2025 Dietary Guidelines Advisory Committee: Meeting 4

Janet de Jesus, MS, RD
Designated Federal Officer
Office of Disease Prevention and Health Promotion
Department of Health and Human Services

January 19, 2024

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2025 Dietary Guidelines Advisory Committee

Sarah Booth, PhD
Chair

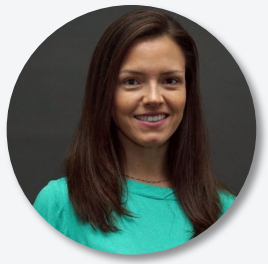
Angela Odoms-Young, PhD, MS
Vice-Chair

Steven Abrams, MD

Cheryl Anderson, PhD, MPH, MS

Aline Andres, PhD, RD

Carol Byrd-Bredbenner, PhD, RD, FAND



Andrea Deierlein, PhD, MPH, MS

Heather Eicher-Miller, PhD

Teresa Fung, ScD, RD

Christopher Gardner, PhD

Edward Giovannucci, MD, ScD

Deanna Hoelscher, PhD, RDN, LD, CNS, FISBNPA

Valarie Blue Bird Jernigan, DrPH, MPH

Jennifer Orlet Fisher, PhD

Cristina Palacios, PhD, MSc

Hollie Raynor, PhD, RD, LDN

Fatima Cody Stanford, MD, MPH, MPA, MBA, FAAP, FACP, FAHA, FAMWA, FTOS

Sameera Talegawkar, PhD

Chris Taylor, PhD, RDN, LD, FAND

Deirdre Tobias, ScD

Dietary Guidelines for Americans, 2025-2030 Timeline

2022

April 15 – May 16
- Scientific questions for public comment

June 15 – July 15
- 2025 Dietary Guidelines Advisory Committee nominations

2023

Advisory Committee Meetings
- Meeting 1 (February 9–10) ✓
- Meeting 2 (May 10) ✓
- Meeting 3 (September 12-13) ✓

2024

Advisory Committee Meetings
- Meeting 4 (January 19)
- Meeting 5 (May 30)
- Meeting 6 (September 26)

Release Scientific Report

2025

Release *Dietary Guidelines for Americans, 2025-2030*

Step 1: Identify Scientific Questions

Step 2: Appoint the Committee

Step 3: Advisory Committee Reviews Scientific Evidence

Step 4: Develop the Dietary Guidelines

Legend

Opportunity for public input

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Opening Remarks

Rachel L. Levine, MD, Assistant Secretary for Health
Admiral, U.S. Public Health Service
Office of the Assistant Secretary for Health,
U.S. Department of Health and Human Services

Stacy Dean, Deputy Under Secretary
Food, Nutrition, and Consumer Services,
U.S. Department of Agriculture

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2025 Dietary Guidelines Advisory Committee Chair and Vice-Chair Remarks

Sarah Booth, PhD

Angela Odoms-Young, PhD, MS

January 19, 2024

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Overview

- Committee Year in Review
- Overview of Today's Agenda

2025 DGAC: Year In Review

Subcommittee and Workgroup Structure

Chair / Vice Chair

Health Equity Working Group

Dietary Patterns and Specific Dietary Pattern Components Across Life Stages

Diet in Pregnancy and Birth through Adolescence

Food Pattern Modeling and Data Analysis

Strategies for Individuals and Families Related to Diet Quality and Weight Management

Meta-Analysis Working Group

Federal Staff Support Team

Year in Review: Committee Meetings

3 Committee Meetings

- ☑ February 9-10, 2023
- ☑ May 10, 2023
- ☑ September 12-13, 2023

Year in Review: Scientific Questions

35 systematic review protocols

- Including, for the first time, 2 with meta-analysis

2 evidence scan protocols

10 food pattern modeling protocols

- Including a comprehensive review of each pattern component and, for the first time, diet simulations

Year in Review: Review of the Evidence To-Date

Over **200,000** articles screened

- To identify articles that meet the criteria for inclusion in the Committee's systematic reviews

Over **400** articles reviewed

- To develop the conclusion statements presented at Meetings 3 and 4

Year in Review: Public Engagement

874 written public comments

Over **4,000** views of new NESR web content from **20** countries

82 oral public comments

Over **132,000** views of content on DietaryGuidelines.gov related to the 2025 Committee

Meetings viewed by over **5,000** people from **49** countries

145 Continuing Professional Education certifications granted

Looking Ahead to the Committee's Second Year

3 Committee Meetings:

- Today (January 19, 2024)
- Meeting 5: May 30, 2024*
- Meeting 6: September 26, 2024*

Continue to review evidence and develop draft conclusion statements for systematic reviews

Review and synthesize results of food pattern modeling and simulation analyses

Review results of data analysis

The Scientific Report of the 2025 DGAC!

- Integration of the evidence across systematic reviews, data analyses, and food pattern modeling
- Anticipated late 2024

* Dates may be subject to change

Today's Agenda

- **Health Equity**, Sameera Talegawkar, PhD
- **Food Pattern Modeling and Data Analysis**, Chris Taylor, PhD, RDN, LD, FAND, and Heather Eicher-Miller, PhD
- **Strategies for Individuals and Families Related to Diet Quality and Weight Management**, Cristina Palacios, PhD, MSc
- **Break**
- **Dietary Patterns and Specific Dietary Components Across Life Stages**, Deanna Hoelscher, PhD, RDN, LD, CNS, FISBNPA
- **Diet in Pregnancy and Birth Through Adolescence**, Jennifer Orlet Fisher, PhD
- **Chair/Vice-Chair Wrap up**, Sarah Booth, PhD and Angela Odoms-Young, PhD, MS

Get Involved

Each Subcommittee or Working Group will be Presenting on Progress Made Since Meeting 3 for Committee Discussion

- New protocols
- Protocol revisions
  - Revisions may be made during the review process to enhance clarity or enable focus on a stronger body of evidence
- Discontinued protocols
  - Subcommittees have continued to prioritize their scientific questions to ensure that the questions addressed are relevant, important, and have the greatest potential impact to Federal programs
  - Other considerations include research availability, workload and capacity, ensuring a comprehensive review of diet and health across all life stages, and health equity
- Draft conclusion statements for questions reviewed to date

Protocols for Systematic Reviews and Food Pattern Modeling

- As needed, protocols will be refined after today's meeting to reflect the Committee discussion.
- All systematic review protocols will have the full publication date range documented to reflect the dates when literature searches were conducted.
- New and revised protocols are expected to be posted at DietaryGuidelines.gov and NESR.usda.gov next month.

For updates, sign up for the Dietary Guidelines listserv on DietaryGuidelines.gov.

The Committee uses NESR's methodology* to synthesize evidence, and develop and grade conclusion statements

- A conclusion statement is carefully constructed, based on the evidence reviewed, to answer the systematic review question.
- A conclusion statement does not draw implications and should not be interpreted as dietary guidance.
- Each conclusion statement is graded based on an assessment of the underlying evidence for consistency, precision, risk of bias, directness, and generalizability.

Grade	Definition
Strong	The level of certainty in the conclusion is strong, such that if new evidence emerges, modifications to the conclusion are unlikely to be required.
Moderate	The level of certainty in the conclusion is moderate, such that if new evidence emerges, modifications to the conclusion may be required.
Limited	The level of certainty in the conclusion is limited, such that if new evidence emerges, modifications to the conclusion are likely to be required.
Grade Not Assignable	A conclusion statement cannot be drawn due to either a lack of evidence, or evidence that has severe limitations.

*NESR's methodology is available online at https://nesr.usda.gov/methodology-overview

Health Equity Working Group

Working Group Chair:
Sameera Talegawkar, PhD

Additional Presenters:
Chris Taylor, PhD, RDN, LD, FAND
Valarie Blue Bird Jernigan, DrPH, MPH

January 19, 2024

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2025 Dietary Guidelines Advisory Committee: Health Equity Working Group

Working Group Members	
Sameera Talegawkar, PhD†	Heather Eicher-Miller, PhD*§
Cheryl Anderson, PhD, MPH, MS† ‡	Valarie Blue Bird Jernigan, DrPH, MPH*‡
Sarah Booth, PhD *†	Hollie Raynor, PhD, RD, LDN †‡
Jennifer Orlet Fisher, PhD‡§	Angela Odoms-Young, PhD, MS‡§
Deanna Hoelscher, PhD, RDN, LD, CNS, FISBNPA†‡	

* Food Pattern Modeling and Data Analysis Subcommittee
† Dietary Patterns and Specific Dietary Pattern Components Across Life Stages Subcommittee
‡ Strategies for Individuals and Families Related to Diet Quality and Weight Management Subcommittee
§ Diet in Pregnancy and Birth through Adolescence Subcommittee

2025 Dietary Guidelines Advisory Committee: Health Equity Working Group Staff

Support Staff	
Meghan Adler, MS, RDN	Chinwe Obudulu, MS, RD, LD
Kara Beckman, PhD	Julia Quam, MSPH, RDN
Gisela Butera, MEd, MLIS	Elizabeth Rahavi, RD
Dana DeSilva, PhD, RD	Kelley Scanlon, PhD, RD
Stephenie Fu	Sara Scinto-Madonich, MS
Molly Higgins, MLIS	Colleen Cruz, MPH, RDN
Tessa Lasswell, MPH, RDN	Ali Webster, PhD, RD
Emily Levin, MPH, RDN	Janet de Jesus, MS, RD (DFO)
Julie Nevins, PhD	Eve Stoody, PhD (DFO Rep)
Julie Obbagy, PhD, RD	

The Dietary Guidelines for Americans: A Health Equity Lens

All scientific questions will be reviewed with a health equity lens to ensure that the next edition of the *Dietary Guidelines* is relevant to people with diverse racial, ethnic, socioeconomic, and cultural backgrounds. HHS and USDA will support the Committee to describe and consider factors such as socioeconomic status*, race, ethnicity, and culture, to the greatest extent possible, based on the information provided in the scientific literature and data.

**Updated to socioeconomic position for the review of the evidence and the Scientific Report*

Progress Since Meeting 3

Work Under Way

- Provided input on protocols and plans for scientific questions related to health equity, including on the work related to diet simulations
- Incorporated health equity considerations into the Committee's review including consideration of public comments
- The Working Group has begun the process of writing the health equity-focused chapter for the Scientific Report

Ongoing Work

	Ongoing Work
Systematic Reviews	• Continue to support health equity considerations throughout the process of conducting systematic reviews • Provide input on how to consistently evaluate socioeconomic position when grading the strength of evidence
Data Analysis	• Examine data on dietary intake and nutrition-related health conditions for demographic subpopulations (i.e., sex, race and/or ethnicity, SEP, age/life stage, household food security, household SNAP benefits, child WIC benefits)
Food Pattern Modeling	• Discuss representation in developing nutrient profiles • Address variability in dietary intake across all protocols • Emphasize new foods in an innovative diet simulation process
Scientific Report	• Outline health equity chapter and cross cutting topics in the Scientific Report • Consider public comments in relation to the totality of evidence examined and the Scientific Report

New Protocol: Diet Simulations

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New Protocol: Diet Simulations Rationale

- The proposed dietary patterns that emerge from food pattern modeling provide the recommended amounts of foods and beverages from each food and subgroup, creating a flexible framework for dietary selections.

- As part of the continuous quality advancement of the Dietary Guidelines process, diet simulation was identified as another opportunity to consider intake variability in addition to existing Food Pattern Modeling methodology

- Like Food Pattern Modeling, diet simulations also consider a broad range of intakes, but instead of using a composite nutrient profile based on a representative food, the energy and nutrient composition of all randomly selected foods and beverages are considered.

- The addition of this systems science approach allows the Committee to examine and refine proposed dietary patterns to ensure that the final pattern(s) recommended to the Departments are inclusive of a broader range of dietary intakes.

New Protocol: Diet Simulations Question

Table A3-2
Healthy U.S.-Style Dietary Pattern for Ages 2 and Older, With Daily or Weekly Amounts From Food Groups, Subgroups, and Components

CALORIE LEVEL OF PATTERN[a]	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
FOOD GROUP OR SUBGROUP[b]	**Daily Amount[c] of Food From Each Group** (Vegetable and protein foods subgroup amounts are per week.)											
Vegetables (cup eq/day)	**1**	**1 ½**	**1 ½**	**2**	**2 ½**	**2 ½**	**3**	**3**	**3 ½**	**3 ½**	**4**	**4**
	Vegetable Subgroups in Weekly Amounts											
Dark-Green Vegetables (cup eq/wk)	½	1	1	1 ½	1 ½	1 ½	2	2	2 ½	2 ½	2 ½	2 ½
Red and Orange Vegetables (cup eq/wk)	2 ½	3	3	4	5 ½	5 ½	6	6	7	7	7½	7½
Beans, Peas, Lentils (cup eq/wk)	½	½	½	1	1½	1½	2	2	2 ½	2 ½	3	3
Starchy Vegetables (cup eq/wk)	2	3 ½	3 ½	4	5	5	6	6	7	7	8	8
Other Vegetables (cup eq/wk)	1 ½	2 ½	2 ½	3 ½	4	4	5	5	5 ½	5 ½	7	7
Fruits (cup eq/day)	**1**	**1**	**1 ½**	**1 ½**	**1 ½**	**2**	**2**	**2**	**2**	**2 ½**	**2 ½**	**2 ½**
Grains (ounce eq/day)	**3**	**4**	**5**	**5**	**6**	**6**	**7**	**8**	**9**	**10**	**10**	**10**
Whole Grains (ounce eq/day)[d]	1 ½	2	2 ½	3	3	3	3 ½	4	4 ½	5	5	5
Refined Grains (ounce eq/day)	1 ½	2	2 ½	2	3	3	3 ½	4	4 ½	5	5	5
Dairy (cup eq/day)	**2**	**2 ½**	**2 ½**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Protein Foods (ounce eq/day)	**2**	**3**	**4**	**5**	**5**	**5 ½**	**6**	**6 ½**	**6 ½**	**7**	**7**	**7**
	Protein Foods Subgroups in Weekly Amounts											
Meats, Poultry, Eggs (ounce eq/wk)	10	14	19	23	23	26	28	31	31	33	33	33
Seafood (ounce eq/wk)[e]	2-3[f]	4	6	8	8	8	9	10	10	10	10	10
Nuts, Seeds, Soy Products (ounce eq/wk)	2	2	3	4	4	5	5	5	5	6	6	6
Oils (grams/day)	**15**	**17**	**17**	**22**	**24**	**27**	**29**	**31**	**34**	**36**	**44**	**51**
Limit on Calories for Other Uses (kcal/day)[g]	**130**	**80**	**90**	**100**	**140**	**240**	**250**	**320**	**350**	**370**	**440**	**580**
Limit on Calories for Other Uses (%/day)	13%	7%	6%	6%	8%	12%	11%	13%	13%	13%	15%	18%

[a] Patterns at 1,000, 1,200, and 1,400 kcal levels are designed to meet the nutritional needs of children ages 2 through 8 years. Patterns from 1,600 to 3,200 kcal are designed to meet the nutritional needs of children 9 years and older and adults. If a child 4 through 8 years of age needs more energy and, therefore, is following a pattern at 1,600 calories or more, his/her recommended amount from the dairy group should be 2½ cup eq per day. Amount of dairy for children ages 9 through 18 is 3 cup eq per day regardless of calorie level. The 1,000 and 1,200 kcal level patterns are not intended for children 9 and older or adults. The 1,400 kcal level is not intended for children ages 10 and older or adults.

Do simulated diets that meet the updated USDA Dietary Patterns and **reflect variation in dietary intakes** achieve nutrient adequacy?

