8)	57.5 (49.0-65.9)	45.2 (34.8-55.6)	.04	53.3 (47.3-59.4)	57.7 (48.3-67.1)	43.5 (38.4-48.7)	.02	.55
Plant omega-3 fat, mg/d	120 (117-123)	120 (118-123)	147 (143-150)	<.001	117 (114-119)	120 (118-123)	143 (141-146)	<.001	.78
Protein, %E	13.9 (13.6-14.2)	14.6 (14.4-14.8)	14.9 (14.8-15.1)	<.001	13.8 (13.6-13.9)	14.6 (14.4-14.7)	14.8 (14.6-15.0)	<.001	.95
Carbohydrate, %E	54.3 (53.8-54.8)	53.3 (52.9-53.8)	52.7 (52.3-53.0)	<.001	55.0 (54.6-55.5)	53.7 (53.3-54.0)	53.0 (52.6-53.4)	<.001	.37
Other nutrients									
Sodium, mg/d	3229 (3158-3301)	3305 (3271-3338)	3372 (3325-3419)	.006	3143 (3111-3174)	3285 (3249-3322)	3287 (3231-3343)	<.001	.69
Cholesterol, mg/d	236 (226-246)	243 (233-253)	246 (240-253)	.08	219 (214-223)	233 (226-239)	241 (235-248)	<.001	.07
Fiber, g/d	12.6 (12.2-13.0)	13.5 (13.3-13.8)	15.2 (14.9-15.5)	<.001	12.4 (12.1-12.6)	13.9 (13.6-14.1)	15.4 (15.1-15.6)	<.001	.15
Potassium, mg/d	2252 (2199-2305)	2248 (2214-2281)	2303 (2268-2338)	.09	2260 (2222-2299)	2317 (2288-2346)	2352 (2322-2382)	<.001	.31
Calcium, mg/d	903 (875-932)	1012 (991-1034)	1065 (1042-1087)	<.001	961 (937-984)	1074 (1056-1092)	1102 (1075-1130)	<.001	.44

Abbreviation: NHANES, National Health and Nutrition Examination Survey.

[a] Data were weighted to be nationally representative. All analyses (except for macronutrients) were energy-adjusted to 2000 kcal/d using the residual method. Macronutrients were reported as % of total energy.

[b] Cooked fish and shellfish containing 500 mg or more of omega-3 fatty acids (EPA and DHA) per 3 ounces were included in the high omgega-3 fatty acids category.

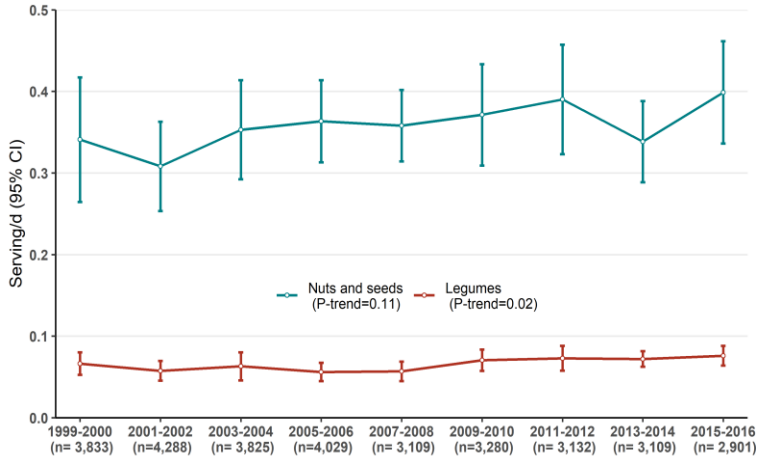
[c] Serving of sugar-sweetened beverage defined as 8 fl oz or 237 grams. Sugar-sweetened beverages include soft drinks, fruit drinks, sports drinks, presweetened teas and energy drinks with more than 50 kcal per 8 fl oz.

[d] *P* for trend was estimated by treating survey-cycle as a continuous variable in a survey-weighted linear regression model. *P* for interaction was calculated using the Wald F test for an interaction term between survey-cycle and the indicator variable (participation of NSLP/SBP).

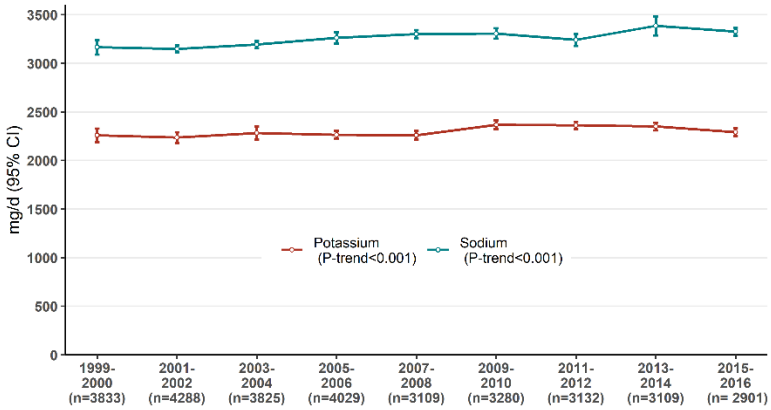
eFigure 1. Trends in Estimated Mean Consumption of Nuts/Seeds and Legumes (Panel A), Sodium and Potassium (Panel B), and Dietary Fat (Panel C) Among US Children Based on NHANES Data From 1999-2016

Data were weighted to be nationally representative. Values in Panels A-B are energy-adjusted to 2000 kcal/d using the residual method. PUMA=polyunsaturated fatty acid, MUFA=monounsaturated fatty acid, SFA=saturated fatty acid.

A.



B.



