2025 Dietary Guidelines Advisory Committee: Meeting 2

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

May 10, 2023

DietaryGuidelines.gov

2025 Dietary Guidelines Advisory Committee Members in Attendance

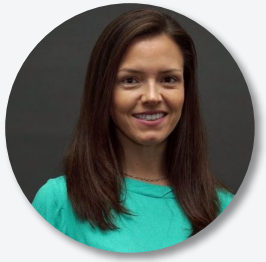
Sarah Booth, PhD
Chair

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

Angela Odoms-Young, PhD, MS
Vice-Chair

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 13)

2024

Advisory Committee Meetings
- Meeting 4 (January 25)
- 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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2025 Dietary Guidelines Advisory Committee: Meeting 2

Agenda

9:00am-3:30pm

- Opening Remarks
- Update on Related Projects
- Dietary Guidelines Advisory Committee Chair and Vice-Chair Remarks
- Subcommittee and Working Group Presentations
- Committee Discussion

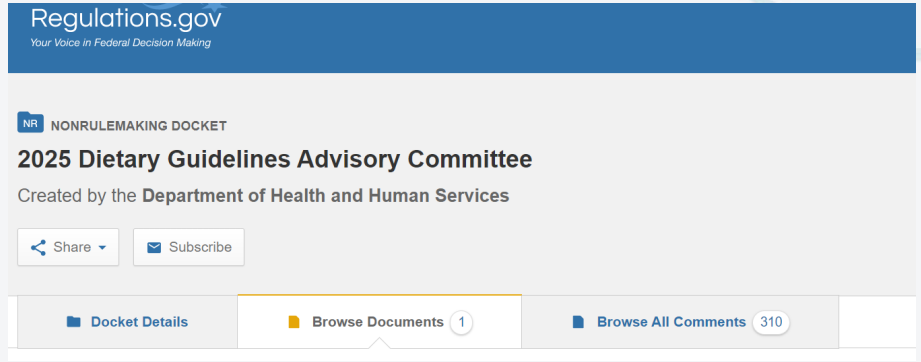
Charge of the Committee

- Examine the evidence on the topics and scientific questions identified by the Departments;
- Develop a report that outlines its science-based review and recommendations to the Departments with rationale;
- Submit its report to the Secretaries of HHS and USDA for consideration as the Departments develop the *Dietary Guidelines for Americans*

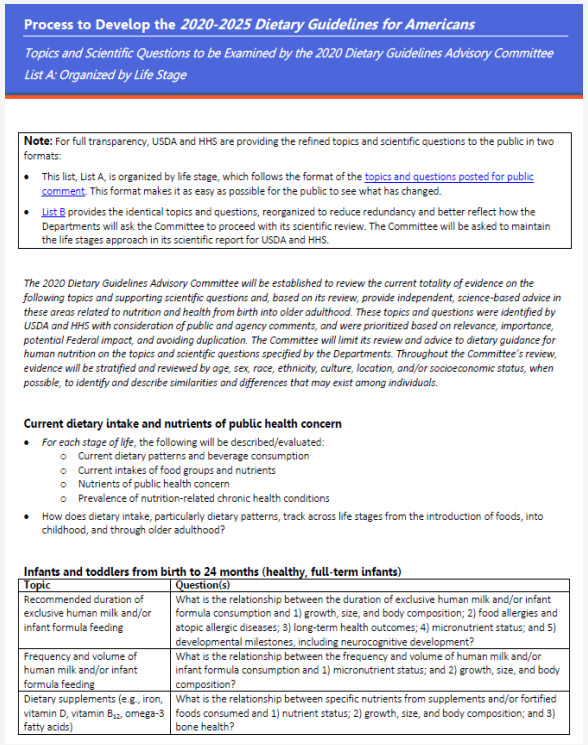
https://www.dietaryguidelines.gov/sites/default/files/2020-12/Infographic_Committee_Report_vs_the_Dietary_Guidelines.pdf

The Committee's Important Role: To Describe the State of Current Nutrition Science

- Each edition of the *Dietary Guidelines* that HHS and USDA develop builds upon the previous edition, with scientific justification for changes informed by the Committee's scientific report—along with input from federal agencies and the public



Question Development Process



Process to Develop the *2020-2025 Dietary Guidelines for Americans*

Topics and Scientific Questions to be Examined by the 2020 Dietary Guidelines Advisory Committee

List A: Organized by Life Stage

Note: For full transparency, USDA and HHS are providing the refined topics and scientific questions to the public in two formats:

- This list, List A, is organized by life stage, which follows the format of the topics and questions posted for public comment. This format makes it as easy as possible for the public to see what has changed.
- List B provides the identical topics and questions, reorganized to reduce redundancy and better reflect how the Departments will ask the Committee to proceed with its scientific review. The Committee will be asked to maintain the life stages approach in its scientific report for USDA and HHS.