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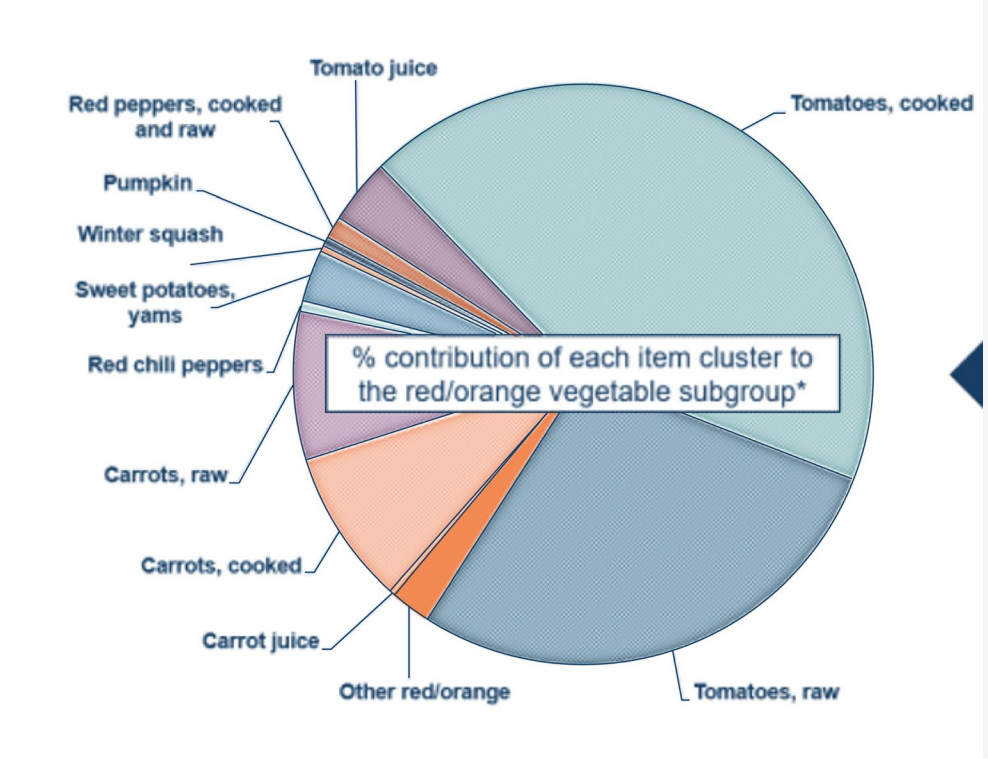
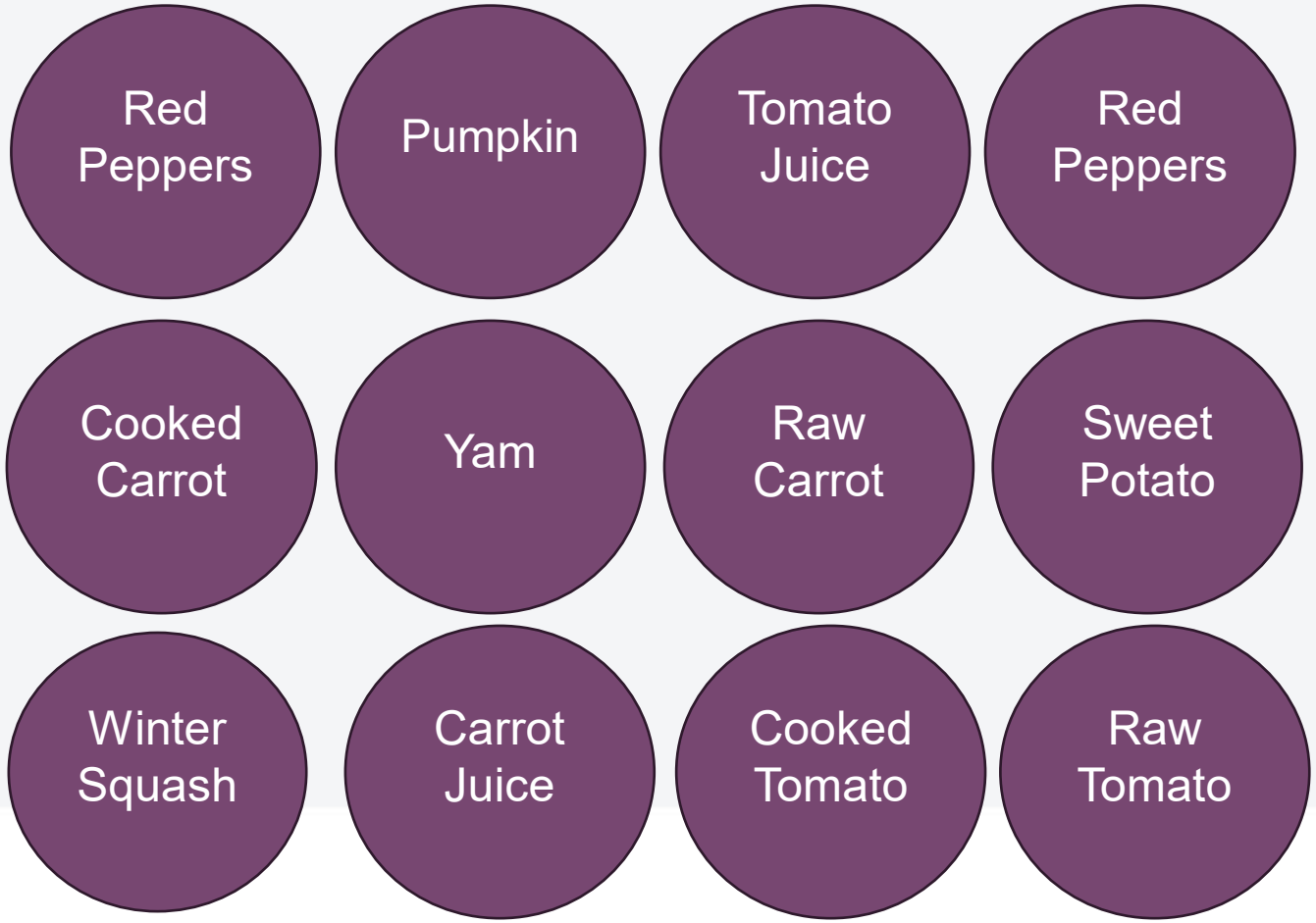
Nutrient Profile Development: Food Pattern Modeling vs. Diet Simulation

Food Pattern Modeling



Diet Simulation



New Protocol: Diet Simulations
Key Definitions *(new for 2025)*

- ***Nutrient-Dense Foods and Beverages:*** Nutrient-dense foods and beverages provide vitamins, minerals, and other health-promoting components and have little added sugars, saturated fat, and sodium. Vegetables, fruits, whole grains, seafood, eggs, beans, peas, and lentils, unsalted nuts and seeds, fat-free and low-fat dairy products, and lean meats and poultry—when prepared with no or little added sugars, saturated fat, and sodium—are nutrient-dense foods. In the Diet Simulations Protocol, foods and beverages lower in saturated fat and added sugars are defined as nutrient-dense.
- ***Simulation:*** Simulation is a systems science method that has been defined as "a mathematical model that describes or recreates computationally a system process."* In USDA FPM, simulation is used to create computationally thousands of daily diets that meet the recommended dietary pattern by randomly selecting foods and beverages from a set of food and beverage items using a predefined probability of selection for each item.

*Vallverdu, 2014 https://doi.org/10.1016/j.protcy.2014.02.003

Diet Simulations Will Test the Proposed 2025 Patterns

1 Nutrient profile development

2 Analyze hypothetical modifications to food groups and/or dietary patterns

3 Evaluate and refine draft dietary patterns

Basis

- Synthesize results
- Develop nutrient profiles

WWEIA Population Subgroups

Protein Foods

Vegan

Dairy and Fortified Soy Alternatives

Low carbohydrate

Staple Carbohydrate Foods

Vegetables

Fruit

- Synthesize results: *all* evidence bases
- Implications within population subgroups
- Draft dietary patterns

Different ranges of nutrient density

Diet Simulations

Protocol status

- Protocol ready for analysis
- Protocol to be developed

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Dietary Intake Simulations: Proposed Analytic Framework

Simulate dietary intake data to construct 500 7-day diets for each age-sex group by randomly selecting different combinations of individual foods and beverages in the amounts recommended in the dietary pattern

Probability of selection of foods and beverages will vary by nutrient-density

Calculate the distribution of energy and nutrient content of the aggregated simulated diets for each age-sex group

Calculation includes the energy and nutrient content of all foods and beverages

Evaluate whether the energy and nutrient content of aggregated simulated diets meet the nutritional goals for the age-sex group

Evaluation criteria include Estimated Energy Requirements, Acceptable Macronutrient Reference Ranges, Estimated Average Requirements, Adequate Intakes, Tolerable Upper Intake Levels/Chronic Disease Risk Reduction Intake, and *Dietary Guidelines* recommendations.

New Protocol: Diet Simulations - Summary of Analyses

The Dietary Guidelines for Americans recommends a focus on nutrient-dense foods to meet dietary patterns

Foods and beverages meeting proposed criteria will be identified as being higher in saturated fat or added sugars prior to analysis and set to a lower probability of selection in simulation analysis:

- Nutrient-dense foods will have an equal probability of selection in simulation
- Foods higher in saturated fat or added sugars will have a lower probability of selection than nutrient-dense foods

Simulate dietary intake data to construct 500 7-day diets for each age-sex group by randomly selecting different combinations of individual foods and beverages in the amounts recommended in the dietary pattern

Probability of selection of foods and beverages will vary by nutrient-density

Criteria for Identifying Foods and Beverages Higher in Saturated Fat[32] and Added Sugars for Diet Simulation

For foods and beverages with a standard portion ≤30 grams:

>25% of the Daily Value (>5 g) of **saturated fat** per standard portion for meats, cheese, and soy alternatives of cheese; >10% of the Daily Value (>2 g) of **saturated fat** per standard portion for all other foods and beverages

AND/OR

>10% of the Daily Value (>5 g) of **added sugars** per standard portion

Exceptions: not applied to nuts and seeds because of beneficial fatty acids; for fats and oils, criteria based on >30% of total fat from saturated fat

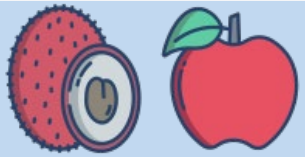
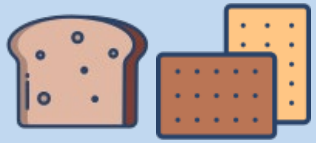
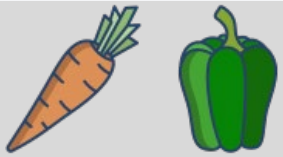
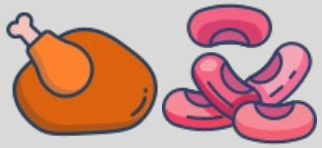
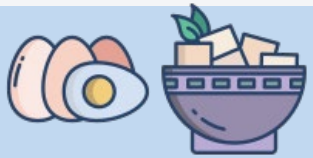
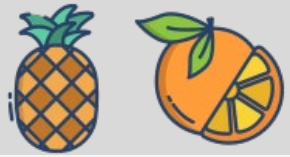
For foods and beverages with a standard portion >30 grams: Thresholds of >10% of Daily Value for saturated fat and added sugars change to >15% of the Daily Value (>3 g saturated fat per standard portion and >7.5 g of added sugars per standard portion)

Criteria adapted from:

FDA: Draft Guidance for Industry: Questions and Answers About Dietary Guidance Statements in Food Labeling (fda.gov)

Health Canada: 2019-canada-food-guide-food-classification-system-development-validation.pdf

New Protocol: Diet Simulation – Simulated daily diets

2000 calorie/day dietary pattern	Vegetables 2 cups	Fruits 2 cups	Grains 6 ounces	Dairy/ Fortified Soy 3 cups	Protein Food 5.5 ounces
Day 1					
Day 2					
Day 3					
...Day 3500					

New Protocol: Diet Simulations - Summary of Analyses

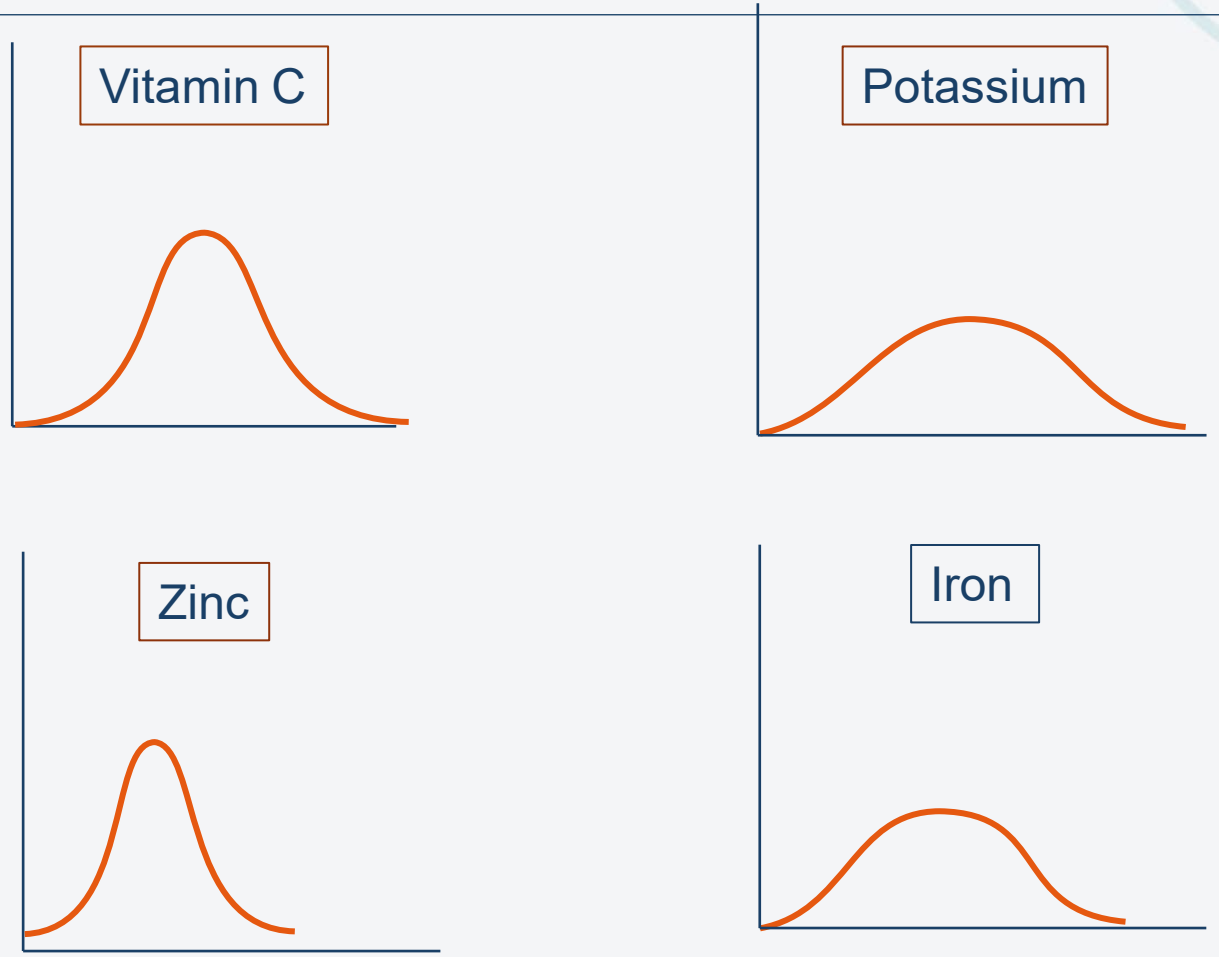
- The energy and nutrient content of each food and beverage selected in the daily simulations is used to calculate a series of percentile distributions to summarize the energy and nutrient content of the aggregated simulated diets for each age-sex group

Calculate the distribution of energy and nutrient content of the aggregated simulated diets for each age-sex group

Calculation includes the energy and nutrient content of all foods and beverages

New Protocol: Diet Simulations - Summary of Analyses

- A percentile distribution will be calculated for energy and for each of 26 nutrients to represent the energy and nutrient content of the aggregated simulated diets for the age-sex group.