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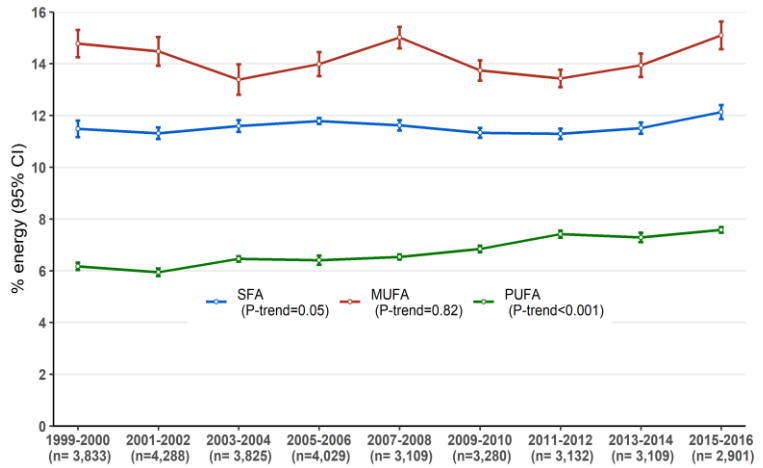
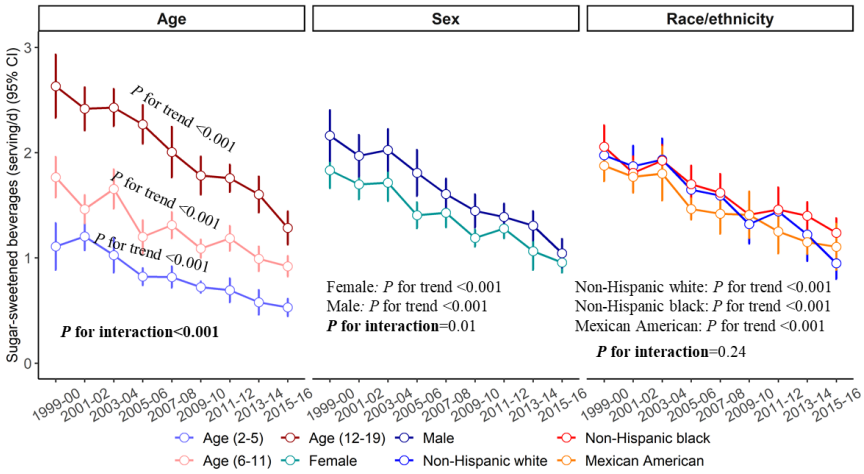


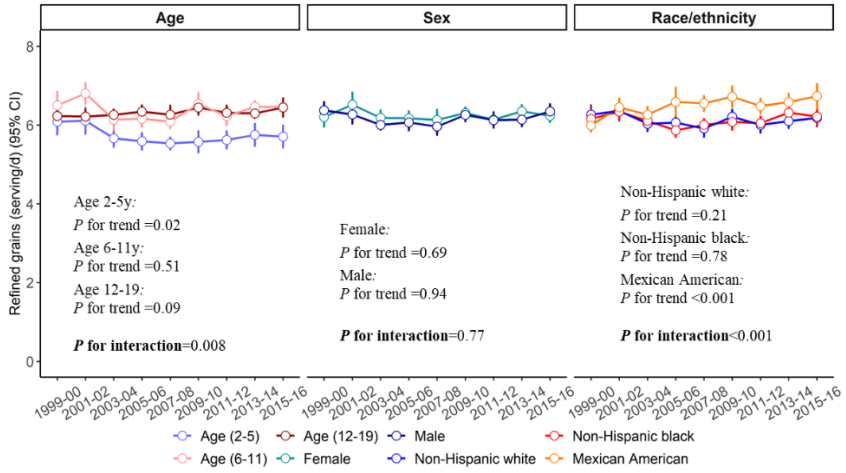
eFigure 2. Trends in Estimated Mean Consumption of Sugar-Sweetened Beverages (Panel A), Refined Grain (Panel B), White Potato (Panel C), Processed Meat (Panel D), Sodium (Panel E), and Fruit Juice (Panel F) by Age, Sex, and Race/Ethnicity Among US Children Based on NHANES Data From 1999-2016

Data were weighted to be nationally representative. Values in Panels A-F were energy-adjusted to 2000 kcal/d using the residual method.

