Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.
eAppendix 1. National Health and Nutrition Examination Survey, Dietary Assessment, Dietary American Heart Association (AHA) scores and Healthy Eating Index scores

NHANES uses a complex, multistage, probability sampling design to select a nationally representative population of civilian, non-institutionalized participants.\(^1\,^2\) The National Center for Health Statistics ethics review board approved the study protocol, and all participants provided written informed consent. Because data are publicly available and de-identified, institutional review board approval was not required for the current investigation.

The US Department of Agriculture (USDA) Automated Multiple-Pass Method was used for collecting 24-hour dietary recalls using “What We Eat In America,” the dietary interview component of NHANES. The USDA Food Patterns Equivalents Database, which disaggregates mixed foods into their components parts, was used to assess changes in food groups. Nutrients were derived from cycle-specific versions of the USDA Food and Nutrient Database for Dietary Studies.

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.\(^4\) The primary dietary targets are fruits/vegetables, whole grains, fish and shellfish, nuts/legumes/seeds, sugar-sweetened beverages, processed meat, sodium, and saturated fat (eTable 1). To best assess changes, we constructed a continuous score. Intake of each dietary item was scored from 0-10 (beneficial components) or 10-0 (harmful components) depending on whether consumption was encouraged or discouraged, respectively. For beneficial dietary components, individuals with zero intake received the lowest score (0). For harmful dietary components, the lowest score (0) was assigned to a higher level approximately equivalent to the 80th to 90th percentile of intake.

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among US adults and rounded to a practical value (eg, 4500mg/d of sodium, one 50-g servings/d of processed meat, two 8-oz servings/d of sugar-sweetened beverages, and 15% energy of saturated fat). 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 are provided in eTable 1. Details regarding the AHA score was published elsewhere.5

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 U.S. Dietary Guidelines for Americans (DGAs) and monitor changes in dietary patterns. The original HEI was released by the United States Department of Agriculture’s (USDA) Center for Nutrition Policy and Promotion in 1995 and since then it has been significantly updated through a collaboration with the USDA and National Cancer Institute (NCI).6 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.
eAppendix 2. Measurement of Education and Race/Ethnicity

Educational attainment for children was classified according to the highest level of their parental education. Information on race/ethnicity was collected by trained NHANES interviewers according to the fixed categories provided by the National Center for Health Statistics using the Computer-Assisted Personal Interview system, with classification identified a household proxy for participants younger than 16 years and by the respondents directly for those aged 16 years and older.
eTable 1. Dietary Components of the American Heart Association (AHA) 2020 Strategic Impact Goals and Scoring Standards

| Component                      | Points Range | Max                               | Scoring Standarda |
|--------------------------------|--------------|-----------------------------------|-------------------|
| AHA Score                      | 0-80         |                                   |                   |
| Fruits and vegetables          | 0-10         | ≥4.5 cups equiv. per day          | ≤4.5 cups equiv. per day |
| Whole grains                   | 0-10         | ≥3 oz equiv. per day              | ≤3 oz equiv. per day |
| Fish and shellfish             | 0-10         | ≥1 oz equiv. per day              | ≤1 oz equiv. per day |
| Nuts, seeds and legumes        | 0-10         | ≥4 servings per day               | ≤4 servings per day |
| Sugar-sweetened beverages      | 10-0         | ≤ 5.14 fl oz per day              | >16 fl per day    |
| Processed meat                 | 10-0         | ≤ 0.5 oz equiv. per day           | >1.764 oz equiv. per day |
| Sodium                         | 10-0         | ≤ 1500 mg per day                 | >4500 mg 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 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

| Component                        | Points Range | Max Score | Scoring Standarda |
|----------------------------------|--------------|-----------|-------------------|
|                                  |              | Max       | Min               |
| **HEI-2015 Adequacy**            |              |           |                   |
| Total Fruitsb                    | 0-5          | ≥0.8 cup equiv. per 1,000 kcal | 0 |
| Whole Fruitsc                    | 0-5          | ≥0.4 cup equiv. per 1,000 kcal | 0 |
| Total Vegetablesd                | 0-5          | ≥1.1 cup equiv. per 1,000 kcal | 0 |
| Greens and Beansd                | 0-5          | ≥0.2 cup equiv. per 1,000 kcal | 0 |
| Whole Grains                     | 0-10         | ≥1.5 oz equiv. per 1,000 kcal | 0 |
| Dairye                           | 0-10         | ≥1.3 cup equiv. per 1,000 kcal | 0 |
| Total Protein Foodsf             | 0-5          | ≥2.5 oz equiv. per 1,000 kcal | 0 |
| Seafood and Plant Proteinsg      | 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                   | 0-10         | ≤1.8 oz equiv. per 1,000 kcal | ≥4.3 oz equiv. per 1,000 kcal |
| Sodium                           | 0-10         | ≤1.1 grams per 1,000 kcal | ≥2.0 grams per 1,000 kcal |
| Added Sugars                     | 0-10         | ≤6.5% of energy | ≥26% of energy |
| Saturated Fats                   | 0-10         | ≤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. Trends in Estimated Percentage of Energy Intake from Grocery Stores, Restaurants, Schools, and Other Sources Among US Children Aged 5 to 19 Years and From Grocery Stores, Restaurants, Worksites and Other Sources Among Adults Aged 20 Years or Older, NHANES 2003 to 2018.

| Estimated percent of energy from each food source, % | Survey-weighted % (95% CI) | 2017-2018 versus 2003-2004, difference (95% CI) |
|-----------------------------------------------------|-----------------------------|--------------------------------------------------|
| **Children**                                         |                             | P-trend                                          |
| Grocery stores                                      | (n=3236)                    | 2003-2004 (n=3318)                               | 2004-2006 (n=2445) | 2007-2008 (n=2596) | 2009-2010 (n=2462) | 2011-2012 (n=2495) | 2013-2014 (n=2383) | 2015-2016 (n=1970) | 2003-2018                  |
| Grocery stores                                      | (66.0-69.5)                 | 67.8                                             | 67.6                                             | 66.3                                             | 68.5                                             | 63.1                                             | 64.5                                             | 63.1                                             | 64.6                                             | <.001 (-6.10, -0.27) |
| Restaurants                                         | (17.9-20.7)                 | 7.93                                             | 7.53                                             | 9.01                                             | 8.90                                             | 9.14                                             | 9.16                                             | 9.43                                             | 6.88                                             | 1.02 |
| Schools                                             | 6.09-9.77                   | 5.0                                              | 6.79                                             | 6.99                                             | 6.73                                             | 8.39                                             | 7.55                                             | 8.91                                             | 8.23                                             | 0.82 (-3.80, 1.67) |
| Other sources                                       | (4.54-5.46)                 | 5.0                                              | 6.79                                             | 6.99                                             | 6.73                                             | 8.39                                             | 7.55                                             | 8.91                                             | 8.23                                             | 3.23 |
| **Adults**                                          | (n=4448)                    | 68.8                                             | 69.1                                             | 70.8                                             | 72.3                                             | 67.5                                             | 67.4                                             | 68.4                                             | 67.3                                             | -1.50 |
| Grocery stores                                      | (67.6-70.1)                 | 68.8                                             | 69.1                                             | 70.8                                             | 72.3                                             | 67.5                                             | 67.4                                             | 68.4                                             | 67.3                                             | -1.50 |
| Restaurants                                         | (21.1-23.2)                 | 22.2                                             | 21.3                                             | 20.7                                             | 19.0                                             | 21.6                                             | 22.7                                             | 21.2                                             | 22.5                                             | -0.95 |
| Worksites                                           | 2.13                         | 1.98                                             | 1.98                                             | 1.39                                             | 1.54                                             | 1.94                                             | 1.19                                             | 1.05                                             | 1.33                                             | -0.79 |
| Other sources                                       | (6.34-7.40)                 | 6.87                                             | 7.70                                             | 7.10                                             | 7.20                                             | 8.94                                             | 8.77                                             | 9.29                                             | 8.88                                             | 2.01 |

Abbreviations: NHANES, National Health and Nutrition Examination Survey.

Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants (“restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information”), schools (“K-12 school cafeteria, childcare center”), worksites (“cafe not in a K-12 school, vending machine, common coffee pot or snack tray) and other sources refer to food items obtained from elsewhere (“sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).

a All estimates incorporate NHANES survey weights to be nationally representative.

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**eTable 4. Estimated Percentage of Energy Intake from Other Sources Among US Children Aged 5 to 19 Years and Adults Aged 20 Years or Older, NHANES 2017-2018.**

| Children                                      | Survey-weighted % (95% CI) a   | Adults                                      | Survey-weighted % (95% CI) a   |
|-----------------------------------------------|--------------------------------|---------------------------------------------|--------------------------------|
| Bar/tavern/lounge                             | 0.04 (0-0.08)                  | Bar/tavern/lounge                           | 0.47 (0.30-0.64)               |
| Community food program - other                | 0.07 (0-0.15)                  | Community food program - other              | 0.08 (0.04-0.12)               |
| From someone else/gift                       | 4.49 (3.45-5.53)               | From someone else/gift                      | 4.38 (3.95-4.80)               |
| Mail order purchase                          | 0.04 (0-0.07)                  | Mail order purchase                         | 0.41 (0.24-0.58)               |
| Grown or caught by you or someone you know b  | 0.31 (0.08-0.53)               | Grown or caught by you or someone you know b| 0.61 (0.21-1.01)               |
| Sport, recreation, or entertainment facility | 0.65 (0.40-0.89)               | Sport, recreation, or entertainment facility| 0.32 (0.21-0.43)               |
| Street vendor, vending truck                  | 0.33 (0.20-0.47)               | Street vendor, vending truck                | 0.30 (0.16-0.45)               |
| Child/Adult home care                         | 0                              | Child/Adult care/home center                | 0.17 (0.01-0.34)               |
| Soup kitchen/shelter/food pantry              | 0.01 (0-0.03)                  | Soup kitchen/shelter/food pantry            | 0.10 (0-0.23)                  |
| Cafeteria NOT in a K-12 school                | 0.60 (0-1.30)                  | Cafeteria in a K-12 school                  | 1.03 (0.77-1.29)               |
| Meals on Wheels                               | 0.09 (0-0.27)                  | Meals on Wheels                             | 0.06 (0-0.11)                  |
| Residential dining facility                   | 0.08 (0-0.21)                  | Residential dining facility                  | 0.07 (0-0.15)                  |
| Fundraiser sales                              | 0.06 (0.03-0.10)               | Fundraiser sales                            | 0.06 (0.02-0.10)               |
| Vending machine                               | 0.09 (0.05-0.12)               | Vending machine                             |                                |
| Common coffee pot or snack tray               | 0.03 (0-0.06)                  | Common coffee pot or snack tray             |                                |
| Others c                                      | 0                              | Others c                                    | 0.81 (0.42-1.20)               |

Abbreviations: NHANES, National Health and Nutrition Examination Survey.

a All estimates incorporate NHANES survey weights to be nationally representative.

b Refers to the combination of grown or caught by you or someone you know and fish caught by you or someone you know.

c Refers to other, specify and don’t know.
## eTable 5. Trends in Quality of Dietary Components Consumed from Different Sources based on the Healthy Eating Index 2015 Among US Children Aged 5-19 Years Old, NHANES 2003-2018.

| HEI-2015 | Survey-weighted AHA mean score (95% CI) a | 2017-2018 versus 2003-2004, difference (95% CI) | P-trend |
|----------|------------------------------------------|-----------------------------------------------|---------|
| **Total Score** | | | |
| Grocery stores | 47.7 (46.7-48.7) | 47.1 (45.9-48.3) | 47.3 (46.1-48.5) | 48.3 (47.6-49.1) | 50.5 (49.2-51.7) | 48.3 (47.2-49.5) | 47.6 (46.0-49.1) | 47.5 (46.1-48.9) | -0.20 | -0.20 (-2.1, 1.5) |
| Restaurants | 37.1 (36.5-37.6) | 36.5 (35.8-37.1) | 35.6 (34.6-36.6) | 37.7 (36.6-38.8) | 37.5 (34.7-36.8) | 35.7 (34.9-36.1) | 35.5 (34.9-36.4) | 35.6 (34.9-36.4) | -1.40 | -1.40 (-2.4, -0.4) |
| Schools | 44.1 (42.5-45.7) | 42.2 (41.1-43.0) | 42.3 (41.1-43.5) | 42.7 (41.2-44.2) | 46.2 (44.3-48.2) | 51.3 (50.0-52.5) | 51.3 (50.4-52.7) | 51.6 (50.4-52.7) | <.001 | <.001 (5.5, 9.4) |
| Other sources | 38.9 (37.9-39.9) | 37.9 (36.3-39.5) | 37.4 (36.2-38.6) | 37.3 (36.2-38.4) | 34.2 (33.1-35.3) | 34.8 (33.2-36.4) | 34.9 (33.3-36.2) | 34.7 (33.3-36.2) | <.001 | <.001 (-6.0, -2.5) |
| **Total vegetables** b | | | |
| (0-5) | | | |
| Grocery stores | 2.11 (1.92-2.31) | 1.92 (1.83-2.06) | 1.94 (1.83-2.05) | 2.07 (1.97-2.16) | 2.04 (1.91-2.16) | 2.04 (2.01-2.21) | 2.01 (2.01-2.23) | 1.99 (1.99-2.18) | .91 | .91 (0.3, 1.5) |
| Restaurants | 3.05 (2.80-3.30) | 2.80 (2.58-3.08) | 2.59 (2.44-2.76) | 2.45 (2.45-2.92) | 2.45 (2.31-2.76) | 2.31 (2.23-2.47) | 2.25 (2.19-2.37) | 2.34 (2.28-2.52) | <.001 | <.001 (0.6, -0.4) |
| Schools | 2.28 (2.10-2.46) | 1.98 (1.80-2.17) | 1.86 (1.71-2.02) | 1.74 (1.52-1.85) | 1.74 (1.52-1.85) | 1.74 (1.71-1.85) | 1.74 (1.71-1.85) | 1.74 (1.71-1.85) | <.001 | <.001 (0.6, -0.4) |
| Other sources | 0.94 (0.80-1.08) | 1.27 (1.10-1.45) | 1.14 (0.97-1.31) | 1.14 (1.11-1.58) | 1.14 (0.99-1.29) | 1.14 (0.87-1.21) | 1.14 (0.88-1.29) | 1.14 (0.78-1.34) | .58 | .58 (-0.2, 0.4) |
| **Greens and beans** b | | | |
| Grocery stores | 0.80 (0.69-0.91) | 0.87 (0.75-0.99) | 0.79 (0.65-0.92) | 0.93 (0.82-1.04) | 0.93 (0.87-1.19) | 1.03 (0.85-1.26) | 1.08 (0.87-1.31) | 0.96 (0.81-1.13) | .06 | .06 (0.0, 0.3) |
| Restaurants | 0.40 (0.30-0.54) | 0.43 (0.30-0.55) | 0.53 (0.43-0.64) | 0.53 (0.39-0.69) | 0.54 (0.46-0.73) | 0.57 (0.41-0.71) | 0.60 (0.49-0.71) | 0.60 (0.40-0.80) | <.001 | <.001 (0.0, 0.2) |
| Schools | 0.30 (0.20-0.40) | 0.38 (0.18-0.55) | 0.34 (0.19-0.53) | 0.34 (0.23-0.51) | 0.34 (0.23-0.51) | 0.34 (0.23-0.51) | 0.34 (0.23-0.51) | 0.34 (0.23-0.51) | <.001 | <.001 (0.0, 0.2) |
| Other sources | 0.14 (0.10-0.18) | 0.20 (0.13-0.27) | 0.25 (0.14-0.35) | 0.25 (0.16-0.35) | 0.25 (0.14-0.35) | 0.25 (0.14-0.35) | 0.25 (0.14-0.35) | 0.25 (0.14-0.35) | <.001 | <.001 (0.0, 0.2) |
| **Total fruits** c | | | |
| Grocery stores | 2.49 (2.30-2.68) | 2.66 (2.47-2.85) | 2.47 (2.24-2.70) | 2.57 (2.39-2.75) | 2.64 (2.45-2.84) | 2.49 (2.29-2.68) | 2.49 (2.04-2.51) | 2.28 (2.05-2.69) | .10 | .10 (-0.4, 0.2) |
| Restaurants | 0.36 (0.29-0.42) | 0.31 (0.21-0.41) | 0.31 (0.24-0.37) | 0.36 (0.30-0.41) | 0.46 (0.31-0.61) | 0.48 (0.23-0.37) | 0.48 (0.30-0.49) | 0.48 (0.31-0.45) | <.001 | <.001 (0.0, 0.2) |
| Schools | 1.99 (1.68-2.3) | 2.10 (1.87-2.32) | 1.97 (1.75-2.20) | 2.18 (1.90-2.46) | 2.36 (2.14-2.59) | 2.42 (2.18-2.67) | 2.42 (2.18-2.67) | 2.42 (2.18-2.67) | <.001 | <.001 (0.0, 0.2) |
| HEI-2015       | Survey-weighted AHA mean score (95% CI) a | 2017-2018 versus 2003-2004, difference (95% CI) |
|---------------|------------------------------------------|-----------------------------------------------|
|                | 2003-2004 (n=3,236)                     | 2005-2006 (n=3,318) | 2007-2008 (n=2,445) | 2009-2010 (n=2,596) | 2011-2012 (n=2,462) | 2013-2014 (n=2,495) | 2015-2016 (n=2,383) | 2017-2018 (n=1,970) | P-trend |
| Other sources  | 1.05 (0.85-1.24)                        | 1.00 (0.77-1.24) | 0.95 (0.76-1.14) | 1.03 (0.89-1.18) | 0.83 (0.62-1.04) | 0.90 (0.71-1.1) | 0.89 (0.67-1.12) | 0.95 (0.67-1.23) | -0.10 |
| Whole fruitsd  |                                          |                  |                  |                  |                  |                  |                  |                  |        |
| Grocery stores | 3.12 (2.90-3.34)                        | 2.29 (2.13-2.46) | 2.23 (2.02-2.44) | 2.30 (2.11-2.49) | 2.36 (2.15-2.57) | 2.31 (2.09-2.54) | 2.13 (1.86-2.39) | 2.25 (1.95-2.55) | <.001 |
| Restaurants    | 0.53 (0.44-0.62)                        | 0.21 (0.14-0.28) | 0.25 (0.19-0.31) | 0.25 (0.19-0.31) | 0.31 (0.17-0.49) | 0.33 (0.23-0.44) | 0.27 (0.18-0.35) | 0.33 (0.23-0.44) | -0.26 |
| Schools        | 2.36 (2.04-2.67)                        | 1.58 (1.39-1.76) | 1.52 (1.37-1.68) | 1.74 (1.54-1.95) | 1.94 (1.72-2.19) | 2.10 (1.87-2.33) | 2.11 (1.86-2.36) | 1.86 (1.66-2.06) | -0.50 |
| Other sources  | 1.19 (0.99-1.38)                        | 0.73 (0.59-0.86) | 0.74 (0.53-0.95) | 0.84 (0.68-1.0) | 0.66 (0.52-0.80) | 0.71 (0.54-0.89) | 0.71 (0.51-0.90) | 0.73 (0.49-0.97) | -0.46 |
| Whole grains   |                                          |                  |                  |                  |                  |                  |                  |                  |        |
| Grocery stores | 1.97 (1.78-2.16)                        | 2.23 (1.95-2.51) | 2.45 (2.18-2.72) | 2.63 (2.52-2.74) | 3.29 (3.01-3.57) | 3.01 (2.70-3.32) | 3.17 (2.83-3.51) | 3.10 (2.86-3.35) | 1.13 |
| Restaurants    | 0.15 (0.09-0.20)                        | 0.17 (0.08-0.26) | 0.12 (0.08-0.17) | 0.19 (0.07-0.31) | 0.31 (0.19-0.43) | 0.35 (0.25-0.45) | 0.29 (0.20-0.38) | 0.36 (0.27-0.45) | <.001 |
| Schools        | 0.54 (0.36-0.71)                        | 0.72 (0.53-0.91) | 0.81 (0.61-1.0) | 0.88 (0.69-1.08) | 1.60 (1.20-2.01) | 1.36 (1.67-2.45) | 1.03 (0.93-2.03) | 1.04 (0.86-2.07) | <.001 |
| Other sources  | 0.91 (0.78-1.05)                        | 0.98 (0.72-1.23) | 0.96 (0.44-0.78) | 0.86 (0.62-1.09) | 1.03 (0.85-1.22) | 1.01 (0.79-1.24) | 1.04 (0.82-1.25) | 1.03 (0.82-1.24) | 0.12 |
| Total dairye   |                                          |                  |                  |                  |                  |                  |                  |                  |        |
| Grocery stores | 6.49 (6.17-6.81)                        | 6.66 (6.37-6.95) | 6.30 (6.04-6.56) | 6.77 (6.53-7.01) | 6.39 (6.07-6.70) | 6.48 (6.20-6.76) | 6.01 (5.66-6.36) | 5.70 (5.49-5.91) | <.001 |
| Restaurants    | 4.99 (4.67-5.31)                        | 5.05 (4.74-5.35) | 5.09 (4.64-5.3) | 5.32 (4.93-5.71) | 5.88 (5.36-6.23) | 5.67 (5.22-6.12) | 5.14 (4.84-5.44) | 5.12 (4.68-5.56) | <.001 |
| Schools        | 7.58 (7.12-8.03)                        | 7.69 (7.38-8.0) | 7.95 (7.39-8.5) | 8.49 (8.18-8.79) | 8.13 (7.82-8.44) | 7.83 (7.54-8.12) | 7.85 (7.30-8.41) | 7.31 (6.88-7.75) | <.001 |
| Other sources  | 2.16 (1.87-2.45)                        | 2.72 (2.42-3.02) | 2.53 (2.18-2.89) | 2.98 (2.57-3.38) | 2.65 (2.23-3.08) | 2.59 (2.11-3.06) | 2.42 (2.02-2.82) | 2.40 (2.01-2.78) | 0.23 |
| Total protein foods b |                                          |                  |                  |                  |                  |                  |                  |                  |        |
| Grocery stores | 3.39 (3.28-3.49)                        | 3.36 (3.24-3.48) | 3.50 (3.39-3.61) | 3.56 (3.45-3.68) | 3.51 (3.37-3.64) | 3.42 (3.25-3.60) | 3.41 (3.25-3.57) | 3.46 (3.33-3.59) | 0.08 |
| Restaurants    | 3.54 (3.40-3.66)                        | 3.47 (3.31-3.62) | 3.47 (3.21-3.72) | 3.58 (3.44-3.71) | 3.46 (3.25-3.67) | 3.45 (3.20-3.53) | 3.37 (3.08-3.46) | 3.27 (3.10-3.46) | 0.05 |
| Schools        | 2.68 (2.44-2.92)                        | 2.79 (2.62-2.96) | 2.94 (2.81-3.06) | 2.70 (2.54-2.86) | 3.10 (2.93-3.28) | 2.90 (2.74-3.06) | 2.88 (2.67-3.08) | 2.49 (2.28-2.69) | <.001 |
| Other sources  | 1.41 (1.21-1.61)                        | 1.91 (1.77-2.04) | 1.81 (1.64-1.99) | 1.75 (1.54-1.97) | 1.66 (1.48-1.84) | 1.63 (1.41-1.86) | 1.65 (1.47-1.82) | 1.77 (1.50-2.03) | <.001 |

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| HEI-2015       | 2003-2004   | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P-trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|----------------|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|-----------------------------------------------|
| Seafood and plant protein, b,f |             |           |           |           |           |           |           |           |        |                                               |
| Grocery stores | 1.73        | 1.76      | 1.65      | 1.85      | 2.0       | 1.70      | 1.76      | 1.77      | 0.05    | -(0.13, 0.22)                                |
| Restaurants    | (1.59-1.86) | (1.52-2.01)| (1.52-1.78)| (1.74-1.96)| (1.86-2.15)| (1.56-1.85)| (1.57-1.94)| (1.66-1.89)| .56     |                                               |
| Schools        | 0.59        | 0.61      | 0.52      | 0.57      | 0.78      | 0.72      | 0.59      | 0.57      | 0.02    | -(0.14, 0.17)                                |
| Other sources  | (0.42-0.68) | (0.45-0.77)| (0.43-0.61)| (0.45-0.68)| (0.61-0.95)| (0.54-0.89)| (0.50-0.69)| (0.48-0.66)| .31     |                                               |
| Sodium         |             |           |           |           |           |           |           |           |        |                                               |
| Grocery stores | 6.76        | 5.80      | 5.67      | 5.05      | 5.46      | 4.96      | 4.98      | 5.47      | -0.55   |                                               |
| Restaurants    | (5.74-6.30) | (5.53-6.06)| (5.46-5.87)| (4.87-5.23)| (5.09-5.83)| (4.72-5.19)| (4.73-5.23)| (5.18-5.76)| <.001   | -(0.96,-0.15)                               |
| Schools        | 3.57        | 3.76      | 3.56      | 3.10      | 3.44      | 3.06      | 3.14      | 3.25      | -0.31   |                                               |
| Other sources  | (3.24-3.89) | (3.42-4.09)| (3.26-3.87)| (2.72-3.47)| (3.10-3.78)| (2.76-3.36)| (2.83-3.46)| (2.99-3.51)| .002    | -(0.74, 0.11)                               |
| Refined grains |             |           |           |           |           |           |           |           |        |                                               |
| Grocery stores | 5.51        | 5.57      | 5.51      | 5.03      | 5.47      | 5.27      | 5.20      | 5.20      | -0.31   |                                               |
| Restaurants    | (5.22-5.80) | (5.39-5.76)| (5.27-5.75)| (4.85-5.21)| (5.25-5.70)| (5.10-5.43)| (4.95-5.44)| (4.92-5.47)| .01     | -(0.71, 0.09)                               |
| Schools        | 4.11        | 4.39      | 4.25      | 4.50      | 4.09      | 3.68      | 3.72      | 4.0       | -0.19   |                                               |
| Other sources  | (3.92-4.45) | (4.03-4.75)| (3.99-4.61)| (4.12-4.87)| (3.70-4.48)| (3.37-3.99)| (3.43-4.0) | (3.66-4.34)| .002    | -(0.63, 0.24)                               |

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| HEI-2015 | Survey-weighted AHA mean score (95% CI) a | 2017-2018 versus 2003-2004, difference (95% CI) | P-trend |
|---------|-----------------------------------------|-----------------------------------------------|--------|
|         | 2003-2004 (n=3,236) | 2005-2006 (n=3,318) | 2007-2008 (n=2,445) | 2009-2010 (n=2,596) | 2011-2012 (n=2,462) | 2013-2014 (n=2,495) | 2015-2016 (n=2,383) | 2017-2018 (n=1,970) |        |
| Saturated fat |        |        |        |        |        |        |        |        |        |
| Grocery stores | 6.09 (5.84-6.34) | 5.79 (5.64-5.94) | 6.08 (5.84-6.32) | 6.34 (6.15-6.53) | 6.40 (6.14-6.67) | 5.93 (5.63-6.24) | 5.49 (5.22-5.76) | 5.42 (5.13-5.71) | <.001 |
| Restaurants | 4.21 (3.94-4.48) | 3.96 (3.68-4.24) | 3.94 (3.61-4.27) | 4.71 (4.25-5.18) | 4.38 (4.09-4.67) | 4.14 (3.83-4.44) | 4.44 (4.22-4.67) | 4.10 (3.82-4.38) | .34 |
| Schools | 4.46 (3.98-4.94) | 4.35 (3.96-4.73) | 4.42 (4.08-4.75) | 4.65 (4.18-5.11) | 5.25 (4.72-5.79) | 6.06 (5.78-6.35) | 5.56 (5.06-6.08) | 5.82 (5.34-6.51) | <.001 |
| Other sources | 6.94 (6.63-7.25) | 6.26 (5.87-6.64) | 6.47 (6.01-6.94) | 6.28 (5.89-6.68) | 5.46 (5.20-5.73) | 6.03 (5.63-6.44) | 5.58 (5.08-6.08) | 5.24 (4.95-5.52) | <.001 |
| Added sugars |        |        |        |        |        |        |        |        |        |
| Grocery stores | 4.32 (3.98-4.65) | 4.80 (4.54-5.06) | 4.94 (4.74-5.15) | 5.32 (5.13-5.52) | 5.37 (5.14-5.59) | 5.79 (5.51-6.07) | 6.14 (5.85-6.43) | 5.95 (5.66-6.24) | <.001 |
| Restaurants | 6.70 (6.35-7.05) | 6.71 (6.24-7.18) | 6.72 (6.43-7.01) | 6.97 (6.56-7.38) | 6.93 (6.65-7.21) | 7.09 (6.84-7.33) | 6.92 (6.63-7.21) | 7.07 (6.77-7.37) | .04 |
| Schools | 7.26 (7.03-7.49) | 7.03 (6.87-7.44) | 7.45 (7.19-7.71) | 7.44 (7.04-7.84) | 7.69 (7.27-8.12) | 7.68 (7.54-8.07) | 7.61 (7.55-7.86) | 7.77 (7.55-7.97) | <.001 |
| Other sources | 3.71 (3.29-4.12) | 4.35 (4.47-4.7) | 4.12 (3.67-4.57) | 4.17 (3.84-4.5) | 3.80 (3.46-4.15) | 3.79 (3.33-4.26) | 4.46 (4.09-4.83) | 4.10 (4.1-4.93) | .06 |

Abbreviations: NHANES, National Health and Nutrition Examination Survey; HEI, Healthy Eating Index.

Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants ("restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information"), schools ("K-12 school cafeteria, childcare center"), worksites ("cafeateria not in a K-12 school, vending machine, common coffee pot or snack tray") and other sources refer to food items obtained from elsewhere ("sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).

a Percentages and CIs were estimated using survey weights to be nationally representative.
b Includes legumes (beans and peas).
c Includes 100% fruit juice.
d Includes all forms except juice.
e Includes all milk products, such as fluid milk, yogurt, and cheese, and fortified soy beverages.
f Includes seafood, nuts, seeds, soy products (other than beverages), and legumes (beans and peas).
g Ratio of poly- and monounsaturated fatty acids (PUFAs and MUFAs) to saturated.
### eTable 6. Trends in diet quality of foods consumed from school (K-12 only) and restaurants (stratified by full service vs. fast food/quick-serve) among US children age 5-19 years, NHANES 2003-2018. *a*

| Diet Components (scoring range) (intake target) | Survey-weighted AHA mean score (95%CI) | 2017-2018 versus 2003-2004, difference (95%CI) |
|-----------------------------------------------|----------------------------------------|-----------------------------------------------|
| **AHA Diet Score (0-80)**                     |                                        |                                               |
| School                                        | 31.1 (30.0-32.2)                       |                                               |
|                                                 | 30.2 (29.0-31.3)                       |                                               |
|                                                 | 30.2 (29.3-31.2)                       |                                               |
|                                                 | 31.8 (30.5-33.2)                       |                                               |
|                                                 | 33.4 (32.0-34.7)                       |                                               |
|                                                 | 37.0 (36.2-37.9)                       |                                               |
|                                                 | 38.3 (37.4-39.1)                       |                                               |
|                                                 | 39.5 (38.9-40.1)                       |                                               |
| **Score Components**                          |                                        |                                               |
| **Fruits and vegetables (0-10)**              |                                        |                                               |
| School                                        | 4.67 (4.11-5.23)                       |                                               |
|                                                 | 4.15 (3.87-4.42)                       |                                               |
|                                                 | 4.10 (3.82-4.38)                       |                                               |
|                                                 | 4.20 (3.84-4.55)                       |                                               |
|                                                 | 4.66 (4.24-5.08)                       |                                               |
|                                                 | 5.04 (4.61-5.48)                       |                                               |
|                                                 | 5.27 (4.91-5.63)                       |                                               |
|                                                 | 4.66 (4.37-4.95)                       |                                               |
| **Whole grains (0-10)**                       |                                        |                                               |
| School                                        | 0.48 (0.32-0.65)                       |                                               |
|                                                 | 0.63 (0.44-0.81)                       |                                               |
|                                                 | 0.78 (0.59-0.98)                       |                                               |
|                                                 | 0.89 (0.69-1.09)                       |                                               |
|                                                 | 1.59 (1.19-1.99)                       |                                               |
|                                                 | 3.99 (3.70-4.29)                       |                                               |
|                                                 | 4.55 (4.07-5.02)                       |                                               |
|                                                 | 4.46 (4.14-4.78)                       |                                               |
| **Fish and shellfish (0-10)**                 |                                        |                                               |
| School                                        | 0.13 (0.05-0.22)                       |                                               |
|                                                 | 0.15 (0.07-0.22)                       |                                               |
|                                                 | 0.09 (0.04-0.13)                       |                                               |
|                                                 | 0.19 (0.02-0.35)                       |                                               |
|                                                 | 0.19 (0.01-0.31)                       |                                               |
|                                                 | 0.33 (0.09-0.58)                       |                                               |
|                                                 | 0.33 (0.15-0.52)                       |                                               |
|                                                 | 0.33 (0.19-0.38)                       |                                               |
|                                                 | 0.39 (0.35-0.79)                       |                                               |
|                                                 | 0.60 (0.26-1.01)                       |                                               |
| **Nuts, seeds and legumes (0-10)**            |                                        |                                               |
| School                                        | 0.95 (0.76-1.15)                       |                                               |
|                                                 | 0.94 (0.52-1.37)                       |                                               |
|                                                 | 0.67 (0.46-0.89)                       |                                               |
|                                                 | 0.70 (0.54-0.86)                       |                                               |
|                                                 | 0.94 (0.75-1.13)                       |                                               |
|                                                 | 0.82 (0.63-1.02)                       |                                               |
|                                                 | 0.84 (0.52-1.17)                       |                                               |
|                                                 | 0.93 (0.74-1.12)                       |                                               |
| **Sugar-sweetened beverages (0-10)**           |                                        |                                               |
| School                                        | 8.67 (8.33-9.01)                       |                                               |
|                                                 | 8.75 (8.29-9.22)                       |                                               |
|                                                 | 9.08 (8.80-9.35)                       |                                               |
|                                                 | 9.57 (9.43-9.72)                       |                                               |
|                                                 | 9.47 (9.25-9.70)                       |                                               |
|                                                 | 9.27 (9.04-9.50)                       |                                               |
|                                                 | 9.71 (9.60-9.83)                       |                                               |
|                                                 | 9.66 (9.50-9.81)                       |                                               |
| **Full-service**                              | 0.78 (0.64-1.00)                       |                                               |
|                                                 | 0.78 (0.64-1.00)                       |                                               |
|                                                 | 0.67 (0.36-0.98)                       |                                               |
|                                                 | 1.04 (0.72-1.35)                       |                                               |
|                                                 | 0.57 (0.31-0.79)                       |                                               |
|                                                 | 0.99 (0.59-1.40)                       |                                               |
|                                                 | 0.90 (0.54-1.26)                       |                                               |
|                                                 | 0.85 (0.49-1.21)                       |                                               |
| **Fast-food**                                 | 0.32 (0.21-0.54)                       |                                               |
|                                                 | 0.32 (0.21-0.54)                       |                                               |
|                                                 | 0.33 (0.18-0.47)                       |                                               |
|                                                 | 0.44 (0.23-0.65)                       |                                               |
|                                                 | 0.52 (0.20-0.84)                       |                                               |
|                                                 | 0.63 (0.39-0.87)                       |                                               |
|                                                 | 0.47 (0.32-0.62)                       |                                               |
|                                                 | 0.45 (0.28-0.61)                       |                                               |
| **2017-2018 versus 2003-2004, difference (95%CI)** |                                        |                                               |

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### Table: Survey-weighted AHA mean score (95% CI) and P-trend

| Diet Components (scoring range) (intake target) | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P-trend 2017-2018 versus 2003-2004, difference (95% CI) |
|--------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------------------------------------|
| **Fast-food**                                    | (5.33-6.44) | (5.41-6.66) | (5.62-6.80) | (6.04-7.29) | (5.96-7.09) | (6.03-6.83) | (5.74-7.02) | (6.28-7.37) | <0.001 (1.12, 2.32) |
| **Processed meat (0-10)**                       | 5.65      | 6.49      | 6.34      | 6.89      | 6.89      | 7.26      | 6.75      | 7.38      | 1.72 |
| **School**                                       | 8.01      | 7.88      | 7.95      | 8.15      | 7.84      | 8.20      | 7.90      | 8.67      | 0.66 |
| **Full-service**                                 | 8.93      | 8.84      | 9.17      | 8.66      | 9.22      | 9.03      | 8.79      | 9.21      | 0.28 |
| **Fast-food**                                    | 8.39      | 8.47      | 8.29      | 8.56      | 8.21      | 8.28      | 8.28      | 8.37      | 0.50 |
| **Sodium (0-10)**                                | 4.59      | 4.27      | 4.0       | 4.27      | 4.43      | 4.29      | 4.86      | 5.59      | 0.03 |
| **School**                                       | (4.34-4.83) | (3.96-4.58) | (3.80-4.19) | (3.90-4.63) | (4.11-4.76) | (4.08-4.5) | (4.54-5.18) | (5.46-5.73) | <0.001 (0.73, 1.29) |
| **Full-service**                                 | 3.02      | 3.10      | 3.16      | 3.17      | 3.61      | 2.83      | 2.85      | 2.35      | -0.68 |
| **Fast-food**                                    | (2.68-3.36) | (2.92-3.40) | (2.66-3.54) | (2.86-3.49) | (3.15-4.07) | (2.34-3.32) | (2.49-3.21) | (1.91-2.78) | 0.01 |
| **Saturated fat (0-10)**                         | 3.89      | 3.88      | 3.76      | 3.18      | 3.51      | 3.27      | 3.51      | 3.70      | -0.18 |
| **School**                                       | (3.62-4.15) | (3.56-4.19) | (3.44-4.07) | (2.75-3.60) | (3.12-3.89) | (3.02-3.53) | (3.26-3.76) | (3.47-3.94) | 0.02 |
| **Full-service**                                 | 3.55      | 3.42      | 3.57      | 3.84      | 4.37      | 5.27      | 4.95      | 5.48      | 1.92 |
| **Fast-food**                                    | (3.15-3.96) | (3.12-3.73) | (3.26-3.89) | (3.39-4.30) | (3.91-4.84) | (5.05-5.53) | (4.68-5.21) | (5.15-5.81) | <0.001 (1.40-2.45) |
| **Sodium (0-10)**                                | 4.18      | 4.46      | 4.57      | 4.39      | 4.99      | 4.84      | 4.24      | 4.50      | 0.33 |
| **School**                                       | (3.77-4.58) | (3.95-4.98) | (4.08-5.07) | (3.88-4.90) | (4.14-5.84) | (4.38-5.30) | (3.67-4.80) | (3.96-5.04) | 0.45 |
| **Full-service**                                 | 3.25      | 2.86      | 2.94      | 4.03      | 3.34      | 3.24      | 3.68      | 3.30      | 0.05 |
| **Fast-food**                                    | (2.96-3.54) | (2.62-3.11) | (2.63-3.24) | (3.54-4.52) | (2.95-3.74) | (2.89-3.60) | (3.33-4.03) | (3.0-3.61) | 0.03 |

Abbreviations: NHANES, National Health and Nutrition Examination Survey; AHA, American Heart Association.
Schools refer to food/beverages consumed from “K-12 school cafeteria”; full-service restaurants refer to food/beverages consumed from “restaurant with waiter/waitress”; and fast-food restaurants refer to food/beverages consumed from “restaurant fast food/pizza”.

a All meals, snacks, and beverages consumed from these sources. To account for varying serving sizes and amounts as well as facilitate interpretation of the overall nutritional quality of different sources of food as compared to diet quality scores and national dietary recommendations, all intakes were adjusted to 2000 kcal/d. See eText 1 for details of the AHA diet score.

All analyses incorporate the NHANES complex sampling design and survey weights to provide nationally representative estimates.

The test for P-trend across cycles evaluates the monotonic trend across the whole period.

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eTable 7. Trends in Proportion of US children Aged 5-19 Years with Poor or Intermediate Diet based on American Heart Association Diet Score, by Different Food Sources and by Age, Sex, Race/Ethnicity, Education, and Income, NHANES 2003-2018.

| Diet Quality by AHA Scores | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P-trend |
|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|
| **Poor diet quality**     |           |           |           |           |           |           |           |           |         |
| Grocery stores            | 53.2      | 48.8      | 47.6      | 44.9      | 43.3      | 45.1      | 45.4      | 45.1      | .006    |
| Restaurants               | 84.8      | 80.6      | 82.2      | 79.5      | 77.8      | 76.9      | 78.7      | 79.6      | .003    |
| Schools                   | 55.6      | 59.2      | 59.8      | 54.9      | 47.2      | 32.1      | 30.0      | 24.4      | <.001   |
| Others                    | 40.0      | 45.7      | 49.0      | 48.4      | 48.4      | 50.8      | 52.3      | 51.7      | <.001   |
| **Intermediate**          |           |           |           |           |           |           |           |           |         |
| Grocery stores            | 46.6      | 51.1      | 51.7      | 54.8      | 56.0      | 54.1      | 54.0      | 54.1      | .01     |
| Restaurants               | 15.2      | 19.4      | 17.8      | 20.5      | 22.2      | 23.1      | 21.3      | 20.4      | .003    |
| Schools                   | 44.3      | 40.8      | 40.1      | 45.1      | 52.6      | 67.6      | 69.8      | 74.8      | <.001   |
| Others                    | 59.7      | 54.1      | 51.0      | 51.6      | 51.6      | 49.2      | 47.6      | 48.2      | <.001   |
| **Ideal**                 |           |           |           |           |           |           |           |           |         |
| Grocery stores            | 0.20      | 0.09      | 0.73      | 0.29      | 0.66      | 0.86      | 0.64      | 0.85      | .02     |
| Restaurants               | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |        |
| Schools                   | 0.07      | 0.07      | 0.13      | 0.17      | 0.29      | 0.23      | 0.86      |          | .05     |
| Others                    | 0.27      | 0.12      | 0         | 0         | 0         | 0         | 0.08      | 0.09      | .44     |

Abbreviations: NHANES, National Health and Nutrition Examination Survey.

Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants ("restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information"), worksites ("cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray") and other sources refer to food items obtained from elsewhere ("sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).

- Percentages and CIs were estimated using survey weights to be nationally representative.
- Poor diet quality was defined as being less than 40% adherent (<32 points). Intermediate was defined as adherence of 40%-79.9% (32-63.9 points). Ideal was defined as 80% adherence or greater (≥64 points).
eTable 8. Trends in Proportion of US Children Aged 5-19 Years with Poor, Intermediate or Ideal Diet from School (K-12 only) and Restaurants (stratified by full service vs. fast food/quick-serve) based on American Heart Association Diet Score, NHANES 2003-2018.  

| Diet Quality by AHA Scores | Survey-weighted AHA mean score (95%CI) | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P-trend |
|----------------------------|----------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|
| **Full-Service Restaurant**|                                        |           |           |           |           |           |           |           |           |         |
| Poor^a                     |                                        | 69.3      | 71.1      | 70.4      | 70.8      | 65.7      | 64.9      | 70.8      | 70.2      | 0.48    |
|                           | (62.9-75.8)                            | (64.6-77.6)| (62.2-78.5)| (65.9-75.7)| (57.7-73.7)| (60.0-69.8)| (63.9-77.6)| (61.4-75.0)|          |
| Intermediate^b             |                                        | 30.5      | 28.9      | 29.6      | 29.2      | 34.3      | 35.1      | 29.3      | 31.8      | 0.46    |
|                           | (24.0-36.9)                            | (22.4-35.4)| (21.5-37.8)| (24.3-34.1)| (26.3-42.3)| (30.2-40.0)| (22.4-36.1)| (25.0-38.6)|          |
| Ideal^b                    |                                        | 0.18      | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0       |
|                           | (0.0-0.54)                             |           |           |           |           |           |           |           |           |         |
| **Fast-Food Restaurant**    |                                        | 13.5      | 17.2      | 13.6      | 19.9      | 19.7      | 19.6      | 19.2      | 18.8      | 0.001   |
|                           | (10.0-16.9)                            | (14.0-20.3)| (11.5-15.6)| (15.1-24.7)| (15.3-24.0)| (16.6-22.6)| (16.0-22.4)| (16.8-20.9)|          |
| **School**                 |                                        | 0.08      | 0.07      | 0.13      | 0.00      | 0.17      | 0.34      | 0.24      | 0.87      | 0.05    |
|                           | (0.0-0.22)                             | (0-0.21)  | (0-0.39)  | (0-0.41)  | (0-0.70)  | (0-0.56)  | (0-2.17)  |           |           |         |

Abbreviations: NHANES, National Health and Nutrition Examination Survey.
full-service restaurants refer to food/beverages consumed from “restaurant with waiter/waitress”; and fast-food restaurants refer to food/beverages consumed from “restaurant fast food/pizza”.

^a Percentages and CIs were estimated using survey weights to be nationally representative.

^b Poor diet quality was defined as being less than 40% adherent (<32 points). Intermediate was defined as adherence of 40%-79.9% (32-63.9 points). Ideal was defined as 80% adherence or greater (≥64 points).
Table 9. Sensitivity Analysisa on Trends in Percentage of Population with Poor or Intermediate Diet Based on American Heart Association Diet Score of 2020 Strategic Impact Goals for Meals Consumed from Different Sources by American Children Aged 5-19 Years, NHANES 2003-2018.

| Diet Quality by AHA Scores | Survey-weighted % (95% CI)b | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P - trend |
|---------------------------|------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Poor diet qualityc (<32)  |                              |           |           |           |           |           |           |           |           |           |
| Grocery stores            | 42.4 (39.1-45.8)             | 38.2 (33.1-43.6) | 37.2 (33.1-41.5) | 33.4 (31.9-34.9) | 32.0 (28.9-35.3) | 32.3 (28.4-36.6) | 34.2 (30.6-37.9) | 33.0 (28.9-37.0) | <.001     |
| Restaurants               | 70.4 (66.1-74.6)             | 62.6 (59.9-65.2) | 66.3 (62.4-70.2) | 58.9 (53.5-64.2) | 62.1 (57.2-67.1) | 63.1 (61.2-64.9) | 63.2 (59.9-66.5) | 62.7 (57.3-68.0) | .04       |
| Schools                   | 37.9 (32.9-42.9)             | 38.8 (33.0-44.6) | 39.2 (35.3-43.2) | 33.8 (27.8-39.7) | 28.8 (21.9-35.8) | 18.5 (14.7-22.3) | 19.5 (16.2-22.7) | 13.3 (10.6-15.9) | <.001     |
| Other sources             | 16.8 (13.7-19.9)             | 26.3 (23.4-29.2) | 23.8 (20.7-26.9) | 27.0 (24.5-29.6) | 28.7 (25.4-32.1) | 27.3 (21.8-32.7) | 25.8 (22.0-29.6) | 29.3 (24.0-35.2) | .001      |
| Intermediated (32-63.9)   |                              |           |           |           |           |           |           |           |           |           |
| Grocery stores            | 57.0 (53.5-60.3)             | 60.1 (55.1-64.9) | 61.0 (57.0-64.9) | 64.5 (62.9-66.2) | 64.6 (62.1-67.1) | 65.1 (61.4-68.6) | 63.1 (59.8-66.3) | 57.0 (53.6-60.4) | .01       |
| Restaurants               | 29.5 (25.3-33.8)             | 37.3 (34.7-40.4) | 33.6 (29.7-37.6) | 41.1 (35.7-46.5) | 37.8 (32.9-42.8) | 36.9 (35.1-38.8) | 36.6 (33.3-39.9) | 36.9 (31.5-42.3) | .05       |
| Schools                   | 61.7 (56.6-66.7)             | 60.5 (54.6-66.5) | 60.3 (56.3-64.4) | 65.7 (59.9-71.5) | 69.5 (62.5-76.5) | 79.6 (75.7-83.6) | 78.4 (75-81.8) | 81.3 (78.0-84.7) | <.001     |
| Other sources             | 82.3 (79.3-85.3)             | 72.3 (69.1-75.5) | 75.7 (72.7-78.6) | 72.2 (69.2-75.3) | 69.9 (66.6-73.2) | 72.4 (67.2-77.7) | 73.5 (69.7-77.3) | 69.5 (63.5-74.9) | .001      |
| Ideal (≥64)               |                              |           |           |           |           |           |           |           |           |           |
| Grocery stores            | 0.63 (0.26-1.51)             | 1.72 (1.03-2.86) | 1.79 (1.16-2.75) | 2.08 (1.44-3.0) | 3.36 (2.16-5.17) | 2.59 (1.91-3.50) | 2.75 (2.01-3.76) | 3.33 (2.22-4.43) | <.001     |
| Restaurants               | 0.10 (0.03-0.41)             | 0.10 (0.02-0.67) | 0.04 (0.02-0.67) | 0.02 (0.00-0.12) | 0.02 (0.00-0.12) | 0.03 (0.00-0.12) | 0.03 (0.00-0.12) | 0.22 (0.06-0.83) | .07       |
| Schools                   | 0.45 (0.06-0.83)             | 0.67 (0.19-1.15) | 0.43 (0.06-0.93) | 0.49 (0.26-3.04) | 1.65 (0.84-3.02) | 1.93 (1.35-2.94) | 2.15 (1.34-2.94) | 5.40 (3.64-7.16) | <.001     |
| Other sources             | 0.89 (0.45-2.83)             | 1.42 (0.05-1.03) | 0.54 (0.05-1.03) | 0.76 (0.43-2.25) | 1.34 (0.43-2.25) | 0.31 (0.11-1.24) | 0.68 (0.21-2.33) | 1.17 (0.59-2.33) | .79       |

Abbreviations: NHANES, National Health and Nutrition Examination Survey.
Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants (“restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information”), schools (“K-12 school cafeteria, childcare center”), worksites (“cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray) and other sources refer to food items obtained from elsewhere (“sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).

a Sensitivity analysis refers to diet quality based on the AHA score excluding fish/shellfish with a total score multiplied by 80/70.
b Percentages and CIs were estimated using survey weights to be nationally representative.
c Poor diet quality was defined as being less than 40% adherent (<32 points). Intermediate was defined as adherence of 40%-79.9% (32-63.9 points). Ideal was defined as 80% adherence or greater (≥64 points).

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| HEI-2015 | Survey-weighted AHA mean score (95% CI) | 2015-2016 versus 2003-2004, difference (95% CI) |
|----------|----------------------------------------|-----------------------------------------------|
| HEI-2015 Total Score
| Grocery | 52.2 (51.2-53.2) | -1.20 (0.28, 2.33) |
| Restaurants | 40.3 (39.2-40.4) | -0.96 (0.0, 1.92) |
| Worksites | 38.6 (38.7-39.8) | -0.33 (0.02, 0.65) |
| Other sources | 42.3 (41.6-43.0) | -0.73 (-1.30, 0.45) |
| Total vegetables<sup>b</sup>
| Grocery | 2.77 (2.70-2.83) | -0.03 (-0.17, 0.11) |
| Restaurants | 3.45 (3.34-3.55) | -0.53 (-0.72, -0.34) |
| Worksites | 1.40 (1.14-1.67) | 0.27 (-0.11, 0.64) |
| Other sources | 1.89 (1.85-2.00) | -0.34 (-0.67, -0.004) |
| Greens and beans<sup>b</sup>
| Grocery | 1.38 (1.28-1.47) | 0.21 (0.04, 0.38) |
| Restaurants | 1.01 (0.84-1.18) | 0.08 (-0.12, 0.27) |
| Worksites | 0.37 (0.19-0.56) | 0.04 (0.04, 0.59) |
| Other sources | 0.48 (0.42-0.55) | 0.04 (-0.06, 0.14) |
| Total fruits<sup>c</sup>
| Grocery | 2.54 (2.33-2.75) | -0.28 (-0.54, -0.008) |
| Restaurants | 0.42 (0.42-0.55) | -0.13 (-0.06, 0.14) |

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|                      | Worksites  | Other sources | Whole fruits $^d$ | Grocery  | Restaurants | Worksites  | Other sources | Whole grains | Total dairy $^a$ | Total protein foods $^b$ |
|----------------------|------------|---------------|------------------|----------|-------------|------------|---------------|--------------|------------------|------------------------|
|                      | (0.36-0.48) | (0.34-0.47)   | (0.31-0.41)      | (0.30-0.44) | (0.39-0.47) | (0.36-0.40) | (0.31-0.40)   | (0.23-0.36)  | (0.36-0.40)      | (0.34-0.40)             |
| Worksites            | 0.68       | 0.55          | 0.40             | 0.66      | 0.80        | 0.50        | 0.74          | 0.48         | -0.20            | 0.02                   |
| Other sources        | (0.52-0.85) | (0.36-0.74)   | (0.27-0.53)      | (0.54-0.77)| (0.47-1.14) | (0.29-0.70) | (0.52-0.96)   | (0.32-0.64)  | .91              | (-0.43, 0.03)         |
| Whole fruits $^d$    | 3.08       | 2.44          | 2.51             | 2.62      | 2.58        | 2.56        | 2.48          | 2.38         | -0.70            | (-1.0, -0.40)          |
| Grocery              | (2.87-3.3) | (2.32-2.57)   | (2.33-2.69)      | (2.54-2.7) | (2.45-2.72) | (2.42-2.69) | (2.30-2.66)   | (2.17-2.59)  | <.001             | (-1.0, -0.40)          |
| Restaurants          | 0.61       | 0.32          | 0.33             | 0.33      | 0.34        | 0.36        | 0.32          | 0.28         | -0.33            | (-0.43, -0.22)         |
| Worksites            | 0.83       | 0.35          | 0.36             | 0.57      | 0.57        | 0.49        | 0.54          | 0.36         | -0.48            | (-0.71, -0.24)         |
| Other sources        | 1.24       | 0.96          | 0.97             | 0.97      | 0.88        | 0.84        | 0.82          | 0.84         | -0.39            | (-0.54, -0.24)         |
| Whole grains         | 2.60       | 2.98          | 2.95             | 3.37      | 3.48        | 3.41        | 3.25          | 3.02         | 0.43             | (-1.0, 0.75)           |
| Grocery              | (2.40-2.79)| (2.80-3.15)   | (2.72-3.18)      | (3.22-3.52)| (3.32-3.65)| (3.26-3.56)| (3.07-3.43)   | (2.76-3.28)  | <.001             | (-1.0, 0.75)           |
| Restaurants          | 0.36       | 0.42          | 0.44             | 0.40      | 0.68        | 0.76        | 0.80          | 0.53         | 0.16             | (-0.02, 0.33)          |
| Worksites            | 0.85       | 0.61          | 0.61             | 1.0       | 1.09        | 1.11        | 0.94          | 0.63         | -0.23            | (-0.81, 0.36)          |
| Other sources        | 0.66       | 0.76          | 0.78             | 0.75      | 0.92        | 0.79        | 0.93          | 0.78         | 0.11             | (-0.07, 0.30)          |
| Total dairy $^a$     | 5.17       | 5.49          | 5.34             | 5.73      | 5.23        | 5.24        | 5.09          | 4.73         | -0.44            | (-0.72, -0.17)         |
| Grocery              | (4.96-5.38)| (5.32-5.67)   | (5.08-5.6)       | (5.63-5.83)| (4.99-5.47)| (5.07-5.42)| (4.83-5.35)| (4.55-4.9)  | <.001             | (-0.72, -0.17)         |
| Restaurants          | 3.97       | 4.09          | 4.19             | 4.43      | 4.66        | 4.63        | 4.30          | 4.30         | 0.33             | (-0.01, 0.64)          |
| Worksites            | 1.88       | 2.42          | 2.14             | 2.67      | 2.36        | 2.18        | 1.87          | 2.12         | 0.24             | (-0.39, 0.87)          |
| Other sources        | 1.79       | 2.28          | 2.20             | 2.31      | 2.02        | 2.31        | 2.11          | 1.93         | 0.14             | (-0.18, 0.45)          |
| Total protein foods $^b$ | 3.84      | 3.68          | 3.94             | 3.99      | 3.93        | 4.01        | 4.06          | 4.02         | 0.18             | (0.06-0.30)            |
| Grocery              | (3.75-3.92)| (3.79-3.98)   | (3.87-4.02)      | (3.91-4.06)| (3.85-4.01)| (3.98-4.05)| (3.97-4.15)| (3.94-4.10)| <.001             | (-0.06, 0.30)          |
| Restaurants          | 4.04       | 4.14          | 4.20             | 4.10      | 4.04        | 4.0         | 3.98          | 3.95         | -0.09            | (-0.29, 0.11)          |
| Worksites            | 1.69       | 1.78          | 1.34             | 1.82      | 2.12        | 1.69        | 1.70          | 2.21         | 0.52             | (-0.16, 0.88)          |
| Other sources        | 2.34       | 2.46          | 2.28             | 2.32      | 2.15        | 2.13        | 2.01          | 2.05         | <.001             | (-0.30, 0.05)          |
| Sodium                  | (2.14-2.55) | (2.27-2.64) | (2.15-2.40) | (2.11-2.54) | (1.99-2.30) | (1.94-2.32) | (1.87-2.15) | (1.92-2.17) | (-0.53, -0.06) |
|-------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|
| Seafood and plant       |             |             |             |             |             |             |             |             |               |
| protein                 |             |             |             |             |             |             |             |             |               |
| Grocery                 | 2.31        | 2.33        | 2.39        | 2.52        | 2.54        | 2.57        | 2.59        | 2.56        | 0.26          |
| Restaurants             | (2.16-2.45) | (2.18-2.48) | (2.24-2.53) | (2.43-2.62) | (2.44-2.63) | (2.46-2.68) | (2.45-2.73) | (2.42-2.72) | <.001 (0.04, 0.47) |
| Worksites               | 1.28        | 1.27        | 1.26        | 1.34        | 1.39        | 1.42        | 1.47        | 1.37        | 0.08          |
| Other sources           | 0.77        | 0.79        | 0.75        | 1.01        | 1.20        | 0.81        | 0.87        | 1.06        | -0.13         |
| (PUFAs + MUFAs) /SFAs   | <0.001      | <0.001      | <0.001      | <0.001      | <0.001      | <0.001      | <0.001      | <0.001      | <0.001        |
| moderation components   |             |             |             |             |             |             |             |             |               |
| Sodium                  |             |             |             |             |             |             |             |             |               |
| Grocery                 | 4.53        | 4.28        | 4.64        | 4.67        | 5.21        | 4.95        | 4.68        | 4.79        | 0.25          |
| Restaurants             | (4.42-4.65) | (4.09-4.46) | (4.4-4.88)  | (4.52-4.82) | (5.02-5.39) | (4.8-5.1)   | (4.52-4.85) | (4.57-5.01) | (0.004, 0.50) |
| Worksites               | 5.01        | 5.45        | 5.25        | 5.42        | 5.37        | 5.23        | 5.23        | 5.17        | -0.34         |
| Other sources           | (4.35-5.59) | (4.27-4.90) | (4.92-5.32) | (4.75-5.64) | (4.95-5.41) | (4.33-5.37) | (4.56-5.55) | (0.04)      | 0.04          |
| Refined grains          |             |             |             |             |             |             |             |             |               |
| Grocery                 | 5.54        | 5.61        | 5.54        | 4.87        | 5.05        | 5.04        | 5.08        | 5.48        | -0.06         |
| Restaurants             | (5.36-5.72) | (5.36-5.86) | (5.38-5.7)  | (4.72-5.03) | (4.92-5.17) | (4.90-5.18) | (4.86-5.3)  | (5.32-5.63) | <.001 (-0.30, 0.17) |
| Worksites               | 2.98        | 2.44        | 2.44        | 2.89        | 2.71        | 2.48        | 2.58        | 2.58        | -0.40         |
| Other sources           | 6.05        | 6.14        | 6.50        | 5.77        | 5.46        | 5.97        | 5.44        | 5.77        | -0.28         |
| Refined grains          |             |             |             |             |             |             |             |             |               |
| Grocery                 | 6.29        | 6.74        | 6.62        | 6.60        | 6.66        | 6.86        | 6.97        | 6.78        | 0.49          |
| Restaurants             | (6.12-6.47) | (6.56-6.91) | (6.44-6.8)  | (6.44-6.76) | (6.47-6.86) | (6.71-7.01) | (6.78-7.16) | (6.64-6.92) | <.001 (0.27, 0.71) |
| Worksites               | 4.49        | 4.51        | 4.50        | 4.48        | 4.76        | 4.53        | 4.62        | 4.42        | -0.07         |
| Other sources           | (4.18-4.80) | (4.31-4.72) | (4.32-4.69) | (4.28-4.67) | (4.51-5.02) | (4.37-4.69) | (4.35-4.89) | (4.09-4.75) | (-0.53, 0.38) |
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| Saturated fat     | (6.65-7.14) | (6.77-7.34) | (6.82-7.28) | (6.67-7.18) | (6.38-6.73) | (6.35-6.82) | (6.58-7.06) | (6.24-6.75) | (-0.76, -0.05) |
|------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| **Grocery**      | 6.33        | 6.23        | 6.54        | 6.70        | 6.83        | 6.42        | 6.07        | 5.81        | -0.52        |
| **Restaurants**  | (6.09-6.57) | (6.07-6.39) | (6.32-6.75) | (6.50-6.90) | (6.60-7.07) | (6.24-6.59) | (5.87-6.27) | (5.61-6.01) | <.001        |
| **Worksites**    | 4.51        | 4.40        | 4.15        | 4.73        | 4.88        | 4.86        | 4.57        | 4.25        | -0.26        |
| **Other sources**| (4.25-4.77) | (4.18-4.62) | (3.97-4.32) | (4.47-4.99) | (4.63-5.13) | (4.65-5.06) | (4.32-4.81) | (4.01-4.49) | .54          |
| **Added sugars** | (6.72-7.38) | (6.02-7.05) | (6.39-7.08) | (6.60-7.27) | (6.79-7.61) | (6.66-8.0)  | (6.44-7.48) | (5.93-7.08) | .85          |
| **Worksites**    | 7.05        | 6.53        | 6.73        | 6.93        | 7.20        | 7.33        | 6.96        | 6.51        | -0.54        |
| **Other sources**| (4.60-5.13) | (4.28-4.62) | (5.99-6.57) | (6.21-6.64) | (5.65-6.13) | (5.12-5.79) | (5.08-5.76) | (4.91-5.44) | <.001        |
| **Added sugars** | 5.84        | 6.16        | 6.10        | 6.39        | 6.54        | 6.58        | 6.80        | 6.63        | 0.79         |
| **Restaurants**  | (5.59-6.09) | (5.92-6.4)  | (5.76-6.45) | (6.24-6.54) | (6.33-6.74) | (6.38-6.78) | (6.58-7.02) | (6.37-6.88) | <.001        |
| **Worksites**    | 7.11        | 7.98        | 7.97        | 7.82        | 7.49        | 7.73        | 7.76        | 8.04        | 0.33         |
| **Other sources**| (7.52-7.91) | (7.80-8.16) | (7.76-8.18) | (7.65-7.99) | (7.31-7.67) | (7.56-7.9)  | (7.60-7.93) | (7.85-8.23) | .76          |
| **Added sugars** | 4.77        | 4.80        | 4.40        | 5.11        | 5.02        | 5.14        | 6.10        | 5.60        | 0.83         |
| **Worksites**    | (4.29-5.25) | (4.24-5.35) | (3.92-4.87) | (4.69-5.54) | (4.51-5.53) | (4.64-5.65) | (5.37-6.84) | (5.1-6.11)  | <.001        |
| **Other sources**| (5.96)       | (6.24)       | (6.29)       | (6.40)       | (5.75)       | (5.65)       | (6.01)       | (5.85)       | -0.11        |
| **Added sugars** | (5.71-6.21) | (5.94-6.55) | (5.97-6.62) | (6.09-6.70) | (5.44-6.06) | (5.33-5.97) | (5.77-6.26) | (5.49-6.22) | .03          |

Abbreviations: NHANES, National Health and Nutrition Examination Survey; HEI, Healthy Eating Index.

Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants (“restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information”), schools (“K-12 school cafeteria, childcare center”), worksites (“cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray) and other sources refer to food items obtained from elsewhere (“sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).

- Percentages and CIs were estimated using survey weights to be nationally representative.
- Includes legumes (beans and peas).
- Includes 100% fruit juice.
- Includes all forms except juice.
- Includes all milk products, such as fluid milk, yogurt, and cheese, and fortified soy beverages.
- Includes seafood, nuts, seeds, soy products (other than beverages), and legumes (beans and peas).
- Ratio of poly- and monounsaturated fatty acids (PUFAs and MUFAs) to saturated.

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| Diet Quality by AHA Scores | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P - trend |
|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|
| Poor diet qualityb (<32)  | 40.1      | 35.9      | 35.1      | 32.7      | 30.3      | 31.4      | 32.6      | 32.9      | .001     |
| Grocery stores            | (36.9-43.2)| (31.8-39.9)| (30.7-39.5)| (30.9-34.5)| (28.0-32.5)| (29.2-33.6)| (29.3-35.9)| (29.0-36.8)|          |
| Restaurants               | 65.4      | 67.6      | 68.1      | 64.7      | 63.3      | 61.3      | 63.7      | 65.2      | .07      |
| Worksites                 | 55.6      | 56.7      | 56.9      | 52.7      | 57.4      | 57.8      | 50.4      | 50.7      | .25      |
| Others                    | 33.8      | 39.8      | 40.0      | 38.3      | 38.7      | 42.7      | 41.9      | 43.8      | <.001    |
| Intermediateb (32-63.9)   | 58.6      | 61.8      | 62.7      | 64.6      | 66.8      | 65.7      | 64.6      | 64.8      | .01      |
| Grocery                   | (55.6-61.8)| (57.9-65.7)| (58.5-66.9)| (62.9-66.3)| (64.9-68.7)| (63.7-67.8)| (61.4-67.8)| (61.2-68.5)|          |
| Restaurants               | 34.6      | 32.4      | 31.8      | 35.2      | 36.6      | 38.7      | 36.3      | 34.8      | .07      |
| Worksites                 | 44.3      | 43.3      | 42.7      | 47.3      | 42.6      | 41.7      | 49.6      | 49.3      | .24      |
| Others                    | 66.0      | 60.0      | 59.8      | 61.6      | 61.1      | 57.1      | 57.9      | 55.7      | <.001    |
| Idealb (≥64)              | 58.6      | 61.8      | 62.7      | 64.6      | 66.8      | 65.7      | 64.6      | 64.8      | .01      |
| Grocery                   | (55.6-61.8)| (57.9-65.7)| (58.5-66.9)| (62.9-66.3)| (64.9-68.7)| (63.7-67.8)| (61.4-67.8)| (61.2-68.5)|          |
| Restaurants               | 34.6      | 32.4      | 31.8      | 35.2      | 36.6      | 38.7      | 36.3      | 34.8      | .07      |
| Worksites                 | 44.3      | 43.3      | 42.7      | 47.3      | 42.6      | 41.7      | 49.6      | 49.3      | .24      |
| Others                    | 66.0      | 60.0      | 59.8      | 61.6      | 61.1      | 57.1      | 57.9      | 55.7      | <.001    |

Abbreviations: NHANES, National Health and Nutrition Examination Survey.
Food sources were grouped as grocery stores (consumed food items obtained from "grocery or supermarket"), restaurants ("restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information"), schools ("K-12 school cafeteria, childcare center"), worksites ("cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray") and other sources refer to food items obtained from elsewhere ("sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others").

a Percentages and CIs were estimated using survey weights to be nationally representative.
b Poor diet quality was defined as being less than 40% adherent (<32 points). Intermediate was defined as adherence of 40%-79.9% (32-63.9 points). Ideal was defined as 80% adherence or greater (≥64 points).
### eTable 12. Sensitivity Analysis<sup>a</sup> on Trends in Proportion of US Adults Age 20+ Years with Poor, Intermediate or Ideal Diet based on American Heart Association Diet Score, by Different Food Sources, NHANES 2003-2018.

| Diet Quality by AHA Scores | Poor diet quality<sup>c</sup> (<32) | Intermediate<sup>c</sup> (32-63.9) | Ideal<sup>c</sup> (≥64) |
|----------------------------|-----------------------------------|-----------------------------------|-------------------------|
|                            | Survey-weighted % (95% CI)<sup>b</sup> |                                   |                         |
|                            | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P - trend |
| Grocery stores             | 30.0      | 28.7      | 27.8      | 25.0      | 21.3      | 22.4      | 24.9      | 23.8      | .002      |
| Restaurants                | 51.6      | 53.5      | 56.1      | 51.8      | 50.0      | 48.6      | 50.6      | 51.3      | .07       |
| Worksites                  | 14.7      | 18.8      | 16.2      | 12.9      | 18.3      | 16.9      | 14.5      | 17.9      | .78       |
| Others                     | 18.5      | 22.5      | 23.9      | 20.6      | 19.6      | 22.2      | 20.2      | 21.4      | .002      |
| Ideal<sup>c</sup> (≥64)    | 65.9      | 66.5      | 67.6      | 68.0      | 71.0      | 70.1      | 68.4      | 70.0      | .004      |
| Grocery stores             | 48.3      | 46.3      | 43.8      | 48.2      | 49.8      | 51.2      | 49.0      | 48.2      | .11       |
| Restaurants                | 85.2      | 80.7      | 83.2      | 85.4      | 80.9      | 80.7      | 84.4      | 81.9      | .56       |
| Worksites                  | 80.3      | 76.9      | 74.7(72-77.5) | 78.5 | 79.5      | 76.6      | 78.4      | 77.7      | .002      |
| Others                     | (78.4-82.1) | (74.7-79.1) | (77.5) | (75.5-81.5) | (76.9-82.1) | (73.6-79.5) | (75.5-81.3) | (74.5-80.9) |          |

**Abbreviations:** NHANES, National Health and Nutrition Examination Survey.

Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants (“restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information”), schools (“K-12 school cafeteria, childcare center”), worksites (“cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray) and other sources refer to food items obtained from elsewhere (“sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).

<sup>a</sup> Sensitivity analysis refers to diet quality based on the AHA score excluding fish/shellfish with a total score multiplied by 80/70.

<sup>b</sup> Percentages and CIs were estimated using survey weights to be nationally representative.

<sup>c</sup> Poor diet quality was defined as being less than 40% adherent (<32 points). Intermediate was defined as adherence of 40%-79.9% (32-63.9 points). Ideal was defined as 80% adherence or greater (≥64 points).

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eTable 13. Trends in Proportion of US Adults Aged 20+ Years with Poor, Intermediate or Ideal Diet from Restaurants based on American Heart Association Diet Score, NHANES 2003-2018.  

| Diet Quality by AHA Scores | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P-trend |
|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|
| **Full-Service Restaurant** |           |           |           |           |           |           |           |           |         |
| Poor<sup>a</sup>            | 49.2      | 50.1      | 53.9      | 50.0      | 45.5      | 43.6      | 52.0      | 52.5      | 0.96    |
| (44.7-53.8)                 | (45.5-54.7)| (50.4-57.4)| (46.1-54.0)| (41.4-49.5)| (38.4-48.8)| (47.3-56.7)| (47.1-57.9)|          |
| Intermediate<sup>b</sup>    | 50.6      | 49.9      | 46.0      | 50.0      | 54.2      | 56.3      | 47.9      | 47.3      | 0.98    |
| (46.1-55.2)                 | (45.3-54.5)| (42.4-49.5)| (46.0-53.9)| (50.4-58.0)| (51.1-61.5)| (43.2-52.7)| (41.8-52.8)|          |
| Ideal<sup>b</sup>           | 0.13      | 0.18      | 0.32      | 0.07      | 0.07      | 0.17      |           |           |         |
| (0.0-0.39)                  | (0.0-0.53)| (0-0.75)  | (0-0.75)  | (0-0.22)  | (0-0.52)  |           |           |           |
| **Fast-Food Restaurant**    |           |           |           |           |           |           |           |           |         |
| Poor<sup>a</sup>            | 74.9      | 79.3      | 76.4      | 75.6      | 72.8      | 71.2      | 70.1      | 72.9      | 0.001   |
| (72.2-77.7)                 | (76.2-82.4)| (74.0-78.8)| (71.8-79.3)| (69.9-75.7)| (68.7-73.6)| (66.0-74.3)| (69.2-76.7)|          |
| Intermediate<sup>b</sup>    | 25.1      | 20.6      | 23.6      | 24.4      | 27.2      | 28.9      | 29.9      | 27.1      | 0.001   |
| (22.3-27.8)                 | (17.5-23.7)| (21.2-26.0)| (20.7-28.2)| (24.3-30.1)| (26.4-31.3)| (25.7-34.0)| (23.3-30.8)|          |
| Ideal<sup>b</sup>           | 0.17      | 0.17      | 0.17      | 0.17      | 0.17      | 0.17      | 0.17      | 0.17      |         |
| (0.06-0.28)                 | (0-0.32)  | (0-0.32)  | (0-0.32)  | (0-0.32)  | (0-0.32)  | (0-0.32)  | (0-0.32)  | (0-0.32)  |

Abbreviations: NHANES, National Health and Nutrition Examination Survey.

full-service restaurants refer to food/beverages consumed from “restaurant with waiter/waitress”; and fast-food restaurants refer to food/beverages consumed from “restaurant fast food/pizza”.

<sup>a</sup> Percentages and CIs were estimated using survey weights to be nationally representative.
<sup>b</sup> Poor die quality was defined as being less than 40% adherent (<32 points). Intermediate was defined as adherence of 40%-79.9% (32-63.9 points). Ideal was defined as 80% adherence or greater (≥64 points).
Table 14. Trends in Estimated Percentage of Energy Intake from Grocery Stores, Restaurants, Schools and Other Sources Among American Children aged 5-19 years by Age, Sex, Race/Ethnicity, Parental Education, and Income, NHANES 2003-2018.

|                          | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|-----------------------------------------------|
| **Grocery stores**       |           |           |           |           |           |           |           |           |           |                                               |
| Age group, y             |           |           |           |           |           |           |           |           |           |                                               |
| 5-11                     | 69.6      | 68.7      | 68.2      | 68.8      | 66.8      | 66.4      | 65.9      | 68.8      | .15        | (-4.90, 3.24)                                |
|                          | (66.8-72.5) | (66.4-71.1) | (65.7-70.3) | (66.3-71.4) | (64.4-69.3) | (63.9-68.9) | (62.5-69.3) | (65.9-71.7) |           |                                               |
| 12-19                    | 66.2      | 66.6      | 65.0      | 68.2      | 59.9      | 62.9      | 60.8      | 61.0      | .22        | (-5.20, -2.80)                               |
|                          | (64.5-67.8) | (64.5-68.8) | (62.7-67.2) | (65.6-63.3) | (60.9-64.9) | (58.5-63) | (57.5-64.4) |           |           |                                               |
| **P for interaction**   | .35       |           |           |           |           |           |           |           |           |                                               |
| **Sex**                  |           |           |           |           |           |           |           |           |           |                                               |
| Female                   | 67.3      | 67.6      | 66.2      | 67.7      | 61.1      | 63.9      | 62.4      | 63.8      | <.001      | (-9.0, -1.40)                                |
|                          | (65.2-69.5) | (65.2-70) | (63.7-68.8) | (65.9-69.4) | (58.7-63.4) | (61.2-66.6) | (60.7-64.1) | (61.2-66.3) |           |                                               |
| Male                     | 68.1      | 67.6      | 66.4      | 69.4      | 65.0      | 65.0      | 63.9      | 65.3      | .01        | (-7.0, 1.38)                                 |
|                          | (66-70.3) | (65.8-69.3) | (64.3-68.5) | (67.2-71.6) | (62.7-67.2) | (63.0-67.0) | (59.9-67.8) | (61.7-68.9) |           |                                               |
| **P for interaction**   | .75       |           |           |           |           |           |           |           |           |                                               |
| **Race/ethnicity**b      |           |           |           |           |           |           |           |           |           |                                               |
| Non-Hispanic white       | 67.0      | 69.1      | 66.4      | 70.4      | 62.2      | 65.7      | 63.8      | 67.1      | .02        | (-4.80, 4.89)                                |
|                          | (64.5-69.6) | (67.4-70.8) | (63.6-69.8) | (67.4-73.4) | (59.2-65.2) | (63.1-68.3) | (60.2-67.4) | (62.9-71.2) |           |                                               |
| Non-Hispanic black       | 68.6      | 63.4      | 63.7      | 63.2      | 61.0      | 61.8      | 62.7      | 60.5      | .10        | (-8.10, -4.20)                               |
|                          | (63.3-74) | (59.2-67.5) | (59.2-68.3) | (61.1-65.4) | (55.3-66.4) | (58.4-65.2) | (60.2-65.3) | (57.9-63.1) |           |                                               |
| Hispanics                | 69        | 67        | 67.2      | 67.1      | 65.8      | 62.2      | 61.3      | 60.8      | .20        | (-8.20, -3.10)                               |
|                          | (65.9-72.1) | (63.2-70.9) | (64-70.4) | (64.5-69.6) | (62.8-68.3) | (59.4-65) | (58.5-64) | (56.8-64.8) |           |                                               |
| **P for interaction**   | .33       |           |           |           |           |           |           |           |           |                                               |
| **Education**            |           |           |           |           |           |           |           |           |           |                                               |
| <High school graduate    | 68.9      | 69.1      | 67.4      | 65.7      | 65.8      | 63.6      | 63.1      | 64.3      | .04        | (-4.59, 0.78)                                |
| High school graduate or GED | 67.0    | 66.8      | 64.6      | 68.3      | 60.4      | 64.3      | 62.0      | 62.9      | .06        | (-4.06, -3.06)                               |
| or some college          | (64.7-69.2) | (65.0-68.7) | (61.3-67.9) | (66.2-70.4) | (57.6-63.2) | (62.0-66.5) | (59.3-64.8) | (59.2-66.6) |           |                                               |
| College graduate or above| 67.5      | 67.6      | 69.6      | 70.3      | 66.1      | 65.1      | 65.0      | 68.6      | 1.06       |                                               |
|                          | (63.9-71.1) | (64.8-70.7) | (66.6-72.6) | (66.7-74.0) | (62.5-69.8) | (60.5-69.7) | (60.4-69.6) | (64.9-72.2) |           |                                               |
| **P for interaction**   | .45       |           |           |           |           |           |           |           |           |                                               |
| **Ratio of family income to poverty level**c |           |           |           |           |           |           |           |           |           |                                               |
| <1.30d                  | 68.5      | 67.6      | 67.1      | 67.9      | 62.8      | 64.0      | 63.4      | 63.0      | .05        | (-12.0, 0.95)                                |
|                          | (64.7-72.3) | (64.3-71) | (64.2-70.0) | (65.6-70.2) | (58.9-66.7) | (61.1-66.9) | (60.8-66) | (57.7-68.2) |           |                                               |

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| Race/ethnicity | Age group, y | Survey-weighted % (95% CI) | P for interaction | 2017-2018 vs. 2003-2004, difference (95% CI) |
|---------------|-------------|-----------------------------|------------------|------------------------------------------|
|               | 2003-2004   | 2005-2006                   | 2007-2008        | 2009-2010                                | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction | 2017-2018 vs. 2003-2004, difference (95% CI) |
| 1.30-3.49     | 67.3        | 68.7                        | 66.2             | 68.1                                     | 62.4       | 64.1       | 63.6       | 64.2       | .004                      | (-7.89, 1.63) |
|               | (63.7-70.9) | (66.5-71.0)                 | (62.6-69.8)      | (66.5-69.6)                              | (59.8-64.9) | (60.9-67.3) | (60.8-66.3) | (61.1-67.3) |                        |                      |
| ≥3.50         | 67.0        | 65.9                        | 65.6             | 68.7                                     | 63.1       | 65.0       | 62.2       | 68.3       | .51                       | (-4.31, 6.80) |
| P for interaction | .42       |                             |                  |                                         |            |            |            |            |                            |                      |

### Restaurants

| Age group, y | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------|
| 5-11         | 15.2      | 13.0      | 13.1      | 12.3      | 13.3      | 14.4      | 14.7      | 15.1      | .33               |
|              | (13.3-17.2)| (11.5-14.4)| (10.7-15.5)| (11.1-13.5)| (11.3-15.2)| (12.7-16)| (12.7-16.6)| (13.1-17.2)| (-2.90, 2.69) |
| 12-19        | 22.8      | 22.3      | 21.4      | 18.8      | 24.5      | 22.5      | 21.8      | 24.7      | 1.95              |
|              | (21.1-24.5)| (21-23.6)| (19.3-23.5)| (17.2-20.5)| (17.2-20.5)| (17.2-20.5)| (17.2-20.5)| (17.2-20.5)|                 |

### Sex

| Sex         | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------|
| Female      | 19.0      | 17.8      | 18.4      | 16.3      | 20.5      | 19.5      | 19.2      | 21.5      | .95               |
|             | (17.5-20.4)| (16.1-19.4)| (16.2-20.7)| (14.7-17.9)| (18.0-23.1)| (17.4-21)| (17.4-21)| (18.9-24.2)| (-3.70, 2.77) |
| Male        | 19.6      | 18.4      | 16.9      | 15.4      | 18.3      | 18.2      | 17.9      | 19.2      | -0.46             |
|             | (17.8-21.5)| (16.6-20.2)| (15.1-18.8)| (14.3-16.5)| (15.3-21.3)| (16.2-20.2)| (16.2-19.6)| (16.5-21.8)|                 |

### Race/ethnicity

| Race/ethnicity | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction |
|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------|
| Non-Hispanic  | 20.7      | 18.6      | 18.5      | 15.5      | 21.3      | 19.3      | 18.3      | 19.5      | -1.20             |
| white         | (18.7-22.7)| (17.3-19.9)| (15.9-21.1)| (13.7-17.3)| (17.4-25.3)| (17.3-21.3)| (16.1-20.5)| (16.8-22.2)| (-4.5, 2.13) |
| Non-Hispanic  | 17.7      | 17.1      | 18.4      | 18.1      | 17.7      | 20.1      | 19.1      | 22.0      | 4.23              |
| black         | (16-19.5) | (14.4-19.9)| (15.5-21.2)| (16.1-20.1)| (14.8-20.6)| (17.5-22.7)| (17.2-20.9)| (19.8-24.1)|                 |
| Hispanics     | 16.8      | 15.1      | 15.3      | 15.9      | 16.5      | 17.8      | 18.8      | 21.6      | 4.83              |
|              | (14.6-19)| (13.1-17.1)| (14-16.7) | (13.7-18) | (15-17.4)| (15-20.6)| (16.3-21.3)| (17.9-25.4)| (<.001 | (.47, 9.19) |

### Education

| Education | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------|
| High school graduate | 17.5 | 14.0 | 15.4 | 15.1 | 16.2 | 15.7 | 17.0 | 17.6 | .009 | (-4.30, 4.48) |
| High school graduate or GED or some college | 19.9 | 18.3 | 19.8 | 16.6 | 21.1 | 19.1 | 18.3 | 20.6 | .72 | (-2, 3.66) |
| College graduate or above | 19.6 | 21.2 | 16.0 | 15.5 | 19.2 | 20.8 | 19.5 | 20.5 | .86 | (-4.85, 6.57) |

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| Ratio of family income to poverty level | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|---------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------------------------------------|
| <1.30 ^d                             | 17.1      | 14.5      | 16.0      | 14.1      | 16.8      | 15.0      | 16.4      | 19.7      | .16       | (-3.0, 6.64)                                  |
| 1.30-3.49                            | 20.3      | 16.8      | 18.8      | 16.2      | 20.4      | 20.4      | 17.0      | 19.5      | .03       | (-3.8, 2.26)                                  |
| ≥3.50 ^e                             | 20.9      | 22.4      | 18.6      | 17.9      | 21.1      | 21.6      | 23.0      | 21.2      | .27       | (-5.7, 6.31)                                  |

### P for interaction

- School

- Age group, y
  - 5-11 (9.97) (7.78-12.2) (8.03-11.9) (8.77-14.5) (9.56-13.9) (10.1-14.6) (9.65-15.1) (9.57-14.3) (5.92-11.4) .84 (-4.8, 2.21)
  - 12-19 (6.19) (6.48-7.90) (4.38-6.65) (5.01-8.73) (6.53-7.47) (6.49-8.32) (6.38-8.14) (5.02-7.9) (3.80-6.94) .67 (-3.1, 1.50)

- Sex
  - Female (8.20) (6.36-10) (6.71-8.53) (6.26-10.9) (6.78-10.5) (7.59-11.6) (7.2-10.4) (7.98-10.9) (4.54-8.59) .65 (-4.4, 1.1)
  - Male (7.68) (7.45) (9.47) (9.19) (8.72) (9.50) (9.43) (7.19) .04 (-0.4, 1.1)

- Race/ethnicity
  - Non-Hispanic white (8.98) (4.98-9.55) (3.6-6.33) (4.1-10.6) (4.05-8.94) (5.37-10.2) (4.77-9.43) (6.56-9.3) (2.63-6.77) .95 (-5.2, 0.6)
  - Non-Hispanic black (4.97) (14.97-13) (11.2-17.3) (8.58-15.3) (11.2-17.6) (7.26-17.9) (9.62-13.8) (8.24-14.6) (7.87-11.9) .72 (-3.6, 5.36)
  - Hispanics (9.86) (9.57-11.8) (9.57-14.2) (9.12-14.5) (9.68-13.7) (8.46-13.5) (10.2-15.2) (9.60-13) (7.24-12.5) .78 (-3.2, 3.22)

- Parental Education
  - <High school graduate (9.81) (6.74-12.9) (8.42-13.8) (8.07-13.3) (11.1-15.3) (8.87-11.9) (9.26-14.8) (8.34-12.6) (7.34-14.1) .83 (-3.65, 5.46)
  - High school graduate or GED (7.86) (5.51-8.65) (6.47-8.65) (7.01-11.1) (6.97-10.8) (7.87-12.3) (8.55-11.1) (9.67-12.3) (4.93-9.49) .21 (-3.92, 2.62)

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| College graduate or above | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------|
|                          | 7.15      | 4.43      | 7.92      | 6.27      | 5.92      | 5.68      | 6.30      | 4.23      | .02              |
|                          | (4.69-9.61) | (2.29-6.57) | (4.31-11.5) | (3.82-8.71) | (3.20-8.64) | (3.24-8.11) | (4.42-8.18) | (2.81-5.66) | (-2.91)         |
| **Ratio of family income to poverty level** |         |           |           |           |           |           |           |           | .08             |
| <1.30^d                 | 10.4      | 11.6      | 10.9      | 12.5      | 12.6      | 13.2      | 12.6      | 8.60      | .98             |
|                        | (7.43-13.4) | (9.82-13.4) | (8.95-12.9) | (10.6-14.5) | (9.61-15.5) | (11.0-15.3) | (10.9-14.2) | (6.05-11.1) | (5.70, 2.11)    |
| 1.30-3.49              | 7.49      | 7.03      | 7.59      | 8.73      | 7.98      | 8.79      | 9.87      | 7.66      | 0.17            |
|                        | (4.83-10.2) | (5.46-8.59) | (5.72-9.46) | (6.07-11.4) | (6.10-9.86) | (6.89-10.7) | (7.81-11.9) | (5.38-9.94) | (-3.30, 3.67)   |
| ≥3.50^e               | 6.22      | 5.27      | 8.55      | 5.30      | 6.53      | 4.80      | 5.67      | 3.01      | -1.20           |
|                        | (4.85-7.58) | (3.22-7.32) | (2.0-8.60) | (3.75-9.31) | (2.78-6.82) | (3.74-7.60) | (1.554.48) | (1.50, 1.09) |                |
| **P for interaction**   | <.001     |           |           |           |           |           |           |           | .01             |
| Others                  |           |           |           |           |           |           |           |           |                 |
| **Age group, y**        |           |           |           |           |           |           |           |           |                 |
| 5-11                    | 5.17      | 8.32      | 7.27      | 7.11      | 7.59      | 6.83      | 7.48      | 7.41      | 2.24            |
|                        | (4.42-5.93) | (7.38-9.27) | (6.04-8.5) | (6.08-8.13) | (6.33-8.84) | (5.74-7.93) | (6.56-8.40) | (5.54-9.28) | (2.22, 4.25)    |
| 12-19                   | 4.86      | 5.52      | 6.77      | 6.41      | 9.05      | 8.16      | 10.1      | 8.93      | 4.08            |
|                        | (4.34-5.38) | (4.61-6.44) | (5.34-8.21) | (5.52-7.31) | (7.14-11.0) | (6.72-9.59) | (8.31-12.0) | (6.59-11.3) | (1.68, 6.47)    |
| **P for interaction**   | <.001     |           |           |           |           |           |           |           |                 |
| **Sex**                 |           |           |           |           |           |           |           |           |                 |
| Female                  | 5.48      | 7.01      | 6.78      | 7.42      | 8.82      | 7.82      | 9.03      | 8.14      | 2.66            |
|                        | (4.73-6.23) | (6.42-7.6) | (5.67-8.87) | (6.52-8.32) | (6.84-10.8) | (6.71-9.83) | (7.59-10.5) | (6.18-10.1) | (0.56, 4.76)    |
| Male                    | 4.55      | 6.58      | 7.22      | 6.03      | 7.97      | 7.30      | 8.80      | 8.32      | 3.77            |
|                        | (3.79-5.31) | (5.55-7.6) | (5.82-8.61) | (4.93-7.13) | (6.34-9.6) | (5.97-8.64) | (6.99-10.6) | (6.59-10.0) | (1.88, 5.65)    |
| **P for interaction**   | <.001     |           |           |           |           |           |           |           |                 |
| **Race/ethnicity**^b    |           |           |           |           |           |           |           |           |                 |
| Non-Hispanic white      | 5.28      | 7.37      | 7.77      | 7.53      | 8.70      | 7.88      | 9.94      | 8.71      | 3.43            |
|                        | (4.57-5.99) | (6.09-8.65) | (6.48-9.06) | (6.54-8.53) | (6.71-10.7) | (6.28-9.48) | (7.68-12.2) | (6.15-11.3) | (0.77, 6.09)    |
| Non-Hispanic black      | 4.67      | 5.23      | 5.99      | 4.33      | 8.75      | 6.38      | 6.74      | 7.66      | 2.98            |
|                        | (3.3-6.04) | (4.59-5.87) | (4.9-7.08) | (3.41-5.24) | (4.7-12.8) | (5.26-7.49) | (5.16-8.33) | (6.38-8.93) | (1.12, 4.85)    |
| Hispanics               | 4.39      | 5.97      | 5.62      | 5.39      | 6.99      | 7.30      | 8.64      | 7.73      | 3.34            |
|                        | (3.39-5.39) | (4.39-7.56) | (4.45-6.33) | (6.07-7.92) | (5.88-8.72) | (6.9-10.4) | (6.26-9.20) | (1.56, 5.12) |                 |
| **P for interaction**   | 0.06      |           |           |           |           |           |           |           |                 |

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### Survey-weighted % (95% CI) 

|                | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction | 2017-2018 versus 2003-2004, difference (95% CI) |
|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------|-----------------------------------------------|
| **<High school graduate** | 3.86      | 5.74      | 6.47      | 5.96      | 7.62      | 8.71      | 9.49      | 7.46      | <.00             | 3.86              |
| GED or some college | (3.23-4.49) | (4.43-7.05) | (4.64-8.30) | (4.85-7.06) | (6.06-9.18) | (5.99-11.4) | (7.40-11.6) | (5.88-9.03) | 1                | (3.23, 4.49)         |
| **College graduate or above** | 5.30      | 7.27      | 6.55      | 6.27      | 8.46      | 6.82      | 8.65      | 9.30      | .001             | 4.0               |
| (4.73-5.88) | (5.52-7.11) | (5.20-7.33) | (6.63-10.3) | (5.72-7.93) | (6.65-10.6) | (6.59-12.0) | .001 | 1.23, 6.76 |                             |
| College graduate or above | 5.75      | 6.59      | 6.50      | 7.88      | 8.80      | 8.40      | 9.24      | 6.75      | .04              | .99               |
| (4.18-7.33) | (5.10-8.08) | (5.07-7.83) | (6.07-9.69) | (6.22-11.4) | (7.46-9.34) | (6.94-11.5) | (4.90-8.60) | .04 | -1.43, 3.42 |

**P for interaction**

.02

**Ratio of family income to poverty level**

| Income Level | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction | 2017-2018 versus 2003-2004, difference (95% CI) |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------|-----------------------------------------------|
| **<1.30**<sup>a</sup> | 4.05      | 6.31      | 5.94      | 5.50      | 7.84      | 7.85      | 7.65      | 8.74      | 4.68             | .02                      |
| (4.14-4.69) | (4.12-7.97) | (4.83-7.04) | (4.49-6.51) | (5.99-9.7) | (6.27-9.43) | (5.98-9.32) | (4.65-12.8) | .002 | (0.54, 8.82) |
| **1.30-3.49** | 4.93      | 7.46      | 7.40      | 7.04      | 9.26      | 6.75      | 9.61      | 8.68      | .37              | .94, 5.57             |
| (3.91-5.95) | (6.36-8.56) | (5.94-8.87) | (5.90-8.17) | (5.82-12.7) | (5.36-13.1) | (7.37-11.8) | (7.18-10.2) | .001 | 1.94, 5.57 |
| **≥3.50**<sup>b</sup> | 5.79      | 6.44      | 7.24      | 8.15      | 8.24      | 8.58      | 9.16      | 7.47      | 1.37             | .02                  |
| (4.77-6.81) | (5.0-7.88) | (4.89-9.59) | (6.46-9.84) | (6.16-10.3) | (6.53-10.6) | (6.58-11.7) | (5.30-9.66) | .02 | -0.80, 3.54 |

**P for interaction**

.08

**Abbreviations:** NHANES, National Health and Nutrition Examination Survey.

Food sources were grouped as grocery stores (consumed food items obtained from "grocery or supermarket"), restaurants ("restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information"), schools ("K-12 school cafeteria, childcare center"), worksites ("cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray") and other sources refer to food items obtained from elsewhere ("sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).