Examples of what distributions may look like

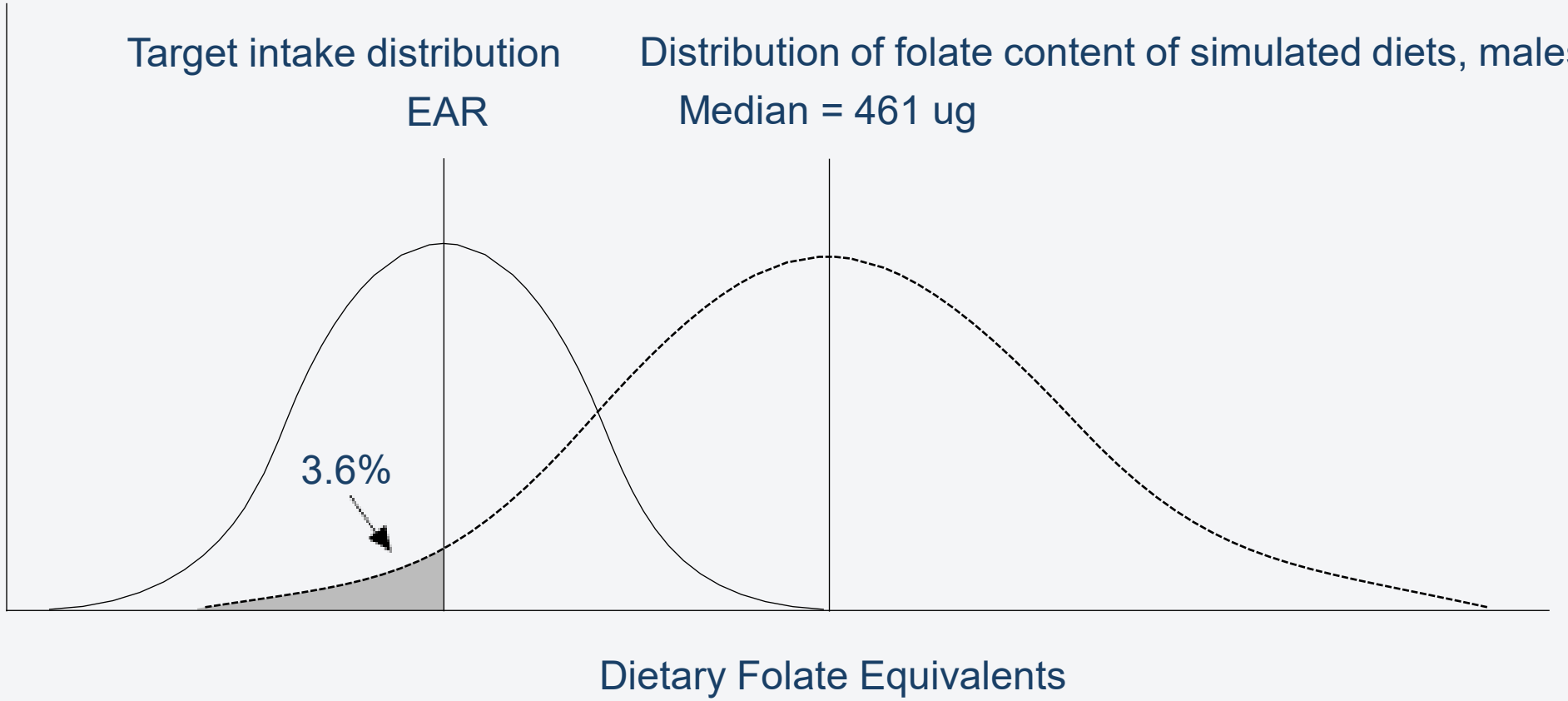
New Protocol: Diet Simulations Summary of Analyses

- Distributions of energy and nutrient content of the aggregated simulated diets will be compared to nutritional goals for the age-sex group.
  - Estimated Energy Requirements (EER)
  - Acceptable Macronutrient Distribution Ranges (AMDR)
  - Estimated Average Requirements (EAR)
  - Adequate Intakes (AI)
  - Tolerable Upper Intake Levels (UL)
  - Chronic Disease Risk Reduction Intake (CDRR)
  - *Dietary Guidelines* recommendations

Evaluate whether the energy and nutrient content of aggregated simulated diets meet the nutritional goals for the age-sex group

Evaluation criteria include Estimated Energy Requirements, Acceptable Macronutrient Reference Ranges, Estimated Average Requirements, Adequate Intakes, Tolerable Upper Intake Levels/Chronic Disease Risk Reduction Intake, and *Dietary Guidelines* recommendations.

Evaluating Whether Simulated Diets Meet Nutritional Goals



Graphic adapted from data presented in Katamay et al. Nutr Rev 2007

Dietary Intake Simulations: Proposed Analytic Framework

Simulate dietary intake data to construct 500 7-day diets for each age-sex group by randomly selecting different combinations of individual foods and beverages in the amounts recommended in the dietary pattern

Probability of selection of foods and beverages will vary by nutrient-density

Calculate the distribution of energy and nutrient content of the aggregated simulated diets for each age-sex group

Calculation includes the energy and nutrient content of all foods and beverages

Evaluate whether the energy and nutrient content of aggregated simulated diets meet the nutritional goals for the age-sex group

Evaluation criteria include Estimated Energy Requirements, Acceptable Macronutrient Reference Ranges, Estimated Average Requirements, Adequate Intakes, Tolerable Upper Intake Levels/Chronic Disease Risk Reduction Intake, and *Dietary Guidelines* recommendations.

Prioritized Population Simulation Analyses

- Diet simulation of foods and beverages consumed by specific populations will enhance the evaluation of dietary patterns recommended by the Committee
- Not all population groups are adequately represented in NHANES data due to sampling
- The Committee will leverage work underway by USDA/FNS Center for Nutrition Policy and Promotion's Nutrition Education and Innovation Division to identify foods and beverages integral to and included in the cuisines of different populations for development of nutrition education resources
- Application of this work to diet simulations is under development, but will be piloted by the Committee to advance the inclusion of diverse foodways in the *Dietary Guidelines* process
- The purpose of this pilot is to test a process to evaluate the proposed dietary patterns considering the dietary practices/foodways of different populations

Diet Simulation for American Indian and Alaska Native Populations

- Committee's commitment to include representation of foods consumed by diverse populations in simulation analyses
- The Committee selected American Indian and Alaska Native populations for the pilot
- This selection is supported by public input calling for *Dietary Guidelines* to be inclusive of American Indian and Alaska Native populations by emphasizing traditional foods in the *Dietary Guidelines* and federal programs

Diet Simulation Framework for American Indian and Alaska Native Populations

- Two experts with professional and lived experience in American Indian foodways and one expert with this expertise in Alaska Native foodways will review and identify foods and beverages in national survey data as:
  1. Integral to the cultural cuisine
  2. Eaten, but not integral to the cuisine
  3. Never consumed as part of the cuisine
- Foods identified as 1. integral to or 2. included in each cultural cuisine will be simulated following the steps of the framework outlined in this presentation
- Simulation will be conducted separately for the American Indian population and for Alaska Native population
- The energy and nutrient content of aggregated simulated diets for each age-sex group will be evaluated against nutritional goals as described in this presented
- Conducting this pilot does not address representativeness of dietary patterns for all tribal organizations or population groups, but it tests a process to expand representativeness and is a starting point for future work

Committee Discussion

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Next Steps

- Continue to integrate health equity across the three approaches as the work evolves and public comments are submitted
- Continue developing health equity content for the Scientific Report

Thank you!

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Food Pattern Modeling and Data Analysis

Data Analysis

Heather Eicher-Miller, PhD

Data Analysis Subcommittee Chair

January 19, 2024

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Agenda

- Data Analysis Progress
- Evidence Scan on Dietary Intakes in the U.S. from March 2020 – December 2022
- Next Steps and Discussion

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Data Analysis Team

Dana DeSilva, PhD, RD
Colleen Cruz, MPH, RDN

Janet de Jesus, MS, RD (DFO)

Eve Stoody, PhD (DFO Rep)

Kara Beckman, PhD

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Data Analysis Progress

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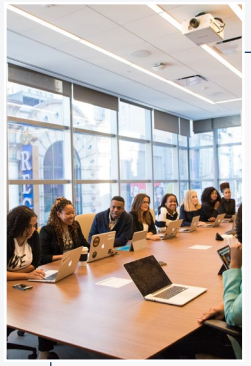
Data Analysis Progress

Determined additional demographic variables to be examined by the Committee



Submitted all data analysis requests to data source experts (ARS, CDC, NCI)

Completed evidence scan on patterns of dietary intake during the COVID-19 pandemic

Discussed health equity considerations with the Health Equity Working Group

Discussed Health Equity and Determined Additional Demographics for Data Analysis: Decisions

Demographics that the 2025 Committee will continue to examine:

- Sex
- Race and/or ethnicity
- Socioeconomic position (e.g., family income, poverty income ratio, education)
- Age/life stage

Additional demographics collected by NHANES that the 2025 Committee prioritized for examination:

- Food security category – Household
- Household food benefit – SNAP
- Child food benefit – WIC

The subpopulations to be examined in each analysis will be determined based on data availability, sample size, and Committee prioritization.

Submitted All Data Analysis Requests: Topics

All analyses requests have been submitted to ARS, CDC, and NCI related to the following topics:

Current patterns of food and beverage consumption

Current intake of food groups and nutrients

Nutrients of public health concern

Prevalence of nutrition-related chronic health conditions

See the *Federal Data Analysis Plan* for the full list of available analyses and new analyses that were requested.

Data analysis results will be synthesized together upon completion of all analyses.

Evidence Scan on Dietary Intakes from March 2020 – December 2022

DietaryGuidelines.gov

Evidence Scan Methodology

- Evaluates volume and characteristics of evidence available on a question or topic
- Describes the evidence, rather than working toward a graded conclusion statement

Evidence scans generally include:

- Developing a protocol
- Searching for/screening studies
- Extracting minimal data

They do not typically include:

- Risk of bias assessment
- Evidence synthesis of study results
- Graded conclusion statements

Reference: Chapter 9: Evidence Scans, NESR Methodology Manual: https://nesr.usda.gov/methodology-overview

Rationale for Evidence Scan

- The COVID-19 (Coronavirus Disease 2019) pandemic led to data collection disruptions for key federal surveys that provide nutrition-related data, including What We Eat in America (WWEIA), National Health and Examination Survey (NHANES).
- The pandemic brought attention to food insecurity, diet-related diseases, and health disparities nationwide.
- **Data on population-based dietary intakes could provide perspective on the U.S. diet during the pandemic.**

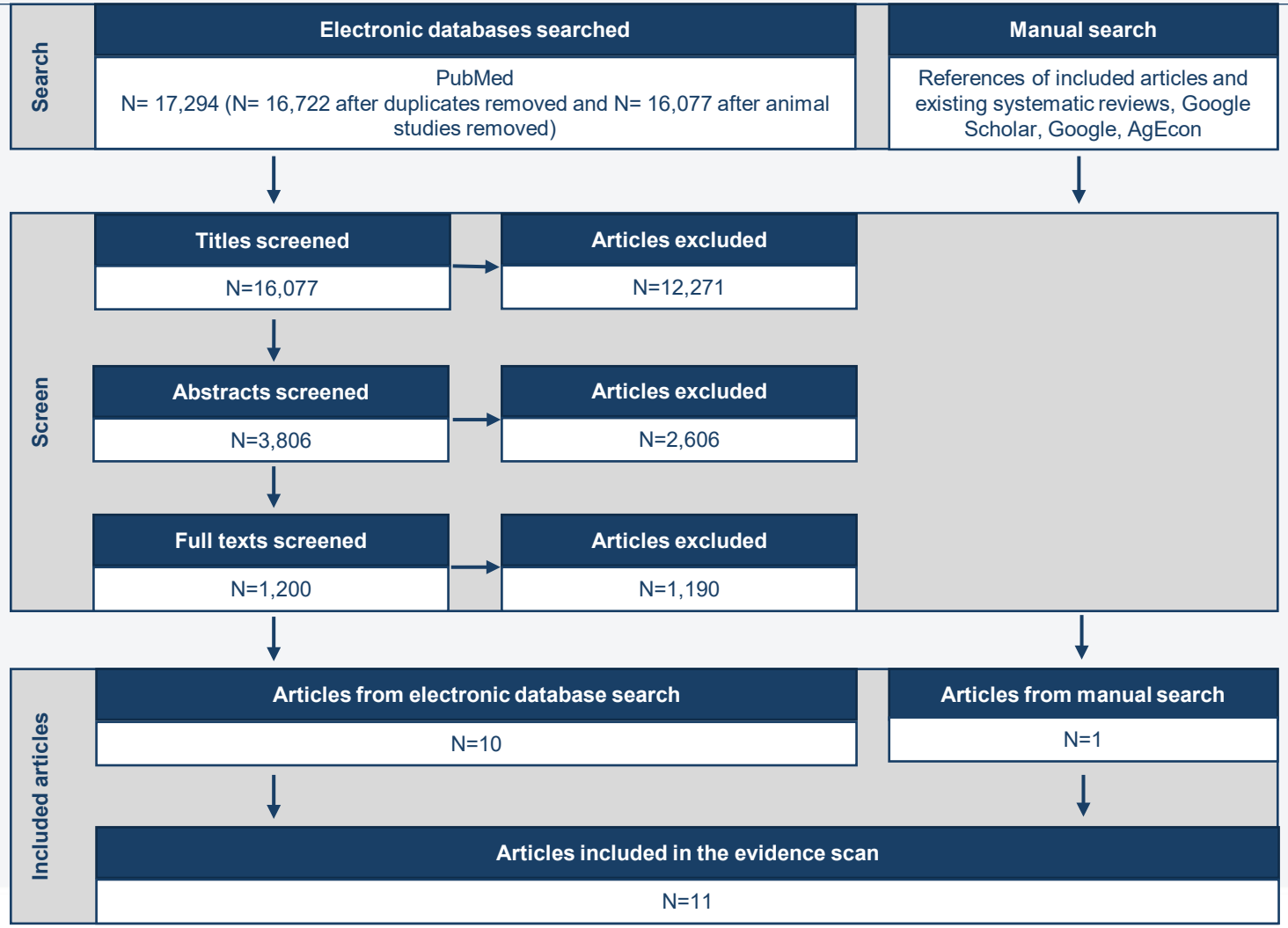
Research Question:

What evidence has been published on the patterns of food and beverage intake, from March 2020 – December 2022, including potential changes in dietary intake due to COVID-19 (Coronavirus Disease 2019)?

Inclusion and Exclusion Criteria

Category	Inclusion Criteria	Exclusion Criteria
Study design	• Randomized controlled trials (RCTs), non-randomized controlled trials, uncontrolled trials, prospective cohort studies, retrospective cohort studies, case-control studies, cross-sectional studies, narrative reviews, systematic reviews	• Case studies, qualitative studies, clinical trials, protocols, or non-studies (e.g., letters to the editor, commentaries, etc.)
Intervention/ exposure	• Studies that measure dietary intake among participants not diagnosed with a disease or health condition	• Studies using data from NHANES • Studies on the role or function of dietary intake on health or disease risk factors • Studies that develop, implement, or evaluate behavior change or education interventions • Measurement tool validation studies
Publication date	• Published March 2020 – December 2022 • Data collected includes at least one dataset from March 2020 or later	• Published before March 2020 or after December 2022 • Data collection dates not indicated, or all datasets collected prior to March 2020
Dietary assessment methods	• Multiple pass 24-hour recall, food frequency questionnaire (FFQ), food records	• Screener tools • Hypothetical diets (e.g., diet simulations, food pattern modelling, theoretical models, machine learning)
Publication status	• Articles that have been peer-reviewed • Gray literature: reports that have not been peer-reviewed but are available from government and nongovernmental organizations	• Articles that have not been peer-reviewed and are not published in peer-reviewed journals, other than reports from government and nongovernmental organizations
Language	• Articles published in English	• Articles published in languages other than English
Country	• Studies conducted in the U.S.	• Studies conducted outside the U.S.
Study participants	• Human participants	• Non-human participants (e.g., animal studies, in-vitro models)

Literature Search and Screening Results



Description of Evidence

Study design	Study population	Population demographics

• Prospective cohort study (N=4)
• Cross-sectional study (N=6)
• Narrative review (N=1)
	• Adults (N=8)
	• Children (N=1)
	• Adolescents (N=1)
	• Pregnant persons (N=1)
		• 23 unique variables
		
		• Most frequently collected:
		  • Gender or sex (N=9)
		  • Race and/or ethnicity (N=8)
		  • Age (N=8)
		  • BMI (N=6)
		  • Education (N=6)

Description of Evidence

Comparison of dietary intakes before and during COVID-19 pandemic	Dietary intake assessment	Dietary intake outcomes
• Comparison before and during the pandemic (N=5) • No comparison to before the pandemic (N=5) • Both (N=1)	• FFQ (N=4) • Multiple pass 24-hour recall (N=4) • Food records (N=2) • Other methods (N=1)	• Total dietary intake (N=6) • Dietary component intake (N=5) • e.g., fruit, vegetables, saturated fat, sugar sweetened beverages, etc.

Considerations for Data Analysis Work by the 2025 Committee

Insufficient research was available to warrant further investigation of food and beverage intakes during the COVID-19 pandemic via a rapid review or systematic review.

- Of the few studies identified, there were none which collected and analyzed datasets that were nationally representative of the U.S. population. In addition, most studies utilized a cross-sectional study design and had samples that were limited in size and demographic representation.
- Within this evidence scan, most studies did not show differences in total intake before and during the COVID-19 pandemic or found intakes that were similar to what would typically be expected based on national pre-pandemic datasets.
- Studies examined related outcomes that may have impacted dietary intakes— including food security, participation in Federal nutrition assistance programs, and Federal poverty level— which could be used to provide context on how the pandemic affected individuals and families across the U.S.