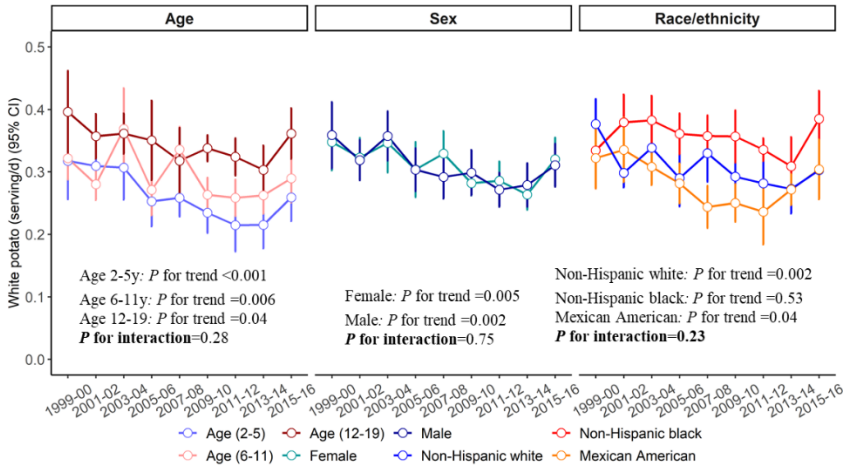
A. Sugar-sweetened beverages



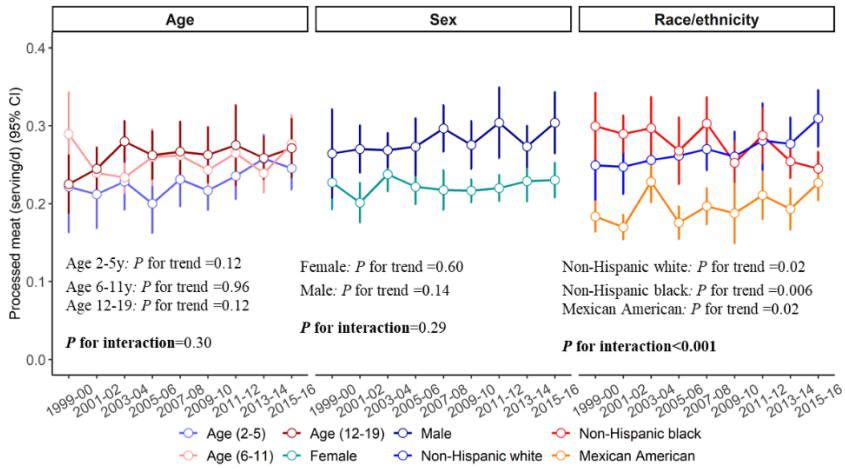
B. Refined grains



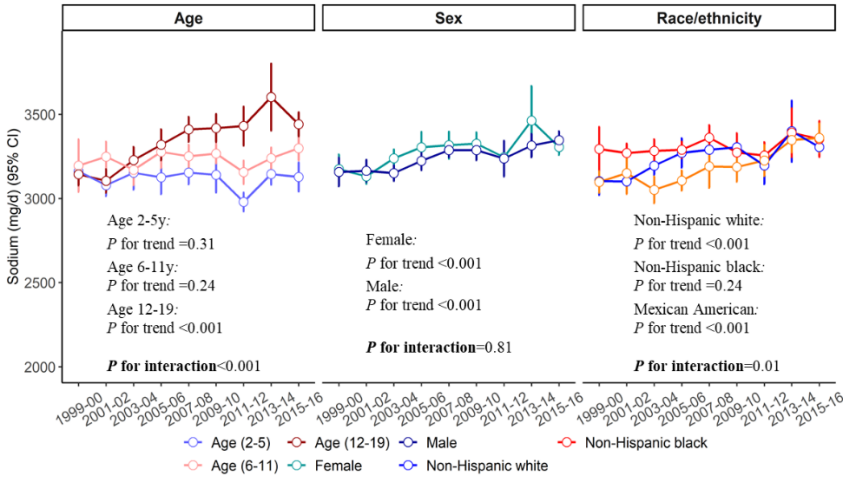
C. White potato



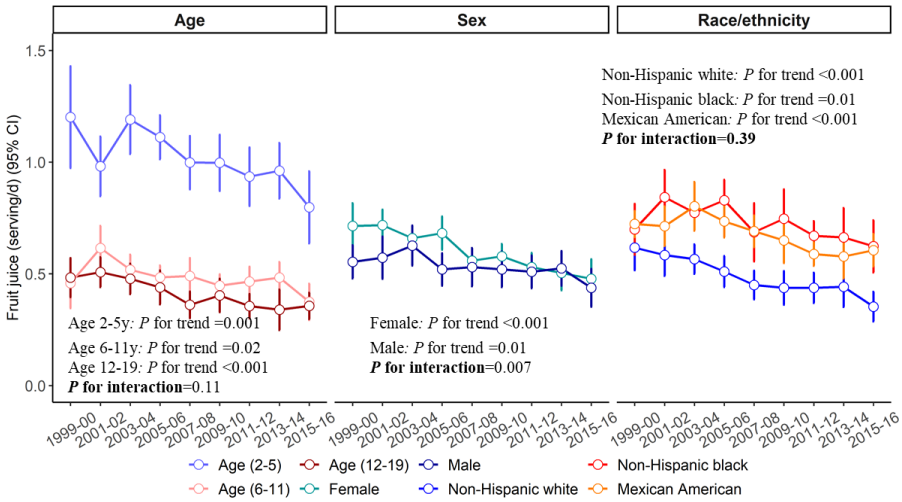
D. Processed meat



E. Sodium



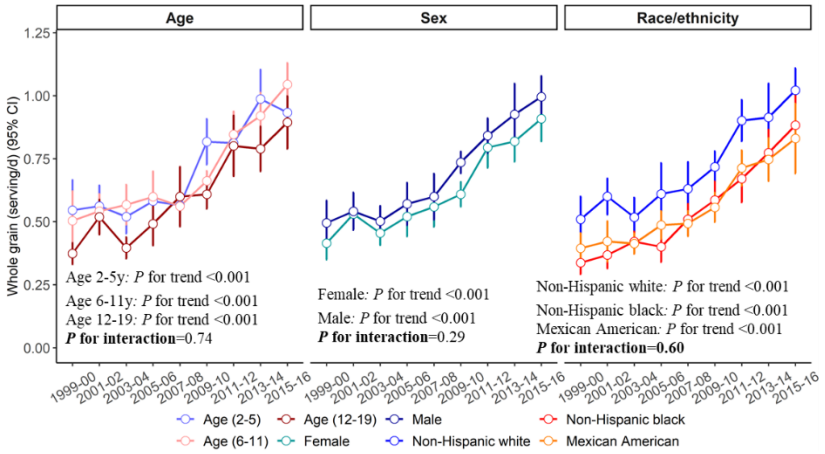
F. Fruit juice



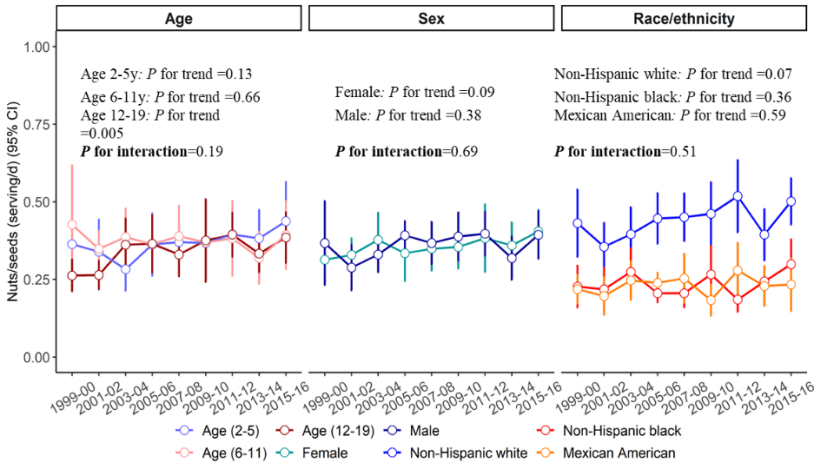
eFigure 3. Trends in Estimated Mean Consumption of Whole Grains (Panel A), Nuts/Seeds (Panel B), Whole Fruits (Panel C), and Seafoods (Panel D) by Age, Sex, and Race/ethnicity Among US Children Based on NHANES Data From 1999-2016

Data were weighted to be nationally representative. Values in Panels A-D were energy-adjusted to 2000 kcal/d using the residual method.