The 2020 Dietary Guidelines Advisory Committee will be established to review the current totality of evidence on the following topics and supporting scientific questions and, based on its review, provide independent, science-based advice in these areas related to nutrition and health from birth into older adulthood. These topics and questions were identified by USDA and HHS with consideration of public and agency comments, and were prioritized based on relevance, importance, potential Federal impact, and avoiding duplication. The Committee will limit its review and advice to dietary guidance for human nutrition on the topics and scientific questions specified by the Departments. Throughout the Committee's review, evidence will be stratified and reviewed by age, sex, race, ethnicity, culture, location, and/or socioeconomic status, when possible, to identify and describe similarities and differences that may exist among individuals.

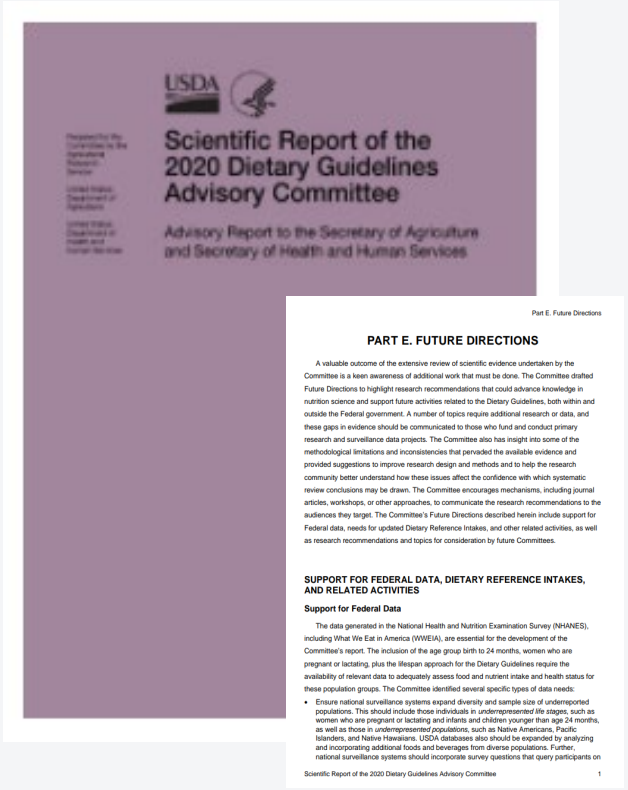
Current dietary intake and nutrients of public health concern

- *For each stage of life*, the following will be described/evaluated:
  - Current dietary patterns and beverage consumption
  - Current intakes of food groups and nutrients
  - Nutrients of public health concern
  - Prevalence of nutrition-related chronic health conditions
- How does dietary intake, particularly dietary patterns, track across life stages from the introduction of foods, into childhood, and through older adulthood?

Infants and toddlers from birth to 24 months (healthy, full-term infants)

Topic	Question(s)
Recommended duration of exclusive human milk and/or infant formula feeding	What is the relationship between the duration of exclusive human milk and/or infant formula consumption and 1) growth, size, and body composition; 2) food allergies and atopic allergic diseases; 3) long-term health outcomes; 4) micronutrient status; and 5) developmental milestones, including neurocognitive development?
Frequency and volume of human milk and/or infant formula feeding	What is the relationship between the frequency and volume of human milk and/or infant formula consumption and 1) micronutrient status; and 2) growth, size, and body composition?
Dietary supplements (e.g., iron, vitamin D, vitamin B_{12}, omega-3 fatty acids)	What is the relationship between specific nutrients from supplements and/or fortified foods consumed and 1) nutrient status; 2) growth, size, and body composition; and 3) bone health?