Acknowledgements

The DAT project team thanks:

- **Molly Higgins, MLIS** (NESR Branch, NGAD, CNPP, FNS, USDA) for development and implementation of the literature search strategy and review of this report.
- **Ramkripa Raghavan, DrPH, MPH, MSc** (NESR Branch, NGAD, CNPP, FNS, USDA) and **Julie Obbagy, PhD, RD** (NESR Branch Chief, NGAD, CNPP, FNS, USDA) for their consultation on NESR evidence scan methodology and review of this report.
- **Carolyn Chung, PhD** (Detailee, ODPHP, OASH, HHS) for assistance with screening and data extraction.

Next Steps and Discussion

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Next Steps

Staff to receive additional analyses from data source experts (ARS, CDC, NIH)

Staff to draft summaries of analysis results for Committee review

Committee to review analysis results, draft conclusions, and determine future directions

The Data Analysis Plan will be updated to reflect new or revised analyses.

Food Pattern Modeling and Data Analysis

Food Pattern Modeling

Chris Taylor, PhD, RDN, LD, FAND

Food Pattern Modeling Subcommittee Chair

January 19, 2024

DietaryGuidelines.gov

2025 Dietary Guidelines Advisory Committee: Food Pattern Modeling and Data Analysis Subcommittee

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Food Pattern Modeling progress since Meeting 3

1 Nutrient profile development

2 Analyze hypothetical modifications to food groups and/or dietary patterns

3 Evaluate and refine draft dietary patterns

Basis

- Synthesize results
- Develop nutrient profiles

WWEIA Population Subgroups

Protein Foods

Vegan

Dairy and Fortified Soy Alternatives

Low carbohydrate

Staple Carbohydrate Foods

Vegetables

Fruit

- Synthesize results: *all* evidence bases
- Implications within population subgroups
- Draft dietary patterns

Different ranges of nutrient density

Diet Simulations

Protocol status

- Protocol ready for analysis
- Protocol to be developed

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Food Pattern Modeling Agenda

1. Food Pattern Modeling Protocols

- Vegetables
- Fruit
- Vegan
- Different ranges of nutrient density

2. Food Pattern Modeling Next Steps

New Protocols: Food Group Modifications

Vegetables

Vegan

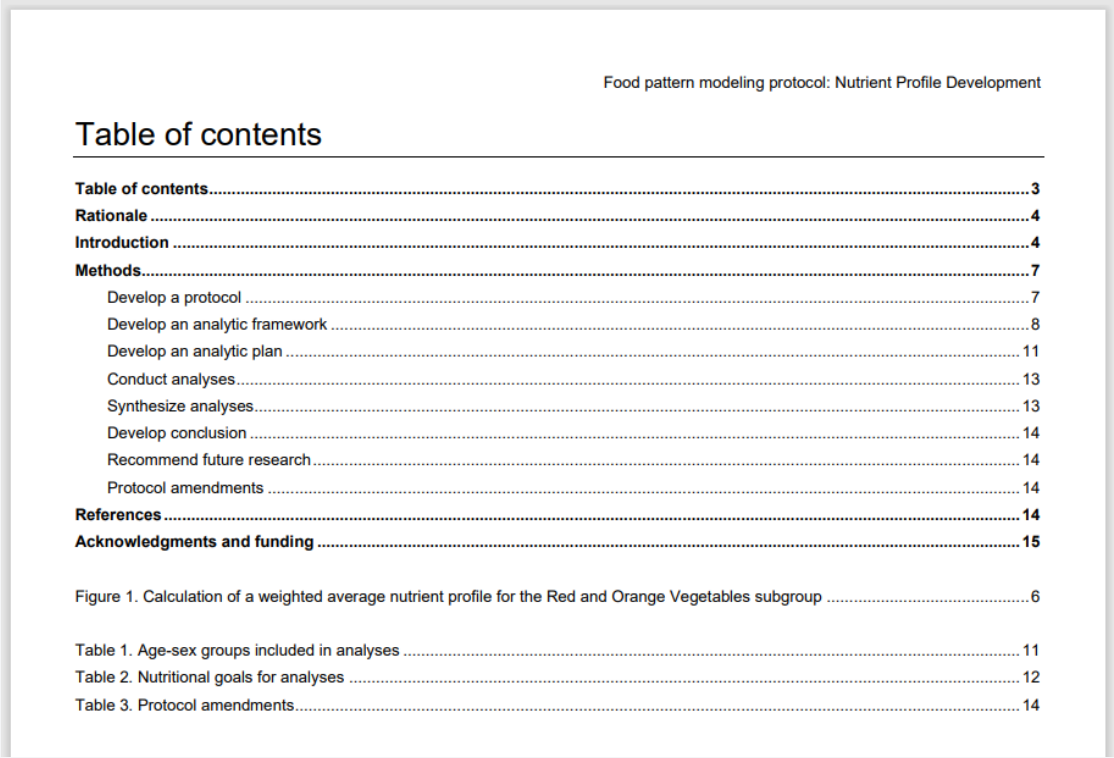
Fruit

Different Ranges of Nutrient Density

Protocols presented today will be available at DietaryGuidelines.gov in the next month.

Discussion Topics Planned for New Protocols

- Rationale
- Key definitions pertinent to analyses
- Analysis questions
- Summary of each analysis
- Methods that differ between protocols
  e.g., population



Food pattern modeling protocol: Nutrient Profile Development

Table of contents

New Protocol: Vegetables

New Protocol: Vegetables Rationale

- Vegetable Foods group is comprised of a variety of foods from plant sources: Dark green; Red and Orange; Beans, peas, and Lentils; Starchy; and Other Vegetables
- Intake of subgroups may be modified by need, budget, cultural/religious norms (e.g., higher intake of starchy vegetables as a staple carbohydrate)
- Previous systematic reviews have linked dietary patterns including vegetables and other components with lower risk of chronic diseases
- Current intakes are below recommended levels in the *Dietary Guidelines*
- Recommendations for intake of red and orange and starchy vegetables made in 2010 were set to meet potassium AI, which has since been reduced
- Hypothetical modifications proposed to examine potential flexibilities that more equitably consider the range of population norms, preferences, and needs

New Protocol: Vegetables Question

Healthy U.S.-Style, 12 - 23 months, 800 calories

Food Group / Subgroup	Quantity	How often?
Vegetables	3/4 cup eq	Daily
Dark-Green	1/3 cup eq	Weekly
Red and Orange	1 3/4 cup eq	Weekly
Beans, Peas, Lentils	1/3 cup eq	Weekly
Starchy	1 1/2 cup eq	Weekly
Other	1 1/4 cup eq	Weekly

cup eq = cup equivalents

Healthy U.S.-Style, Ages 2+ years, 2000 calories

Food Group / Subgroup	Quantity	How often?
Vegetables	2 1/2 cup eq	Daily
Dark-Green	1 1/2 cup eq	Weekly
Red and Orange	5 1/2 cup eq	Weekly
Beans, Peas, Lentils	1 1/2 cup eq	Weekly
Starchy	5 cup eq	Weekly
Other	4 cup eq	Weekly

What are the implications for nutrient intakes when **modifying** the **Vegetables food group** and **subgroup quantities** within the Healthy U.S.-Style Dietary Pattern?

DietaryGuidelines.gov

Find all patterns at DietaryGuidelines.gov: ***Dietary Guidelines, 2020-2025*** **Appendix 3: USDA Dietary Patterns**
https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf

New Protocol: Vegetables
Summary of Analyses (Objective 1 of 3)

Objective 1: Analysis on the nutritional contribution of the Vegetables food group and subgroups

1. Understand the nutritional composition of the food group alone and within the pattern
2. Understand the nutritional contribution of the food group compared to current intakes

Partial draft objective:

Objective 1: Identify the nutritional composition and contribution of the Vegetables food group and subgroups in current dietary intakes, relative to the 2020 Healthy U.S.-Style Dietary Pattern goals for ages 12 months and older.

New Protocol: Vegetables
Summary of Analyses (Objective 2 of 3)

Objective 2: Analysis on the nutritional contribution of the Vegetables food group and subgroups

1. Incrementally reduce quantities of the food group in the Dietary Pattern
2. Evaluate nutrient intake implications of the hypothetical reductions

Partial draft objective:

Objective 2: Evaluate nutrient intake implications when the quantity of the Vegetables food group in the patterns is reduced by ¼ cup equivalents (cup eq) for lower calorie levels and 1 cup eq for higher calorie levels in the Dietary Pattern.

New Protocol: Vegetables Analysis Overview (Objective 3 of 3)

Objective 3: Analyses modifying food group quantities and proportions

1. For each subgroup, incrementally reduce subgroup quantity + increase remaining subgroup quantities
2. Evaluate nutrient intake implications of the hypothetical shifts

Partial draft objective:

Objective 3: Evaluate implications on meeting nutritional goals when the proportions of vegetable subgroups are incrementally modified in each calorie level of the 2020 Healthy U.S.-Style Dietary Pattern.

New Protocol: Fruits

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New Protocol: Fruits Rationale

- Fruits food group is comprised of a variety of foods from plant sources in many forms: raw or cooked fruit, canned or frozen, dried fruit, 100% fruit juice
- Intake of Fruits may be modified by need, budget, cultural/religious norms
- Previous systematic reviews have linked dietary patterns including fruits and other components with lower risk of chronic diseases
- Current intakes are below recommended levels in the *Dietary Guidelines*
- Hypothetical modifications proposed to examine potential flexibilities that more equitably consider the range of population norms, preferences, and needs

New Protocol: Fruits Question

2020 Healthy U.S.-Style Dietary Pattern, Ages 2 Years and Older

Calorie Level**	Food Group^	Quantity	How often?
1,000	Fruits	1 cup eq	Daily
1,400	Fruits	1 cup eq	Daily
2,000	Fruits	2 cup eq	Daily
3,000	Fruits	2 ½ cup eq	Daily

^This food group does not include subgroups in the *Dietary Guidelines, 2020-2025*

What are the implications for nutrient intakes when **modifying** the **Fruits** food group **quantities** within the Healthy U.S.-Style Dietary Pattern?

DietaryGuidelines.gov

Find all patterns at DietaryGuidelines.gov: ***Dietary Guidelines, 2020-2025*** **Appendix 3: USDA Dietary Patterns**
https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf

New Protocol: Fruits
Summary of Analyses (Objective 1 of 3)

Objective 1: Analysis on the nutritional contribution of the food group

1. Understand the nutritional composition of the food group alone and within the pattern
2. Understand the nutritional contribution of the food group compared to current intakes

Partial draft objective:

Objective 1: Identify the nutritional composition and contribution of the Fruits food group in current dietary intakes, relative to the 2020 Healthy U.S.-Style Dietary Pattern goals for ages 12 through 23 months and ages 2 years and older.

New Protocol: Fruits
Summary of Analyses (Objective 2 of 3)

Objective 2: Analysis on the nutritional contribution of the food group

1. Incrementally reduce quantities of the food group in the Dietary Pattern
2. Evaluate nutrient intake implications of the hypothetical reductions

Partial draft objective:

Objective 2: Evaluate nutrient intake implications when the quantity of Fruits food group in the patterns are reduced by ¼ cup eq increments for lower calorie levels and by ½ cup eq increments for higher calorie levels in the 2020 Healthy U.S.-Style Dietary Patterns.

New Protocol: Fruits
Summary of Analyses (Objective 3 of 3)

Objective 3: Analysis modifying food group quantities and proportions

- Evaluate implications on meeting nutritional goals by creating and modeling various proportions of draft subgroups (Whole Fruits, 100% Fruit Juice) within the Fruits food group.
- Evaluate nutrient intake implications of the hypothetical scenarios

Partial draft objective:

Objective 3: Evaluate implications on meeting nutritional goals by modifying the proportions of foods (i.e., Whole Fruits and 100% Fruit Juice) by creating and modeling various proportions of draft subgroups within the Fruits food group. Models will examine current intake proportions (roughly ⅔ Whole Fruit; ½ Fruit Juice) and proportions in ¼ cup eq increments.

New Protocol: Vegan

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New Protocol: Vegan Rationale

- Intake of animal-source foods and beverages may be modified or eliminated based on preferences, needs, budget, and cultural/religious norms.
- Vegan diets may be adopted for various reasons and vary in composition, which may have implications for nutrient intakes.
- Nationally representative data on current intakes for vegan diets is not available.
- Vegan food products are limited in national databases.
- 2010 food pattern modeling analyses modeled a vegan food pattern scenario and determined fortified foods were necessary to meet recommendations for certain nutrients.
- **Meeting nutritional goals is an important consideration when removing or replacing food groups, such as in a vegan diet.**

New Protocol: Vegan Question and Population

What are the implications for nutrient intakes when **animal sources** of foods and beverages contributing to the **Dairy and Fortified Soy Alternatives** and **Protein Foods groups** and **subgroups** are removed or replaced with **plant sources** within the Healthy Vegetarian Dietary Pattern?

2020 Healthy Vegetarian Dietary Pattern, Ages 2+ years, 2,000 calories

Food Group/*Subgroup*	Quantity	How often?
Dairy and Fortified Soy Alternatives	3 cup eq	Daily
Protein Foods	3 ½ oz eq	Daily
Eggs	3 oz eq	Weekly

cup eq = cup equivalents
oz eq = ounce equivalents

Analyses will be applied to the 2020 Healthy Vegetarian Dietary Pattern for ages 2+ years. The Healthy Vegetarian Dietary Pattern (lacto-ovo) was developed using nationally representative data from self-identified vegetarians.

New Protocol: Vegan
Key Definitions *(new for 2025)*

- **Vegan diet**: For the purposes of these analyses, a vegan diet includes plant-source foods and ingredients (e.g., Vegetables, Fruits, Grains, Soy Products, Nuts and Seeds, Beans, Peas, and Lentils, and Fortified Soy Alternatives) that contribute to food groups and subgroups, and excludes animal-source foods and ingredients (e.g., the Dairy; Meat, Poultry, and Eggs; and Seafood foods groups and subgroups) which contribute to food groups and subgroups. Animal-source ingredients that do not contribute to food groups and subgroups (e.g., gelatin, lard, honey) will not be captured in the nutrient profiles and, thus, will not be identified in the Food and Nutrient Database for Dietary Studies (FNDDS) for exclusion in these analyses.

- **Plant-based meat alternatives**: For the purposes of these analyses, plant-based meat alternatives are defined as plant-source Protein Foods that mimic animal-source Protein Foods in look, taste, feel, and nutritional contribution and are used as a meat substitute.

New Protocol: Vegan
Summary of Analyses (Objective 1 of 4)

Objective 1: Analysis on the nutritional contribution of plant-source Protein Foods subgroups

1. Compare the nutritional contribution of the subgroups
2. Determine if any modifications to the nutrient profiles should be made

Partial draft objective:

Objective 1: Compare the nutrient profiles for the plant-source Protein Foods subgroups (Nuts and Seeds; Soy Products; Beans, Peas, and Lentils) to identify their nutritional contribution in the 2020 H-VEG Dietary Pattern. Nutrient profiles may be modified or combined for subsequent analyses in the protocol based on these results.

New Protocol: Vegan
Summary of Analyses (Objective 2 of 4)

Objective 2: Analysis on the nutritional contribution of plant-based meat alternatives

1. Compare the nutritional contribution of various plant-based meat alternatives
2. Examine the similarities and differences compared to the plant-source Protein Foods subgroups

Partial draft objective:

Objective 2: Compare the nutritional contribution of various plant-based meat alternatives. Examine the similarities and differences compared to the nutrient profiles for the plant-source Protein Foods subgroups in the 2020 Healthy Vegetarian Dietary Pattern.

New Protocol: Vegan
Summary of Analyses (Objective 3 of 4)

Objective 3: Analysis modifying food group/subgroup quantities

1. Remove Eggs and Dairy and Fortified Soy Alternatives
2. Evaluate nutrient intake implications

Partial draft objective:

Objective 3: Evaluate the implications on meeting nutritional goals when removing the Eggs subgroup and Dairy and Fortified Soy Alternatives group from each calorie level of the 2020 Healthy Vegetarian Dietary Pattern. The nutritional composition of the Dietary Pattern will be examined.