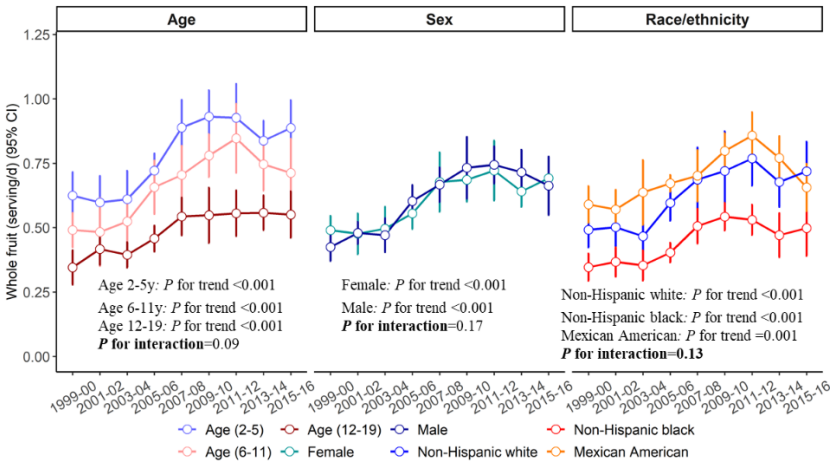
A. Whole grains



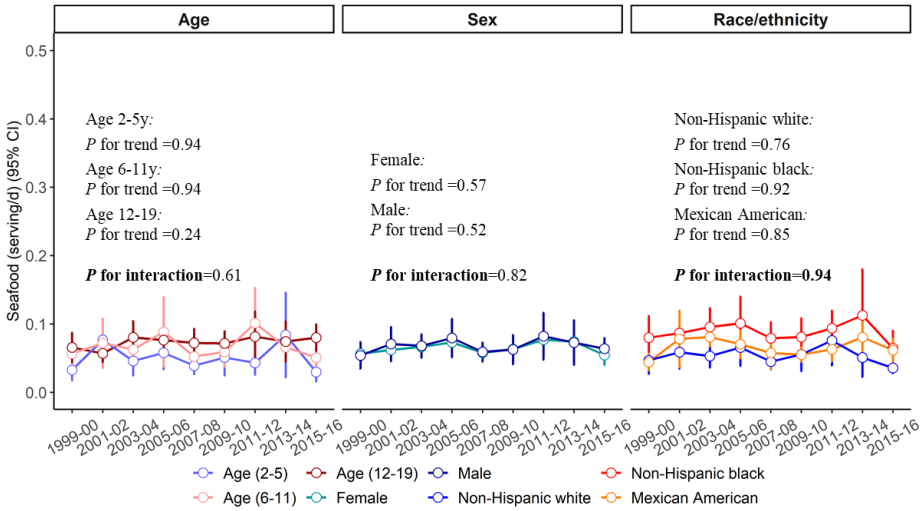
B. Nuts/seeds



C. Whole fruits



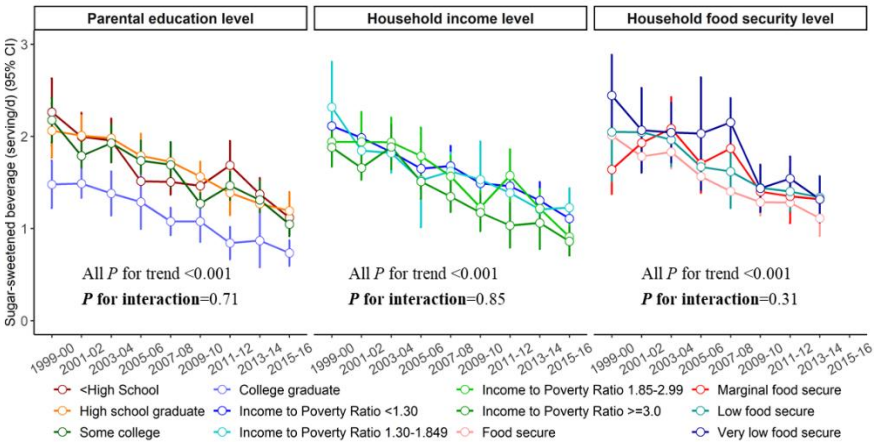
D. Seafoods



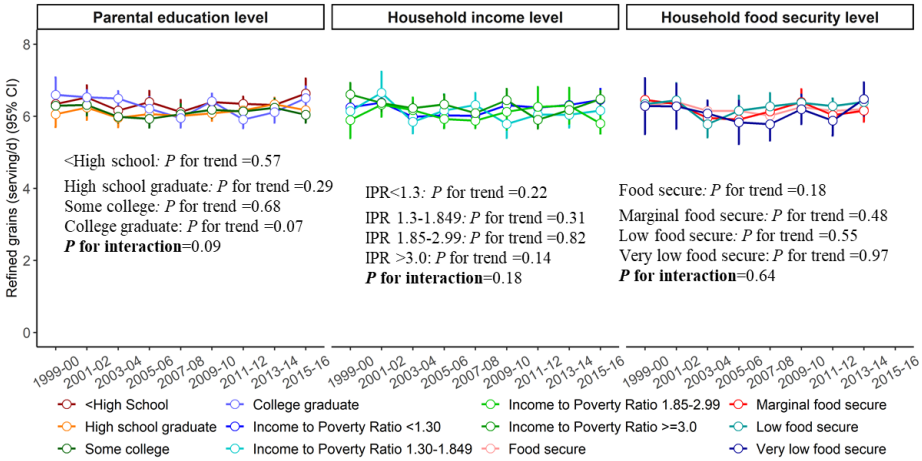
eFigure 4. Trends in Estimated Mean Consumption of Sugar-Sweetened Beverages (Panel A), Refined Grains (Panel B), White Potato (Panel C), Processed Meat (Panel D), Sodium (Panel E), and Fruit Juice (Panel F) by Parental Education Level, Household Income Level, and Household Food Security Level Among US Children Based on NHANES Data From 1999-2016

Data were weighted to be nationally representative. Values in Panels A-F were energy-adjusted to 2000 kcal/d using the residual method.