2020 Dietary Guidelines Advisory Committee Systematic Review Questions



USDA

Scientific Report of the 2020 Dietary Guidelines Advisory Committee

Advisory Report to the Secretary of Agriculture and Secretary of Health and Human Services

Part E. Future Directions

PART E. FUTURE DIRECTIONS

A valuable outcome of the extensive review of scientific evidence undertaken by the Committee is a keen awareness of additional work that must be done. The Committee drafted Future Directions to highlight research recommendations that could advance knowledge in nutrition science and support future activities related to the Dietary Guidelines, both within and outside the Federal government. A number of topics require additional research or data, and these gaps in evidence should be communicated to those who fund and conduct primary research and surveillance data projects. The Committee also has insight into some of the methodological limitations and inconsistencies that pervaded the available evidence and provided suggestions to improve research design and methods and to help the research community better understand how these issues affect the confidence with which systematic review conclusions may be drawn. The Committee encourages mechanisms, including journal articles, workshops, or other approaches, to communicate the research recommendations to the audiences they target. The Committee's Future Directions described herein include support for Federal data, needs for updated Dietary Reference Intakes, and other related activities, as well as research recommendations and topics for consideration by future Committees.

SUPPORT FOR FEDERAL DATA, DIETARY REFERENCE INTAKES, AND RELATED ACTIVITIES

Support for Federal Data

The data generated in the National Health and Nutrition Examination Survey (NHANES), including What We Eat in America (WWEIA), are essential for the development of the Committee's report. The inclusion of the age group birth to 24 months, women who are pregnant or lactating, plus the lifespan approach for the Dietary Guidelines require the availability of relevant data to adequately assess food and nutrient intake and health status for these population groups. The Committee identified several specific types of data needs:

- Ensure national surveillance systems expand diversity and sample size of underreported populations. This should include those individuals in *underrepresented life stages*, such as women who are pregnant or lactating and infants and children younger than age 24 months, as well as those in *underrepresented populations*, such as Native Americans, Pacific Islanders, and Native Hawaiians. USDA databases also should be expanded by analyzing and incorporating additional foods and beverages from diverse populations. Further, national surveillance systems should incorporate survey questions that query participants on

Scientific Report of the 2020 Dietary Guidelines Advisory Committee 1

2020 Advisory Committee Recommendations for Future Committees

VA/DoD CLINICAL PRACTICE GUIDELINE FOR THE MANAGEMENT OF ADULT OVERWEIGHT AND OBESITY

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

CDC Healthy Schools

The Community Guide

Consideration of Existing Federal Resources (examples)