New Protocol: Vegan
Summary of Analyses (Objective 4 of 4)

Objective 4: Analysis modifying food group/subgroup quantities

1. Replace Eggs with plant-source Protein Foods or other food groups
2. Replace Dairy and Fortified Soy Alternatives with fortified non-dairy alternatives
3. Evaluate nutrient intake implications

Partial draft objective:

Objective 4: Evaluate the implications on meeting nutritional goals by 1) replacing Eggs with plant-source Protein Foods subgroups and/or other food groups, and 2) replacing Dairy and Fortified Soy Alternatives with fortified non-dairy alternatives. The nutritional composition of the Dietary Pattern will be examined.

New Protocol: Different Ranges of Nutrient Density

New Protocol: Different Ranges of Nutrient Density Rationale

- Once nutrient needs are met through food groups, the USDA Dietary Patterns include a small number of remaining calories, “limit on calories for other uses”.
- These calories are available only when the foods and beverages selected to achieve food group goals are in their most nutrient dense forms.
- The proposed FPM analyses will explore how the remaining calories for other uses could be used if food group and subgroup goals are met.
- These FPM analyses will be conducted **after** draft patterns are proposed by the Committee

New Protocol: Different Ranges of Nutrient Density Question

Daily Limits on Calories for Other Uses in the 2020 Healthy U.S.-Style Dietary Pattern, ages 2 and older*

	1,000 calorie	1,200 calorie	1,400 calorie	1,600 calorie	1,800 calorie	2,000 calorie	2,200 calorie	2,400 calorie
Limits on Calories for Other Uses (kcal/day)	**130**	**80**	**90**	**100**	**140**	**240**	**250**	**320**
Limits on Calories for Other Uses (%/day)	**13%**	**7%**	**6%**	**6%**	**8%**	**12%**	**11%**	**13%**

*Note: There are no remaining calories for other uses for the Healthy U.S.-Style Dietary Pattern for Ages 12 through 23 months

What **quantities of foods and beverages lower in nutrient density can be accommodated** in the USDA Dietary Patterns **while meeting nutritional goals within calorie levels**?

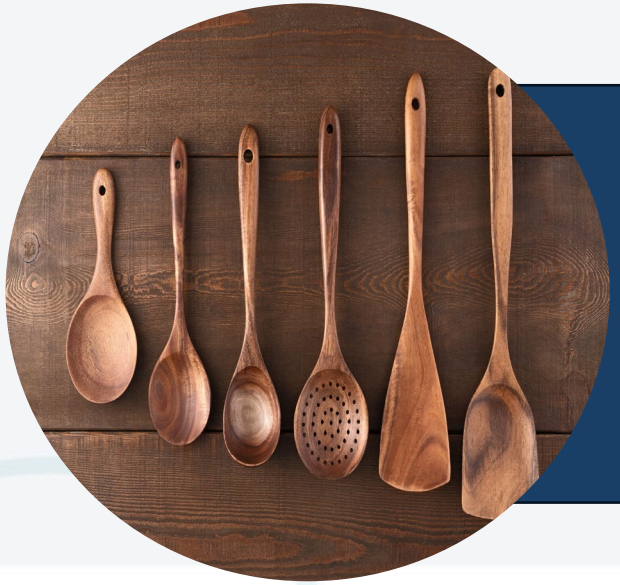
DietaryGuidelines.gov

Find all patterns at DietaryGuidelines.gov: ***Dietary Guidelines, 2020-2025*** **Appendix 3: USDA Dietary Patterns**
https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf

New Protocol: Different Ranges of Nutrient Density Summary of Analyses (Objective 1 of 5)

Objective 1: Examine the variation/range of a quantified limit on calories for other uses.

	1,000 calorie	2,000 calorie	2,400 calorie
Limits on Calories for Other Uses (kcal/day)	130	240	320
Limits on Calories for Other Uses **Range** (kcal/day)	**TBD**	**TBD**	**TBD**



Partial draft objective:

Objective 1: Determine the remaining calories for each proposed dietary pattern based on nutrient profiles developed for each population subgroup outlined in the FPM protocol on the question, "What are the differences between nutrient profiles calculated using the dietary intakes of the total U.S. population and populations subgroups ?"

New Protocol: Different Ranges of Nutrient Density Summary of Analyses (Objective 2 of 5)

Objective 2: Analyses on Nutrient Density

Dairy and Fortified Soy Alternatives Composite Nutrient Profile

Nutrient Profiles for:

- **Whole Milk**
- **Reduced Fat Milk**
- **Flavored Milk**
- **Whole Milk Yogurt**
- **Low fat Yogurt**
- **Flavored Yogurt**

Partial draft objective:

Objective 2: Compare 1 cup-equivalent (cup-eq) of the nutrient profile for the Dairy and Fortified Soy Alternatives food group to the nutrient profiles for 1 cup-eq of the following foods/beverages: milk (whole, reduced fat, flavored), yogurt (whole, low fat, flavored)

New Protocol: Different Ranges of Nutrient Density Summary of Analyses (Objective 3 of 5)

Objective 3: Analyses on Nutrient Density

Nutrient Dense Food Groups:
- **Fruits**
- **Vegetables**
- **Protein Foods**
- **Grains**

+

Select examples:
- **Skim milk → Low fat milk**
- **Skim milk → Reduced fat milk**
- **Skim milk → Whole fat milk**
- **Plain, fat free yogurt → Whole milk yogurt**
- **Plain, fat free yogurt → Low fat yogurt**
- **Plain, fat free yogurt → Flavored yogurt**

Partial draft objective:

Objective 3: Examine the implications on nutrient intakes and limits on calories for other uses when all food groups and subgroups goals except those for Dairy and Fortified Soy Alternatives are met using nutrient-dense choices. **Quantitative recommendations for the Dairy and Fortified Soy Alternatives food group will be examined using the nutrient profiles for the higher fat and/or higher added sugar milk and yogurts.**

New Protocol: Different Ranges of Nutrient Density Summary of Analyses (Objective 4 of 5)

Objective 4: Analyses on Nutrient Density

All Nutrient Dense Food Groups:
- **Fruits**
- **Vegetables**
- **Protein Foods**
- **Grains**
- **Dairy and Fortified Soy Alternatives**

+

Additional foods/beverages:
- **Alcohol**
- **Sugar Sweetened Beverages**
- **Coffees and Teas**
- **Candy and Sugars**

Partial draft objective:

Objective 4: Examine the implications on nutrient intakes and limits on calories for other uses when all food groups and subgroup goals are met using nutrient-dense choices, **and the following foods and/or beverages are consumed in addition to those food groups**: alcohol, sugar sweetened beverages (i.e., soft drinks, fruit drinks, sport and energy drinks), coffees and teas with added sugars/saturated fats, candy and sugars.

New Protocol: Different Ranges of Nutrient Density Summary of Analyses (Objective 5 of 5)

Objective 5: Analyses on Nutrient Density

Nutrient Dense Food Groups:
- **Fruits**
- **Vegetables**
- **Protein Foods**
- **Grains**
- **Dairy and Fortified Soy Alternatives**

+

Additional foods/beverages and/or partial contributors to food group goals:
- **Desserts and Sweet Snacks**
- **Breakfast Cereals and Bars, higher added sugar**
- **Condiments and Sauces**

Partial draft objective:

Objective 5: Examine the implications on nutrient intakes and limits on calories for other uses when all food groups and subgroup goals are met using nutrient-dense choices, **and the following foods and/or beverages are consumed in addition to those food groups OR as partial contributors to their respective food groups: Desserts and sweet snacks; breakfast cereals and bars, higher added sugar; condiments and sauces**

Next Steps

Food Pattern Modeling Progress Since Meeting 3

1 Nutrient profile development

2 Analyze hypothetical modifications to food groups and/or dietary patterns

3 Evaluate and refine draft dietary patterns

Basis

- Synthesize results
- Develop nutrient profiles

WWEIA Population Subgroups

Protein Foods

Vegan

Dairy and Fortified Soy Alternatives

Low carbohydrate

Staple Carbohydrate Foods

Vegetables

Fruit

- Synthesize results: *all* evidence bases
- Implications within population subgroups
- Draft dietary patterns

Different ranges of nutrient density

Diet Simulations

Protocol status

- Protocol ready for analysis
- Protocol to be developed

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Committee Discussion

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Meeting Break

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Strategies for Individuals and Families Related to Diet Quality and Weight Management

Subcommittee Chair: Cristina Palacios, PhD, MSc

Additional Presenter: Aline Andres, PhD, RD

January 19, 2024

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2025 Dietary Guidelines Advisory Committee: Strategies for Individuals and Families Related to Diet Quality and Weight Management Subcommittee

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Progress Since Meeting 3

Systematic Reviews with Draft Conclusion Statements

- Frequency of meals and/or snacking and energy intake
- Frequency of meals and/or snacking and diet quality

Systematic Reviews Under Way

- Frequency of meals and/or snacking and growth, body composition, and risk of obesity
- Portion size and growth, body composition, and risk of obesity
- Portion size and energy intake

Evidence Scan Under Way

- Culturally tailored dietary interventions and diet-related psychosocial factors, dietary intake, diet quality, and health outcomes

Discontinued Evidence Scan

- Home food availability in adults and diet-related psychosocial factors, dietary intake, diet quality, and health outcomes

Evidence Review: Frequency of Meals and/or Snacking

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Analytic Framework: What is the relationship between frequency of meals and/or snacking and consuming a dietary pattern that is better aligned with the *Dietary Guidelines for Americans*?

Approach: New NESR Systematic Review, Included articles published from January 2000 – May 2023

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Toddlers, children, and adolescents (1 up to 19 years)	Frequency of meals and/or snacking*	Different frequency of meals and/or snacking	Diet quality as measured by Healthy Eating Index (HEI), including versions jointly released by USDA and HHS starting in 2008 (HEI-2005, HEI-2010, and HEI-2015)	• Sex • Age • Physical activity • Race and/or ethnicity • Socioeconomic position • Diet quality at baseline • Smoking (adults, older adults)
Adults and older adults (19 years and older)				

* Definitions will vary across studies and include occasion-based measures such as meals (e.g., breakfast), snacking, and number of eating occasions.

Synthesis organization

- ***Intervention/Exposure***: Meals (e.g., breakfast); Snacking; Number of eating occasions
  - ***Population***: Toddlers; Children; Adolescents; Adults; Older adults
    - ***Outcome***: Diet quality

Summary of **frequency of meals and/or snacking** and diet quality conclusion statement and grade

Life Stage	Frequency of Meals and/or Snacking		
	Breakfast	Number of Eating Occasions	Snacking
Children / Adolescents	Conclusion statement cannot be drawn		
Adults / Older Adults			

Frequency of meals and/or snacking and consuming a dietary pattern that is aligned with the Dietary Guidelines for Americans

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between frequency of meals and/or snacking and consuming a dietary pattern that is better aligned with the Dietary Guidelines for Americans because there is not enough evidence available. (Grade: Grade Not Assignable)
Body of evidence	2 articles: both prospective cohort studies
Rationale	There is not enough evidence available to answer this question. Two included articles assessed breakfast and no articles with other categories of frequency of meals were included. The articles had inconsistent results and were in very specific populations: • 10th graders • military recruits

Analytic Framework: What is the relationship between frequency of meals and/or snacking and energy intake?

Approach: New NESR Systematic Review, Included articles published from January 2000 – May 2023

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Toddlers, children, and adolescents (1 up to 19 years)	Frequency of meals and/or snacking*	Different frequency of meals and/or snacking	Energy intake	• Sex • Age • Physical activity • Race and/or ethnicity • Socioeconomic position • Anthropometry • Smoking (adults, older adults)
Adults and older adults (19 years and older)				

* Definitions will vary across studies and include occasion-based measures such as meals (e.g., breakfast), snacking, and number of eating occasions.

Synthesis organization

- ***Intervention/Exposure***: Meals (e.g., breakfast); Snacking; Number of eating occasions
- ***Population***: Toddlers; Children; Adolescents; Adults; Older adults
- ***Outcome***: Energy intake

Summary of **frequency of meals and/or snacking** and energy intake conclusion statements and grades

Life Stage	Frequency of Meals and/or Snacking		
	Breakfast	Number of Eating Occasions	Snacking
Children / Adolescents	Conclusion statement cannot be drawn		
Adults / Older Adults	**Limited evidence** in adults Conclusion statement cannot be drawn for older adults	Conclusion statement cannot be drawn	Conclusion statement cannot be drawn

Frequency of meals and/or snacking and energy intake in children and adolescents

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between frequency of meals and/or snacking and energy intake in children and adolescents due to heterogeneity of exposures and lack of evidence. (Grade: Grade Not Assignable)
Body of evidence	5 articles: all crossover RCT
Rationale	Only a small number of articles met inclusion criteria for this review, and they varied in exposures and outcomes assessed: • 3 trials assessed breakfast consumption, • 1 trial assessed snacking, and • 1 trial assessed number of eating occasions.

Breakfast and energy intake in adults and older adults

Conclusion Statement and Grade	**Limited evidence** suggests that breakfast consumption compared to no breakfast consumption does not decrease total energy intake in adults. (Grade: Limited)	**A conclusion statement cannot be drawn** about the relationship between breakfast and energy intake in older adults due to no evidence available. (Grade: Grade Not Assignable)
Body of evidence	19 articles; 18 RCT, 1 prospective cohort study	0 articles
Consistency	Few concerns due to consistent direction of effects.	No articles met the inclusion criteria
Precision	Serious concerns due to small sample sizes.	
Risk of bias	Some concerns due to risk of bias related to: • Methods for randomization and concealment not reported. • No power calculations. • No preregistered data analysis plans. • High attrition and did not account for the impact of those lost to follow-up.	
Directness	Minimal concerns due to the body of evidence explicitly examining the relationship.	
Generalizability	Serious concerns because most participants across the body of evidence were young adults (~19-30 years) and very few articles reported a measure of race and/or ethnicity or socioeconomic position.	

Number of eating occasions and energy intake in adults and older adults

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between number of eating occasions and energy intake in adults and older adults due to a lack of articles and serious limitations related to generalizability. (Grade: Grade Not Assignable)
Body of evidence	6 articles: 5 RCT, 1 prospective cohort study
Rationale	Only a small number of articles met inclusion criteria for this review and they are not generalizable to the overall U.S. population. The trials were narrowly focused on eating occasions in the context of weight loss intervention trials in populations with overweight and/or obesity or in those who had previously lost weight and would not be generalizable to a free-living U.S. population.

Snacking and energy intake in adults and older adults

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between snacking and energy intake in adults and older adults due to a lack of articles and serious limitations related to generalizability. (Grade: Grade Not Assignable)
Body of evidence	5 articles: all RCT
Rationale	There is not enough evidence available to answer this question and the evidence that is available is not generalizable to the overall U.S. population. The trials were narrowly focused on snacking in the context of weight loss intervention trials in populations with overweight and/or obesity and would not be generalizable to a free-living U.S. population.

Committee Discussion

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Next Steps

- Continue work on systematic reviews and evidence scan:
  - Frequency of meals and/or snacking and:
    - Growth, body composition, and risk of obesity
    - Consuming a dietary pattern that is aligned with the *Dietary Guidelines for Americans*
    - Energy intake
  - Portion size and:
    - Growth, body composition, and risk of obesity
    - Energy intake
  - Culturally tailored dietary interventions and diet-related psychosocial factors, dietary intake, diet quality, and health outcomes

Thank you!