<sup>a</sup> All percentages were survey-weighted; %, proportion.

<sup>b</sup> Trends in diet for the other race or mixed race group are not presented in the race/ethnicity-stratified results due to their small sample sizes.

<sup>c</sup> Represents the ratio of family income to the federal poverty threshold, adjusting for household size. For reference, the federal threshold in 2016 for a family of 4 was $24,300/y. A family of 4 earning $33,534/y would have a ratio of 1.38.

<sup>d</sup> Indicates a lower level of income.

<sup>e</sup> Indicates a higher level of income.
**eTable 15. Trends in Estimated Percentage of Energy Intake from Grocery Stores, Restaurants, Worksites and Other Sources Among Adults Aged 20 Years or Older by Age, Sex, Race/Ethnicity, Education and Income, NHANES 2003 to 2018.**

| Survey-weighted % (95% CI) a | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|-----------------------------------------------|
| **Grocery stores**           |           |           |           |           |           |           |           |           |           |                                               |
| **Age group, y**             |           |           |           |           |           |           |           |           |           |                                               |
| 20-49                        | 65.3      | 66.4      | 67.9      | 69.4      | 62.6      | 63.5      | 64.0      | 63.6      | <.001      | <.001 (-3.90, 0.56)                           |
| ≥50                          | 73.8      | 72.7      | 74.8      | 76.1      | 73.3      | 71.9      | 73.3      | 71.2      | .02        | (-5.10, 0.03)                                |
| **P for interaction**        | .002      |           |           |           |           |           |           |           |           |                                               |
| **Sex**                      |           |           |           |           |           |           |           |           |           |                                               |
| Female                       | 69.5      | 71.0      | 72.5      | 73.7      | 69.1      | 68.9      | 70.2      | 69.2      | .04        | (-2.60, 1.99)                                |
| Male                         | 68.1      | 67.0      | 69.0      | 70.8      | 65.8      | 65.7      | 66.5      | 65.2      | .001       | (-5.40, -0.41)                               |
| **P for interaction**        | .002      |           |           |           |           |           |           |           |           |                                               |
| **Race/ethnicity**           |           |           |           |           |           |           |           |           |           |                                               |
| Non-Hispanic                 | 68.4      | 68.4      | 70.5      | 71.7      | 67.6      | 67.5      | 69.1      | 67.4      | .21        | (-4.0, 1.96)                                 |
| white                        | 66.9-69.9 | 66.7-70.1 | 68.3-72.8 | 70.4-73  | 65.2-70.1 | 66.4-68.5 | 67.0-71.2 | 64.9-70  | .21        | -.10 (-4.0, 1.96)                            |
| Non-Hispanic                 | 70.6      | 68.7      | 69.9      | 74.1      | 64.4      | 64.1      | 63.6      | 63.3      | -7.30      |                                               |
| black                        | 66.9-74.4 | 66.5-70.9 | 67.2-72.6 | 71.5-76.6 | 60.5-68.2 | 62.3-66.0 | 60.6-66.5 | 60.7-65.9 | .001       | (-12.0, -2.8)                                |
| Hispanics                    | 70.7      | 71.8      | 71.6      | 73.7      | 68.8      | 68.8      | 67.2      | 67.4      | -3.30      |                                               |
| **P for interaction**        | .002      |           |           |           |           |           |           |           |           |                                               |
| **Education**                |           |           |           |           |           |           |           |           |           |                                               |
| <High school graduate        | 74.9      | 75.1      | 75.2      | 77.3      | 73.2      | 71.5      | 71.5      | 72.6      | .002       | (-5.40, 0.77)                                |
| High school                  | 73.6-76.2 | 72.9-77.3 | 73.1-77.2 | 74.9-79.7 | 71.6-74.7 | 69.6-73.4 | 67.9-75  | 69.8-75.4 | .002       | -2.30 (-5.40, 0.77)                          |
| graduate or GED              | 68.1      | 69.7      | 71.5      | 71.0      | 68.8      | 67.0      | 68.8      | 67.0      | -1.10      |                                               |
| Some college or above        | 67.8      | 68.2      | 68.6      | 70.6      | 65.9      | 66.0      | 67.5      | 65.2      | -2.60      |                                               |
| College graduate or above    | 66.4      | 65.5      | 69.2      | 72.0      | 65.4      | 67.1      | 67.9      | 67.9      | 1.48       |                                               |
| **P for interaction**        | .002      |           |           |           |           |           |           |           |           |                                               |
| **Ratio of family income to poverty level** |           |           |           |           |           |           |           |           |           |                                               |

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| Education | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------------------------------------|
| <1.30 d   | 73.4      | 75.9      | 74.8      | 73.5      | 69.4      | 69.5      | 70.1      | 69.1      | .001      | (-4.30)                                      |
|           | (71.5-75.3) | (74.7-77.9) | (72.5-77.1) | (71.8-75.2) | (62.9-75.9) | (67.1-71.9) | (67.5-72.8) | (65.2-73) |           |                                              |
| 1.30-3.49 | 68.7      | 70.8      | 71.7      | 73.7      | 67.8      | 67.9      | 68.3      | 67.6      | .02       | (-0.10)                                      |
|           | (65.9-71.5) | (68.5-73.1) | (68.8-74.6) | (71.8-75.5) | (65.4-70.2) | (65.7-70) | (66.5-70) | (65.6-69.6) |           |                                              |
| ≥3.50 e   | 66.9      | 65.1      | 68.0      | 70.0      | 65.2      | 65.3      | 66.9      | 65.8      | .05       | (-0.46)                                      |
|           | (65.6-68.7) | (63.2-66.9) | (65.7-70.4) | (67.8-71.5) | (62.7-67.7) | (63.8-66.9) | (64.3-69.6) | (63.1-68.4) |           |                                              |
| P for interaction | <.001 |          |          |          |          |          |          |          |          |                                              |
| Age group, y |          |          |          |          |          |          |          |          |          |                                              |
| 20-49     | 25.8      | 24.1      | 23.6      | 22.1      | 25.5      | 26.3      | 25.4      | 26.4      | .05       | (-1.80, 3.05)                                 |
|           | (24.4-27.1) | (22.3-25.9) | (21.9-25.3) | (21.2-23) | (24.3-26.8) | (24.3-28.3) | (23.7-27.2) | (24.4-28.4) |           |                                              |
| ≥50       | 17.2      | 17.4      | 16.8      | 14.9      | 16.9      | 18.4      | 16.6      | 18.3      | .24       | (-0.99, 3.22)                                 |
|           | (16.1-18.2) | (15.9-18.8) | (14.9-18.8) | (13.8-15.9) | (15.6-18.3) | (17.2-19.7) | (14.9-18.3) | (16.5-20.1) |           |                                              |
| P for interaction | <.001 |          |          |          |          |          |          |          |          |                                              |
| Sex       |          |          |          |          |          |          |          |          |          |                                              |
| Female    | 21.1      | 19.5      | 18.9      | 17.3      | 20.2      | 21.8      | 19.8      | 21.0      | .23       | (-2.40, 2.28)                                 |
|           | (19.9-22.3) | (18-21.1) | (17.1-20.8) | (16.2-18.4) | (19.0-21.4) | (20.2-23.4) | (18.2-21.4) | (19.0-23.0) |           |                                              |
| Male      | 23.4      | 23.1      | 22.7      | 20.7      | 23.1      | 23.6      | 22.8      | 24.1      | .75       | (0.75, 3.03)                                  |
|           | (21.9-24.8) | (21.2-25) | (20.7-24.8) | (19.5-22.0) | (21.4-24.8) | (22.2-25.1) | (20.9-24.7) | (22.4-25.8) |           |                                              |
| P for interaction | <.001 |          |          |          |          |          |          |          |          |                                              |
| Race/ethnicity b |          |          |          |          |          |          |          |          |          |                                              |
| Non-Hispanic | 22.2      | 21.2      | 20.7      | 19.2      | 21.8      | 22.7      | 20.5      | 22.2      | .07       | (2.80, 2.97)                                 |
| white     | (20.8-23.5) | (19.2-23.2) | (18.5-22.8) | (18.2-20.3) | (20-23.6) | (20.9-24.5) | (18.6-22.4) | (19.7-24.8) |           |                                              |
| Non-Hispanic | 22.0      | 23.2      | 22.5      | 18.6      | 23.1      | 24.2      | 25.3      | 26.0      | .04       | (2.67, 7.76)                                 |
| black     | (19.2-24.9) | (21.3-25.2) | (20.6-24.3) | (16.2-21) | (21.4-24.8) | (21.7-26.8) | (22.6-28) | (23.6-28.5) |           |                                              |
| Hispanics | 21.9      | 20.0      | 20.3      | 18.3      | 20.7      | 21.5      | 22.6      | 22.7      | .82       | (1.95, 3.54)                                 |
|           | (19.9-23.8) | (17.3-22.8) | (18.2-22.6) | (16.2-20.3) | (17.6-23.7) | (19.1-23.9) | (20.4-24.7) | (20.8-24.6) |           |                                              |
| P for interaction | .61 |          |          |          |          |          |          |          |          |                                              |
| Education |          |          |          |          |          |          |          |          |          |                                              |
| <High school | 17.5      | 17.2      | 16.6      | 15.5      | 17.5      | 18.5      | 17.7      | 18.9      | .21       | (1.5, 4.3)                                  |
| graduate  | (15.8-19.1) | (14.8-19.7) | (15-18.3) | (13.7-17.3) | (15.8-19.2) | (16.8-20.3) | (14.5-20.8) | (16.5-21.3) |           |                                              |
| High school | 23.4      | 20.9      | 21      | 20.3      | 21.0      | 21.9      | 20.4      | 22.4      | .21       | (1.5-4.3)                                  |
| graduate or GED | (21-25.8) | (18.7-23.1) | (18.5-23.4) | (18.7-21.9) | (18.8-23.2) | (20-23.9) | (18.1-22.7) | (19.2-25.5) |           |                                              |
| Some college or above | 22.6      | 21.7      | 22.3      | 20.7      | 23.0      | 24.5      | 22.5      | 24.4      | 1.81      | (5.28, 8.88)                                 |
|           | (20.9-24.3) | (19.5-23.9) | (20.4-24.2) | (19.7-21.6) | (20.9-25.1) | (22.8-26.2) | (20.9-24) | (21.8-27.0) |           |                                              |

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| Age group, y | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| 20-49       | 2.70      | 2.23      | 1.48      | 1.72      | 2.62      | 1.50      | 1.26      | 1.65      | <.001      |
| 50+         | 1.32      | 1.63      | 1.16      | 1.30      | 1.13      | 0.82      | 0.81      | 0.99      | <.001      |
| P for interaction | <.001 |            |           |            |           |           |           |           |            |
| Sex         |           |           |           |           |           |           |           |           |            |
| Female      | 2.19      | 1.76      | 1.23      | 1.56      | 1.70      | 0.97      | 1.0       | 1.24      | <.001      |
| Male        | 2.06      | 2.21      | 1.49      | 1.52      | 2.19      | 1.41      | 1.1       | 1.44      | <.001      |
| P for interaction | .48   |           |           |           |           |           |           |           |            |
| Race/ethnicity |         |           |           |           |           |           |           |           |            |
| Non-Hispanic white | 2.15      | 1.97      | 1.28      | 1.63      | 1.59      | 1.0       | 0.90      | 1.24      | <.001      |
| Non-Hispanic black | 2.24      | 2.43      | 1.96      | 1.58      | 3.71      | 2.16      | 1.56      | 1.55      | <.001      |
| Hispanics   | 1.53      | 1.94      | 1.36      | 1.23      | 2.04      | 1.21      | 1.02      | 1.53      | <.002      |
| P for interaction | .48   |           |           |           |           |           |           |           |            |

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|                | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend versus 2003-2004, difference (95% CI) |
|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------------------------------------------------|
| Race/ethnicity |           |           |           |           |           |           |           |           |                                                 |
| <High school   | 1.19      | 1.41      | 1.02      | 1.33      | 1.06      | 0.97      | 0.67      | 0.86      | -0.33                                           |
| graduate       | (0.69-1.69)| (0.64-2.18)| (0.73-1.32)| (0.53-2.14)| (0.46-1.67)| (0.59-1.35)| (0.35-0.99)| (0.47-1.24)| .05 (-0.97, 0.30)                                 |
| High school    | 1.43      | 2.08      | 1.28      | 1.32      | 1.56      | 1.16      | 0.76      | 1.37      | -0.06                                           |
| graduate or GED| (0.96-1.89)| (1.49-2.67)| (0.83-1.72)| (0.86-1.79)| (1.05-2.07)| (0.80-1.52)| (0.28-1.24)| (1.04-1.70)| .03 (-0.63, 0.51)                                 |
| Some college or above | (1.81-4.11)| (1.51-2.50)| (1.10-1.83)| (1.10-1.91)| (1.02-3.85)| (1.03-1.41)| (0.67-1.54)| (1.23-1.76)| .001 (-2.65, -0.28)                             |
| College graduate or above | (1.75-3.24)| (1.58-2.85)| (1.04-2.06)| (1.56-2.23)| (1.44-2.79)| (0.97-1.59)| (0.82-1.84)| (0.69-1.88)| .001 (-2.17, -0.26)                             |
| P for interaction| <.001     |           |           |           |           |           |           |           |                                                 |
| Ratio of family income to poverty level a |           |           |           |           |           |           |           |           |                                                 |
| <1.30 d        | 1.34      | 1.15      | 0.77      | 1.23      | 2.57      | 1.04      | 0.90      | 1.25      | -0.09                                           |
| (0.82-1.87)    | (0.74-1.55)| (0.51-1.03)| (0.88-1.59)| (0.43-4.70)| (0.76-1.32)| (0.42-1.37)| (0.66-1.85)| .98 (-0.88, 0.71)                               |
| 1.30-3.49      | 2.03      | 2.06      | 1.01      | 1.41      | 1.72      | 1.08      | 0.90      | 1.72      | -0.31                                           |
| (1.40-2.66)    | (1.41-2.71)| (0.79-1.24)| (1.02-1.80)| (1.51-1.93)| (0.88-1.28)| (0.58-1.21)| (1.20-2.23)| .03 (-1.10, 0.50)                               |
| ≥3.50 e        | 2.51      | 2.27      | 1.95      | 1.82      | 1.27      | 1.29      | 1.29      | 1.21      | -1.30                                           |
| (1.83-3.20)    | (1.96-2.58)| (1.52-2.38)| (1.09-2.55)| (0.95-1.59)| (0.77-1.80)| (0.77-1.80)| (0.73-1.70)| <.001 (-2.14, -0.46)                            |
| P for interaction| <.001     |           |           |           |           |           |           |           |                                                 |
| Others         |           |           |           |           |           |           |           |           |                                                 |
| Age group, y   |           |           |           |           |           |           |           |           |                                                 |
| 20-49          | 6.25      | 7.27      | 7.03      | 6.80      | 9.23      | 8.69      | 9.33      | 8.32      | <.001 (2.06)                                    |
| (5.70-6.81)    | (6.58-7.96)| (6.09-7.98)| (5.93-7.66)| (8.24-10.2)| (7.65-9.74)| (8.18-10.5)| (7.50-9.13)| .98 (1.08, 3.05)                               |
| ≥50            | 7.27      | 8.30      | 7.19      | 7.72      | 8.60      | 8.85      | 9.26      | 9.48      | .005 (0.07, 3.45)                               |
| (6.54-8.9)     | (6.75-9.85)| (6.42-7.95)| (6.73-8.72)| (6.95-10.2)| (7.97-9.74)| (7.85-10.7)| (8.27-10.7)| .76 (0.15, 4.03)                               |
| P for interaction| .06       |           |           |           |           |           |           |           |                                                 |
| Sex            |           |           |           |           |           |           |           |           |                                                 |
| Female         | 7.26      | 7.73      | 7.35      | 7.47      | 8.99      | 8.34      | 9.03      | 8.56      | .003 (1.30)                                     |
| (6.77-7.74)    | (6.62-8.85)| (6.43-8.27)| (6.80-8.14)| (7.89-10.1)| (7.47-9.21)| (7.98-10.1)| (7.33-9.79)| .98 (-0.02, 2.62)                              |
| Male           | 6.44      | 7.67      | 6.81      | 6.90      | 8.89      | 9.22      | 9.58      | 9.22      | <.001 (2.78)                                    |
| (5.61-7.28)    | (6.59-8.74)| (5.92-7.70)| (6.30-7.51)| (7.54-10.2)| (8.14-10.3)| (8.31-10.9)| (8.29-10.2)| .01 (1.53, 4.03)                               |
| P for interaction| .01       |           |           |           |           |           |           |           |                                                 |
| Race/ethnicity b |           |           |           |           |           |           |           |           |                                                 |
| Non-Hispanic white | 7.25      | 8.41      | 7.52      | 7.44      | 8.99      | 8.86      | 9.46      | 9.08      | .002 (1.83)                                     |
| (6.49-8.01)    | (7.13-9.7)| (6.62-8.42)| (6.85-8.02)| (7.62-10.4)| (7.78-9.95)| (8.07-10.8)| (7.84-10.3)| (0.37, 3.29)                                   |
| Non-Hispanic black | 5.11      | 5.62      | 5.67      | 5.76      | 8.82      | 9.46      | 9.57      | 9.11      | <.001 (4.0)                                     |
| (3.95-6.27)    | (4.69-6.55)| (4.76-6.57)| (4.67-6.86)| (7.6-10)  | (8.11-10.8)| (8.27-10.9)| (7.94-10.3)| (2.36, 5.65)                                   |

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| Survey-weighted % (95% CI) \(^a\) | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|----------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------------------------------|
| Hispanics                        |          |          |          |          |          |          |          |          |          | <.001                           | 2.50     | (1.32, 3.68) |
| P for interaction                |          | <.001    |          |          |          |          |          |          |          |                                  |          |          |
| Education                        |          |          |          |          |          |          |          |          |          |                                  |          |          |
| <High school graduate           | 6.42     | 6.24     | 7.19     | 5.87     | 8.25     | 9.01     | 10.2     | 7.66     | .001      | -1.24                           | (.65, 1.87)|          |
| (5.28-7.56)                     | (4.82-7.66) | (5.33-9.06) | (4.7-7.04) | (6.92-9.59) | (8.03-9.99) | (8.33-12.1) | (6.24-9.09) |          |          |                                  |          |          |
| High school graduate or GED     | 7.08     | 7.28     | 6.27     | 7.40     | 8.67     | 9.91     | 10.1     | 9.30     | <.001     | 2.22                            | (.66, 3.78)|          |
| (6.01-8.15)                     | (5.98-8.58) | (5.45-7.08) | (6.36-8.44) | (6.52-10.8) | (8.12-11.7) | (8.16-10.4) |          |          |          |                                  |          |          |
| Some college or above           | 6.68     | 8.14     | 7.62     | 7.23     | 8.69     | 8.26     | 8.98     | 8.94     | .003      | 2.26                            | (.76, 3.75)|          |
| (6.01-7.36)                     | (6.86-9.43) | (6.69-8.55) | (6.38-8.09) | (6.69-10.7) | (7.1-9.42) | (7.53-10.4) | (7.61-10.3) |          |          |                                  |          |          |
| College graduate or above       | 7.19     | 8.55     | 7.27     | 7.91     | 9.74     | 8.34     | 8.72     | 8.85     | .08       | 1.67                            | (-.38, 3.71)|          |
| (6.11-8.27)                     | (7.27-9.82) | (6.11-8.42) | (6.67-9.14) | (8.51-11) | (7.50-9.19) | (7.23-10.2) | (7.11-10.6) |          |          |                                  |          |          |
| P for interaction               |          |          |          |          |          |          |          |          | .047      |                                  |          |          |

**Ratio of family income to poverty level**\(^f\)

|                | <1.30 \(^d\) | 1.30-3.49 | ≥3.50 \(^e\) |
|----------------|--------------|------------|-------------|
|                | (5.30-6.88)  | (6.12-8.47) | (6.56-8.73) |
| 2003-2004      | 6.09         | 7.29       | 6.79        |
| (5.30-6.88)    | (6.12-8.47)  | (6.56-8.73) | (6.01-7.37) |
| 2005-2006      | 7.0          | 7.16       | 7.20        |
| (6.01-7.99)    | (5.67-8.65)  | (6.56-8.73) | (6.0-7.37)  |
| 2007-2008      | 6.66         | 8.20       | 6.93        |
| (5.86-7.46)    | (7.49-12)    | (6.29-7.56) | (6.66-8.80) |
| 2009-2010      | 6.97         | 7.89       | 9.32        |
| (5.61-8.98)    | (6.17-7.77)  | (6.52-9.27) | (7.55-10.4) |
| 2011-2012      | 7.0          | 8.99       | 8.62        |
| (5.67-8.65)    | (6.0-7.37)   | (7.5-9.74)  | (8.29-10.3) |
| 2013-2014      | 6.66         | 8.63       | 9.13        |
| (5.86-7.46)    | (6.29-7.56)  | (7.40-8.86) | (7.36-10.9) |
| 2015-2016      | 6.73         | 9.67       | 9.05        |
| (6.66-8.80)    | (8.23-11.1)  | (7.40-8.86) | (7.73-10.4) |
| 2017-2018      | 6.37         | 9.01       | 8.72        |
| (5.71-7.89)    | (7.72-9.24)  | (7.34-9.41) | (7.36-10.9) |

P for interaction: .10

**Abbreviations:** NHANES, National Health and Nutrition Examination Survey.

Food sources were grouped as grocery stores (consumed food items obtained from "grocery or supermarket"), restaurants ("restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information"), schools ("K-12 school cafeteria, childcare center"), worksites ("cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray) and other sources refer to food items obtained from elsewhere ("sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).

\(^a\) All percentages were survey-weighted; %, proportion.

\(^b\) Trends in diet for the other race or mixed race group are not presented in the race/ethnicity-stratified results due to their small sample sizes.

\(^c\) Represents the ratio of family income to the federal poverty threshold, adjusting for household size. For reference, the federal threshold in 2016 for a family of 4 was $24,300/y. A family of 4 earning $33,534/y would have a ratio of 1.38.

\(^d\) Indicates a lower level of income.