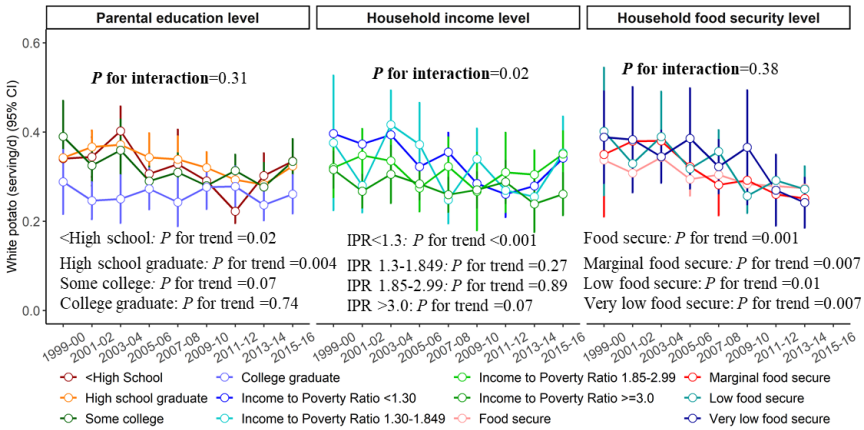
A. Sugar-sweetened beverages



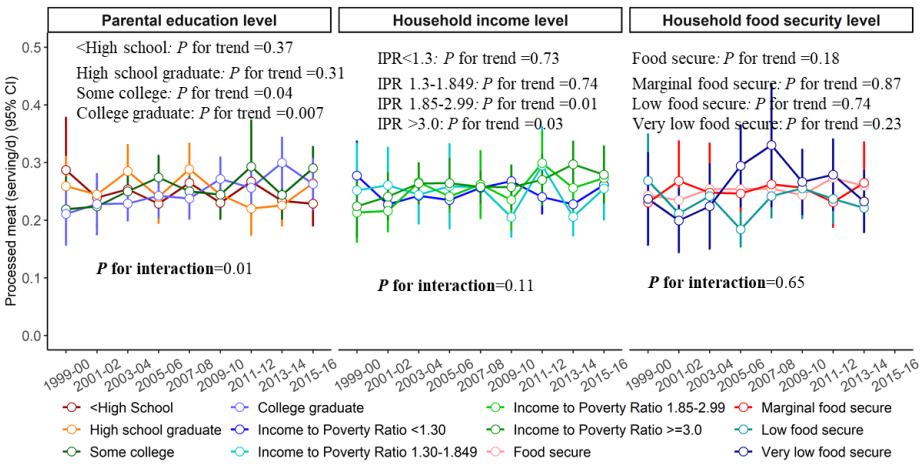
B. Refined grains



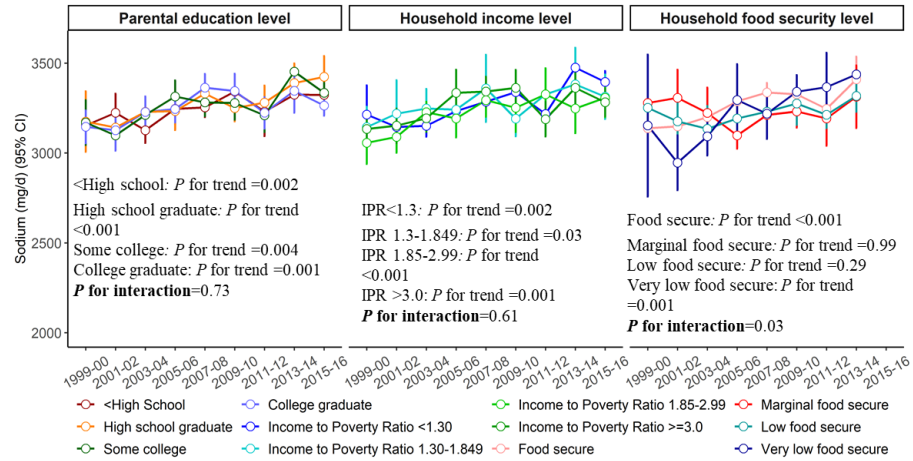
C. White potato



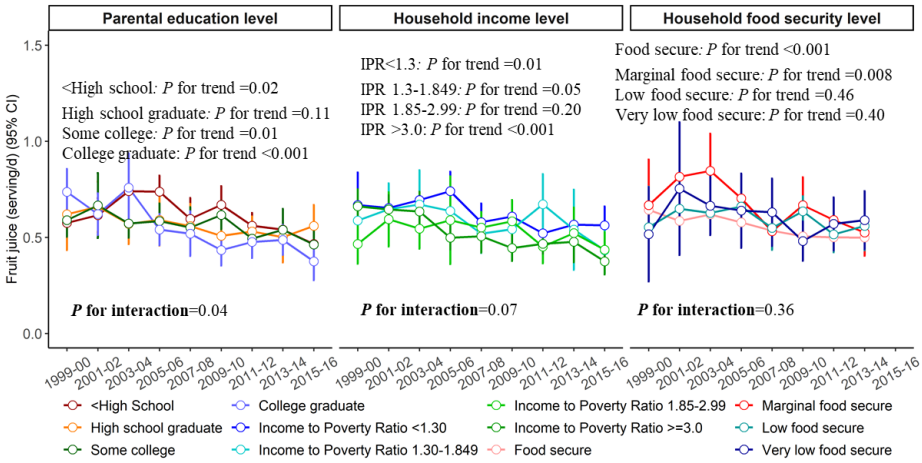
D. Processed meat



E. Sodium



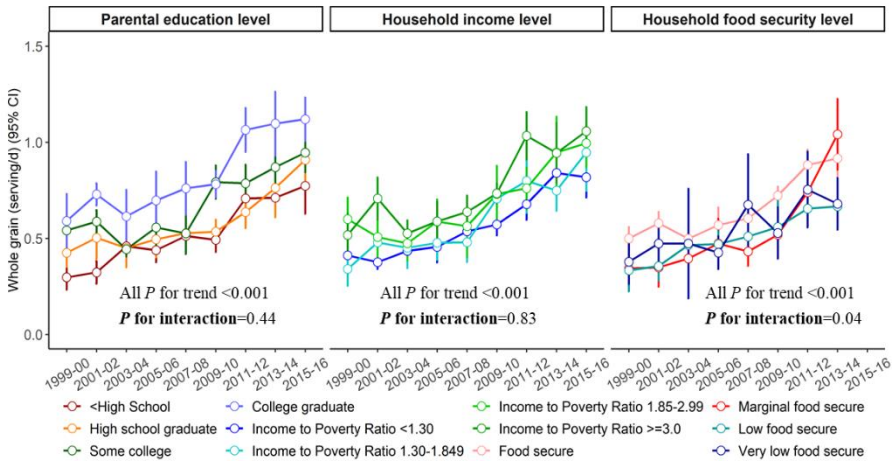
F. Fruit juice



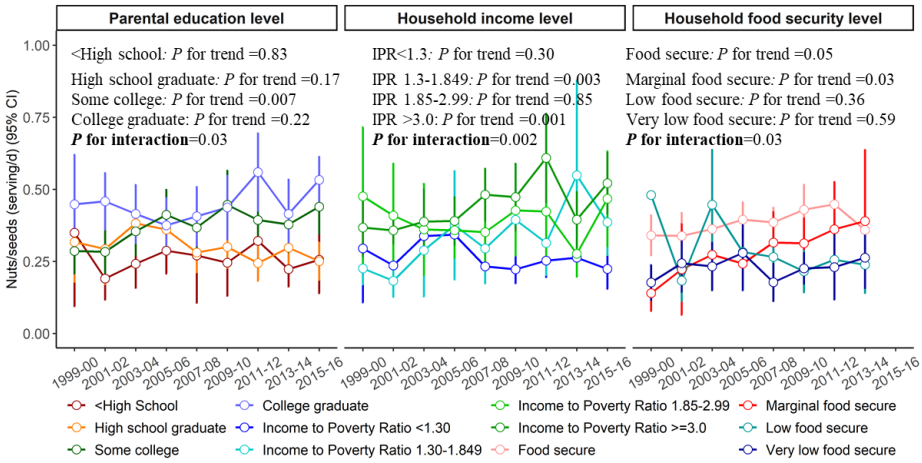
eFigure 5. Trends in Estimated Mean Consumption of Whole Grains (Panel A), Nuts/Seeds (Panel B), Whole Fruits (Panel C), and Seafoods (Panel D) by Parental Education Level, Household Income Level, and Household Food Security Level Among US Children Based on NHANES Data From 1999-2016

Data were weighted to be nationally representative. Values in Panels A-D were energy-adjusted to 2000 kcal/d using the residual method.