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Meeting Break

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Dietary Patterns and Specific Dietary Pattern Components Across Life Stages Subcommittee

Subcommittee Chair: Deanna Hoelscher, PhD, RDN, LD, CNS, FISBNPA

Additional Presenters: Cheryl Anderson, PhD, MPH, MS; Christopher Gardner, PhD; Hollie Raynor, PhD, RD, LDN; Deirdre Tobias, ScD; Teresa Fung, ScD, RD; Andrea Deierlein, PhD, MPH, MS

January 19, 2024

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2025 Dietary Guidelines Advisory Committee: Dietary Patterns and Specific Dietary Pattern Components Across Life Stages Subcommittee

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Progress Since Meeting 3: Dietary Patterns

Systematic Reviews with Draft Conclusion Statements

- Dietary patterns and **growth, body composition, and risk of obesity**

Systematic Reviews Under Way

- Dietary patterns with **varying amounts of ultra-processed foods** and **growth, body composition, and risk of obesity**
- Dietary patterns and risk of **type 2 diabetes**
- Dietary patterns and risk of **cardiovascular disease**
- Dietary patterns and risk of **cognitive decline, dementia, and Alzheimer's disease**
- Dietary patterns and risk of **breast cancer**
- Dietary patterns and risk of **colorectal cancer**
- Dietary patterns and **bone health**

Discontinued Systematic Reviews

- Dietary patterns and risk of **prostate cancer**

Progress Since Meeting 3: Specific Dietary Pattern Components

Systematic Reviews with Draft Conclusion Statements

- Dairy milk and milk alternatives and **growth, body composition, and risk of obesity**
- Low- and no-calorie sweetened beverages and **growth, body composition, and risk of obesity**
- 100% juice and **growth, body composition, and risk of obesity**

Systematic Reviews Under Way

- Sugar-sweetened beverages and **growth, body composition, and risk of obesity**
- Sugar-sweetened beverages and **risk of type 2 diabetes**
- Low- and no-calorie sweetened beverages and **risk of type 2 diabetes**
- Food sources of saturated fat and **risk of cardiovascular disease**

Discontinued Systematic Reviews

- Coffee and/or tea and **growth, body composition, and risk of obesity**
- Coffee and/or tea and **risk of type 2 diabetes**
- Dairy milk and milk alternatives and **risk of type 2 diabetes**
- 100% juice and **risk of type 2 diabetes**

Protocol Revisions

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Protocol Revisions: Dietary Patterns Varying in Ultra-Processed Food (UPF) and Growth, Body Composition, and Risk of Obesity [126]

Date	Protocol Revision	Rationale
January 2024	Inclusion and exclusion criteria were revised to include only the following comparator: "different levels of consumption and/or adherence to the same dietary pattern with different amounts of UPF."	These revisions were made so that the effect of different amounts of UPF in dietary patterns on outcomes could be determined. This revision was made before any evidence was synthesized for this question.
	Inclusion and exclusion criteria for the publication date were revised to correct the search date range to include literature published from January 2000–January 2024.	This revision was to update an error in the original protocol. This revision was made before any evidence was synthesized for this question.

Protocol Revisions: Dietary Patterns and Risk of Cardiovascular Disease[127]

Date	Protocol Revision	Rationale
September 2023	Inclusion and exclusion criteria for population was revised to exclude infants and toddlers.	This revision was made because dietary fat intake requirements differ for infants and toddlers compared to other life stages. These revisions were made before any evidence was synthesized.
	Inclusion and exclusion criteria for study duration was revised to include studies with a duration of ≥4 weeks.	The study duration criteria for intervention studies was revised from ≥12 weeks to ≥4 weeks given that changes in intermediate cardiovascular-related outcomes can occur within 4 weeks. These revisions were made before any evidence was synthesized.
	Inclusion and exclusion criteria for size of study groups was revised to include all observational studies, irrespective of the size of study groups.	The revision to include observational studies irrespective of the size of the study groups (i.e., not limiting to studies with >1000 participants) was made to include smaller observational studies that may enroll under-represented populations and life stages. These revisions were made before any evidence was synthesized.
	Inclusion and exclusion criteria for country was revised such that for studies conducted in adults and older adults, only those studies conducted in the U.S. will be included.	The revision to include studies conducted in the U.S. (only for adults and older adults population) was made based on the following considerations: 1) the existing systematic review that the Committee is updating for this question has a conclusion statement of strong for adults; 2) to enable the Committee to focus their update on studies that are most applicable to the U.S. population in terms of dietary intake, risk of cardiovascular disease, and other factors that may impact the relationship being examined.

Protocol Revisions: Food Sources of Saturated Fat and Risk of Cardiovascular Disease

Date	Protocol Revision	Rationale
January 2024	Inclusion and exclusion criteria was revised to only include intervention studies with ≥30 participants per study group or report a power calculation.	This revision to include intervention studies with adequate number of participants or reporting power calculation for the outcome(s) of interest was made to enable focus on a stronger body of evidence. This edit will make it consistent with the systematic review question on dietary patterns and cardiovascular disease. These revisions were made before any evidence was synthesized.

Protocol Revisions: Beverages

Date	Protocol Revision	Rationale	Systematic reviews that the revision applies to
December 2023	The quantitative synthesis plan was updated to limit meta-analysis to the population birth up to 19 years.	This revision was made to focus meta-analysis efforts on the population most likely to yield results that will inform guidance.	100% juice and growth, body composition, and risk of obesity
	The quantitative synthesis was updated to clarify the number of studies required to consider conducting a meta-analysis.	This revision was made to clarify that two studies are necessary, but not necessarily sufficient, to conduct a meta-analysis.	100% juice and growth, body composition, and risk of obesity; Sugar-sweetened beverages and growth, body composition, and risk of obesity
	For reviews with beverages as the exposure examining risk of type 2 diabetes, inclusion and exclusion criteria for study design were revised to exclude intermediate outcomes from observational studies in adults (fasting blood glucose, fasting insulin, glucose tolerance/insulin resistance, hemoglobin A1c, and prediabetes).	This change was made to focus on a stronger body of evidence. Trial data in adults examining intermediate outcomes will still be included, as will both trial and observational intermediate outcome data in children.	Sugar-sweetened beverages and risk of type 2 diabetes; Low- and no-calorie sweetened beverages and risk of type 2 diabetes

Committee Discussion: Protocol Revisions

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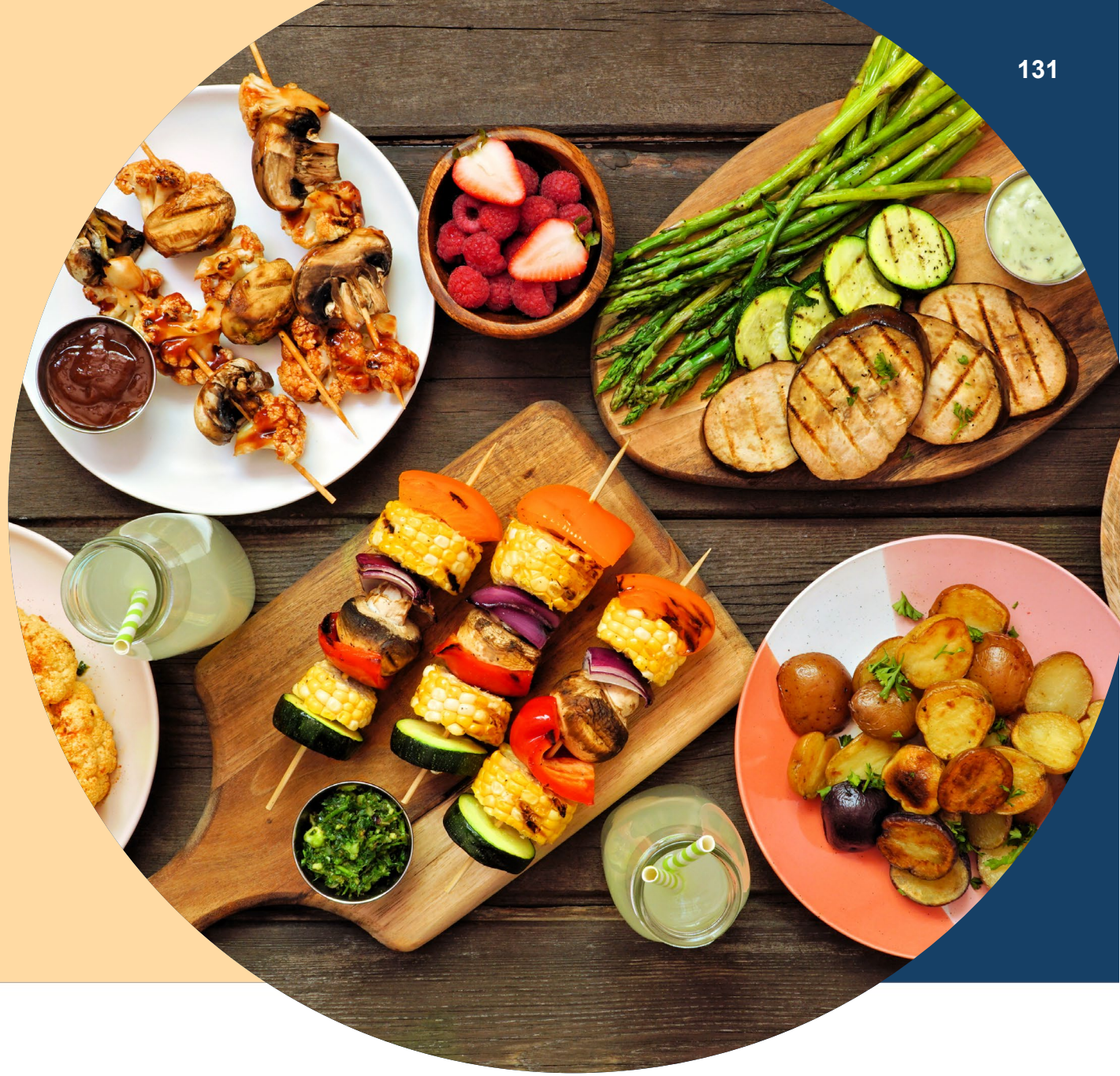
Evidence Review: Dietary Patterns



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Analytic Framework: What is the relationship between **dietary patterns** consumed [132] and **growth, body composition, and risk of obesity?**

Approach: Update to Existing NESR Systematic Review, Included articles published from January 1980 – May 31, 2023

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Infants and toddlers (Birth to 24 months)	Consumption of a dietary pattern	Different dietary pattern(s) Different adherence/ consumption levels to the same dietary pattern	**Growth** (in infants; toddlers; children; adolescents)**:** • Height, length/stature-for-age • Weight, weight-for-age • Stunting, failure to thrive, wasting • BMI-for-age, weight-for-length/stature • Body circumferences (arm, neck, thigh) • Head circumference **Body Composition** (in infants; toddlers; children; adolescents; adults; older adults)**:** • Skinfold thickness • Fat mass, ectopic fat • Fat-free mass or lean mass • Waist circumference, waist-to-hip-ratio	•Sex •Age •Physical activity •Anthropometry at baseline •Race/ethnicity •Socioeconomic position •Smoking (adults, older adults, pregnancy) •Alcohol intake (adults, older adults) •Parity (pregnancy, postpartum) •Diabetes mellitus in the current pregnancy (pregnancy) •Hypertensive disorders in the current pregnancy (pregnancy) •Human milk feeding (postpartum)
Children and adolescents (2 to up to 19 years)			**Growth** (in children; adolescents) **:** list of outcomes as stated above **Body Composition** (in children; adolescents; adults; older adults)**:** list of outcomes as stated above **Risk of Obesity** (in children; adolescents; adults; older adults)**:** • BMI • Underweight • Normal weight • Overweight and/or obesity • Weight gain	
Adults and older adults (19 years and older)			**Body Composition** (in adults; older adults)**:** list of outcomes as stated above **Risk of Obesity** (in adults; older adults)**:** list of outcomes as stated above • Weight loss, maintenance	
Individuals during pregnancy and during postpartum			**Pregnancy and Postpartum-Related Weight Change:** • Gestational weight gain (during pregnancy) • Postpartum weight change (during postpartum)	

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Synthesis organization

- ***Population***: Infants and toddlers; Children and adolescents; Adults; Older adults; Individuals during pregnancy; Individuals during postpartum
  - ***Outcome***: Growth, Body composition, Risk of obesity; Weight loss and maintenance; Pregnancy and postpartum-related weight change

Life stages to be presented for the relationship between dietary patterns consumed and growth, body composition, and risk of obesity

- Dietary patterns consumed during postpartum and postpartum weight change
- Dietary patterns consumed by adults and older adults and body composition and risk of obesity
- Dietary patterns consumed by children and adolescents and growth, body composition, and risk of obesity
- Dietary patterns consumed from birth to 24 months of age and growth, body composition, and risk of obesity

Dietary patterns consumed by individuals during postpartum and postpartum weight change

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between dietary patterns consumed during postpartum and optimum postpartum weight change because there are substantial concerns with consistency, precision, risk of bias, and generalizability in the body of evidence. (Grade: Grade Not Assignable)
Body of evidence	7 articles: 1 RCT and 6 PCS
Rationale	The available evidence was too inconsistent to draw conclusions on the relationship between dietary patterns during postpartum and postpartum weight change. Further, these studies had high or very risk of bias and issues with precision and generalizability.

Dietary patterns consumed by adults and older adults and body composition and risk of obesity [135]

Conclusion Statement and Grade	**Moderate** evidence indicates that dietary patterns consumed by adults and older adults emphasizing vegetables, fruits, and whole grains; fish/seafood; nuts; legumes; lower in meats (including red and processed meats), and low in refined grains and sugar-sweetened foods and beverages are associated with **favorable** outcomes related to body weight (including lower BMI, waist circumference, or percent body fat) or risk of obesity. The dietary patterns associated with these favorable outcomes include higher intakes of unsaturated fats and lower intakes of saturated fats and sodium. (Grade: Moderate)
Body of evidence	106 articles: 26 articles from RCTs, 80 articles from observational studies (79 prospective and 1 retrospective cohort studies)
Consistency	Minimal variation in direction and significance of findings.
Precision	Few concerns with sample size/power and width of confidence intervals.
Risk of bias	Some concerns, particularly for risk of bias due to confounding and selection of reported results.
Directness	Few concerns and most studies were directly examining the relationship of interest.
Generalizability	Few concerns with participants, dietary patterns, and outcomes examined relative to the U.S. population.

Dietary patterns consumed by children and adolescents and unfavorable growth, body composition, and risk of obesity

Conclusion Statement and Grade	**Limited** evidence suggests that dietary patterns consumed during childhood and adolescence are associated with **unfavorable** growth patterns and body composition, and higher risk of obesity later in childhood up to early adulthood. Components shared across these dietary patterns include relatively higher intakes of fried potatoes, refined grains, meat (red and processed), sugar-sweetened drinks, and sugar-sweetened or savory/salty snack foods and relatively lower intakes of vegetables, fruits, and whole grains. (Grade: Limited)
Body of evidence	62 articles: 3 RCTs, 59 prospective cohort studies
Consistency	Substantial concerns due to considerable variation in the magnitude and significance of effects
Precision	Serious concerns due to small sample sizes, wide confidence intervals
Risk of bias	Some concerns, particularly for risk of bias due to confounding and exposure misclassification
Directness	Some concerns in observational studies
Generalizability	Some concerns with participant characteristics and dietary patterns

Dietary patterns consumed by children and adolescents and favorable growth, body composition, and risk of obesity

Conclusion Statement and Grade	**Limited** evidence suggests that dietary patterns consumed during childhood and adolescence are associated with **favorable** growth patterns and body composition, and lower risk of obesity later in childhood up to early adulthood. Components shared across these dietary patterns include relatively higher intakes of vegetables, fruits, legumes, nuts, whole grains, fish/seafood, dairy (low-fat, unsweetened), and relatively lower intakes of meat (red and processed), sugar-sweetened drinks, and sugar-sweetened or savory/salty snack foods. (Grade: Limited)
Body of evidence	62 articles: 3 RCTs, 59 prospective cohort studies
Consistency	Serious concerns due to considerable variation in the magnitude and significance of effects
Precision	Serious concerns due to small sample sizes, wide confidence intervals
Risk of bias	Some concerns, particularly for risk of bias due to exposure misclassification and missing data
Directness	Substantial concerns with indirect trials; most observational studies directly examined question of interest
Generalizability	Some concerns with participant characteristics and dietary patterns

Dietary patterns consumed from birth-24 months and growth, body composition, and risk of obesity

Conclusion Statement and Grade	A conclusion was not drawn about the relationship between dietary patterns consumed from birth to 24 months of age and growth, body composition, and risk of obesity, because of substantial concerns with consistency (Grade Not Assignable)
Body of evidence	19 articles: 1 RCT, 18 prospective cohort studies
Rationale	Critical limitations in the direction and magnitude of effects prevent assessment of consistency across the body of evidence. Some concerns were identified with risk of bias, including important domains not accounted for (e.g., confounding and missing data). Many studies were directly examining the relationship of interest. Relative to the U.S. population, the dietary patterns examined and participant characteristics (e.g., age) may be less generalizable.