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° Indicates a higher level of income.
### Table 16. Trends in Proportions of US Children Aged 5-19 years with Poor or Intermediate Diet based on American Heart Association Diet Score, by Different Food Sources and by Age, Sex, Race/Ethnicity, Education and Income, NHANES 2003-2018

| Grocery stores | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | P for interaction |
|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|-------------------|
| **Poor Diet**  |           |           |           |           |           |           |           |           |             |                   |
| **Age group, y** |           |           |           |           |           |           |           |           |             |                   |
| 5-11           | 49.8      | 40.8      | 44.2      | 40.6      | 41.4      | 39.9      | 43.8      | 41.7      | .17          |                   |
|                | (44.5-55.0) | (32.1-49.5) | (39.7-48.7) | (37.2-44.1) | (38.3-46.6) | (34.0-45.9) | (39.6-48.1) | (36.2-47.2) |             |                   |
| 12-19          | 56.2      | 55.4      | 50.3      | 48.6      | 44.9      | 49.4      | 46.7      | 48.0      | .002         | .16               |
|                | (52.5-59.8) | (44.8-59.8) | (45.9-55.8) | (44.3-49.7) | (46.1-52.6) | (41.1-52.3) | (42.4-53.7) |             |             |                   |
| **Sex**        |           |           |           |           |           |           |           |           |             |                   |
| Female         | 52.2      | 49.3      | 42.6      | 43.0      | 40.6      | 41.1      | 41.1      | 41.0      | .001         |                   |
|                | (47.9-56.5) | (42.1-56.6) | (37.6-47.8) | (39.3-46.7) | (34.6-46.7) | (37.2-44.9) | (37.0-45.2) | (34.8-47.5) |             |                   |
| Male           | 54.1      | 48.3      | 52.6      | 46.9      | 45.9      | 48.7      | 49.4      | 49.1      | .11          | .22               |
|                | (48.6-59.6) | (42.7-54.0) | (46.1-59.0) | (43.9-49.9) | (41.2-50.6) | (43.3-54.1) | (43.6-55.2) | (45.0-53.2) |             |                   |
| **Race/ethnicity** |           |           |           |           |           |           |           |           |             |                   |
| Non-Hispanic white | 54.0      | 48.5      | 47.8      | 45.1      | 41.1      | 48.2      | 44.2      | 46.1      | .05          |                   |
|                | (48.6-60.0) | (41.2-58.6) | (40.8-54.9) | (40.4-49.9) | (34.9-47.3) | (42.2-54.2) | (38.1-50.2) | (39.3-53.0) |             |                   |
| Non-Hispanic black | 56.8      | 60.0      | 56.4      | 50.3      | 54.1      | 51.1      | 52.9      | 55.5      | .09          | .86               |
|                | (53.3-60.3) | (54.6-65.3) | (52.3-60.4) | (45.6-55.0) | (49.5-58.8) | (47.7-54.6) | (46.0-59.8) | (48.7-62.1) |             |                   |
| Hispanics      | 47.2      | 41.7      | 43.4      | 43.7      | 41.8      | 39.3      | 44.0      | 42.3      | .42          |                   |
|                | (40.1-54.3) | (37.6-56.0) | (36.9-50.1) | (37.3-50.1) | (35.6-48.0) | (35.3-43.4) | (39.0-49.1) | (36.4-48.4) |             |                   |
| **Parental Education** |           |           |           |           |           |           |           |           |             |                   |
| <High school graduate | 51.9      | 52.2      | 51.2      | 44.0      | 49.5      | 49.1      | 45.7      | 42.8      | .04          |                   |
|                | (44.5-59.3) | (47.5-57.4) | (44.3-58.0) | (37.9-50.1) | (41.5-57.6) | (43.2-55.1) | (38.1-53.3) | (35.6-50.1) |             |                   |
| High school graduate or GED or some college | 55.9      | 49.8      | 51.5      | 49.6      | 46.2      | 45.5      | 48.8      | 51.3      | .10          |                   |
|                | (49.6-62.2) | (44.1-55.4) | (47.6-55.1) | (45.8-53.3) | (42.2-50.2) | (41.2-49.8) | (43.5-54.1) | (45.9-56.7) |             |                   |
| College graduate or above | 45.1      | 41.2      | 36.8      | 36.9      | 32.1      | 40.6      | 36.9      | 35.2      | .26          |                   |
|                | (35.8-54.5) | (27.8-54.6) | (28.7-43.9) | (24.8-39.5) | (33.1-48.4) | (28.7-45.1) | (26.6-43.7) |             |             |                   |
| **Ratio of family income to poverty level** |           |           |           |           |           |           |           |           |             |                   |
| <1.30 d        | 52.7      | 50.2      | 49.6      | 53.7      | 49.9      | 46.0      | 53.6      | 49.7      | .60          |                   |
|                | (45.8-59.6) | (44.1-56.4) | (43.1-56.2) | (49.2-58.2) | (46.6-53.3) | (39.8-52.2) | (47.3-60.0) | (43.4-55.9) |             |                   |
| 1.30-3.49      | 55.5      | 50.4      | 53.2      | 45.2      | 44.0      | 48.6      | 48.3      | 48.1      | .11          |                   |
|                | (46.8-64.3) | (41.5-59.3) | (46.5-59.9) | (40.3-50.5) | (37.5-50.5) | (42.9-54.3) | (42.8-53.7) | (43-53.2) |             |                   |
| ≥3.50          | 51.0      | 45.4      | 41.1      | 37.7      | 33.8      | 39.0      | 34.2      | 37.4      | .003         |                   |
|                | (44.2-57.8) | (40.0-50.9) | (35.0-47.4) | (33.7-41.9) | (28.0-40.0) | (31.3-47.2) | (26.0-43.6) | (28.3-47.5) |             |                   |

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| Grocery                  | AHA Diet Score, Weighted Mean (95% CI) | P for trend | P for interaction |
|-------------------------|----------------------------------------|-------------|-------------------|
|                         | 2003-2004                              | 2005-2006   | 2007-2008         | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 |
| Intermediate Diet       |                                        |             |                   |           |           |           |           |           |
| Age group, y            |                                        |             |                   |           |           |           |           |           |
| 5-11                    | 50.2                                   | 59.1        | 54.5              | 58.9      | 58.2      | 58.7      | 55.6      | 58.1      | .19       | .92       |
|                         | (45.0-55.4)                            | (50.4-67.9) | (49.8-59.2)       | (55.8-61.9) | (53.1-63.3) | (52.9-64.6) | (51.4-59.8) | (52.6-63.6) | .23       | .85       |
| 12-19                   | 43.5                                   | 44.4        | 49.4              | 51.3      | 54.2      | 50.2      | 52.6      | 50.6      | .001      | .001      |
|                         | (40.2-46.8)                            | (39.3-48.3) | (42.9-54.0)       | (47.1-55.6) | (49.7-58.7) | (47.1-53.2) | (47.1-58.1) | (45.3-55.8) |           |           |
| Sex                     |                                        |             |                   |           |           |           |           |           |           |
| Female                  | 47.4                                   | 50.5        | 56.0              | 56.9      | 58.4      | 58.0      | 58.1      | 57.5      | .001      | .001      |
|                         | (43.5-51.2)                            | (43.3-57.8) | (50.9-61.0)       | (53.2-60.6) | (52.5-64.4) | (54.4-61.6) | (53.9-62.3) | (51.4-63.3) | .03       |
| Male                    | 45.9                                   | 51.7        | 47.3              | 52.6      | 53.7      | 50.5      | 50.1      | 50.7      | .16       | .03       |
|                         | (40.4-51.4)                            | (46.0-57.3) | (49.5-53.8)       | (49.0-58.4) | (45.0-56.0) | (44.5-55.7) | (46.7-54.7) |           |           |
| Race/ethnicity\(b\)     |                                        |             |                   |           |           |           |           |           |           |
| Non-Hispanic white      | 45.8                                   | 51.4        | 51.3              | 54.5      | 57.9      | 50.6      | 55.1      | 53.1      | .08       | .08       |
|                         | (39.9-51.6)                            | (44.1-58.7) | (44.2-58.4)       | (49.8-59.2) | (52.0-63.8) | (45.2-56.1) | (49.2-61.0) | (46.4-59.7) | .90       |
| Non-Hispanic black      | 43.2                                   | 39.9        | 43.5              | 49.5      | 45.9      | 48.6      | 47.1      | 43.7      | .12       | .12       |
|                         | (39.7-46.7)                            | (34.7-45.3) | (39.4-47.6)       | (44.8-54.2) | (41.2-50.5) | (45.1-52.1) | (40.2-54.0) | (37.3-50.3) | .48       |
| Hispanics               | 52.4                                   | 58.2        | 56.3              | 56.0      | 57.8      | 60.5      | 55.2      | 57.3      | .48       | .48       |
|                         | (45.3-59.6)                            | (54.0-62.3) | (49.7-62.7)       | (49.7-62.3) | (51.5-64.1) | (56.5-64.4) | (50.0-60.4) | (51.3-63.0) |           |
| Parental Education      |                                        |             |                   |           |           |           |           |           |           |
| <High school graduate   | 48.1                                   | 47.8        | 48.5              | 55.7      | 50.5      | 50.7      | 54.0      | 56.5      | .06       | .06       |
| High school graduate or | (40.7-55.4)                            | (42.6-53.0) | (41.8-55.2)       | (49.7-61.8) | (42.4-58.5) | (45.0-56.4) | (46.4-61.6) | (48.9-64.1) | .92       |
| some college            | 44.1                                   | 50.1        | 48.4              | 50.3      | 53.7      | 53.6      | 50.8      | 48.7      | .13       | .13       |
| College graduate or     | 53.8                                   | 58.7        | 61.3              | 62.5      | 66.3      | 58.3      | 61.7      | 62.2      | .38       | .38       |
| above                   | (44.2-63.3)                            | (45.3-72.1) | (53.6-69.0)       | (57.2-67.7) | (59.3-73.3) | (51.3-65.2) | (54.2-69.1) | (53.3-71.1) |           |
| Ratio of family income  |                                        |             |                   |           |           |           |           |           |           |
| to poverty level\(c\)  |                                        |             |                   |           |           |           |           |           |           |
| <1.30 \(d\)            | 47.2                                   | 49.7        | 49.3              | 46.2      | 49.9      | 53.6      | 46.2      | 49.9      | .61       | .61       |
|                         | (40.3-54.2)                            | (43.6-55.8) | (43.4-55.3)       | (41.8-50.7) | (46.6-53.3) | (47.5-59.8) | (39.7-52.7) | (43.8-56.1) | .18       |
| 1.30-3.49               | 44.4                                   | 49.4        | 46.3              | 54.4      | 55.6      | 50.4      | 51.1      | 51.7      | .13       |
|                         | (35.7-53.2)                            | (40.4-58.4) | (39.5-53.1)       | (49.7-59.1) | (49.3-61.9) | (45.5-55.8) | (45.7-56.5) | (46.6-56.8) |           |
| ≥3.50                   | 48.4                                   | 56.4        | 58.1              | 62.0      | 59.7      | 64.5      | 60.6      | 60.5      | .007      | .007      |
|                         | (43.2-53.6)                            | (49.1-60.0) | (51.7-64.2)       | (58.0-65.8) | (58.6-70.0) | (52.0-66.6) | (55.6-72.5) | (50.6-69.8) |           |
| Restaurants             |                                        |             |                   |           |           |           |           |           |           |
| Age group, y            |                                        |             |                   |           |           |           |           |           |           |
| 5-11                    | 86.4                                   | 76.8        | 79.9              | 79.0      | 76.4      | 78.4      | 80.9      | 80.7      | .37       | .37       |
|                         | (82.6-90.2)                            | (71.7-82.0) | (75.9-84)         | (74.7-83.2) | (72.3-80.5) | (74.2-82.7) | (76.0-85.8) | (75.7-85.7) | .09       |           |

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| Grocery       | 2003-2004     | 2005-2006     | 2007-2008     | 2009-2010     | 2011-2012     | 2013-2014     | 2015-2016     | 2017-2018     | P for trend | P for interaction |
|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------|-------------------|
| 12-19         | 83.5           | 83.3           | 83.8           | 79.8           | 78.7           | 75.7           | 76.8           | 78.8           | <.001       |                   |
| Sex           |                |                |                |                |                |                |                |                |             |                   |
| Female        | 82.1           | 76.1           | 78.2           | 78.7           | 77.4           | 75.0           | 78.0           | 77.4           | .30         |                   |
| Male          | 87.1           | 84.7           | 86.6           | 80.3           | 78.3           | 78.7           | 79.3           | 81.9           | .002        | .13               |
| Race/ethnicity |                |                |                |                |                |                |                |                |             |                   |
| Non-Hispanic white | 87.4     | 82.4           | 82.2           | 81.2           | 80.7           | 77.1           | 78.9           | 79.5           | .002        | .03               |
| Non-Hispanic black | 80.6     | 77.8           | 82.1           | 75.2           | 78.2           | 78.9           | 82.0           | 80.6           | .65         |                   |
| Hispanics     | 79.1           | 75.4           | 85.1           | 79.7           | 74.3           | 73.5           | 78.1           | 79.1           | .46         |                   |
| Parental Education |          |                |                |                |                |                |                |                |             |                   |
| <High school graduate | 83.5     | 80.1           | 87.5           | 80.6           | 80.9           | 78.9           | 78.3           | 74.0           | .006        |                   |
| High school graduate or GED or some college | 86.2     | 81.2           | 82.0           | 81.2           | 76.3           | 76.1           | 82.0           | 81.2           | .03         | .55               |
| College graduate or above | 83.3     | 80.6           | 78.4           | 77.6           | 78.4           | 76.5           | 74.8           | 79.4           | .27         |                   |
| Ratio of family income to poverty level |            |                |                |                |                |                |                |                |             |                   |
| <1.30 d       | 82.9           | 83.3           | 84.5           | 82.2           | 79.0           | 80.0           | 81.2           | 79.9           | .10         | .19               |
| 1.30-3.49     | 87.1           | 75.1           | 85.3           | 83.0           | 79.8           | 79.3           | 84.1           | 79.7           | .38         |                   |
| ≥3.50         | 85.0           | 85.5           | 77.9           | 75.8           | 75.1           | 72.4           | 71.3           | 81.1           | .004        |                   |
| Intermediate Diet |          |                |                |                |                |                |                |                |             |                   |
| Age group, y  |                |                |                |                |                |                |                |                |             |                   |
| 5-11          | 13.6           | 23.2           | 20.1           | 21.0           | 23.6           | 21.6           | 19.1           | 19.3           | .37         | .09               |
| 12-19         | 16.4           | 16.7           | 16.2           | 20.2           | 21.3           | 24.3           | 23.2           | 21.2           | .001        |                   |

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| Grocery | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | P for interaction |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|-----------------|
| Female  | 17.8      | 23.9      | 21.8      | 21.3      | 22.6      | 25.0      | 22.0      | 22.6      | .28         | .14             |
| Male    | 12.9      | 15.3      | 13.4      | 19.7      | 21.7      | 21.3      | 20.7      | 18.1      | .002        |                 |
| Race/ethnicityb | | | | | | | | | | |
| Non-Hispanic white | 12.5      | 17.6      | 17.8      | 18.8      | 19.3      | 22.9      | 21.1      | 20.5      | .002        | .03             |
| Non-Hispanic black | 19.4      | 22.2      | 17.9      | 24.8      | 21.8      | 21.1      | 18.0      | 19.4      | .65         |                 |
| Hispanics | 20.9      | 24.6      | 14.9      | 20.3      | 25.7      | 26.5      | 21.9      | 20.9      | .46         |                 |
| Parental Education | | | | | | | | | | |
| <High school graduate | 16.5      | 19.9      | 12.5      | 19.4      | 19.1      | 21.1      | 21.7      | 26        | .006        |                 |
| High school graduate or GED or some college | 13.7      | 18.8      | 18       | 18.8      | 23.7      | 23.9      | 18        | 18.8      | .03         | .56             |
| College graduate or above | 16.7      | 19.4      | 21.6      | 22.4      | 21.6      | 23.5      | 25.2      | 20.6      | .27         |                 |
| Ratio of family income to poverty levelc | | | | | | | | | | |
| <1.30d | 16.9      | 16.7      | 15.5      | 17.8      | 21.0      | 22.0      | 18.8      | 20.1      | .09         | .19             |
| 1.30-3.49 | 12.9      | 24.9      | 14.7      | 17.0      | 20.2      | 20.7      | 15.9      | 20.3      | .39         |                 |
| ≥3.50 | 15.0      | 14.5      | 22.1      | 24.2      | 24.9      | 27.6      | 28.7      | 18.9      | .004        |                 |
| Age group, y | | | | | | | | | | |
| 5-11 | 50.5      | 54.7      | 53.4      | 47.9      | 43.6      | 30.2      | 32.0      | 21.8      | <.001       | .003            |
| 12-19 | 62.6      | 66.0      | 68.0      | 64.2      | 52.6      | 34.9      | 27.4      | 27.5      | <.001       | .03             |
| Sex | | | | | | | | | | |
| Female | 51.0      | 54.7      | 58.6      | 54.6      | 45.0      | 31.3      | 29.5      | 22.5      | <.001       |                 |
| Male | 60.3      | 63.8      | 60.9      | 55.2      | 49.6      | 32.9      | 30.4      | 25.9      | <.001       | .13             |

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| Grocery | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | P for interaction |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|-----------------|
| Race/ethnicity** | | | | | | | | | | |
| Non-Hispanic white | 54.4 | 55.4 | 65.6 | 59.0 | 54.1 | 36.8 | 33.8 | 27.0 | <.001 | .12 |
| Non-Hispanic black | 53.1 | 62.0 | 48.3 | 45.9 | 42.9 | 25.5 | 23.4 | 23.9 | <.001 | |
| Hispanics | 54.9 | 58.6 | 58.8 | 47.4 | 38.8 | 31.4 | 28.2 | 21.1 | <.001 | |
| Parental Education | | | | | | | | | | |
| <High school graduate | 58.0 | 51.9 | 53.4 | 50.2 | 38.1 | 31.1 | 30.0 | 23.8 | <.001 | .39 |
| High school graduate or GED or some college | 52.0 | 62.8 | 62.9 | 53.5 | 52.3 | 34.0 | 28.5 | 27.6 | <.001 | |
| College graduate or above | 61.5 | 57.4 | 61.6 | 63.1 | 47.2 | 29.6 | 33.2 | 18.7 | <.001 | |
| Ratio of family income to poverty level*** | | | | | | | | | | |
| <1.30 | 54.2 | 54.7 | 54.0 | 51.5 | 43.1 | 30.6 | 30.5 | 28.6 | <.001 | .18 |
| 1.30-3.49 | 58.4 | 62.0 | 62.4 | 55.0 | 54.7 | 33.6 | 27.0 | 21.7 | <.001 | |
| ≥3.50 | 52.3 | 59.7 | 65.4 | 56.7 | 41.8 | 33.4 | 33.0 | 20.6 | <.001 | |
| Intermediate Diet | | | | | | | | | | |
| Age group, y | | | | | | | | | | |
| 5-11 | 49.5 | 45.2 | 46.4 | 52.1 | 56.3 | 69.7 | 67.6 | 77.1 | <.001 | .002 |
| 12-19 | 37.2 | 34.0 | 32.0 | 35.8 | 47.2 | 64.7 | 72.6 | 71.9 | <.001 | |
| Sex | | | | | | | | | | |
| Female | 49.0 | 45.1 | 41.1 | 45.4 | 54.9 | 68.2 | 70.5 | 76.2 | <.001 | |
| Male | 39.6 | 36.2 | 39.1 | 44.8 | 50.1 | 67.0 | 69.2 | 73.6 | <.001 | .13 |
| Race/ethnicity** | | | | | | | | | | |
| Non-Hispanic white | 45.5 | 44.6 | 34.4 | 41.0 | 45.9 | 63.2 | 66.2 | 73.0 | <.001 | .13 |
| Non-Hispanic black | 46.9 | 37.7 | 51.7 | 54.1 | 57.0 | 74.4 | 75.7 | 76.1 | <.001 | |

© 2021 Liu J et al. JAMA Network Open.
| Grocery | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | P for interaction |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|------------------|
| Hispanics | (45.1-50.2) | (34.0-48.7) | (35.3-46.1) | (45.3-59.9) | (53.5-67.8) | (63.6-72.6) | (66.1-76.8) | (66.2-86.3) | <.001 | .35 |
| Education | | | | | | | | | | |
| <High school graduate | (42.0-48.1) | (46.0-49.8) | (49.8-61.7) | (61.7-68.4) | (68.4-69.8) | (69.8-73.4) | | <.001 | .04 |
| High school graduate or GED or some college | (33.1-50.8) | (39.5-56.6) | (40.5-51.5) | (41.8-57.9) | (53.7-70.3) | (59.7-77.7) | (64.4-75.1) | (65.8-81) | <.001 | |
| College graduate or above | (47.9-71.1) | (37.1-46.5) | (46.5-47.6) | (47.6-65.7) | (65.7-71.2) | (71.2-72.0) | | <.001 | .01 |
| Gender | | | | | | | | | | |
| Female | (45.6-48.5) | (46.0-56.5) | (48.5-56.5) | (45.6-68.9) | (68.9-69.3) | (69.3-69.7) | | <.001 | .15 |
| Male | (40.6-45.0) | (38.0-45.0) | (45.0-45.3) | (45.3-66.1) | (66.1-72.9) | (72.9-77.6) | | <.001 | |
| Race/ethnicity | | | | | | | | | | |
| Non-Hispanic white | (43.8-46.0) | (47.5-51.7) | (51.7-50.7) | (50.7-53.0) | (53.0-56.7) | (56.7-62.2) | (50.8-62.8) | | <.001 | .22 |
| Non-Hispanic black | (40.8-46.9) | (40.5-51.5) | (40.0-54.9) | (45.9-56.4) | (45.0-56.4) | (46.4-59.5) | (51.2-62.2) | (50.8-62.8) | | <.001 | |
| Hispanics | (36.0-59.4) | (29.4-51.3) | (28.4-40.8) | (29.5-57.1) | (41.1-75.3) | (56.0-77.0) | (54.5-79.6) | (69.3-89.5) | | |

| Parental Education | | | | | | | | | | |

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### Parental Education

#### Age group, y

| Grocery                        | AHA Diet Score, Weighted Mean (95% CI)* | P for trend | P for interaction |
|--------------------------------|----------------------------------------|-------------|-------------------|
| <High school graduate         | 39.4 (34.2-44.5)                      | .48         | .12               |
| High school graduate          | 40.2 (37.0-51.0)                      | <.001       |                   |
| College graduate or GED or some college | 38.1 (26.7-49.4)      |             |                   |
| Ratio of family income to poverty level<sup>c</sup> | | | |
| <1.30<sup>d</sup>               | 39.1 (33.4-44.9)                      | .08         |                   |
| 1.30-3.49                      | 32.7 (24.6-40.8)                      | .001        | .36               |
| ≥3.50                          | 48.4 (38.0-58.9)                      | .09         |                   |

#### Intermediate Diet

#### Age group, y

| 5-11                           | 63.9 (53.5-74.3)                      | .18         | .24               |
| 12-19                          | 56.6 (52.2-59.5)                      | <.001       |                   |

#### Sex

| Female                        | 60.3 (54.4-66.2)                      | .01         |                   |
| Male                          | 59.0 (52.1-66.0)                      | .001        | .31               |

#### Race/ethnicity<sup>b</sup>

| Non-Hispanic white | 58.9 (51.6-66.3) | .001 | .04 |
| Non-Hispanic black  | 60.2 (53.5-66.8) | .002 |     |
| Hispanics           | 58.0 (51.3-64.8) | .98  |     |

#### Parental Education

| <High school graduate       | 60.6 (55.5-65.8) | .49  | .12 |
| High school graduate or GED or some college | 59.3 (52.3-66.3) | <.001 |     |

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### Grocery AHA Diet Score, Weighted Mean (95% CI)\(^a\)

| Grocery                                      | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | P for interaction |
|----------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|------------------|
| College graduate or above                    | 61.9      | 55.4      | 52.3      | 49.0      | 55.4      | 44.7      | 46.7      | 51.7      | .12          |                  |
| Ratio of family income to poverty level\(^c\) |           |           |           |           |           |           |           |           |             |                  |
| <1.30 \(^d\)                                | 60.9      | 57.4      | 57.4      | 48.9      | 51.7      | 53.6      | 51.3      | 53.6      | .09          |                  |
|                                             | (55.1-66.6)| (50.1-64.7)| (47.9-66.8)| (40.3-57.5)| (44.0-59.5)| (43.5-63.8)| (43.2-59.4)| (45.5-61.6)|            |                  |
| 1.30-3.49                                   | 66.5      | 50.4      | 48.8      | 52.8      | 53.0      | 48.4      | 48.1      | 43.5      | .001         | .39              |
|                                             | (61.3-70.8)| (44.1-59.4)| (41.4-65.2)| (40.9-57.7)| (44.9-61.0)| (39.5-57.2)| (40.7-55.4)| (37.4-49.6)|            |                  |
| ≥3.50                                       | 52.0      | 57.1      | 50.2      | 52.2      | 49.8      | 45.6      | 44.2      | 48.6      | .08          |                  |
|                                             | (41.3-62.7)| (50.0-64.3)| (42.2-58.1)| (44.5-59.9)| (40.9-58.8)| (33.9-57.2)| (35.4-53.1)| (41.2-56)  |            |                  |

Abbreviations: NHANES, National Health and Nutrition Examination Survey.

Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants (“restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information”), schools (“K-12 school cafeteria, childcare center”), worksites (“cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray) and other sources refer to food items obtained from elsewhere (“sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).

\(^a\) All percentages were survey-weighted; %, proportion.

\(^b\) Trends in diet for the other race or mixed race group are not presented in the race/ethnicity-stratified results due to their small sample sizes. \(^c\) Represents the ratio of family income to the federal poverty threshold, adjusting for household size. For reference, the federal threshold in 2016 for a family of 4 was $24,300/y. A family of 4 earning $33,534/y would have a ratio of 1.38.

\(^d\) Indicates a lower level of income.

\(^e\) Indicates a higher level of income.
### Table 17. Trends in American Heart Association Diet Score for Meals Consumed from Different Sources by Age Group, Sex, Race/Ethnicity, Parental Education, and Income among American Children aged 5-19 years, NHANES 2003-2018

| Age group, y | AHA Diet Score, Weighted Mean (95% CI) | P for trend 2017-2018 versus 2003-2004, difference (95% CI) |
|--------------|----------------------------------------|-------------------------------------------------------------|
|              | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 |
| **Grocery stores** |          |          |          |          |          |          |          |          |
| **Sex** |          |          |          |          |          |          |          |          |
| Female | 31.7 | (30.7-32.8) | 31.2 | (30.6-31.8) | 31.4 | (30.8-32.1) | 31.7 | (31.0-32.4) | 31.8 | (31.2-32.4) | .45 | .001 (1.39, 5.27) |
| Male | 30.6 | (29.8-31.5) | 31.4 | (30.0-32.9) | 33.0 | (32.3-33.7) | 33.3 | (32.9-34.0) | 32.9 | (31.7-34.1) | .17 | .002 (1.80, 6.07) |
| **Race/ethnicity** |          |          |          |          |          |          |          |          |
| Non-Hispanic white | 31.0 | (29.7-32.4) | 32.9 | (30.9-33.9) | 32.9 | (31.1-34.8) | 33.8 | (32.7-35.0) | 33.8 | (31.7-35.0) | .006 | (.001, 5.88) |
| Non-Hispanic black | 29.9 | (29.1-30.7) | 30.5 | (28.9-30.7) | 32.0 | (29.2-31.7) | 31.5 | (30.2-32.7) | 32.1 | (30.1-33.2) | .01 | (.004, 3.24) |
| Hispanics | 32.0 | (30.5-33.6) | 33.3 | (32.8-35.1) | 34.1 | (31.8-34.8) | 34.9 | (32.1-34.0) | 35.0 | (32.6-35.6) | .006 | (.14, 5.43) |
| **Parental Education** |          |          |          |          |          |          |          |          |
| <High school graduate | 31.0 | (29.1-32.9) | 31.8 | (30.2-33.5) | 31.3 | (29.5-33.1) | 33.3 | (32.0-34.7) | 32.3 | (30.5-34.1) | .009 | (.007, 5.96) |
| High school graduate or GED or some college | 30.1 | (29.1-31.2) | 31.6 | (30.7-32.5) | 32.7 | (31.7-33.7) | 33.7 | (32.5-34.8) | 33.6 | (32.2-34.9) | .004 | (.03, 4.53) |
| College graduate or above | 34.5 | (32.0-37.0) | 36.9 | (35.0-37.7) | 35.9 | (34.8-38.0) | 39.3 | (37.1-41.6) | 36.3 | (34.3-38.4) | .04 | (-.49, 6.01) |
| P for interaction | .69 | | | | | | | | | |
| **Ratio of family income to poverty level** |          |          |          |          |          |          |          |          |
| <1.30 | 31.4 | (29.7-33.1) | 32.2 | (30.5-33.8) | 32.2 | (30.3-34.1) | 31.5 | (30.4-32.6) | 32.6 | (31.9-33.4) | .40 | (.40, 4.42) | 1.76 | .003 (0.97, 4.83) | 2.90 |
| 1.30-1.80 | 30.9 | (29.4-32.5) | 30.9 | (29.8-32.8) | 31.8 | (30.8-32.9) | 32.8 | (30.8-34.1) | 33.1 | (31.1-35.1) | .40 | (.004, 4.88) | 3.33 | .001 (1.39, 5.27) |
| ≥1.80 | 30.8 | (29.1-32.6) | 32.1 | (30.7-33.6) | 32.8 | (31.3-34.5) | 33.7 | (32.7-34.8) | 33.5 | (31.1-35.9) | .40 | (.003, 4.93) | 3.80 | .006 (0.35, 5.43) | 3.80 |

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| Race/ethnicity      | AHA Diet Score, Weighted Mean (95% CI)a | P for trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|---------------------|------------------------------------------|-------------|-----------------------------------------------|
|                     | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 |
| Non-Hispanic white  | 24.3      | 25.7      | 25.2      | 26.5      | 25.8      | 25.8      | 25.4      | 26.6      | 2.30       | .03       | (0.71, 3.88) |
| Non-Hispanic black  | 25.4      | 26.7      | 25.2      | 26.6      | 25.8      | 25.8      | 25.4      | 26.6      | 2.30       | .03       | (0.71, 3.88) |
| Hispanics           | 25.8      | 26.7      | 25.2      | 25.5      | 26.7      | 26.7      | 26.0      | 26.1      | 0.26       | .30       | (-1.80, 1.05) |
| Parental Education  |                                        | .09         | .09       | .09       | .09       | .09       | .09       | .09       | .09        | .09       | .09       |
| <High school graduate | 25.4      | 25.7      | 24.1      | 25.8      | 25.7      | 25.4      | 25.8      | 26.9      | 1.52       | .08       | (-0.40, 3.43) |
| High school graduate or GED or some college | 24.5      | 25.8      | 25.2      | 26.2      | 26.5      | 25.9      | 25.0      | 25.6      | 1.09       | .25       | (-0.14, 2.33) |
| College graduate or above | 24.7      | 26.8      | 25.9      | 26.9      | 26.5      | 26.8      | 26.9      | 26.8      | 2.05       | .13       | (-0.18, 4.28) |

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| Race/ethnicity | Sex | Age group, y | AHA Diet Score, Weighted Mean (95% CI) | P for trend versus 2003-2004, difference (95% CI) |
|----------------|-----|--------------|----------------------------------------|-----------------------------------------------|
|                |     |              | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 |
|                |     |              | <1.30d    |           |           |           |           |           |           |           |           |
|                |     |              | (24.8-26.7) | (25.1-27.1) | (23.9-25.4) | (24.5-26.6) | (24.9-26.9) | (25.4-26.9) | (23.9-26.6) | (23.7-26.5) | <.001 |
|                |     |              | 1.30-3.49 |           |           |           |           |           |           |           |           |
|                |     |              | (22.9-24.8) | (25.5-27.3) | (23.8-26.1) | (24.8-27.0) | (24.0-26.4) | (23.5-26.6) | (23.7-26.3) | (25.0-27.3) | .22 |
|                |     |              | ≥3.50e    |           |           |           |           |           |           |           |           |
|                |     |              | (23.8-25.9) | (24.4-26.7) | (24.9-27.3) | (25.5-28.5) | (26.6-29.0) | (26.7-28.2) | (25.4-28.5) | (25.7-28.0) | .001 |

**P for interaction**

| Schools | 2017-2018 |
|----------------|-----------|
|              | 7.82      |

| Age group, y | AHA Diet Score, Weighted Mean (95% CI) | P for interaction |
|--------------|----------------------------------------|-------------------|
| 5-11         |                                        | .02               |
| 12-19        |                                        | .003              |

| Sex | AHA Diet Score, Weighted Mean (95% CI) | P for interaction |
|-----|----------------------------------------|-------------------|
| Female |                                        | .06               |

| Race/ethnicity | AHA Diet Score, Weighted Mean (95% CI) | P for interaction |
|----------------|----------------------------------------|-------------------|
| Non-Hispanic white |                                        | .01               |

| Parental Education | AHA Diet Score, Weighted Mean (95% CI) | P for interaction |
|--------------------|----------------------------------------|-------------------|
| <High school graduate |                                        | .71               |