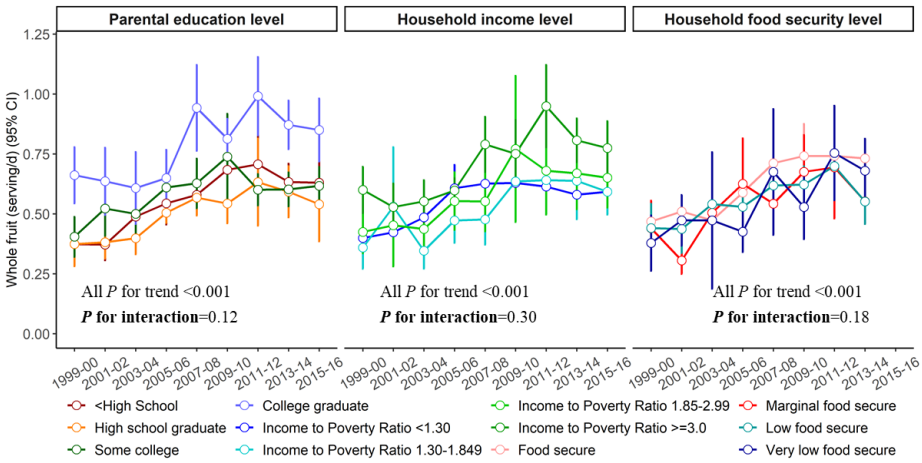
A. Whole grains



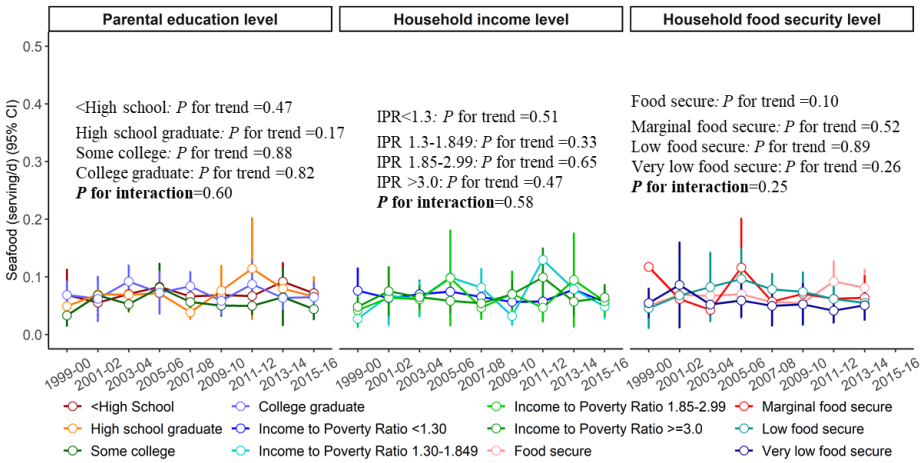
B. Nuts/seeds



C. Whole fruits



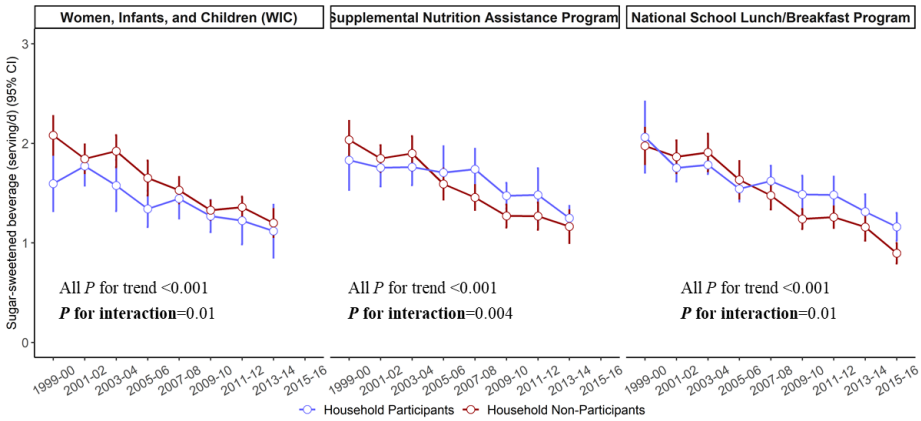
D. Seafoods



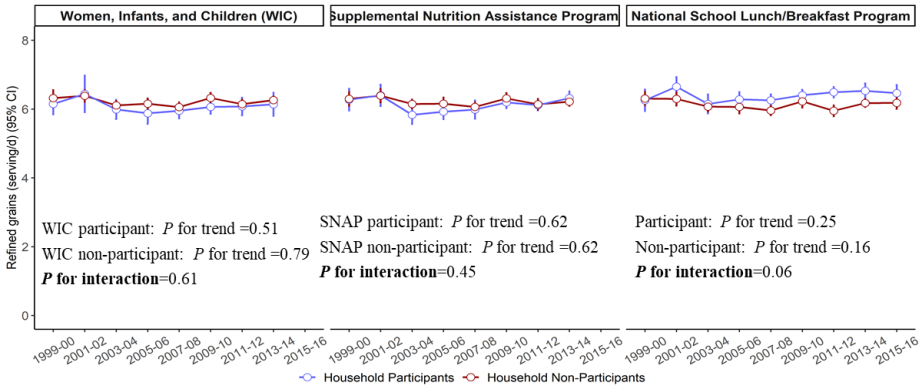
eFigure 6. Trends in Estimated Mean Consumption of Sugar-Sweetened Beverages (Panel A), Refined Grains (Panel B), White Potato (Panel C), Processed Meat (Panel D), Sodium (Panel E), and Fruit Juice (Panel F) by Participation of Women, Infants, and Children (WIC), Supplemental Nutrition Assistance Program (SNAP), and National School Lunch/Breakfast Program Among US Children Based on NHANES Data From 1999-2016

Data were weighted to be nationally representative. Values in Panels A-F were energy-adjusted to 2000 kcal/d using the residual method.