Summary of dietary patterns consumed and growth, body composition, and risk of obesity

Conclusion Statements by Life Stage			
Birth to 24 Months	Children and Adolescents	Adults and Older Adults	Postpartum
Conclusion statement cannot be drawn	• **Limited** evidence suggests that dietary pattern… are associated with **unfavorable** growth patterns and body composition, and higher risk of obesity later in childhood up to early adulthood. Components shared across these dietary patterns include relatively higher intakes of fried potatoes, refined grains, meat (red and processed), sugar-sweetened drinks, and sugar-sweetened or savory/salty snack foods and relatively lower intakes of vegetables, fruits, and whole grains. (Grade: Limited) • **Limited** evidence suggests that dietary patterns… are associated with **favorable** growth patterns and body composition, and lower risk of obesity later in childhood up to early adulthood. Components shared across these dietary patterns include relatively higher intakes of vegetables, fruits, legumes, nuts, whole grains, fish/seafood, dairy (low-fat, unsweetened), and relatively lower intakes of meat (red and processed), sugar-sweetened drinks, and sugar-sweetened or savory/salty snack foods. (Grade: Limited)	**Moderate** evidence indicates that dietary patterns… emphasizing vegetables, fruits, whole grains, fish/seafood, nuts, legumes; lower in meats (including red and processed meats), and low in refined grains and sugar-sweetened foods and beverages are associated with **favorable** outcomes related to body weight (including lower BMI, waist circumference, or percent body fat) or risk of obesity. The dietary patterns associated with these favorable outcomes include higher intakes of unsaturated fats and lower intakes of saturated fats and sodium. (Grade: Moderate)	Conclusion statement cannot be drawn

Committee Discussion: Dietary Patterns

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Evidence Review: Specific Dietary Pattern Components

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Analytic Framework: What is the relationship between **beverage patterns** consumed and **growth, body composition, and risk of obesity**?

Approach: New NESR Systematic Review, Included articles published from January 2000 – May 2023

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Children and adolescents (2 to 19 years)	Consumption of a beverage pattern	Consumption of or adherence to a different beverage pattern Different levels of consumption of or adherence to a beverage pattern	**Growth** (in children; adolescents): • Height • Weight • Stunting, failure to thrive, wasting • BMI-for-age • Body circumferences (arm, neck, thigh) **Body Composition** (in children; adolescents; adults; older adults): • Skinfold thickness • Fat mass, ectopic fat • Fat-free mass or lean mass • Waist circumference, waist-to-hip-ratio **Risk of Obesity** (in children; adolescents; adults; older adults): • BMI • Underweight • Normal weight • Overweight and/or obesity • Weight gain	Sex Age Race/ethnicity Socioeconomic position Anthropometry at baseline Diet quality Physical activity Smoking (adults, older adults, pregnancy) Parity (pregnancy, postpartum) Diabetes mellitus in the current pregnancy (pregnancy) Hypertensive disorders in the current pregnancy (pregnancy) Human milk feeding (postpartum)
Adults and older adults (19 years and older)			**Body Composition** (in adults; older adults): list of outcomes as stated above **Risk of Obesity** (in adults; older adults): list of outcomes as stated above • Weight loss and maintenance	
Individuals during pregnancy and during postpartum			**Pregnancy and Postpartum-related Weight Change:** • Gestational weight gain (during pregnancy) • Postpartum weight change (during postpartum)	

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Synthesis organization

- ***Population***: Infants and toddlers; Children and adolescents; Adults; Older adults; Individuals during pregnancy; Individuals during postpartum
  - ***Outcome***: Growth, Body composition, Risk of obesity; Weight loss and maintenance; Pregnancy and postpartum-related weight change

Beverage patterns consumed and growth, body composition, and risk of obesity

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between beverage pattern consumption and growth, body composition, and risk of obesity because there is not enough evidence available. (Grade: Grade Not Assignable)
Body of evidence	4 articles: 3 prospective cohort studies (1 each in children, adults, and individuals during pregnancy) and 1 RCT (in children)
Rationale	• Included studies varied in the beverage patterns and life stages examined • Childhood was the only life stage with more than 1 included study • The 2 included studies in children differed substantially in how they defined beverage patterns (e.g., predefined vs. data-driven) and direction of association between beverage types and outcomes (e.g., juice intake was categorized as beneficial in one article and detrimental in the other)

Analytic Framework: What is the relationship between **100% juice** consumption and **growth, body composition, and risk of obesity**?

Approach: Update to Existing NESR Systematic Review, Included articles published from January 2000 – May 2023

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Infants and Toddlers (Birth up to 2 years)	100% juice consumption	Consumption of a different amount of 100% juice (including no consumption and versions diluted with water) 100% juice vs. water 100% juice vs. solid	**Growth** (in infants; toddlers; children; adolescents)**:** • Height, length/stature-for-age • Weight, weight-for-age • Stunting, failure to thrive, wasting • BMI-for-age, weight-for-length/stature • Body circumferences (arm, neck, thigh) **Body Composition** (in children; adolescents; adults; older adults)**:** • Skinfold thickness • Fat mass, ectopic fat • Fat-free mass or lean mass • Waist circumference, waist-to-hip-ratio **Risk of Obesity** (in children; adolescents; adults; older adults)**:** • BMI • Underweight • Normal weight • Overweight and/or obesity • Weight gain	**Maternal age (infants, toddlers)** **Milk feeding practices (human milk, infant formula, or both) (infants, toddlers)** **Gestational age (infants, toddlers)** Sex Age Race/ethnicity Socioeconomic position Anthropometry at baseline Diet quality (except infants and toddlers) Physical activity (except infants and toddlers) Smoking (adults, older adults, pregnancy) Parity (pregnancy, postpartum) Diabetes mellitus in the current pregnancy (pregnancy) Hypertensive disorders in the current pregnancy (pregnancy) Human milk feeding (postpartum)
Children and adolescents (2 to 19 years)				
Adults and older adults (19 years and older)			**Body Composition** (in adults; older adults)**:** list of outcomes as stated above **Risk of Obesity** (in adults; older adults): list of outcomes as stated above • Weight loss and maintenance	
Individuals during pregnancy and during postpartum			**Pregnancy and Postpartum-related Weight Change:** • Gestational weight gain (during pregnancy) • Postpartum weight change (during postpartum)	

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Synthesis organization

- ***Population***: Infants and toddlers; Children and adolescents; Adults; Older adults; Individuals during pregnancy; Individuals during postpartum
  - ***Outcome***: Growth, Body composition, Risk of obesity; Weight loss and maintenance; Pregnancy and postpartum-related weight change

Summary of **100% juice** consumption and growth, body composition, and risk of obesity conclusion statements and grades

Conclusion Statements by Life Stage		
Children / Adolescents	Adults / Older Adults	Pregnancy and Postpartum
• **Moderate** evidence for no association with body composition and risk of obesity	• **Moderate** evidence for no association with body composition • **Limited** evidence for no association with weight gain	• Conclusion statements cannot be drawn

100% juice consumption by **children and adolescents** and growth, body composition, and risk of obesity

Conclusion Statement and Grade	**Moderate** evidence indicates that 100% juice consumption is not associated with body composition and risk of obesity in young children through adolescents. (Grade: Moderate)
Body of evidence	1 RCT; 28 prospective cohort studies (16 in meta-analyses)
Consistency	Few concerns with consistency in findings across studies
Precision	Some concerns due to small sample sizes
Risk of bias	Some concerns with risk of bias, primarily due to confounding and missing data
Directness	Few concerns with directness across studies
Generalizability	Some concerns with generalizability to the US population

100% juice consumption by **adults** and body composition and risk of obesity

Conclusion Statement and Grade	**Limited** evidence suggests that 100% juice consumption may not be associated with weight gain in adults. (Grade: Limited)	**Moderate** evidence indicates that 100% juice intake is not associated with body composition in adults. (Grade: Moderate)
Body of evidence	4 RCT; 11 prospective cohort studies	3 RCT; 7 prospective cohort studies
Consistency	Substantial concerns with consistency in the direction of findings	Few concerns with consistency across the body of evidence
Precision	Substantial concerns due to varying metrics across studies	Substantial concerns with precision due to the small number of studies and varying metrics across them
Risk of bias	Some concerns with risk of bias, primarily due to confounding and missing data	Some concerns with risk of bias, primarily due to confounding and missing data
Directness	Some concerns with directness due to variation in the type of juice measured	Some concerns with directness due to variation in the type of juice measured
Generalizability	Substantial concerns with generalizability to the US population due to weight status in the trials and limited racial and/or ethnic and socioeconomic diversity in the cohort studies	Substantial concerns with generalizability to the US population due to weight status in the trials and limited racial and/or ethnic and socioeconomic diversity in the cohort studies

100% juice consumption by individuals during **pregnancy** and gestational weight gain

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between 100% juice consumption during pregnancy and gestational weight gain because there is no evidence available. (Grade: Grade Not Assignable)
Body of evidence	0 articles
Rationale	There were no eligible articles examining 100% juice consumption and gestational weight gain.

100% juice consumption by individuals during **postpartum** and postpartum weight change

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between 100% juice consumption during postpartum and postpartum weight change because there is no evidence available. (Grade: Grade Not Assignable)
Body of evidence	0 articles
Rationale	There were no eligible articles examining 100% juice consumption and postpartum weight change.

Analytic Framework: What is the relationship between **dairy milk and milk alternative** consumption and **growth, body composition, and risk of obesity?**

Approach: Update to Existing NESR Systematic Review, Included articles published from January 2000 – May 2023

<table>
<tr><th>Population</th><th>Intervention/ Exposure</th><th>Comparator</th><th>Outcome</th><th>Key Confounders</th></tr>
<tr><td>Children and adolescents (2 to 19 years)</td><td rowspan="3">Dairy milk and milk alternative consumption</td><td rowspan="3">Consumption of a different amount of dairy milk and milk alternatives

Dairy milk and milk alternatives vs. water

Dairy milk and milk alternatives with different amounts of fat and/or sweetener</td><td>Growth (in children; adolescents):
• Height
• Weight
• Stunting, failure to thrive, wasting
• BMI-for-age
• Body circumferences (arm, neck, thigh)

Body Composition (in children; adolescents; adults; older adults):
• Skinfold thickness
• Fat mass, ectopic fat
• Fat-free mass or lean mass
• Waist circumference, waist-to-hip-ratio

Risk of Obesity (in children; adolescents; adults; older adults):
• BMI
• Underweight
• Normal weight
• Overweight and/or obesity
• Weight gain</td><td rowspan="3">Sex
Age
Race/ethnicity
Socioeconomic position
Anthropometry at baseline
Diet quality
Physical activity
Smoking (adults, older adults, pregnancy)
Parity (pregnancy, postpartum)
Diabetes mellitus in the current pregnancy (pregnancy)
Hypertensive disorders in the current pregnancy (pregnancy)
Human milk feeding (postpartum)</td></tr>
<tr><td>Adults and older adults (19 years and older)</td><td>Body Composition (in adults; older adults): list of outcomes as stated above

Risk of Obesity (in adults; older adults): list of outcomes as stated above
• Weight loss and maintenance</td></tr>
<tr><td>Individuals during pregnancy and during postpartum</td><td>Pregnancy and Postpartum-related Weight Change:
• Gestational weight gain (during pregnancy)
• Postpartum weight change (during postpartum)</td></tr>
</table>

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Synthesis organization

- ***Population***: Children and adolescents; Adults; Older adults; Individuals during pregnancy; Individuals during postpartum
  - ***Outcome***: Growth, Body composition, Risk of obesity; Weight loss and maintenance; Pregnancy and postpartum-related weight change

Summary of **dairy milk and milk alternative** consumption and growth, body composition, and risk of obesity conclusion statements and grades

Intervention / Exposure	Conclusion Statements by Life Stage		
	Children / Adolescents	Adults / Older Adults	Pregnancy and Postpartum
Total Milk	• **Limited** evidence for favorable association in younger children • A conclusion statement cannot be drawn in older children/adolescents	• **Moderate** evidence for no association	• Conclusion statements cannot be drawn
Milk by Fat Content	• **Limited** evidence for favorable association (higher-fat dairy milk compared to lower-fat dairy milk) in younger children • A conclusion statement cannot be drawn in older children/adolescents	• A conclusion statement cannot be drawn	
Milk Alternatives	• A conclusion statement cannot be drawn	• A conclusion statement cannot be drawn	
Sweetened Milk	• A conclusion statement cannot be drawn in younger children • **Limited** evidence for no association in older children/adolescents	• A conclusion statement cannot be drawn	

Total dairy milk and milk alternative consumption by children and adolescents and growth, body composition, and risk of obesity

Conclusion Statement and Grade	**Limited** evidence suggests that total milk consumption *in younger children* may be associated with favorable growth and body composition, and lower risk of obesity in children. (Grade: Limited)	**A conclusion statement cannot be drawn** about the relationship between total milk consumption and growth, body composition, and risk of obesity *in older children and adolescents* because the available evidence has substantial concerns with directness, consistency, and risk of bias. (Grade: Grade Not Assignable)
Body of evidence	13 prospective cohort studies	5 RCT, 1 NRCT, 14 prospective cohort studies
Consistency	Some concerns with inconsistency in the direction of findings	Rationale: • Trials did not account for energy intake when comparing the addition of milk to water or a non-intervention control • Observational studies were highly variable in exposure and comparator definitions and found a mix of null, positive, and negative associations • Several studies had a high risk of bias across multiple domains
Precision	Substantial concerns due to smaller sample sizes and varying metrics across studies	
Risk of bias	Substantial concerns, particularly risk of bias due to confounding and missing data	
Directness	Few concerns with directness	
Generalizability	Substantial concerns with generalizability due to minimal racial and/or ethnic diversity	

Dairy milk consumption by milk fat content in children and adolescents and growth, body composition, and risk of obesity

Conclusion Statement and Grade	**Limited** evidence suggests that consumption of higher-fat dairy milk compared to lower-fat dairy milk *in younger children* is associated with favorable growth and body composition, and lower risk of obesity in children. (Grade: Limited)	**A conclusion statement cannot be drawn** about the relationship between consumption of milk by fat content and growth, body composition, and risk of obesity *in older children and adolescents* because the available evidence has substantial concerns with consistency, quantity, and risk of bias. (Grade: Grade Not Assignable)
Body of evidence	6 prospective cohort studies	5 prospective cohort studies
Consistency	Some concerns with inconsistency in findings, though all were either positive or null	Rationale: • The number of eligible studies was small • Multiple studies utilized unadjusted outcome data • Exposure definitions varied substantially, and findings were mixed • Several studies had a high risk of bias across multiple domains
Precision	Substantial concerns due to the small number of studies and varying metrics across them	
Risk of bias	Substantial concerns, particularly risk of bias due to confounding and missing data	
Directness	Some concerns due to a lack of direct trial data	
Generalizability	Few concerns with generalizability to the US population	

Milk alternative consumption by children and adolescents and growth, body composition, and risk of obesity

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between consumption of milk alternatives and growth, body composition, and risk of obesity in children and adolescents because there is not enough evidence available. (Grade: Grade Not Assignable)
Body of evidence	1 NRCT
Rationale	There was only one eligible study examining milk alternative consumption and growth, body composition, and risk of obesity in children and adolescents.

Sweetened milk consumption by **children and adolescents** and growth, body composition, and risk of obesity

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between consumption of sweetened milk and growth, body composition, and risk of obesity *in younger children* because there is no evidence available. (Grade: Grade Not Assignable)	**Limited** evidence suggests that there is no relationship between consumption of sweetened milk and growth, body composition, and risk of obesity *in older children and adolescents*. (Grade: Limited)
Body of evidence	0 articles	3 prospective cohort studies
Consistency	No articles met the inclusion criteria	Some concerns with inconsistency in direction of findings
Precision		Substantial concerns due to the small number of studies and varying metrics across them
Risk of bias		Some concerns, particularly risk of bias due to missing data
Directness		Some concerns with directness
Generalizability		Substantial concerns in generalizability to the US population

Total dairy milk and milk alternative consumption by **adults** and body composition and risk of obesity [156]

Conclusion Statement and Grade	**Moderate** evidence indicates that total milk consumption is not associated with measures of body composition or risk of obesity in adults. (Grade: Moderate)
Body of evidence	8 RCT, 17 prospective cohort studies
Consistency	Some concerns with inconsistency in the direction of results
Precision	Some concerns with precision due to varying metrics and wide confidence intervals
Risk of bias	Some concerns with risk of bias due to inadequate randomization, confounding, and missing data
Directness	Few concerns with directness
Generalizability	Substantial concerns with generalizability to the US population due to lack of data on race and/or ethnicity

Dairy milk consumption by milk fat content in **adults** and body composition and risk[157] of obesity

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between consumption of milk by fat content and body composition and risk of obesity in adults because the available evidence has substantial concerns with directness, consistency, and an absence of trial data. (Grade: Grade Not Assignable)
Body of evidence	14 prospective cohort studies
Rationale	• There were no eligible trials examining milk by fat content in adults • Findings for higher-fat milk intake were substantially mixed, with studies finding negative, positive, and null associations • Multiple studies showed no association, or the direction of the association was difficult to interpret • Exposure definition and comparators varied substantially across studies (e.g., “Low-fat milk” defined as skim and 1% or skim, 1%, and 2%)

Milk alternative consumption in adults and body composition and risk of obesity

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between consumption of milk alternatives and body composition and risk of obesity in adults because there is not enough evidence available. (Grade: Grade Not Assignable)
Body of evidence	1 prospective cohort study
Rationale	There was only one eligible study examining milk alternative consumption and body composition and risk of obesity in adults.