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| Ratio of family income to poverty level | AHA Diet Score, Weighted Mean (95% CI) | P for interaction | P for trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|---------------------------------------|----------------------------------------|------------------|------------|-----------------------------------------------|
|                                       | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 |
| <1.30<sup>d</sup>                     | 32.1      | 31.1     | 31.3      | 32.2      | 34.5      | 37.5      | 37.8      | 39.7      | <.001      | (5.31, 9.85) |
|                                       | (30.5-33.7) | (29.1-33.2) | (29.7-32.8) | (30.3-34.2) | (33.0-36.0) | (36.4-38.6) | (36.3-39.3) | (38.1-41.3) | .758      |
| 1.30-3.49                             | 30.7      | 30.3     | 29.7      | 31.8      | 32.3      | 36.3      | 38.6      | 39.9      | <.001      | (7.60, 10.6) |
|                                       | (29.7-31.8) | (28.6-31.9) | (28.1-31.3) | (29.7-34.0) | (30.0-34.7) | (34.8-37.7) | (37.7-39.5) | (38.8-40.9) | .912      |
| ≥3.50<sup>e</sup>                     | 31.1      | 30.5     | 29.7      | 31.2      | 33.9      | 36.9      | 37.5      | 38.9      | <.001      | (4.63, 11.0) |
|                                       | (28.6-33.6) | (28.3-32.8) | (28.1-31.3) | (28.9-33.5) | (31.9-36.0) | (33.6-40.3) | (34.8-40.1) | (37.0-40.9) | .40       |
| P for interaction                     | <.40      |          |           |           |           |           |           |           |           |            |
| Others                                |           |           |           |           |           |           |           |           |           |            |
| Age group, y                          |           |           |           |           |           |           |           |           |           |            |
| 5-11                                  | 35.4      | 34.2     | 33.2      | 34.0      | 33.7      | 32.6      | 33.8      | 34.1      | -1.30      | (-3.90, 1.21) |
|                                       | (33.9-37.0) | (32.5-35.9) | (31.5-35.0) | (33.3-34.6) | (31.3-36.1) | (31.4-33.7) | (32.8-34.9) | (32.1-36.1) | .29       |
| 12-19                                 | 34.6      | 33.0     | 33.5      | 32.7      | 31.8      | 32.1      | 32.0      | 32.1      | -2.50      | (-3.90, -1.10) |
|                                       | (33.9-35.3) | (32.1-33.9) | (31.9-35.0) | (31.2-34.1) | (30.5-33.1) | (31.0-33.3) | (30.8-33.2) | (30.9-33.3) | <.001     |
| P for interaction                     | <.40      |          |           |           |           |           |           |           |           |            |
| Sex                                   |           |           |           |           |           |           |           |           |           |            |
| Female                                | 35.6      | 33.3     | 34.0      | 34.5      | 33.4      | 32.7      | 33.4      | 33.9      | -1.70      | (-3.60, 0.20) |
|                                       | (34.4-36.7) | (31.9-34.7) | (32.5-35.5) | (33.5-35.4) | (31.9-34.9) | (31.5-33.8) | (32.3-34.5) | (32.4-35.4) | .08       |
| Male                                  | 34.4      | 33.9     | 32.7      | 32.1      | 31.9      | 32.0      | 32.3      | 32.2      | -2.20      | (-4.10, -0.28) |
|                                       | (33.3-35.5) | (32.1-35.8) | (31.7-33.8) | (31.5-32.6) | (30.5-33.4) | (30.8-33.2) | (31.4-33.2) | (30.6-33.7) | .07       |
| P for interaction                     | <.40      |          |           |           |           |           |           |           |           |            |
| Race/ethnicity<sup>b</sup>            |           |           |           |           |           |           |           |           |           |            |
| Non-Hispanic white                    | 34.9      | 33.3     | 33.0      | 33.0      | 31.9      | 31.0      | 32.1      | 32.5      | -2.40      | (-5.00,-0.12) |
|                                       | (33.9-35.9) | (31.6-35.1) | (31.2-34.7) | (32.1-34.0) | (30.3-33.5) | (29.6-32.3) | (31.0-33.2) | (30.2-34.8) | .008      |
| Non-Hispanic black                    | 34.5      | 34.0     | 34.1      | 33.8      | 32.6      | 33.6      | 34.4      | 32.2      | -2.40      | (-4.50,-0.31) |
|                                       | (33.2-35.9) | (32.5-35.4) | (32.6-35.6) | (31.4-36.2) | (30.6-34.6) | (32.3-35.0) | (33.0-35.7) | (30.6-33.7) | .09       |
| Hispanics                             | 34.8      | 34.1     | 34.1      | 32.9      | 34.0      | 33.7      | 33.2      | 35.1      | 0.31       | (-1.80, 2.43) |
|                                       | (33.5-36.1) | (32.2-36.1) | (32.7-35.4) | (31.6-34.3) | (32.7-35.3) | (33.1-34.4) | (31.4-35.0) | (33.4-36.8) | .99       |
| P for interaction                     | <.40      |          |           |           |           |           |           |           |           |            |
| Parental Education                    |           |           |           |           |           |           |           |           |           |            |
| <High school graduate                 | 35.1      | 32.8     | 33.4      | 33.5      | 32.2      | 33.6      | 33.7      | 36.2      | 1.10       | (-2.20, 4.43) |
|                                       | (33.7-36.6) | (31.5-34.2) | (31.7-35.1) | (32.8-34.2) | (29.2-35.1) | (31.4-35.7) | (31.7-35.7) | (33.2-39.2) | .49       |
| High school graduate or GED or some college | 35.0      | 34.0     | 33.2      | 33.7      | 32.2      | 32.9      | 32.6      | 31.6      | -3.30      | (-4.90,-1.80) |
|                                       | (33.8-36.1) | (32.5-35.4) | (31.5-34.9) | (32.4-35) | (30.9-33.6) | (31.9-33.8) | (31.6-33.6) | (30.6-32.6) | <.001     |            |
### AHA Diet Score, Weighted Mean (95% CI)<sup>a</sup>

|          | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|-----------------------------------------------|
| College graduate or above | 35.3      | 33.4      | 34.0      | 32.7      | 33.8      | 31.2      | 32.9      | 34.6      | -0.75      | (-3.50, 1.99)                               |

| P for interaction | .02 |

| Ratio of family income to poverty level<sup>c</sup> | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction |
|-----------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------|
| <1.30<sup>d</sup> | 34.7      | 34.2      | 35.3      | 33.1      | 33.2      | 33.3      | 33.8      | 33.6      | -1.10            | (-3.20, 1.07) |
| (33.5-35.8) | (32.9-35.4) | (32.8-37.7) | (31.7-34.5) | (31.7-34.7) | (31.9-34.8) | (32.2-35.3) | (31.8-35.4) | .15         | (-6.10, -2.10) |
| 1.30-3.49 | 36.0      | 32.9      | 31.9      | 33.4      | 32.2      | 32.5      | 32.6      | 31.9      | -4.10           | (-6.20, 0.97) |
| (34.7-37.4) | (31.2-34.6) | (30.2-33.7) | (31.9-34.8) | (30.0-34.4) | (31.2-33.9) | (31.4-33.8) | (30.4-33.4) | .006        | (-6.10, -2.10) |
| ≥3.50<sup>e</sup> | 34.3      | 34.2      | 33.0      | 33.4      | 32.4      | 31.1      | 32.5      | 33.8      | -0.55           | (-3.60, 2.49) |
| (32.4-36.1) | (31.8-36.6) | (31.7-34.3) | (31.2-35.5) | (29.4-35.4) | (28.9-33.3) | (30.6-34.4) | (31.4-36.2) | .22         | (-3.60, 2.49) |

Abbreviations: NHANES, National Health and Nutrition Examination Survey.
Food sources were grouped as grocery stores (consumed food items obtained from "grocery or supermarket"), restaurants ("restaurant fast food/pizza,

<sup>a</sup> All percentages were survey-weighted; %, proportion.
<sup>b</sup> Trends in diet for the other race or mixed race group are not presented in the race/ethnicity-stratified results due to their small sample sizes. Represents the ratio of family income to the federal poverty threshold, adjusting for household size. For reference, the federal threshold in 2016 for a family of 4 was $24,300/y. A family of 4 earning $33,534/y would have a ratio of 1.38.
<sup>d</sup> Indicates a lower level of income.
<sup>e</sup> Indicates a higher level of income.
### eTable 18. Trends in Healthy Eating Index-2015 for Meals Consumed from Different Sources by Age Group, Sex, Race/Ethnicity, Education, and Income among American Children aged 5-19 years, NHANES 2003-2018

| Age group, y | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | P for interaction |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|-----------------|
| 5-11         | 48.9      | 49.1      | 48.5      | 49.9      | 51.9      | 50.4      | 48.6      | 49.0      | 0.10       | -2.20, 2.44    |
|              | (47.1-50.7)| (47.4-50.7)| (47.3-49.7)| (48.8-50.9)| (50.3-53.6)| (48.3-52.4)| (47.1-50.2)| (47.5-50.5)|            |                 |
| 12-19        | 46.7      | 45.5      | 46.3      | 47.1      | 49.3      | 46.7      | 46.6      | 46.2      | -0.46      | -2.40, 1.50    |
|              | (45.8-47.6)| (44.4-46.5)| (44.9-47.6)| (46.2-47.9)| (47.6-51)| (45.6-47.7)| (44.8-48.5)| (44.5-47.9)|            |                 |
| P for interaction | 0.99        |          |           |           |           |           |           |           |            |                 |

#### Sex

- **Female**
  - 48.1
  - (46.9-49.3)
  - 48.0
  - (45.9-50.1)
  - 48.4
  - (47.6-49.3)
  - 50.8
  - (49.1-52.4)
  - 48.8
  - (47.6-50.1)
  - 48.4
  - (47.2-49.6)
  - 48.7
  - (47.2-50.2)
- **Male**
  - 47.3
  - (46.2-48.4)
  - 46.9
  - (45.6-48.2)
  - 48.2
  - (47.3-49.2)
  - 50.2
  - (48.9-51.5)
  - 47.9
  - (46.4-49.4)
  - 46.7
  - (44.7-48.7)
  - 44.7
  - (43.4-47.9)

- **Racial/ethnicity**
  - **Non-Hispanic white**
    - 47.0
    - (45.5-48.6)
    - 46.9
    - (45.0-49.0)
    - 48.2
    - (47.1-49.4)
    - 51.2
    - (49.6-52.9)
    - 47.9
    - (45.9-49.8)
    - 47.6
    - (45.4-49.8)
    - 47.1
    - (44.4-49.9)
  - **Non-Hispanic black**
    - 46.7
    - (45.5-47.9)
    - 45.1
    - (44.3-45.9)
    - 46.3
    - (44.2-47.1)
    - 46.5
    - (45.1-47.6)
    - 46.4
    - (45.3-47.8)
    - 44.6
    - (42.2-47.0)
  - **Hispanics**
    - 50.4
    - (48.5-52.3)
    - 49.3
    - (48.2-50.4)
    - 49.3
    - (47.9-50.7)
    - 51
    - (48.5-51.3)
    - 50.0
    - (48.8-51.2)
    - 48.2
    - (46.5-49.8)
    - 49.1
    - (47.9-50.2)

- **Parental Education**
  - <High school graduate
    - 47.8
    - (45.9-49.6)
    - 47.1
    - (45.6-48.7)
    - 47.8
    - (47.0-48.7)
    - 49.4
    - (47.1-51.7)
    - 47.0
    - (45.1-48.9)
    - 46.7
    - (44.1-49.3)
    - 46.4
    - (44.9-47.9)
  - High school graduate or GED or some college
    - 47.2
    - (46.0-48.4)
    - 46.7
    - (45.6-47.8)
    - 45.5
    - (44.3-46.8)
    - 47.4
    - (46.3-48.6)
    - 48.4
    - (47.3-49.6)
    - 47.2
    - (45.8-48.5)
    - 46.2
    - (44.6-47.8)
    - 45.7
    - (43.8-47.5)
  - College graduate or above
    - 49.5
    - (46.6-52.4)
    - 48.3
    - (45.1-51.5)
    - 51.7
    - (49.8-53.6)
    - 50.2
    - (48.4-51.9)
    - 55.4
    - (53.3-57.4)
    - 51.9
    - (49.3-54.4)
    - 50.7
    - (49.1-53.6)
  - P for interaction
    - 0.13
    -          

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| Ratio of family income to poverty level\textsuperscript{c} | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|----------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------------------------------------|
| <1.30 \textsuperscript{d}                               | 48.3      | 47.5      | 47.0      | 46.6      | 47.8      | 46.8      | 44.8      | 45.7      | .02       | (-5.10, 0.02)                                 |
| (46.4-49.1)                                              |           |           |           | (45.6-47.7) | (47.0-48.7) | (45.0-48.7) | (42.8-46.9) | (43.9-47.4) |           |                                               |
| 1.30-3.49                                                | 46.4      | 46.8      | 45.4      | 47.7      | 50.9      | 47.8      | 47.4      | 46.9      | .52       |                                               |
| (44.9-47.8)                                              |           |           |           |           |           |           |           |           |           |                                               |
| ≥3.50 \textsuperscript{e}                                | 48.8      | 47.0      | 49.0      | 50.1      | 53.6      | 50.9      | 50.1      | 50.5      | .06       | (-1.24, 4.65)                                 |
| (47.1-50.6)                                              |           |           |           |           |           |           |           |           |           |                                               |
| P for interaction                                       | <.001     |           |           |           |           |           |           |           |           |                                               |

Restaurants

| Age group, y | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------------------|
| 5-11         | 37.3      | 36.6      | 36.3      | 37.8      | 37.0      | 34.9      | 35.2      | 35.5      | .005               |
| (36.2-38.4)  | (35.0-38.2) | (34.8-37.8) | (36.4-39.2) | (35.0-38.1) | (33.6-37.5) | (33.6-37.4) | (34.1-36.9) | (34.1-36.9) | (34.1-36.9) |
|              |           |           |           |           |           |           |           |           | (-3.60, -0.07)    |
| 12-19        | 36.9      | 36.4      | 35.1      | 37.7      | 37.9      | 36.3      | 35.7      | 35.7      | .27                |
| (36.0-37.7)  | (35.7-37.1) | (34.2-36.0) | (35.6-38.9) | (35.6-38.9) | (35.1-37.6) | (34.9-36.6) | (34.4-37)  | (34.4-37)  | (-2.70, 0.37)     |
| P for interaction                                    | .17       |           |           |           |           |           |           |           |                    |

Sex

| Sex         | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------------------|
| Female      | 37.7      | 37.5      | 36.6      | 37.7      | 37.9      | 36.0      | 35.5      | 36.2      | .004               |
| (36.7-38.7) | (36.0-39.0) | (35.2-38.1) | (36.4-38.9) | (35.4-39.5) | (34.8-37.2) | (34.8-36.1) | (35.0-37.4) | (35.0-37.4) | (34.1-36.9) |
| Male        | 36.5      | 35.5      | 34.5      | 37.8      | 37.1      | 35.4      | 35.6      | 35.0      | .29                |
| (35.5-37.5) | (34.7-36.4) | (33.6-35.4) | (36.0-38.1) | (36.0-38.1) | (33.6-37.3) | (34.2-36.9) | (33.5-36.5) | (33.5-36.5) | (33.5-36.5) |
| Interaction | .29       |           |           |           |           |           |           |           |                    |

Race/ethnicity\textsuperscript{b}

| Race/ethnicity  | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction |
|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------------------|
| Non-Hispanic    | 36.6      | 35.6      | 35.2      | 37.7      | 37.0      | 35.1      | 35.3      | 35.8      | -0.87              |
| white           | (35.9-37.4) | (34.8-36.4) | (33.9-36.6) | (36.2-39.2) | (35.7-38.3) | (33.6-36.5) | (34.1-36.4) | (34.4-37.2) | (34.4-37.2) |
| Non-Hispanic    | 38.2      | 38.8      | 36.6      | 38.1      | 38.5      | 36.7      | 35.5      | 35.3      | -2.90              |
| black           | (37.2-39.2) | (37.7-40)  | (35.1-38)  | (36.2-40.0) | (37.1-40.0) | (35.6-37.8) | (34.4-36.7) | (33.8-36.9) | <.001              |
| Hispanics       | 37.5      | 38.1      | 35.9      | 37.0      | 38.0      | 36.7      | 35.5      | 36.4      | -1.10              |
| (36.7-38.3)     | (36.9-39.4) | (34.8-37.0) | (36.0-38.1) | (36.9-39.0) | (35.4-38.1) | (33.9-37.1) | (34.4-38.4) | (34.4-38.4) | (34.4-38.4) |
| P for interaction | .10       |           |           |           |           |           |           |           |                    |

Parental Education

| Education      | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction |
|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------------------|
| <High school   | 36.5      | 36.6      | 34.6      | 36.8      | 37.3      | 34.9      | 34.7      | 37.1      | .062               |
| graduate       | (35.7-37.3) | (35.2-38.0) | (33.1-36.1) | (35.8-37.8) | (35.8-38.8) | (32.9-36.9) | (33.5-36.0) | (34.9-39.4) | (34.9-39.4) |

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|                  | HEI-2015, Weighted Mean (95% CI)<sup>a</sup> | P for trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|------------------|--------------------------------------------|-------------|-----------------------------------------------|
|                  | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 |          |
| High school      |            |           |           |           |           |           |           |           |          |
| graduate or      |            |           |           |           |           |           |           |           |          |
| GED or some      |            |           |           |           |           |           |           |           |          |
| college          | 37.0       | 36.4      | 35.6      | 37.4      | 37.7      | 35.8      | 35.8      | 35.9      | -.14     |
|                  | (36.6-37.5)| (35.6-37.2)| (34.3-36.9)| (35.7-39.0)| (36.6-38.7)| (34.5-37.2)| (34.9-36.7)| (34.5-37.3)|          |
| College          |            |           |           |           |           |           |           |           |          |
| graduate or      |            |           |           |           |           |           |           |           |          |
| above            | 37.0       | 36.4      | 36.8      | 38.4      | 37.2      | 36.1      | 35.0      | 34.5      | -.25     |
|                  | (35.3-38.6)| (35.3-37.6)| (34.8-38.7)| (36.4-40.4)| (35.5-38.9)| (34.4-37.8)| (33.7-36.2)| (33.0-36.0)|          |
| P for interaction| .21        |           |           |           |           |           |           |           |          |
| Ratio of family  |            |           |           |           |           |           |           |           |          |
| income to        |            |           |           |           |           |           |           |           |          |
| poverty level<sup>b</sup> |        |           |           |           |           |           |           |           |          |
| <1.30<sup>d</sup> | 38.2      | 36.8      | 35.2      | 36.8      | 37.4      | 35.5      | 34.9      | 35.6      | -.26     |
|                  | (37.1-39.3)| (35.9-37.7)| (34.0-36.5)| (36.0-37.7)| (36.0-38.8)| (33.9-37.1)| (33.5-36.3)| (33.6-37.7)|          |
| 1.30-3.49        | 36.7      | 36.6      | 35.1      | 37.4      | 37.3      | 35.2      | 35.0      | 36.0      | -.65     |
|                  | (35.6-37.8)| (35.5-37.7)| (33.4-36.8)| (35.5-39.4)| (36.0-38.6)| (33.7-36.6)| (33.2-35.9)| (33.8-38.3)|          |
| ≥3.50<sup>e</sup> | 36.4      | 36.0      | 36.6      | 38.5      | 37.5      | 36.7      | 36.3      | 34.8      | -1.56    |
|                  | (35.3-37.5)| (34.9-37.1)| (34.7-38.5)| (35.7-40.3)| (35.2-39.8)| (35.3-38.1)| (34.9-37.7)| (33.5-36.1)|          |
| P for interaction| .47        |           |           |           |           |           |           |           |          |
| Schools          |            |           |           |           |           |           |           |           |          |
| Age group, y     |            |           |           |           |           |           |           |           |          |
| 5-11             | 45.5      | 43.1      | 44.3      | 45.0      | 47.9      | 52.6      | 52.7      | 52.8      | .01      |
|                  | (43.6-47.4)| (42.0-44.3)| (42.9-45.7)| (43.8-46.2)| (45.8-50.1)| (51.7-53.5)| (51.2-54.1)| (50.9-54.6)|          |
| 12-19            | 42.1      | 40.3      | 39.7      | 39.7      | 43.7      | 49.5      | 52.9      | 50.1      | .21      |
|                  | (40.6-43.6)| (39.2-41.5)| (37.9-41.6)| (37.4-42.0)| (41.2-46.3)| (47.0-51.9)| (50.8-55.0)| (48.3-52.0)|          |
| P for interaction| .07        |           |           |           |           |           |           |           |          |
| Sex              |            |           |           |           |           |           |           |           |          |
| Female           | 44.5      | 41.9      | 41.9      | 43.3      | 46.7      | 51.3      | 52.0      | 51.6      | .01      |
|                  | (42.5-46.4)| (40.6-43.2)| (40.1-43.6)| (41.3-45.4)| (43.8-49.6)| (49.3-53.3)| (50.2-53.9)| (49.9-53.3)|          |
| Male             | 43.7      | 42.2      | 42.7      | 42.1      | 45.7      | 51.3      | 53.4      | 51.6      | .01      |
|                  | (41.9-45.4)| (41.2-43.3)| (41.1-44.2)| (40.5-43.8)| (44.2-47.3)| (50.0-52.6)| (51.4-55.4)| (50.1-53.5)|          |
| P for interaction| .41        |           |           |           |           |           |           |           |          |
| Race/ethnicity<sup>f</sup> |        |           |           |           |           |           |           |           |          |
| Non-Hispanic     | 43.8      | 41.8      | 41.9      | 41.8      | 43.9      | 49.8      | 51.1      | 48.8      | .04      |
| white             | (41.1-46.4)| (40.7-42.9)| (39.5-44.3)| (39.4-44.3)| (41.2-46.5)| (46.7-52.8)| (49.1-53.1)| (46.9-51.3)|          |
| Non-Hispanic     | 44.8      | 44.0      | 44.0      | 44.0      | 47.5      | 52.4      | 53.6      | 52.8      | .08      |
| black             | (43.4-46.1)| (42.2-45.7)| (42.4-45.6)| (43.1-45.9)| (45.4-49.7)| (51.2-53.7)| (51.3-55.9)| (51.6-54.1)|          |
| Hispanics         | 44.9      | 42.1      | 41.9      | 44.6      | 48.9      | 52.7      | 54.5      | 54.1      | 9.24     |

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|                              | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 |
|------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| **Race/ethnicity**           |           |           |           |           |           |           |           |           |
| **Sex**                      |           |           |           |           |           |           |           |           |
| **Age group, y**             |           |           |           |           |           |           |           |           |
| **Ratio of family income to poverty level** |           |           |           |           |           |           |           |           |
| **Parental Education**       |           |           |           |           |           |           |           |           |
| **P for interaction**        | .01       |           |           |           |           |           |           |           |

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### Abbreviations: NHANES, National Health and Nutrition Examination Survey.

Food sources were grouped as grocery stores (consumed food items obtained from "grocery or supermarket"), restaurants ("restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information"), schools ("K-12 school cafeteria, childcare center"), worksites ("cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray") and other sources refer to food items obtained from elsewhere ("sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others").

All percentages were survey-weighted; %, proportion.

Trends in diet for the other race or mixed race group are not presented in the race/ethnicity-stratified results due to their small sample sizes.

Represents the ratio of family income to the federal poverty threshold, adjusting for household size. For reference, the federal threshold in 2016 for a family of 4 was $24,300/y. A family of 4 earning $33,534/y would have a ratio of 1.38.

Indicates a lower level of income.

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eTable 19. Trends in Proportions of US Adults Age 20+ Years with Poor or Intermediate Diet based on American Heart Association Diet Score by Different Food Sources and by Age, Sex, Race/Ethnicity, Education, and Income, NHANES 2003-2018.

| Grocery | AHA Diet Score, Weighted % (95% CI) | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P-trend | P for interaction |
|---------|-------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|------------------|
| Poor Diet | Grocery stores |<.001 |<.001 |
| Age group, y | | | | | | | | | | | |
| 20-49 | | | | | | | | | | | |
| ≥50 | | | | | | | | | | | |
| Sex | | | | | | | | | | | |
| Female | | | | | | | | | | | |
| Male | | | | | | | | | | | |
| Race/ethnicityb | | | | | | | | | | | |
| Non-Hispanic white | | | | | | | | | | | |
| Non-Hispanic black | | | | | | | | | | | |
| Hispanics | | | | | | | | | | | |
| Education | | | | | | | | | | | |
| <High school graduate | | | | | | | | | | | |
| High school graduate or GED | | | | | | | | | | | |
| Some college or above | | | | | | | | | | | |
| College graduate or above | | | | | | | | | | | |
| Ratio of family income to poverty levelc | | | | | | | | | | | |
| <1.30d | | | | | | | | | | | |

© 2021 Liu J et al. JAMA Network Open.
| Grocery | AHA Diet Score, Weighted % (95% CI)a | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 |
|---------|--------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1.30-3.49 |                                      | 40.1      | 38.7      | 35.4      | 36.3      | 31.4      | 32.8      | 35.9      | 36.0      |
|         |                                      | (35.8-44.4) | (34.3-43) | (30.2-40.7) | (32.7-39.9) | (28.6-34.2) | (30.2-35.4) | (32.6-39.3) | (31.1-41.0) |
| ≥3.50   |                                      | 36.9      | 30.7      | 31.0      | 25.7      | 23.1      | 23.6      | 26.8      | 26.5      |
|         |                                      | (32.7-41.4) | (25.7-36.2) | (26.8-35.6) | (23.1-28.5) | (18.6-28.4) | (20.7-26.8) | (23.0-31.0) | (22.4-31.1) |
| Intermediate Diet |                   |           |           |           |           |           |           |           |           |
| Age group, y |                                   |         |           |           |           |           |           |           |           |
| 20-49   |                                      | 52.9      | 57.4      | 57.3      | 60.7      | 61.8      | 62.3      | 61.8      | 63.1      |
|         |                                      | (48.6-57.1) | (52.8-62.1) | (52.7-62) | (58-63.4) | (58.5-65.1) | (59.8-64.7) | (57.3-66.4) | (59.3-66.8) |
| ≥50     |                                      | 66.7      | 67.8      | 70        | 69.8      | 72.8      | 69.8      | 67.6      | 66.7      |
|         |                                      | (64.1-69.3) | (64.2-71.5) | (65.1-74.9) | (67.5-72) | (70.3-75.4) | (66.7-72.8) | (64.7-70.5) | (62.4-71.1) |
| Sex     |                                      |         |           |           |           |           |           |           |           |
| Female  |                                      | 62.5      | 65.8      | 66.3      | 68.5      | 69.7      | 70.0      | 68.2      | 68.2      |
|         |                                      | (58.6-66.5) | (62.3-69.3) | (61.5-71) | (66.6-70.4) | (67.4-72) | (66.8-73.3) | (64.6-71.8) | (64.0-72.4) |
| Male    |                                      | 54.4      | 57.4      | 58.7      | 60.4      | 63.8      | 61.1      | 60.7      | 61.2      |
|         |                                      | (50.6-58.2) | (52.8-62.1) | (53.4-63.9) | (57.6-63.3) | (61.1-66.4) | (59.1-63.2) | (56.4-64.9) | (56.9-65.6) |
| Race/ethnicityb |                             |         |           |           |           |           |           |           |           |
| Non-Hispanic white |                        | 58.5      | 62.5      | 63.0      | 64.3      | 67.9      | 66.1      | 63.8      | 64.0      |
|         |                                      | (54.9-62.0) | (58.4-66.7) | (57.3-68.8) | (62.3-66.4) | (65.8-69.9) | (63.6-68.5) | (59.4-68.2) | (59.4-68.5) |
| Non-Hispanic black |                      | 48.5      | 50.6      | 53.9      | 54.5      | 58.3      | 57.2      | 57.0      | 57.5      |
|         |                                      | (40.7-56.2) | (43.3-57.9) | (49.4-58.4) | (49-60) | (52.5-64.2) | (52.6-61.8) | (52.4-61.7) | (51.1-63.9) |
| Hispanics |                                   | 66.6      | 65.3      | 64.0      | 68.6      | 63.7      | 66.0      | 65.5      | 67.8      |
|         |                                      | (60.5-72.7) | (60.1-70.4) | (60.4-67.6) | (62.9-74.3) | (58.6-68.8) | (60.5-71.5) | (62.0-69.0) | (63.1-72.5) |
| Education |                                  |         |           |           |           |           |           |           |           |
| <High school graduate |                           | 56.9      | 56.8      | 54.1      | 60.3      | 57.2      | 60.7      | 56.8      | 59.8      |
|         |                                      | (51.6-62.1) | (52.2-61.3) | (50.2-57.9) | (50.6-63.9) | (54.6-59.9) | (57.3-64.0) | (52.2-61.5) | (53.9-65.8) |
| High school graduate or GED |                  | 50.7      | 56.0      | 57.8      | 53.6      | 62.4      | 59.3      | 59.8      | 56.9      |
|         |                                      | (48.3-53.2) | (51.3-60.7) | (51.4-64.1) | (49.8-57.3) | (58.0-66.8) | (55.7-63.0) | (56.0-63.5) | (52.2-61.7) |
| Some college or above College graduate or above |                     | 57.2      | 61.5      | 62.7      | 64.2      | 65.1      | 63.8      | 65       | 60       |
|         |                                      | (53.0-61.4) | (55.9-67.1) | (58.5-66.9) | (60.9-67.5) | (61.2-68.9) | (59.9-67.8) | (59.7-70.3) | (55.1-64.9) |
| Ratio of family income to poverty levelc |             | 70.9      | 71.0      | 74.8      | 76.9      | 76.4      | 75       | 70.7      | 78.8      |
| <1.30d  |                                      | (66.6-75.2) | (66.7-75.4) | (69.3-80.3) | (73.5-80.4) | (74.5-78.4) | (71.5-78.5) | (66.5-74.8) | (76.0-81.7) |
| 1.30-3.49 |                                     | 53.5      | 56.1      | 51.7      | 57.1      | 57.9      | 55.4      | 58.9      | 56.6      |
|         |                                      | (48.2-58.8) | (50.6-61.6) | (46.2-57.1) | (54.5-59.7) | (54.3-61.6) | (51.5-59.7) | (54.3-63.4) | (51.5-61.8) |
|         |                                      | 59.0      | 60.0      | 62.8      | 61.7      | 66.7      | 65.4      | 62.7      | 61.4      |
|         |                                      | (54.8-63.2) | (55.4-64.7) | (57.9-67.6) | (58.1-65.3) | (63.7-69.7) | (62.8-67.9) | (59.4-65.9) | (56.7-66.1) |
| Grocery | AHA Diet Score, Weighted % (95% CI)<sup>a</sup> | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P-trend | P for interaction |
|----------|---------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|-----------------|
| ≥3.50<sup>e</sup> | Restaurants | | | | | | | | | | |
| | | (56.2-65.8) | (60.1-69.9) | (62.0-70.8) | (67.1-73.0) | (67.6-76.5) | (69.5-74.2) | (63.7-73.2) | (67.0-75.1) | | .001 |
| Age group, y | | | | | | | | | | | |
| 20-49 | | 69.3 | 70.7 | 72.1 | 68.8 | 66.2 | 67.5 | 66.3 | 67.6 | | .06 |
| | | (65.4-73.1) | (67.3-74.1) | (68.4-75.7) | (64.4-73.2) | (62.5-69.8) | (64.6-70.3) | (62.6-70) | (62.9-72.2) | | .20 |
| ≥50 | | 58.4 | 62.2 | 61.5 | 58.0 | 59.2 | 52.6 | 60.1 | 62.2 | | .88 |
| Sex | | | | | | | | | | | |
| Female | | 63.0 | 64.2 | 66.8 | 62.4 | 60.0 | 58.6 | 62.0 | 61.7 | | .12 |
| | | (57.9-68.1) | (60.2-68.2) | (63.7-70.0) | (59.1-65.8) | (55.7-64.4) | (56.4-60.9) | (57.1-66.9) | (57.3-66.0) | | .80 |
| Male | | 67.8 | 70.9 | 69.4 | 67.0 | 66.5 | 64.1 | 65.5 | 68.9 | | .21 |
| Race/ethnicity<sup>b</sup> | | | | | | | | | | | |
| Non-Hispanic white | | 65.7 | 67.5 | 68.0 | 63.3 | 63.7 | 59.8 | 62.9 | 66.3 | | .17 |
| | | (61.5-69.9) | (64.5-70.4) | (64.7-71.4) | (58.9-67.8) | (59.7-67.8) | (56.8-62.7) | (56.5-69.3) | (61.1-71.6) | | .63 |
| Non-Hispanic black | | 70.9 | 74.6 | 73.8 | 69.8 | 67.3 | 62.6 | 69.8 | 66.3 | | .04 |
| | | (64.9-76.8) | (68.8-80.8) | (71.1-76.6) | (67.9-75.5) | (62.8-76.7) | (62.6-72) | (64.5-73.5) | (64.6-72.6) | | .69 |
| Hispanics | | 62.5 | 68.1 | 64.7 | 65.6 | 59.0 | 66.7 | 65.8 | 61.1 | | .59 |
| Education | | (54.4-70.5) | (61.5-74.8) | (60.1-69.3) | (61.7-69.5) | (55.6-62.5) | (63.0-70.5) | (61.9-69.6) | (55.3-66.9) | | |
| <High school graduate | | 66.3 | 75.1 | 72.2 | 65.7 | 65.9 | 69.6 | 69.1 | 68.1 | | .42 |
| | | (61.8-70.9) | (71.0-79.3) | (67.8-76.6) | (59.8-71.7) | (60.6-71.1) | (65.5-73.7) | (64.9-73.4) | (61.5-74.6) | | .09 |
| High school graduate or GED | | 72.8 | 71.5 | 72.7 | 71.2 | 76.0 | 71.1 | 76.2 | 74.7 | | .26 |
| | | (68.0-77.5) | (67.2-75.8) | (69.3-76.0) | (65.6-76.9) | (71.6-80.5) | (64.5-77.7) | (71.2-81.2) | (70.4-78.9) | | .74 |
| Some college or above | | 64.0 | 68.8 | 69.4 | 68.2 | 63.9 | 63.1 | 65.5 | 66.2 | | .46 |
| | | (59.4-68.6) | (64.5-73.1) | (65.5-73.3) | (63.8-72.5) | (58.5-69.4) | (60-66.3) | (59.5-71.4) | (61.3-71.1) | | .62 |
| College graduate or above | | 58.6 | 59.1 | 59.7 | 54.8 | 54.0 | 49.6 | 53 | 55.5 | | .05 |
| | | (50.2-67) | (56.1-62.0) | (54.5-64.9) | (49.9-59.6) | (48.1-59.9) | (46.1-53) | (46.6-59.4) | (50.3-60.7) | | |
| Ratio of family income to poverty level<sup>c</sup> | | | | | | | | | | | |
| <1.30<sup>d</sup> | | 69.0 | 76.7 | 72.4 | 70.8 | 70.3 | 72.1 | 70.3 | 72.5 | | .96 |
| | | (63.0-75.1) | (70.1-83.4) | (67.6-77.1) | (66.0-75.6) | (65.2-75.4) | (67.2-77.1) | (64.4-76.1) | (67.2-77.9) | | .33 |
| 1.30-3.49 | | 64.3 | 72.6 | 73.3 | 66.9 | 68.9 | 66.3 | 68.2 | 66.2 | | .35 |
| | | (59.6-69.0) | (69.3-75.8) | (69.6-76.9) | (61.7-72.1) | (65.6-72.1) | (62.1-70.5) | (64-72.3) | (61.9-70.6) | | .69 |
| ≥3.50<sup>e</sup> | | 63.7 | 62.1 | 63.1 | 60.5 | 56.4 | 52.3 | 58.4 | 60.5 | | .03 |