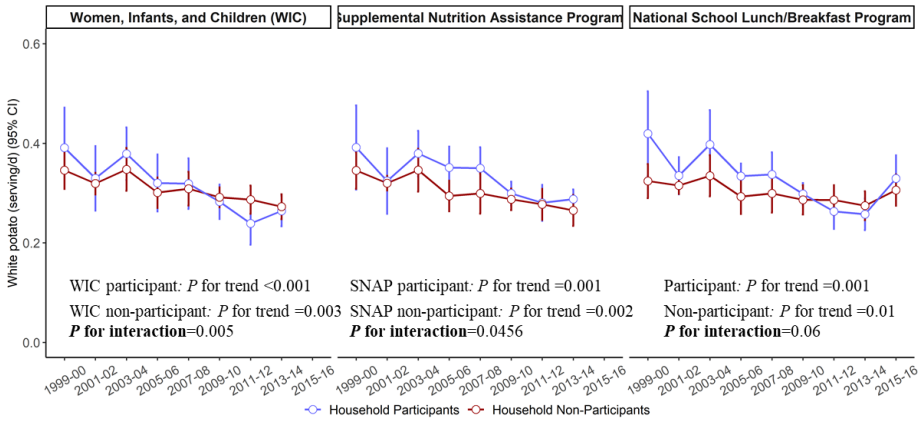
A. Sugar-sweetened beverages



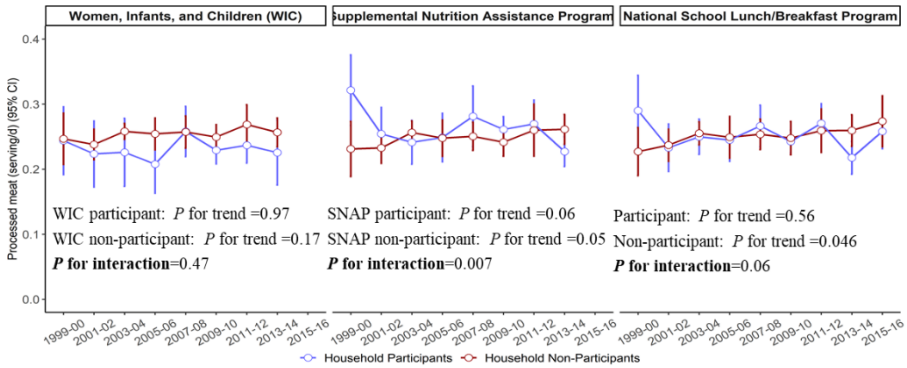
B. Refined grain



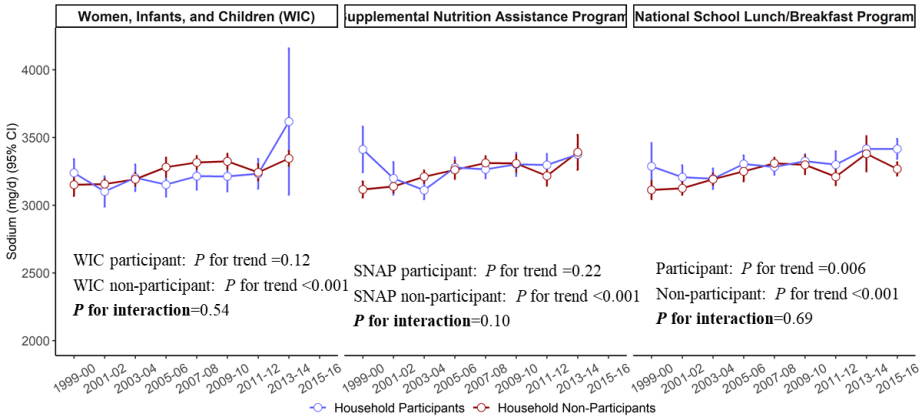
C. White potato



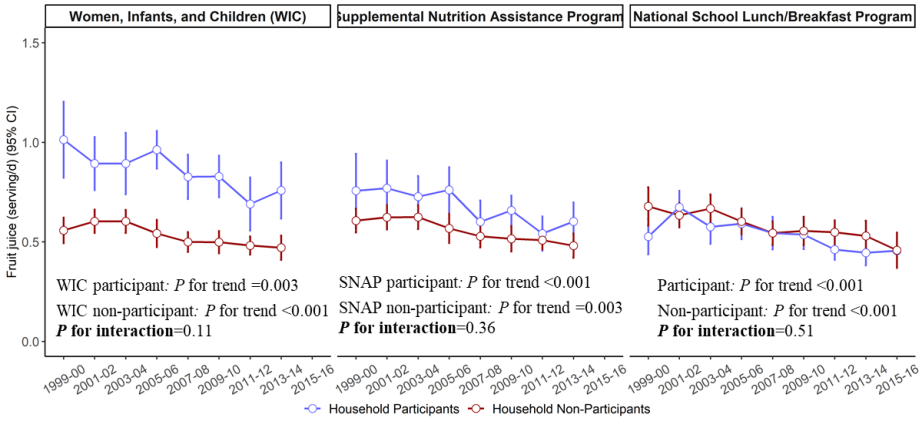
D. Processed meat



E. Sodium



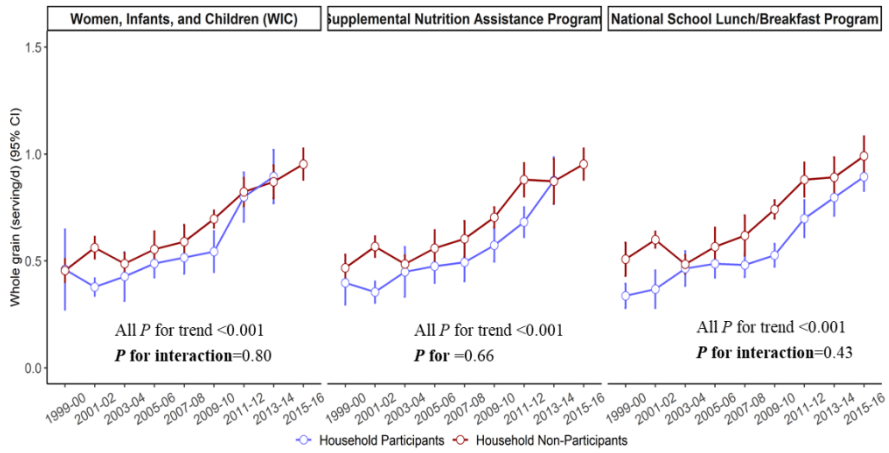
F. Fruit juice



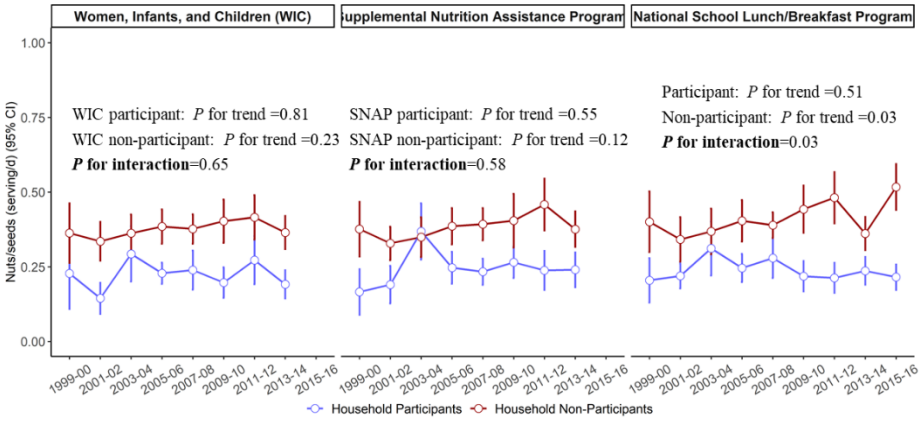
eFigure 7. Trends in Estimated Mean Consumption of Whole Grains (Panel A), Nuts/Seeds (Panel B), Whole Fruits (Panel C), and Seafoods (Panel D) by Participation