Sweetened milk consumption in adults and body composition and risk of obesity

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between consumption of sweetened milk and body composition and risk of obesity in adults because there is not enough evidence available. (Grade: Grade Not Assignable)
Body of evidence	0 articles
Rationale	No articles met the inclusion criteria

Dairy milk and milk alternative consumption by individuals during **pregnancy** and gestational weight gain

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between milk consumption during pregnancy and gestational weight gain because there is not enough evidence available. (Grade: Grade Not Assignable)
Body of evidence	2 prospective cohort studies
Rationale	Studies varied substantially on exposure definition, analysis technique, and direction of findings

Dairy milk and milk alternative consumption by individuals during **postpartum** and postpartum weight change

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between milk consumption during postpartum and postpartum weight change because there is no evidence available. (Grade: Grade Not Assignable)
Body of evidence	0 articles
Rationale	No articles met the inclusion criteria

Analytic Framework: What is the relationship between **low- and no-calorie sweetened beverage** consumption and **growth, body composition, and risk of obesity**?

Approach: Update to Existing NESR Systematic Review, Included articles published from January 2000 – May 2023

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Children and adolescents (2 to 19 years)	Low- and no-calorie sweetened beverage (LNCSB) consumption	Consumption of a different amount of LNCSB (including no consumption and versions diluted with water) LNCSB vs. water	**Growth** (in children; adolescents): • Height • Weight • Stunting, failure to thrive, wasting • BMI-for-age • Body circumferences (arm, neck, thigh) **Body Composition** (in children; adolescents; adults; older adults): • Skinfold thickness • Fat mass, ectopic fat • Fat-free mass or lean mass • Waist circumference, waist-to-hip-ratio **Risk of Obesity** (in children; adolescents; adults; older adults): • BMI • Underweight • Normal weight • Overweight and/or obesity • Weight gain	Sex Age Race/ethnicity Socioeconomic position Anthropometry at baseline Diet quality Physical activity Smoking (adults, older adults, pregnancy) Parity (pregnancy, postpartum) Diabetes mellitus in the current pregnancy (pregnancy) Hypertensive disorders in the current pregnancy (pregnancy) Human milk feeding (postpartum)
Adults and older adults (19 years and older)			**Body Composition** (in adults; older adults): list of outcomes as stated above **Risk of Obesity** (in adults; older adults): list of outcomes as stated above • Weight loss and maintenance	
Individuals during pregnancy and during postpartum			**Pregnancy and Postpartum-related Weight Change:** • Gestational weight gain (during pregnancy) • Postpartum weight change (during postpartum)	

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Synthesis organization

- ***Population***: Infants and toddlers; Children and adolescents; Adults; Older adults; Individuals during pregnancy; Individuals during postpartum
  - ***Outcome***: Growth, Body composition, Risk of obesity; Weight loss and maintenance; Pregnancy and postpartum-related weight change

Summary of **low- and no-calorie sweetened beverage** consumption and growth, body composition, and risk of obesity conclusion statements and grades

Conclusion Statements by Life Stage		
Children / Adolescents	Adults / Older Adults	Pregnancy and Postpartum
• **Limited** evidence for no association	• **Moderate** evidence for no association	• Conclusion statements cannot be drawn

Low- and no-calorie sweetened beverage consumption by **children and adolescents** and growth, body composition, and risk of obesity

Conclusion Statement and Grade	**Limited** evidence suggests that low and no-calorie sweetened beverage consumption may not be associated with growth, body composition, and risk of obesity in children and adolescents. (Grade: Limited)
Body of evidence	17 prospective cohort studies
Consistency	Substantial concerns with variation in the direction of findings
Precision	Some concerns due to small sample sizes and varying metrics across studies
Risk of bias	Substantial concerns, particularly risk of bias due to confounding and missing data
Directness	Some concerns with directness, given lack of RCT data
Generalizability	Some concerns with applicability to the U.S. population due to low reported racial and/or ethnic diversity

Low- and no-calorie sweetened beverage consumption by **adults** and body composition[165] and risk of obesity

Conclusion Statement and Grade	**Moderate** evidence indicates that low- and no-calorie sweetened beverage consumption is not associated with a change in body composition and risk of obesity in adults compared with water or lower amounts of low and no-calorie sweetened beverages. (Grade: Moderate)
Body of evidence	8 RCTs, 19 prospective cohort studies
Consistency	Some concerns with variation in the direction of findings, primarily in observational studies
Precision	Some concerns with small sample sizes; variation in metrics across studies
Risk of bias	Substantial concerns, particularly due to confounding and missing data in observational studies
Directness	Some concerns with directness in observational studies
Generalizability	Substantial concerns with applicability to the U.S. population due to low diversity in reported race and/or ethnicity and socioeconomic position

Low- and no-calorie sweetened beverage consumption by individuals during **pregnancy** and gestational weight gain

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between low- and no-calorie sweetened beverage consumption during pregnancy and gestational weight gain because there is no evidence available. (Grade: Grade Not Assignable)
Body of evidence	0 articles
Rationale	There were no eligible articles examining low- and no-calorie sweetened beverage consumption and gestational weight gain.

Low- and no-calorie sweetened beverage consumption by individuals during **postpartum** and postpartum weight change

Conclusion Statement and Grade	**A conclusion statement cannot be drawn** about the relationship between low- and no-calorie sweetened beverage consumption during postpartum and postpartum weight change because there is not enough evidence available. (Grade: Grade Not Assignable)
Body of evidence	1 PCS
Rationale	There was only one eligible article examining low- and no-calorie sweetened beverage consumption and postpartum weight change.

Committee Discussion

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Next Steps

Continue work on systematic reviews:

Dietary Patterns

- Dietary patterns with varying amounts of ultra-processed foods and growth, body composition, and risk of obesity
- Dietary patterns and risk of type 2 diabetes
- Dietary patterns and risk of cardiovascular disease
- Dietary patterns and risk of cognitive decline, dementia, and Alzheimer's disease
- Dietary patterns and risk of breast cancer
- Dietary patterns and risk of colorectal cancer
- Dietary patterns and bone health

Specific Dietary Pattern Components

- Sugar-sweetened beverages and growth, body composition, and risk of obesity
- Sugar-sweetened beverages and risk of type 2 diabetes
- Low- and no-calorie sweetened beverages and risk of type 2 diabetes
- Food sources of saturated fat and risk of cardiovascular disease

Meeting Break

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Diet in Pregnancy and Birth through Adolescence

Subcommittee Chair: Jennifer Orlet Fisher, PhD

Additional Presenter: Carol Byrd-Bredbenner, PhD

January 19, 2024

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2025 Dietary Guidelines Advisory Committee: Diet in Pregnancy and Birth through Adolescence Subcommittee

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2025 Dietary Guidelines Advisory Committee: Diet in Pregnancy and Birth through Adolescence Subcommittee

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* Health Equity Working Group Member

Progress since Meeting 3

- **Systematic Reviews with Draft Conclusion Statements**
- Repeated exposure to food and:
  - Food acceptance
- Dietary patterns consumed during pregnancy and:
  - Risk of hypertensive disorders of pregnancy

- **Systematic Reviews Under Way**
- Complementary Feeding and:
  - Growth, body composition, and risk of obesity
- Parental and caregiver feeding styles and practices during childhood and adolescence and:
  - Growth, body composition, and risk of obesity;
  - Consuming a dietary pattern that is more aligned with the *Dietary Guidelines for Americans*
- Dietary patterns consumed during pregnancy and:
  - Gestational age at birth;
  - Birth weight

Repeated Exposure and Food Acceptance

Analytic Framework: What is the relationship between **repeated exposure to food** and **food acceptance** in **young children 2 to 6 years**

Approach: Update to Existing NESR Systematic Review, Included articles published from January 1980 – May 31, 2023

Population	***Intervention / exposure***	***Comparator***	***Outcome***	***Key confounders***
Infants and toddlers (birth up to 24 months) Young children (2 up to 6 years)	Repeated exposure to food or food-type – child is exposed to a target food multiple times	• Pre-exposure versus post-exposure (within-subject) • No exposure versus exposure (between subjects) • Taste exposure versus non-taste exposure	Food acceptance of the exposed food (in infants, toddlers, young children, school-aged children) • Amount or rate of target or novel food consumed • Length of feeding of target or novel food during infant-led feeding • Facial or body response (expressions made during feeding/eating of target or novel food) • Caregiver's or investigator's perception of infants' enjoyment of the target or novel food • Willingness to try or taste the target or novel food • Hedonic responses • Child's verbal indication of liking of food	• Race and/or ethnicity • Socioeconomic position (SEP) and/or parental education

Repeated exposure to food and food acceptance in young children - vegetables

Conclusion Statement and Grade	Moderate evidence indicates that **repeated taste exposure** to a **single or multiple novel, familiar or disliked vegetable(s)** is likely to increase acceptance of the **target vegetable(s)** in young children ages 2 up to 6 years old.	Limited evidence suggests that **repeated taste exposure** to a **target vegetable** is likely to increase acceptance of a **different vegetable** in young children ages 2 up to 6 years old.
Body of evidence	15 articles; 14 RCTs and 1 NRCT	6 articles; 6 RCTs
Consistency	The body of evidence is consistent in direction of effects, with 14 of 15 studies demonstrating effects on one or more indicators of acceptance.	The body of evidence shows considerable variation in direction of effects.
Precision	The body of evidence has no concerns with precision because studies had adequate sample sizes and were sufficiently powered.	The body of evidence has some concerns with precision due to small sample sizes and lack of power analysis.
Risk of bias	The body of evidence has some concerns with risk of bias due to potential for confounding, missing data, and selection of reported results.	The body of evidence concerns due to potential for confounding, missing data, and selection of reported results.
Directness	The body of evidence is directly designed to address the question.	The body of evidence is directly designed to address the question.
Generalizability	The body of evidence has serious concerns with generalizability relative to the U.S. population, because participants lacked diversity with respect to race/ethnicity and socioeconomic position.	The body of evidence has serious concerns with generalizability relative to the U.S. population, because participants lacked diversity with respect to race/ethnicity and socioeconomic position.

Repeated exposure to food and food acceptance in young children - fruits

Conclusion Statements and Grades	A conclusion statement cannot be drawn about the effect of **repeated taste exposure** to **fruit(s)** on acceptance of **target fruit(s)** in young children ages 2 up to 6 years old because there is no evidence available.	A conclusion statement cannot be drawn about the effect of **repeated taste exposure** to a **target fruit** on acceptance of a **different fruit** in young children ages 2 up to 6 years old because there is no evidence available.
Grade	Grade not assignable	Grade not assignable
Body of Evidence/ Rationale	No studies assessed the effect of repeated taste exposure of a target fruit on acceptance of the target fruit in children 2-6 years old.	No studies assessed the effect of repeated taste exposure of a target fruit on acceptance of the different fruit in children 2-6 years old.

Repeated exposure to food and food acceptance in young children - non-taste exposures

Conclusion Statement and Grade	Moderate evidence indicates that **repeated non-taste exposure alone** or **together with taste exposure** to **a target fruit or vegetable** increases acceptance, specifically willingness to try, of the target fruit or vegetable in young children ages 2 up to 6 years old.
Body of evidence	5 articles; 4 RCTs and 1 NRCT
Consistency	The body of evidence is consistent in direction of effects, with 5 of 5 studies demonstrating effects on one indicators of acceptance.
Precision	The body of evidence has no concerns with precision because studies had adequate sample sizes and were sufficiently powered.
Risk of bias	The body of evidence has some concerns with risk of bias due to potential for errors in measurement of outcome (perceived liking and willingness to taste), missing data and selection of reported results.
Directness	The body of evidence was directly designed to address the question.
Generalizability	The body of evidence has serious concerns with generalizability relative to the U.S. population because participants lacked diversity with respect to race/ethnicity and socioeconomic position.

Summary of conclusion statements - repeated exposure and food acceptance

Conclusion Statements by Life Stage		
Intervention	Infants / Toddlers (Birth to 24 months)	Young Children (2 up to 6 years)
Repeated taste exposure to Vegetables	• **Moderate** evidence for acceptance of the target vegetable(s) • **Moderate** evidence for acceptance of a different vegetable, but not a fruit	• **Moderate** evidence for acceptance of the target vegetable(s) • **Limited** evidence for acceptance of a different vegetable
Repeated taste exposure to Fruits	• **Moderate** evidence for acceptance of the target fruit • **Limited** evidence for acceptance of a different fruit, but not a vegetable	• Conclusion statements cannot be drawn
Repeated non-taste exposures	• Conclusion statements cannot be drawn	• **Moderate** evidence for acceptance of the target fruit or vegetable

Dietary Patterns During Pregnancy

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Analytic Framework: What is the relationship between **dietary patterns** consumed **during pregnancy** and risk of **hypertensive disorders of pregnancy**?

Approach: Update to Existing NESR Systematic Review, Included articles published from January 1980 – May 31, 2023

Population	***Intervention/ Exposure***	***Comparator***	***Outcome***	***Key confounders***
Individuals during pregnancy	Consumption of a dietary pattern	Different dietary pattern(s) Different adherence/ consumption levels to the same dietary pattern	In individuals during pregnancy: • Blood pressure (systolic, diastolic) • Protein in the urine (proteinuria) • Eclampsia • Preeclampsia • Gestational hypertension	• Age • Race and/or ethnicity • Socioeconomic position • Anthropometry (pre-pregnancy BMI) • Smoking • Parity • Diabetes mellitus in the current pregnancy • History of hypertensive disorders of pregnancy

Synthesis organization:

I. ***Population***: Individuals during pregnancy

- ***I.*** ***Outcome:*** Blood pressure (systolic, diastolic); Protein in the urine (proteinuria); Eclampsia; Preeclampsia; Gestational hypertension

Key definitions:

Dietary patterns: the quantities, proportions, variety, or combination of different foods, drinks, and nutrients (when available) in diets, and the frequency with which they are habitually consumed.

Dietary patterns consumed during pregnancy and risk of hypertensive disorders of pregnancy

Conclusion Statement and Grade	A conclusion statement cannot be drawn about the relationship between dietary patterns consumed during pregnancy and risk of hypertensive disorders of pregnancy because there are substantial concerns with directness, precision, and consistency in the body of evidence. (Grade: Grade Not Assignable)
Body of evidence	31 articles: 16 PCS, 6 RCT, 1 NRCT
Rationale	None of the intervention studies were designed to directly examine the relationship between dietary patterns during pregnancy and risk of hypertensive disorders during pregnancy, and the low incidence of the outcome limited precision of results. In addition, the available evidence was too inconsistent, both in the composition of the dietary patterns and the direction of the results, to draw a conclusion.

Thank you!

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Committee Discussion

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Thank you!

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Thank You!

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Dietary Guidelines for Americans, 2025-2030 Timeline

2022

April 15 – May 16
- Scientific questions for public comment

June 15 – July 15
- 2025 Dietary Guidelines Advisory Committee nominations

2023

Advisory Committee Meetings
- Meeting 1 (February 9–10) ✓
- Meeting 2 (May 10) ✓
- Meeting 3 (September 12-13) ✓

2024

Advisory Committee Meetings
- Meeting 4 (January 19) ✓
- Meeting 5 (May 30)
- Meeting 6 (September 26)

Release Scientific Report

2025

Release *Dietary Guidelines for Americans, 2025-2030*

Step 1: Identify Scientific Questions

Step 2: Appoint the Committee

Step 3: Advisory Committee Reviews Scientific Evidence

Step 4: Develop the Dietary Guidelines

Legend

Opportunity for public input

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Public Engagement

- Provide public comments to the Committee.
- Attend virtual Committee meetings
- Sign up for updates
- Visit DietaryGuidelines.gov
- Media requests: odphpinfo@hhs.gov

https://www.dietaryguidelines.gov/get-involved

Next Steps

- Next month, updated systematic review protocols will be posted at NESR.usda.gov and new and updated food pattern modeling protocols, including diet simulations, will be posted at DietaryGuidelines.gov
- Public comments on protocols are appreciated in a month following posting
- Subcommittees/Working Groups will continue conducting their evidence reviews
- Meeting 5: Tentatively scheduled for May 30