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| Grocery | AHA Diet Score, Weighted % (95% CI)<sup>a</sup> | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P-trend | P for interaction |
|---------|-----------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|------------------|
| **Intermediate Diet Age group, y**<sup>b</sup> | | | | | | | | | | | |
| 20-49 | | 30.7 (26.9-34.6) | 29.2 (25.8-32.6) | 27.8 (24.1-31.4) | 31.1 (26.7-35.5) | 33.8 (30.2-37.5) | 32.5 (29.6-35.4) | 33.6 (29.9-37.3) | 32.4 (27.8-37.1) | .05 | .19 |
| ≥50 | | 41.6 (37.5-45.8) | 37.8 (34.0-41.5) | 38.5 (35.5-41.4) | 42.0 (37.7-46.2) | 40.6 (36.7-44.4) | 47.4 (42.4-52.4) | 39.9 (33.1-46.8) | 37.8 | .88 |
| **Sex** | | | | | | | | | | | |
| Female | | 37.0 (31.9-42.1) | 35.7 (31.7-39.8) | 33.0 (29.8-36.1) | 37.6 (34.2-40.9) | 40.0 (35.6-44.3) | 41.3 (39.1-42.6) | 38.0 (33.1-42.9) | 38.3 | .11 |
| Male | | 32.2 (27.9-36.5) | 29.1 (26.3-31.9) | 30.6 (26.5-34.7) | 33.0 (28.0-38.0) | 33.4 (30.6-36.1) | 35.9 (32.8-39.0) | 34.4 (28.9-39.9) | 31.1 | .21 |
| **Race/ethnicity<sup>b</sup>** | | | | | | | | | | | |
| Non-Hispanic white | | 34.3 (30.1-38.5) | 32.5 (29.5-35.4) | 31.8 (28.5-35.2) | 36.7 (32.2-41.1) | 36.2 (32.2-40.2) | 40.2 (37.3-43.2) | 37.0 (30.6-43.5) | 33.7 | .16 |
| Non-Hispanic black | | 29.1 (23.2-35.1) | 25.2 (19.2-31.2) | 26.1 (23.4-28.7) | 28.0 (23.8-32.2) | 30.2 (23.3-37.2) | 32.5 (27.7-37.3) | 31.0 (26.5-35.5) | 31.4 | .04 |
| Hispanics | | 37.5 (29.5-45.6) | 31.9 (25.2-38.5) | 35.3 (30.7-39.9) | 34.4 (30.5-38.3) | 40.9 (37.4-44.4) | 33.2 (29.3-37.0) | 34.2 (30.4-38.1) | 38.9 | .60 |
| **Education** | | | | | | | | | | | |
| <High school graduate | | 33.7 (29.1-38.2) | 24.9 (20.7-29) | 27.8 (23.4-32.2) | 34.3 (28.3-40.2) | 34.1 (28.9-39.4) | 30.3 (26.2-34.4) | 30.9 (26.6-35.1) | 31.9 | .43 |
| High school graduate or GED | | 27.2 (22.5-32.2) | 28.5 (24.2-32.8) | 27.3 (24.0-30.7) | 28.8 (23.1-34.4) | 24.0 (19.5-28.4) | 28.9 (22.3-35.5) | 23.8 (18.8-28.8) | 25.3 | .26 |
| Some college or above | | 36.0 (31.4-40.6) | 31.2 (26.9-35.5) | 30.3 (26.4-34.2) | 31.7 (27.3-36.1) | 36.1 (30.6-41.5) | 36.8 (33.6-39.9) | 34.4 (28.5-40.4) | 33.8 | .46 |
| College graduate or above | | 41.4 (33.0-49.8) | 40.8 (37.8-43.7) | 40.2 (35.1-45.4) | 45.2 (40.4-50.1) | 45.8 (39.9-51.6) | 50.4 (47.0-53.9) | 47.0 (40.6-53.4) | 44.5 | .04 |
| **Ratio of family income to poverty level<sup>c</sup>** | | | | | | | | | | | |
| <1.30<sup>d</sup> | | 31.0 (24.9-37.0) | 23.3 (16.6-29.9) | 27.1 (22.5-31.7) | 29.2 (24.4-34.0) | 29.7 (24.6-34.8) | 27.9 (22.9-32.8) | 29.5 (23.8-35.2) | 27.5 (22.1-32.8) | .94 |
| 1.30-3.49 | | 35.7 (31.0-40.4) | 27.4 (24.2-30.7) | 26.7 (23.1-30.3) | 33.1 (27.9-38.3) | 31.0 (27.8-34.1) | 33.7 (29.5-37.9) | 31.8 (27.7-36) | 33.8 | .35 |
| ≥3.50<sup>e</sup> | | 36.3 (32.1-40.7) | 37.8 (34.2-41.7) | 36.9 (32.4-41.7) | 39.4 (36.1-42.9) | 43.6 (39.3-48.0) | 47.6 (44.8-48.0) | 41.6 (35.4-48.0) | 39.5 | .03 |

<sup>a</sup>© 2021 Liu J et al. JAMA Network Open.
| Grocery | AHA Diet Score, Weighted % (95% CI) | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | \(P\)-trend | \(P\) for interaction |
|---------|----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------------------|
| **Age group, y** | | | | | | | | | | | |
| 20-49 | | 58.5 | 59.4 | 62.6 | 57.4 | 58.7 | 55.6 | 48.4 | 51.5 | .04 | .08 |
| ≥50 | | 47.5 | 52.1 | 46.3 | 44.0 | 54.6 | 61.7 | 54.5 | 49.0 | .38 | |
| **Sex** | | | | | | | | | | | |
| Female | | 51.6 | 56.1 | 50.9 | 54.0 | 52.4 | 52.0 | 47.1 | 46.1 | .23 | .63 |
| Male | | 58.9 | 57.2 | 62.2 | 51.5 | 61.5 | 62.0 | 53.1 | 54.5 | .53 | |
| **Race/ethnicity** | | | | | | | | | | | |
| Non-Hispanic white | | 52.6 | 55.8 | 56.5 | 50.0 | 59.8 | 59.2 | 54.0 | 52.8 | .73 | .01 |
| Non-Hispanic black | | 51.1 | 48.9 | 53.3 | 56.7 | 58.8 | 50.9 | 42.5 | 41.9 | .04 | |
| Hispanics | | 72.7 | 65.0 | 62.5 | 59.5 | 52.1 | 56.7 | 55.8 | 50.1 | .0001 | |
| **Education** | | | | | | | | | | | |
| <High school graduate | | 71.1 | 54.1 | 54.7 | 61.7 | 63.4 | 51.0 | 53.0 | 43.9 | .10 | .21 |
| High school graduate or GED | | 61.5 | 68.1 | 61.0 | 50.7 | 69.5 | 65.9 | 51.9 | 54.9 | .17 | |
| Some college or above | | 54.3 | 52.1 | 55.2 | 52.1 | 56.8 | 60.2 | 57.5 | 53.5 | .50 | |
| College graduate or above | | 47.1 | 55.3 | 56.5 | 51.5 | 50.0 | 52.8 | 43.2 | 46.2 | .42 | |
| **Ratio of family income to poverty level** | | | | | | | | | | | |
| <1.30 \(^d\) | | 60.3 | 62.9 | 63.8 | 53.0 | 74.2 | 64.7 | 48.9 | 41.8 | .14 | .65 |
| 1.30-3.49 | | 59.2 | 57.0 | 59.8 | 55.7 | 54.4 | 60.1 | 48.1 | 54.2 | .21 | |
| ≥3.50 \(^e\) | | 52.3 | 55.5 | 54.5 | 49.4 | 52.6 | 55.2 | 51.0 | 48.5 | .59 | |

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| Grocery       | AHA Diet Score, Weighted % (95% CI)<sup>a</sup> | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P-trend | P for interaction |
|---------------|------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|------------------|
| 20-49         |                                               | 41.4      | 40.6      | 36.9      | 42.6      | 41.3      | 43.7      | 51.6      | 48.5      | .04     | .68              |
| ≥50           |                                               | 52.5      | 47.9      | 53.7      | 56.0      | 45.4      | 38.3      | 45.5      | 51.0      | .38     |                  |
| Sex           |                                               |           |           |           |           |           |           |           |           |         |                  |
| Female        |                                               | 48.4      | 43.9      | 48.3      | 46.0      | 47.6      | 47.3      | 52.9      | 53.9      | .23     | .65              |
| Male          |                                               | 40.8      | 42.8      | 37.8      | 48.5      | 38.5      | 37.7      | 46.9      | 45.5      | .52     |                  |
| Race/ethnicity<sup>b</sup> |   | Non-Hispanic white | 47.3      | 44.2      | 43.0      | 50.0      | 40.2      | 40.4      | 46.0      | 47.2      | .74     | .01              |
|               |                                               | Non-Hispanic black | 38.9      | 51.1      | 46.7      | 43.3      | 41.2      | 47.9      | 57.5      | 58.1     | .04     |                  |
|               |                                               | Hispanics | 27.3      | 35.0      | 37.5(28.6-| 40.5      | 47.9      | 43.3      | 44.2      | 49.9     | .001   |                  |
|               |                                               |           |           |           |           |           |           |           |           |         |                  |
| Education     |                                               |           |           |           |           |           |           |           |           |         |                  |
| <High school graduate |   | 28.9      | 45.9      | 45.3      | 38.3      | 36.6      | 49.0      | 47.0      | 56.1      | .10     | .22              |
| High school graduate or GED |   | 38.5      | 31.9      | 39.0      | 49.3      | 30.5      | 34.1      | 48.1      | 45.1      | .17     |                  |
| Some college or above |   | 45.4      | 47.9      | 44.8      | 47.9      | 43.2      | 39.8      | 42.5      | 46.5      | .53     |                  |
| College graduate or above | | 52.9      | 44.7      | 42.4      | 48.5      | 50.0      | 46.0      | 56.8      | 53.8      | .43     |                  |
| Ratio of family income to poverty level<sup>c</sup> |   | <1.30<sup>d</sup> | 39.7      | 37.1      | 36.2      | 47.0      | 25.8      | 35.3      | 51.1      | 58.2     | .14     | .65              |
|               |                                               | 1.30-3.49 | 40.8      | 43.0      | 40.2      | 44.3      | 45.6      | 39.9      | 51.9      | 45.8     | .21     |                  |
|               |                                               | ≥3.50<sup>e</sup> | 47.5      | 44.5      | 44.9      | 50.6      | 47.4      | 43.8      | 49.0      | 51.5     | .59     |                  |
|               | Others                                       |           |           |           |           |           |           |           |           |         |                  |
| Age group, y  |                                               | 20-49     | 35.6      | 39.9      | 44.2      | 40.9      | 43.8      | 45.2      | 46.3      | 48.1     | <.001 | .18              |

© 2021 Liu J et al. JAMA Network Open.
| Grocery | AHA Diet Score, Weighted % (95% CI) | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P-trend | P for interaction |
|---------|-------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|------------------|
| ≥50     | 31.5 (26.3-36.8) 38.3 (29.3-38.7) 34.0 (31.9-38.8) 35.4 (27.9-37.4) 32.6 (31.7-43.0) 40.0 (32.2-41.9) 37.1 (35.4-43.9) 39.6 (35.4-43.9) | .03       |          |          |          |          |          |          |          |        |                  |
| Sex     |                                     |           |           |           |           |           |           |           |           |        |                  |
| Female  | 33.9 (30.3-37.5) 37.2 (32.9-41.6) 36.7 (31.8-41.7) 36.4 (33.5-39.2) 35.8 (32.0-39.7) 39.8 (36.8-42.8) 38.3 (34.9-41.7) 40.8 (37.7-44.0) | .009      | .24      |          |          |          |          |          |          |        |                  |
| Male    | 33.7 (29.6-37.8) 41.4 (38-44.8) 43.0 (39.1-46.9) 40.5 (36.1-45.0) 41.7 (37.4-46) 45.7 (41.7-49.7) 45.3 (41.0-49.6) 46.9 (38.5-55.3) | .002      |          |          |          |          |          |          |          |        |                  |
| Race/ethnicity |                             |           |           |           |           |           |           |           |           |        |                  |
| Non-Hispanic white | 32.2 (29.0-35.5) 39.0 (35.0-42.9) 39.4 (35.4-43.5) 37.6 (34.0-41.1) 37.5 (33.9-41.1) 44.4 (41.7-47.8) 42.2 (37.7-46.7) 46.0 (39.6-52.3) | <.001     | .001     |          |          |          |          |          |          |        |                  |
| Non-Hispanic black | 35.0 (27.4-42.6) 42.6 (37.2-48.1) 42.1 (37.3-47.0) 41.8 (35.4-48.3) 37.6 (33.7-41.4) 39.5 (33.8-45.1) 41.7 (37.5-46.0) 42.8 (37.4-48.3) | .34       |          |          |          |          |          |          |          |        |                  |
| Hispanics | 44.4 (36.7-52.2) 42.8 (36.4-49.2) 41.2 (36.0-46.3) 43.4 (38.7-48.1) 43.8 (35.6-52.1) 38.8 (41.8-46.2) 44.0 (39.6) 39.6 (33.5-45.6) | .36       |          |          |          |          |          |          |          |        |                  |
| Education |                               |           |           |           |           |           |           |           |           |        |                  |
| <High school | 36.8 (30.0-43.7) 39.1 (33.1-45.2) 41.0 (33.1-49.0) 38.9 (32.5-45.3) 38.4 (31.6-45.2) 43.8 (38.5-49.1) 42.5 (35.7-49.3) 42.6 (35.1-50.1) | .15       | .04      |          |          |          |          |          |          |        |                  |
| High school graduate | 34.3 (27.5-41.1) 37.1 (28.7-45.6) 43.1 (38.4-47.8) 40.4 (34.6-46.3) 43.9 (35.6-52.3) 47.5 (43.1-51.9) 47.1 (40.9-53.2) 48.5 (43.2-53.8) | <.001     |          |          |          |          |          |          |          |        |                  |
| GED | 34.2 (31.4-37.0) 41.7 (28.5-40.4) 34.5 (26.6-44.6) 40.6 (36.7-44.5) 40.6 (39.5-46.5) 43.0 (39.9-49.0) 44.4 (44.2-51) | <.001     |          |          |          |          |          |          |          |        |                  |
| Some college or above | 31.0 (26.7-35.3) 38.0 (32.4-43.7) 41.2 (37.3-45.1) 34.1 (26.2-42.0) 34.6 (29.9-39.3) 38.9 (34.5-43.3) 36.1 (31.2-40.9) 36.3 (28.8-43.8) | .71       |          |          |          |          |          |          |          |        |                  |
| Ratio of family income to poverty level |                      |           |           |           |           |           |           |           |           |        |                  |
| <1.30  | 37.8 (30.4-45.1) 40.4 (35.0-45.8) 42.3 (35.3-49.4) 39.3 (32.9-45.6) 41.8 (36.1-47.5) 41.9 (36.9-46.8) 45.7 (38.9-52.6) 46.1 (41.3-50.8) | .03       | .41      |          |          |          |          |          |          |        |                  |
| 1.30-3.49 | 35.6 (31.4-39.7) 39.3 (34.0-44.5) 35.4 (32.1-38.7) 36.5 (31.3-41.7) 39.2 (34.0-44.4) 48.2 (44.2-52.2) 43.2 (37.5-48.9) 44.1 (38.9-49.2) | <.001     |          |          |          |          |          |          |          |        |                  |
| ≥3.50  | 31.5 (27.5-35.8) 39.2 (36.4-42.0) 42.6 (37.8-47.6) 39.6 (35.6-43.9) 35.9 (31.5-40.5) 39.9 (34.6-44.5) 38.2 (35.4-51.6) | .10       |          |          |          |          |          |          |          |        |                  |
| Intermediate Diet Age group, y |                      |           |           |           |           |           |           |           |           |        |                  |
| 20-49  | 64.4 (60.8-68.0) 60.1 (56.2-64) 55.8 (51.7-59.9) 59.0 (54.5-63.6) 56.2 (52.9-69.6) 54.7 (50.3-59) 53.5 (50.5-56.6) 51.7 (46.4-57.0) | <.001     | .19      |          |          |          |          |          |          |        |                  |
| ≥50    | 68.1 (62.3-73.8) 61.2 (56.4-66.0) 65.6 (60.8-70.3) 64.6 (61.2-67.9) 66.8 (61.9-71.7) 57.0 (57.7-67.7) 57.7-67.7 55.3-64.0 | .04       |          |          |          |          |          |          |          |        |                  |

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| Grocery | AHA Diet Score, Weighted % (95% CI)<sup>a</sup> | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P-trend | P for interaction |
|---------|-----------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|---------|------------------|
| Sex     |                                               |          |          |          |          |          |          |          |          |        |                  |
| Female  |                                               | 65.7     | 62.6     | 62.9     | 63.6     | 63.7     | 59.9     | 61.4     | 58.6     | .008    | .23              |
|         |                                               | (62.2-69.3) | (58.2-67.0) | (57.9-67.9) | (60.8-66.4) | (59.6-67.8) | (56.9-62.9) | (58.0-64.9) | (55.4-61.9) |         |                  |
| Male    |                                               | 66.3     | 58.4     | 57.0     | 59.4     | 58.3     | 54.3     | 54.5     | 52.7     | .002    |                  |
|         |                                               | (62.2-70.4) | (55.0-61.8) | (53.1-60.8) | (55.0-63.8) | (54.0-62.6) | (50.5-58.3) | (50.2-58.9) | (44.4-61.0) |         |                  |
| Race/ethnicity<sup>b</sup> |                                               |          |          |          |          |          |          |          |          |        |                  |
| Non-Hispanic white |                                               | 67.5     | 60.8     | 60.3     | 62.4     | 62.2     | 55.5     | 57.6     | 53.5     | <.001   | <.001           |
|         |                                               | (64.3-70.8) | (56.8-64.8) | (56.2-64.4) | (58.8-65.9) | (58.5-65.8) | (52.0-59.0) | (53.0-62.2) | (47.2-59.7) |         |                  |
| Non-Hispanic black |                                               | 65.0     | 57.4     | 57.9     | 58.2     | 62.4     | 60.5     | 58.0     | 57.2     | .33     |                  |
|         |                                               | (57.4-72.6) | (51.9-62.8) | (53.0-62.7) | (51.7-64.6) | (58.6-66.2) | (54.9-66.2) | (53.8-62.2) | (51.7-62.6) |         |                  |
| Hispanics |                                               | 55.5     | 57.2     | 58.8     | 56.6     | 56.2     | 61.2     | 56.0     | 60.3     | .38     |                  |
|         |                                               | (47.8-63.3) | (50.8-63.6) | (53.7-64) | (47.9-64.4) | (56.4-66.1) | (53.8-58.2) | (54.2-66.4) |         |         |                  |
| Education |                                               |          |          |          |          |          |          |          |          |        |                  |
| <High school graduate |                                               | 63.2     | 60.9     | 59.0     | 61.1     | 61.6     | 56.2     | 57.5     | 57.3     | .15     | .05              |
|         |                                               | (56.3-70.0) | (54.8-66.9) | (51.0-66.9) | (54.7-67.5) | (54.8-68.4) | (50.9-61.5) | (50.7-64.3) | (49.8-64.9) |         |                  |
| High school graduate or GED |                                               | 65.7     | 62.4     | 56.9     | 59.6     | 56.1     | 52.5     | 52.7     | 51.5     | <.001   |                  |
|         |                                               | (58.9-72.5) | (54.0-70.7) | (52.2-61.6) | (53.7-65.4) | (47.7-64.4) | (48.1-56.9) | (46.5-58.9) | (46.2-56.8) |         |                  |
| Some college or above College graduate or above |                                               | 65.8     | 58.2     | 65.5     | 59.4     | 59.4     | 57.0     | 55.5     | 52.3     | <.001   |                  |
|         |                                               | (63.0-68.6) | (53.3-63) | (59.5-71.5) | (55.4-63.4) | (55.5-63.3) | (53.5-60.5) | (50.9-60.1) | (48.9-55.7) |         |                  |
| Ratio of family income to poverty level<sup>c</sup> |                                               |          |          |          |          |          |          |          |          |        |                  |
| <1.30<sup>d</sup> |                                               | 62.2     | 59.6     | 57.5     | 60.7     | 58.2     | 58.1     | 54.1     | 53.6     | .03     | .34              |
|         |                                               | (54.9-69.5) | (54.2-65) | (50.5-64.5) | (54.6-67.1) | (52.5-63.8) | (53.2-63.1) | (47.3-60.9) | (49.1-58.1) |         |                  |
| 1.30-3.49 |                                               | 64.4     | 60.6     | 64.6     | 63.4     | 60.8     | 51.5     | 56.5     | 55.3     | <.001   |                  |
|         |                                               | (60.3-68.6) | (55.3-65.9) | (61.3-67.9) | (58.2-68.6) | (55.6-66) | (47.5-55.5) | (50.9-62.1) | (50.3-60.3) |         |                  |
| ≥3.50<sup>e</sup> |                                               | 68.5     | 60.5     | 57.0     | 60.3     | 63.6     | 60.0     | 61.6     | 56.2     | .09     |                  |
|         |                                               | (64.7-72.3) | (57.7-63.2) | (51.9-61.9) | (56.1-64.4) | (58.6-68.2) | (55.1-64.5) | (57.7-65.4) | (48.0-64.1) |         |                  |

Abbreviations: NHANES, National Health and Nutrition Examination Survey. Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants (“restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information”), schools (“K-12 school cafeteria, childcare center”), worksites (“cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray”) and other sources refer to food items obtained from elsewhere (“sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).<sup>a</sup><br>Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants (“restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information”), and others).<sup>a</sup><br>Abbreviations: NHANES, National Health and Nutrition Examination Survey. Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants (“restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information”), worksites (“cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray”) and other sources refer to food items obtained from elsewhere (“sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).<sup>a</sup><br>Abbreviations: NHANES, National Health and Nutrition Examination Survey. Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants (“restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information”), worksites (“cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray”) and other sources refer to food items obtained from elsewhere (“sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).<sup>a</sup><br>Abbreviations: NHANES, National Health and Nutrition Examination Survey. Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants (“restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information”), worksites (“cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray”) and other sources refer to food items obtained from elsewhere (“sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).<sup>a</sup> All percentages were survey-weighted; %, proportion.

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Trends in diet for the other race or mixed race group are not presented in the race/ethnicity-stratified results due to their small sample sizes. Represents the ratio of family income to the federal poverty threshold, adjusting for household size. For reference, the federal threshold in 2016 for a family of 4 was $24,300/y. A family of 4 earning $33,534/y would have a ratio of 1.38.

Indicates a lower level of income.