of Women, Infants, and Children (WIC), Supplemental Nutrition Assistance Program (SNAP), and National School Lunch/Breakfast Program Among US Children Based on NHANES Data From 1999-2016

Data were weighted to be nationally representative. Values in Panels A-D were energy-adjusted to 2000 kcal/d using the residual method.

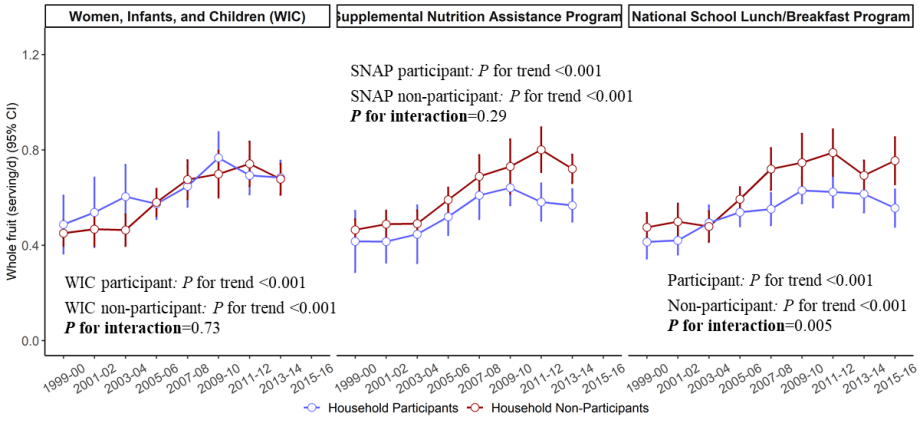
A. Whole grains



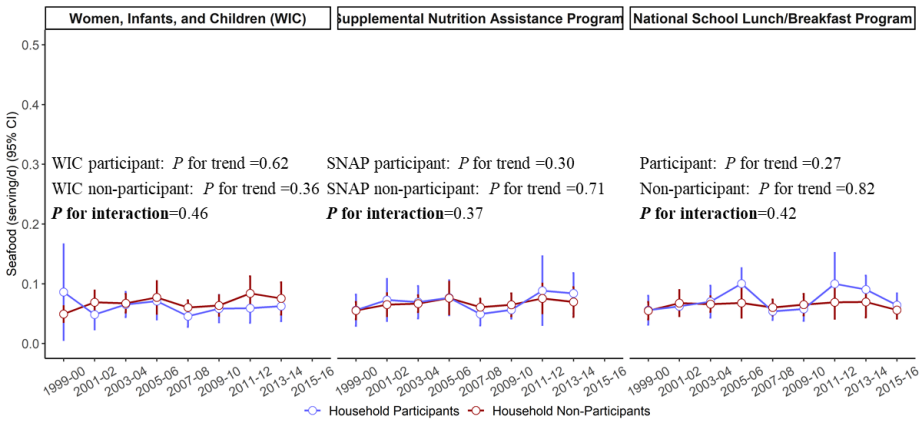
B. Nuts/seeds



C. Whole fruits



D. Seafoods



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