Indicates a higher level of income.
| Age group, y | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|--------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------------------------------------|
| Grocery stores |            |            |            |            |            |            |            |            |            |                                          |
| Age group, y |            |            |            |            |            |            |            |            |            |                                          |
| 20-49        | 33.8       | 35.6       | 35.7       | 36.6       | 37.4       | 37.4       | 37.2       | 37.2       | <.001      | 3.35 (1.52, 5.18)                         |
| ≥50          | 38.4       | 40.3       | 40.4       | 40.7       | 41.9       | 41.0       | 39.8       | 39.4       | .98        | (-0.74, 2.70)                             |
| P for interaction | <.001 |            |            |            |            |            |            |            |            |                                          |
| Sex          |            |            |            |            |            |            |            |            |            |                                          |
| Female       | 37.1       | 39.3       | 39.0       | 40.0       | 41.1       | 40.8       | 40.0       | 39.5       | 2.43       | 2.43 (0.62, 4.23)                         |
| Male         | 34.3       | 35.8       | 36.2       | 36.6       | 37.7       | 37.2       | 36.8       | 36.9       | .97        | 2.59 (0.86, 4.32)                         |
| P for interaction | .97    |            |            |            |            |            |            |            |            |                                          |
| Race/ethnicity |            |            |            |            |            |            |            |            |            |                                          |
| Non-Hispanic | 35.9       | 38.2       | 37.9       | 38.8       | 40.0       | 39.2       | 38.5       | 37.9       | 2.00       | 2.00 (0.008, 4.00)                        |
| white        | (34.5-37.3) | (37.0-39.4) | (35.9-39.9) | (38.0-39.7) | (38.8-41.2) | (38.1-40.4) | (37.4-39.6) | (36.5-39.3) | .03        | (0.008, 4.0)                             |
| Non-Hispanic | 32.5       | 33.7       | 34.6       | 34.7       | 35.8       | 35.9       | 35.6       | 36.1       | 3.59       | 3.59 (1.08, 6.11)                         |
| black        | (30.9-34.2) | (31.4-36.1) | (33.5-35.8) | (32.9-36.4) | (33.8-37.8) | (34.6-37.2) | (34.1-37.2) | (34.2-38.0) | .01        | (1.08, 6.11)                             |
| Hispanics    | 37.1       | 37.0       | 36.9       | 37.8       | 37.7 (36.5-) | 38.1       | 37.5       | 39.1       | 1.99       | 1.99 (-0.41, 4.39)                       |
| P for interaction | .31    |            |            |            |            |            |            |            |            |                                          |
| Education    |            |            |            |            |            |            |            |            |            |                                          |
| <High school graduate | 34.2 | 34.8 | 34.3 | 35.7 | 35.6 | 36.0 | 35.5 | 36.5 | 2.27 | 2.27 (-0.20, 4.73)                          |
| High school graduate | 33.0 | 35.4 | 36.0 | 35.0 | 36.8 | 36.1 | 35.4 | 35.5 | 2.41 | 2.41 (0.57, 4.26)                          |
| Some college or above | 35.6 | 37.4 | 37.3 | 37.6 | 38.9 | 37.8 | 37.6 | 36.6 | 1.05 | 1.05 (-0.42, 2.51)                         |
| College graduate or above | 40.3 | 41.8 | 42.6 | 44.0 | 43.9 | 44.1 | 42.6 | 43.2 | 2.86 | 2.86 (0.92, 4.80)                          |
| P for interaction | .34    |            |            |            |            |            |            |            |            |                                          |

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| Race/ethnicity | <1.30 | 1.30-3.49 | ≥3.50 | P for interaction |
|---------------|-------|-----------|-------|------------------|
| Non-Hispanic white | | | | |
| Non-Hispanic black | | | | |
| Hispanics | | | | |
| P for interaction | | | | |

| Gender | <1.30 | 1.30-3.49 | ≥3.50 | P for interaction |
|--------|-------|-----------|-------|------------------|
| Female | | | | |
| Male | | | | |
| P for interaction | | | | |

| Education | <High school | High school | Some college or above | College graduate or above | P for interaction |
|-----------|--------------|-------------|----------------------|--------------------------|------------------|
| P for interaction | | | | | |
| Ratio of family income to poverty level | 27.4 | 26.8 | 27.0 | 27.0 | 27.5 | 26.7 | 27.7 | 27.6 | .02 |
|----------------------------------------|------|------|------|------|------|------|------|------|-----|
| <1.30 d                                | (26.3-28.6) | (25.5-28.5) | (25.9-28.1) | (25.9-28.1) | (26.5-28.5) | (25.2-28.2) | (26.3-29.2) | (26.3-29.0) | .52 (-1.50, 1.93) |
| 1.30-3.49                              | 28.7 | 27.0 | 27.2 | 28.0 | 28.0 | 28.6 | 28.1 | 28.8 | .02 |
| ≥3.50 e                                | 29.0 | 29.6 | 29.1 | 29.7 | 30.7 | 31.5 | 30.0 | 29.8 | .80 |
| P for interaction                      | .54 |

| Age group, y |
|--------------|
| 20-49        | 33.1 | 32.2 | 32.5 | 33.9 | 33.3 | 34.3 | 35.1 | 33.1 | -.02|
|              | (31.7-34.5) | (31.1-33.2) | (31.5-33.4) | (32.9-34.9) | (31.5-35.0) | (33.0-35.6) | (33.6-36.5) | (31.5-34.6) | .07 (-2.10, 2.10) |
| ≥50          | 34.5 | 33.6 | 34.3 | 35.2 | 34.8 | 34.5 | 33.8 | 34.0 | -.48 |
| P for interaction | .28 |

| Sex |
|-----|
| Female | 33.9 | 32.4 | 34.1 | 34.2 | 33.9 | 34.9 | 35.1 | 33.6 | -.33 |
|      | (32.6-35.2) | (30.6-34.2) | (33.3-34.9) | (33.1-36.5) | (32.3-35.5) | (33.0-36.8) | (33.0-37.1) | (31.8-35.3) | .26 (-2.50, 1.86) |
| Male  | 33.1 | 32.9 | 32.2 | 34.4 | 33.6 | 33.9 | 34.3 | 33.2 | .15 |
| P for interaction | .99 |

| Race/ethnicityb |
|-----------------|
| Non-Hispanic white | 33.8 | 32.7 | 33.3 | 34.6 | 34.2 | 34.7 | 34.6 | 33.1 | -.76 |
|      | (32.4-35.3) | (31.4-33.9) | (32.3-34.2) | (33.7-35.6) | (32.1-36.3) | (32.5-36.8) | (32.9-36.3) | (31.1-35.3) | .40 (-3.20, 1.69) |
| Non-Hispanic black | 32.5 | 34.6 | 32.8 | 33.7 | 31.9 | 34.7 | 35.3 | 35.2 | 2.77 |
|      | (30.7-34.2) | (33.6-35.7) | (31.5-34.2) | (30.9-38.5) | (29.1-34.7) | (33.5-35.9) | (33.4-37.1) | (33.3-37.2) | .05 (0.15, 5.38) |
| Hispanics | 31.9 | 31.6 | 32.5 | 33.7 | 32.4 | 33.3 | 33.0 | 33.1 | 1.15 |
|      | (30.5-33.4) | (30.2-33.0) | (31.1-33.9) | (32.1-35.3) | (30.8-34.1) | (30.4-36.3) | (31.2-34.8) | (31.1-35.1) | .18 (-1.30, 3.64) |
| P for interaction | .69 |

| Education |
|-----------|
| <High school graduate | 32.7 | 33.5 | 32.3 | 32.5 | 32.3 | 34.5 | 34.0 | 35.6 | 2.90 |
|      | (29.6-35.9) | (31.8-35.3) | (30.3-34.4) | (30.7-34.4) | (30.1-34.6) | (32.3-36.7) | (31.6-36.4) | (30.4-40.9) | .30 (-3.20, 9.03) |
| High school graduate or GED | 33.0 | 30.3 | 31.1 | 34.6 | 32.2 | 33.0 | 32.8 | 32.9 | -.08 |
|      | (31.9-34.1) | (28.3-32.3) | (29.9-32.3) | (33.0-36.1) | (31.0-33.3) | (31.1-34.9) | (29.9-35.7) | (31.6-34.2) | .16 (-1.80, 1.62) |
| Some college or above | 33.2 | 33.4 | 34.3 | 32.7 | 32.7 | 34.2 | 32.7 | 32.7 | .55 |
|      | (31.7-34.7) | (31.7-35.1) | (32.8-35.6) | (32.2-34.3) | (29.6-34.5) | (31.1-34.3) | (32.5-36.5) | (30.7-34.6) | .60 (-3.0, 1.90) |

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| College graduate or above | 34.4 | 33.2 | 33.7 | 35.5 | 36.5 | 36.7 | 35.9 | 34.0 | -0.43  |
|--------------------------|------|------|------|------|------|------|------|------|--------|
| P for interaction        | .21  |      |      |      |      |      |      |      |        |
| Ratio of family income to poverty level<sup>a</sup> | 33.1 | 32.6 | 32.2 | 34.0 | 29.4 | 32.9 | 34.3 | 35.0 | 1.86   |
| <1.30                          | (30.6-35.7) | (31.3-33.9) | (30.9-33.5) | (32.5-35.4) | (27.0-31.8) | (31.0-34.8) | (29.7-38.8) | (32.1-37.9) | .52 | (-2.0, 5.7) |
| 1.30-3.49                      | 33.4 | 32.5 | 32.8 | 33.4 | 33.7 | 33.4 | 34.9 | 32.6 | -0.78 |
| ≥3.50                          | 33.5 | 32.8 | 33.4 | 35.1 | 35.8 | 35.3 | 35.0 | 33.9 | .39    |
| P for interaction             | .68  |      |      |      |      |      |      |      |        |
| Age group, y                 |      |      |      |      |      |      |      |      |        |
| 20-49                         | 35.2 | 34.9 | 33.4 | 35.0 | 34.4 | 34.2 | 34.0 | 34.0 | -1.10 |
|                             | (34.2-36.1) | (34.2-35.7) | (32.6-34.2) | (34.0-36.0) | (33.8-35.1) | (33.1-35.3) | (33.3-34.8) | (33.0-35.1) | .09 | (-2.60, 0.30) |
| ≥50                           | 37.3 | 36.1 | 37.1 | 36.1 | 36.9 | 35.4 | 36.0 | 35.4 | -1.90 |
|                             | (36.2-38.4) | (34.9-37.3) | (36-38.2) | (35.1-37.1) | (36.2-37.7) | (34.7-36.1) | (34.8-37.1) | (34.4-36.4) | .01 | (-3.40, -0.38) |
| P for interaction             | .34  |      |      |      |      |      |      |      |        |
| Sex                           |      |      |      |      |      |      |      |      |        |
| Female                        | 36.2 | 36.1 | 36.0 | 36.1 | 36.7 | 35.5 | 35.7 | 35.5 | -0.66 |
|                             | (35.2-37.1) | (35.0-37.2) | (34.8-37.2) | (35.4-36.8) | (36.0-37.4) | (35.0-36.0) | (34.9-36.6) | (35.0-36.0) | .16 | (-1.80, 0.43) |
| Male                          | 36.1 | 34.8 | 34.0 | 34.8 | 34.4 | 33.9 | 34.2 | 33.9 | -2.10 |
|                             | (35.1-37.1) | (34.1-35.4) | (33.1-34.9) | (33.8-35.9) | (33.7-35.2) | (32.9-35.0) | (33.4-35.1) | (32.3-35.6) | .03 | (-4.0, -0.21) |
| P for interaction             | .26  |      |      |      |      |      |      |      |        |
| Race/ethnicity<sup>b</sup>   |      |      |      |      |      |      |      |      |        |
| Non-Hispanic white           | 36.3 | 35.6 | 35.0 | 35.6 | 35.7 | 34.1 | 34.7 | 34.2 | -2.10 |
|                             | (35.2-37.1) | (34.6-36.6) | (34.0-36.1) | (34.6-36.7) | (34.9-36.6) | (33.3-34.8) | (33.6-35.7) | (32.9-35.6) | .005 | (-3.80, -0.31) |
| Non-Hispanic black           | 35.0 | 34.5 | 34.2 | 34.4 | 35.8 | 35.7 | 35.1 | 34.5 | -0.48 |
|                             | (32.9-37.1) | (33.5-35.4) | (32.9-35.5) | (33.3-35.6) | (35.0-36.6) | (34.7-36.7) | (34.1-36.1) | (33.2-35.8) | .62 | (-3.0, 2.04) |
| Hispanics                    | 34.8 | 34.9 | 35.1 | 34.7 | 34.5 | 36.2 | 35.0 | 35.8 | 0.99  |
|                             | (33.6-36) | (33.5-36.4) | (34.2-36.0) | (33.5-35.9) | (32.8-36.2) | (35.3-37.2) | (34.1-35.8) | (34.7-36.9) | .12 | (-0.66, 2.64) |
| P for interaction             | .006 |      |      |      |      |      |      |      |        |
| Education                    |      |      |      |      |      |      |      |      |        |
| <High school graduate        | 36.1 | 35.3 | 34.5 | 35.2 | 35.2 | 34.5 | 34.2 | 35.3 | -0.85 |
|                             | (34.9-37.3) | (34.0-36.6) | (32.8-36.2) | (34.2-36.2) | (34.0-36.5) | (33.6-35.4) | (33.0-35.4) | (33.8-36.7) | .15 | (-2.80, 1.07) |

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Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants (“restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information”), schools (“K-12 school cafeteria, childcare center”), worksites (“cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray) and other sources refer to food items obtained from elsewhere (“sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).

Abbreviations: NHANES, National Health and Nutrition Examination Survey.

| High school | Some college or above | College graduate or above |
|-------------|-----------------------|---------------------------|
| graduate or | (34.0-37.2) | (34.3-36.4) | (36.7-38.4) |
| GED | (33.7-35.5) | (34.1-36.4) | (34.0-36.7) |
| | (33.3-36.1) | (34.4-37.1) | (35.3-37.8) |
| | (33.2-36.4) | (34.5-35.8) | (35.6-37.4) |
| | (31.6-34.5) | (33.9-35.7) | (35.2-36.6) |
| | (33.3-35.8) | (32.8-35.5) | (35.1-37.4) |
| | (32.3-34.6) | (33.0-34.3) | (35.5-38.0) |

| P for interaction | .59 | .80 | .76 |

| Ratio of family income to poverty level |
|---------------------------|----------|----------|----------|
| <1.30 \(^d\) | (33.3-36.7) | (34.6-36.5) | (35.9-37.9) |
| 1.30-3.49 | (33.5-35.9) | (34.3-36.6) | (34.8-36.9) |
| ≥3.50 \(^e\) | (32.5-35.7) | (34.0-35.9) | (33.3-35.1) |

| P for interaction | .37 | .04 | .20 |

| | .79 | .76 | .27 |

\(^a\) All percentages were survey-weighted; %, proportion.

\(^b\) Trends in diet for the other race or mixed race group are not presented in the race/ethnicity-stratified results due to their small sample sizes.

\(^c\) Represents the ratio of family income to the federal poverty threshold, adjusting for household size. For reference, the federal threshold in 2016 for a family of 4 was $24,300/y. A family of 4 earning $33,534/y would have a ratio of 1.38.

\(^d\) Indicates a lower level of income.

\(^e\) Indicates a higher level of income.
| Age group, y | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | 2017-2018 versus 2003-2004, difference (95% CI) |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------------------------------|
| Grocery stores | | | | | | | | | |
| 20-49 | 49.9 | 50.4 | 50.7 | 52.4 | 52.9 | 52.5 | 52.3 | 51.0 | .01 | (-0.86, 3.10) |
| ≥50 | 55.5 | 56.1 | 57.1 | 57.3 | 57.8 | 56.9 | 55.6 | 54.7 | .22 | (-2.60, 1.01) |
| P for interaction | <.001 | | | | | | | | |
| Sex | | | | | | | | | |
| Female | 53.0 | 54.3 | 54.4 | 56.0 | 56.5 | 56.0 | 55.1 | 53.7 | .22 | (-1.60, 2.91) |
| Male | 51.3 | 51.2 | 52.2 | 52.9 | 53.7 | 52.9 | 52.6 | 51.8 | .14 | (-1.10, 1.92) |
| P for interaction | .95 | | | | | | | | |
| Race/ethnicityb | | | | | | | | | |
| Non-Hispanic white | 52.1 | 53.3 | 53.6 | 55.1 | 55.6 | 54.8 | 54.3 | 52.3 | .26 | (-1.90, 2.47) |
| Non-Hispanic black | 50.7 | 49.7 | 50.5 | 51.0 | 51.9 | 51.3 | 50.3 | 51.1 | .37 | (-1.70, 2.62) |
| Hispanics | 54.2 | 52.7 | 53.3 | 53.6 | 54.2 | 54.0 | 52.8 | 53.7 | .96 | (-2.90, 2.0) |
| P for interaction | .66 | | | | | | | | |
| Education | | | | | | | | | |
| <High school graduate | 50.6 | 51.0 | 49.9 | 51.7 | 51.8 | 50.9 | 50.3 | 50.5 | .99 | (-2.70, 2.44) |
| High school graduate or GED | 49.8 | 49.8 | 51.7 | 50.8 | 52.9 | 51.0 | 50.7 | 49.6 | .99 | (-2.70, 2.16) |
| Some college or above | 52.0 | 52.3 | 53.0 | 53.7 | 54.0 | 53.2 | 53.1 | 51.0 | .77 | (-3.20, 1.06) |
| College graduate or above | 56.4 | 57.4 | 58.4 | 60.5 | 59.5 | 60.3 | 58.4 | 58.3 | .09 | (-0.30, 1.16) |
| P for interaction | .95 | | | | | | | | |
| Ratio of family income to poverty levelc | | | | | | | | | |

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| Age group, y | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------------------------------------|
| <1.30 d     | 49.8      | 50.4      | 50.0      | 50.7      | 51.4      | 50.6      | 50.5      | 50.0      | .69       | .019 (-2.40, 2.74)                           |
| 1.30-3.49   | 51.9      | 51.5      | 52.7      | 53.5      | 54.0      | 53.3      | 52.1      | 52.2      | .52       | (-2.20, 2.71)                                |
| ≥3.50 e     | 53.8      | 54.9      | 55.2      | 57.1      | 58.4      | 57.9      | 56.9      | 54.6      | .03       | (-1.43, 2.96)                                |
| P for interaction | .44          |           |           |           |           |           |           |           |          |                                               |

### Restaurants

| Race/ethnicityb | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction |
|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------|
| Non-Hispanic white | 40.1      | 39.8      | 39.2      | 40.1      | 40.1      | 40.1      | 40.9      | 40.2      | .79               | -1.40 (-3.10, 0.30) |
| Non-Hispanic black | 40.0      | 39.3      | 39.4      | 39.2      | 40.9      | 40.0      | 40.2      | 39.1      | .97               | -0.97 (-2.80, 0.87) |
| Hispanics       | 41.1      | 40.2      | 39.4      | 39.7      | 41.9      | 39.6      | 39.0      | 40.2      | .26               | -0.89 (-2.80, 0.98) |
| P for interaction | .28       |           |           |           |           |           |           |           |                   |                                               |

### Education

| Education       | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for interaction |
|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------|
| <High school graduate | 39.7      | 38.9      | 37.8      | 39.0      | 40.5      | 39.0      | 37.9      | 37.8      | .19               | -1.90 (-3.80, 0.12) |
| High school graduate or GED | 38.6      | 38.6      | 38.2      | 39.1      | 39.2      | 38.4      | 38.7      | 36.3      | .04               | -2.40 (-4.10, -0.59) |
| Some college or above | 40.7      | 39.4      | 39.8      | 39.3      | 40.9      | 40.8      | 39.4      | 39.5      | .51               | -1.20 (-2.70, 0.31) |

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### HEI-2015, Weighted Mean (95% CI)\(^a\)

|                     | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | 2017-2018 difference (95% CI) |
|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|--------------------------------|
| College graduate or above | 42.1      | 41.7      | 40.6      | 41.8      | 42.9      | 42.8      | 42.1      | 41.6      | .53        | (-0.49, 2.70, 1.71)            |
| P for interaction    | .30       |           |           |           |           |           |           |           |            |                                |
| **Ratio of family income to poverty level** |           |           |           |           |           |           |           |           |            |                                |
| <1.30\(^d\)         | 38.8      | 38.0      | 37.8      | 38.4      | 39.7      | 38.2      | 38.4      | 38.3      | .98        | (-2.60, 3.57, 1.57)            |
| (37.5-40.2)         | (37.6-39.1) | (37.5-39.1) | (37.5-39.4) | (38.8-40.6) | (37.1-39.2) | (37.0-39.8) | (36.7-39.9) |           |            |                                |
| 1.30-3.49           | 40.5      | 38.5      | 38.5      | 39.6      | 40.1      | 39.8      | 39.0      | 38.5      | .16        | (-3.40, -0.66, -2.10)          |
| (39.6-41.4)         | (37.8-39.2) | (37.4-39.6) | (38.8-40.3) | (39.0-41.2) | (38.8-40.9) | (38.2-39.7) | (37.4-39.5) |           |            |                                |
| ≥3.50\(^e\)        | 41.1      | 41.2      | 40.5      | 40.8      | 42.7      | 42.7      | 41.6      | 39.9      | .85        | (-3.06, 0.80, -1.13)           |
| (40.1-42.0)         | (40.2-42.3) | (39.9-41.1) | (39.6-41.9) | (41.5-43.9) | (42.0-43.4) | (40.1-43.1) | (38.3-41.6) |           |            |                                |
| P for interaction   | .48       |           |           |           |           |           |           |           |            |                                |
| **Worksites**       |           |           |           |           |           |           |           |           |            |                                |
| Age group, y        |           |           |           |           |           |           |           |           |            |                                |
| 20-49               | 38.0      | 37.4      | 36.3      | 38.6      | 40.7      | 39.5      | 39.8      | 39.5      | <.001      | (-0.53, 3.58, -0.41)           |
| (37.0-38.9)         | (36.4-38.5) | (34.8-37.9) | (36.8-40.5) | (38.7-42.8) | (38.1-40.8) | (37.9-41.8) | (37.6-41.3) |           |            |                                |
| ≥50                 | 40.5      | 38.6      | 38.9      | 42.2      | 40.1      | 40.0      | 39.6      | 40.0      | .76        | (-5.20, 4.39, -0.41)           |
| (37.9-43.0)         | (35.8-41.4) | (37.0-40.7) | (40.1-44.4) | (37.3-43.0) | (36.8-43.2) | (36.9-42.4) | (36.4-44.1) |           |            |                                |
| P for interaction   | .20       |           |           |           |           |           |           |           |            |                                |
| **Sex**             |           |           |           |           |           |           |           |           |            |                                |
| Female              | 39.9      | 38.3      | 37.8      | 40.4      | 42.0      | 41.3      | 40.8      | 40.4      | .04        | (-2.0, 2.89, 1.58)             |
| (38.3-41.5)         | (36.1-40.5) | (35.9-39.6) | (38.2-42.7) | (39.7-44.2) | (38.8-43.7) | (38.1-43.5) | (38.6-42.2) |           |            |                                |
| Male                | 37.5      | 37.6      | 36.7      | 39.3      | 39.3      | 38.5      | 39.0      | 39.1      | .09        | (-1.9, 5.06, -0.9)             |
| (36.0-39.0)         | (36.0-39.1) | (35.0-38.4) | (36.8-41.9) | (36.5-42.1) | (36.8-40.2) | (37.0-40.9) | (35.9-42.2) |           |            |                                |
| P for interaction   | .86       |           |           |           |           |           |           |           |            |                                |
| **Race/ethnicity**  |           |           |           |           |           |           |           |           |            |                                |
| Non-Hispanic white  | 38.8      | 37.9      | 37.2      | 40.7      | 40.4      | 40.0      | 39.8      | 39.2      | .14        | (3.10, 3.91, 2.14)             |
| (37.1-40.5)         | (36.3-39.6) | (35.4-39.0) | (39.2-42.3) | (37.4-43.4) | (37.9-42.1) | (37.7-41.8) | (36.1-42.3) |           |            |                                |
| Non-Hispanic black  | 37.6      | 39.5      | 37.7      | 40.2      | 40.1      | 40.6      | 40.3      | 41.4      | .01        | (0.31, 7.34, 3.83)             |
| (35.0-40.1)         | (37.7-41.4) | (35.9-39.4) | (37.3-43.0) | (39.2-41.1) | (38.7-42.5) | (37.5-43.1) | (39.0-43.8) |           |            |                                |
| Hispanics            | 36.6      | 35.4      | 36.6      | 37.3      | 39.7      | 39.4      | 37.8      | 38.7      | .02        | (-1.80, 5.85, 2.05)            |
| (33.7-39.6)         | (33.2-37.6) | (34.1-39.0) | (34.7-39.8) | (37.3-42.2) | (35.9-42.8) | (35.1-40.5) | (36.3-41.1) |           |            |                                |
| P for interaction   | .59       |           |           |           |           |           |           |           |            |                                |

\(^a\) 2003-2004 versus 2007-2008, 2009-2010 versus 2011-2012, 2013-2014 versus 2015-2016, 2017-2018 versus 2003-2004.

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## HEI-2015, Weighted Mean (95% CI)a

| Education                        | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | 2017-2018 versus 2003-2004, difference (95% CI) |
|----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|-----------------------------------------------|
| <High school graduate           | 37.5      | 37.3      | 37.9      | 37.5      | 35.1      | 39.7      | 37.0      | 43.7      | .43        | (-7.90, 20.4)                                |
| High school graduate or GED      | 37.1      | 35.1      | 35.5      | 39.3      | 38.0      | 36.9      | 37.8      | 38.0      | .05        | (-1.30, 3.05)                                |
| Some college or above            | 39.3      | 37.8      | 37.0      | 40.3      | 39.5      | 38.1      | 40.6      | 39.6      | .20        | (-2.20, 2.76)                                |
| College graduate or above        | 39.3      | 40.1      | 38.4      | 40.7      | 44.3      | 42.6      | 40.4      | 40.2      | .16        | (-3.60, 5.36)                                |
| P for interaction                |           |           |           |           |           |           |           |           | .85        |                                               |
| Ratio of family income to poverty levelb |       |           |           |           |           |           |           |           |           |                                               |
| <1.30 d                         | 37.6      | 36.6      | 33.7      | 38.4      | 38.9      | 36.9      | 40.5      | 43.6      | .06        | (-2.80, 14.7)                                |
| 1.30-3.49                      | 39.6      | 36.8      | 37.5      | 39.6      | 38.8      | 39.2      | 39.6      | 38.3      | .64        | (-3.50, 0.77)                                |
| ≥3.50 e                        | 38.3      | 38.8      | 37.8      | 40.7      | 42.7      | 40.5      | 39.9      | 40.0      | .03        | (-1.43, 4.98)                                |
| P for interaction                |           |           |           |           |           |           |           |           | .12        |                                               |
| Age group, y                     |           |           |           |           |           |           |           |           |           |                                               |
| 20-49                            | 40.9      | 40.4      | 39.5      | 40.6      | 36.3      | 35.7      | 36.0      | 35.5      | <.001      | (-5.30, -7.0, -3.0)                           |
| ≥50                             | 44.0      | 42.1      | 42.8      | 41.4      | 40.1      | 38.6      | 38.6      | 36.9      | <.001      | (-9.40, -4.90)                               |
| P for interaction                |           |           |           |           |           |           |           |           | .67        |                                               |
| Sex                              |           |           |           |           |           |           |           |           |           |                                               |
| Female                          | 42.3      | 41.4      | 41.9      | 41.9      | 39.2      | 37.6      | 39.0      | 37.0      | <.001      | (-5.30, -7.0, -3.7)                           |
| Male                            | 42.2      | 40.9      | 39.9      | 40.0      | 36.9      | 36.6      | 35.7      | 35.4      | <.001      | (-8.60, -5.0)                                |
| P for interaction                |           |           |           |           |           |           |           |           | .07        |                                               |

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| HEI-2015, Weighted Mean (95% CI)a | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | 2017-2018 | P for trend | P for interaction | 2017-2018 versus 2003-2004, difference (95% CI) |
|-----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|----------------|---------------------------------|
| Non-Hispanic white                | 42.6      | 41.6      | 40.9      | 41.2      | 37.9      | 36.4      | 37.5      | 35.9      |            | .002           | <.001 (-6.70,-4.50) |
| Non-Hispanic black                | 41.8      | 39.3      | 40.3      | 40.1      | 38.0      | 36.8      | 35.3      | 35.3      | <.001      | (-6.50,-7.60)  |
| Hispanics                          | 40.6      | 39.4      | 40.3      | 39.9      | 38.0      | 39.6      | 38.3      | 37.6      | .01        | (-7.00,-6.00)  |
| P for interaction                 |           |           |           |           |           |           |           |           |            |                |                                 |
| Education                         |           |           |           |           |           |           |           |           |            |                |                                 |
| <High school graduate             | 43.0      | 40.9      | 41.9      | 41.4      | 37.8      | 37.7      | 37.4      | 37.5      |            | <.001 (-8.90,-2.20) |
| High school                       |           |           |           |           |           |           |           |           |            |                |                                 |
| graduate or GED                   | 41.5      | 42.7      | 40.0      | 40.8      | 38.6      | 35.9      | 36.3      | 36.1      | <.001      | (-8.20,-2.60)  |
| Some college or above             | 42.3      | 40.4      | 42.0      | 40.5      | 37.2      | 37.1      | 37.9      | 33.8      | <.001      | (-7.00,-4.20)  |
| College                           | 42.5      | 40.9      | 40.2      | 41.4      | 38.8      | 37.5      | 37.2      | 38.4      | <.001      | (-6.40,-4.20)  |
| P for interaction                 |           |           |           |           |           |           |           |           |            |                |                                 |
| Ratio of family income to poverty levelb |           |           |           |           |           |           |           |           |            |                |                                 |
| <1.30a                            | 42.0      | 40.9      | 41.0      | 41.5      | 37.0      | 37.5      | 37.1      | 34.4      | <.001      | -0.001 (-12.00,-3.40) |
| 1.30-3.49                         | 42.6      | 40.8      | 42.8      | 41.1      | 39.3      | 37.2      | 36.4      | 35.9      | <.001      | -0.001 (-8.50,-4.80) |
| ≥3.50c                            | 41.8      | 41.4      | 39.5      | 40.8      | 38.0      | 36.9      | 38.1      | 36.6      | <.001      | -0.001 (-5.20,-2.79) |
| P for interaction                 | .24       |           |           |           |           |           |           |           |            |                |                                 |

Abbreviations: NHANES, National Health and Nutrition Examination Survey.

Food sources were grouped as grocery stores (consumed food items obtained from “grocery or supermarket”), restaurants (“restaurant fast food/pizza, restaurant with waiter/waitress, restaurant no additional information”), schools (“K-12 school cafeteria, childcare center”), worksites (“cafeteria not in a K-12 school, vending machine, common coffee pot or snack tray) and other sources refer to food items obtained from elsewhere (“sport, recreation, or entertainment facility, street vendor, vending truck, from someone else/gift, and others).

a All percentages were survey-weighted; %, proportion.

b Trends in diet for the other race or mixed race group are not presented in the race/ethnicity-stratified results due to their small sample sizes.

c Represents the ratio of family income to the federal poverty threshold, adjusting for household size. For reference, the federal threshold in 2016 for a family of 4 was $24,300/y. A family of 4 earning $33,534/y would have a ratio of 1.38. d Indicates a lower level of income. e Indicates a higher level of income.

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eFigure 1. Trends in Estimated Percentage of Energy Intake from Grocery Stores, Restaurants, Schools or Worksites, and Other Sources Among US Children Aged 5-19 Years (A: top) and Adults Age 20+ Years (B: bottom), NHANES 2003-2004 to 2017-2018.

Data were weighted to be nationally representative.
eFigure 2. Trends in Estimated Proportions of Americans Consuming Foods from Grocery Stores (A), Restaurants (B), Schools or Worksites (C), and Other Sources (D) with Poor, Intermediate or Ideal Diet Quality Among Children Aged 5 to 19 Years (left) and Adults Aged 20 Years or Older (right), NHANES 2003-2004 to 2017-2018.

Data were weighted to be nationally representative.
eFigure 3. Trends in Estimated Proportions of Americans Consuming Foods from Schools with Poor, Intermediate or Ideal Diet Quality Among Children Aged 5 to 19 Years by Age (top) and Sex (bottom), NHANES 2003-2004 to 2017-2018.
eFigure 4. Trends in Estimated Proportions of Americans Consuming Foods from Grocery with Poor, Intermediate or Ideal Diet Quality by Age for Children (top) and Adults (bottom), NHANES 2003-2004 to 2017-2018.
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