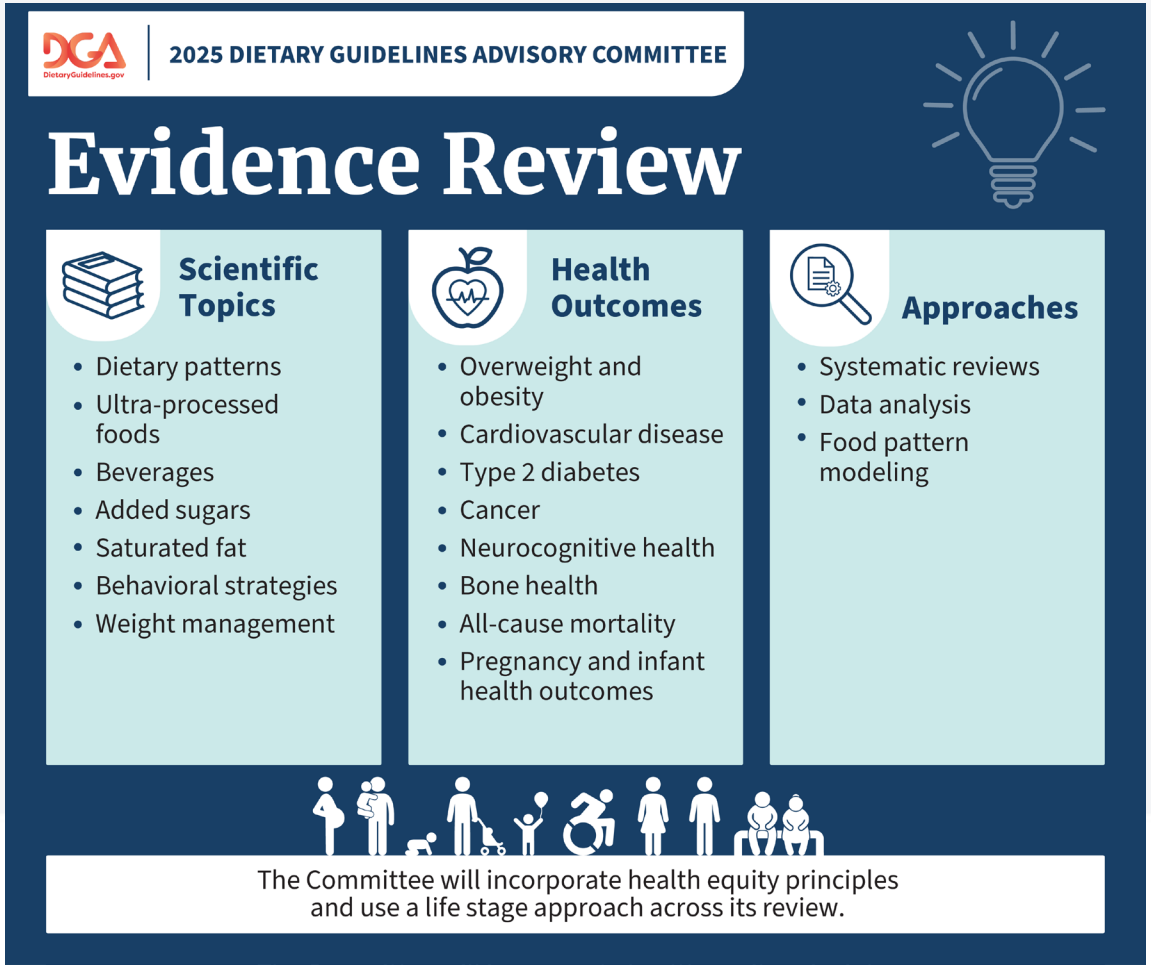
USDA Nutrition Evidence Systematic Review
U.S. DEPARTMENT OF AGRICULTURE

NESR Continuous Evidence Monitoring and Evidence Scans

Topics of Public Health Interest

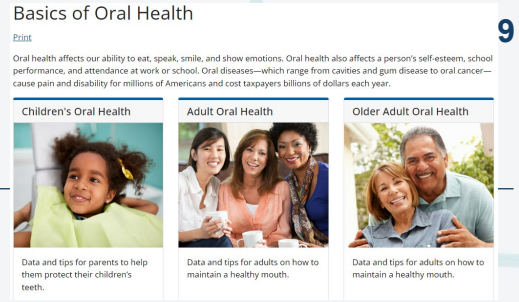
Scientific Question Identification

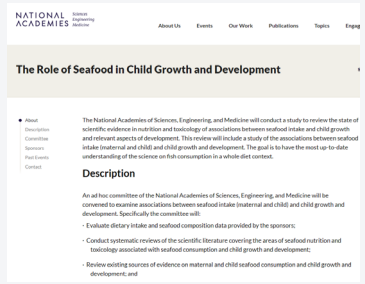
- HHS and USDA conducted a yearlong process to gather information, receive input from federal experts, and review relevant documents to develop scientific questions

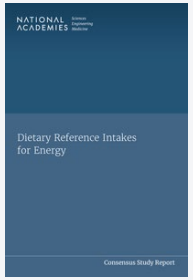


DGAC has Finite Time and Membership

- Existing evidenced based federal guidance can be used to inform the *Dietary Guidelines for Americans, 2025-2030*. These topics do not require formal review by the Committee. These include, but are not limited to:
  - Healthy Food Environments (e.g., Community Preventive Service Task Force findings)
  - Oral Health (e.g., CDC and NIH)
  - Food Safety (e.g., FoodSafety.gov)
  - Specific Nutrient Recommendations (Dietary Reference Intakes)
  - Human milk, infant formula, and health outcomes (e.g., Forthcoming federal systematic reviews)
  - Seafood (e.g., FDA/EPA Advice about Eating Fish)
  - Eating Disorders (e.g., National Institute of Mental Health)
  - Physical Activity (Physical Activity Guidelines for Americans)







Follow the Committee's Progress

Dietary Guidelines for Americans

CONTACT US | FAQS

Home | About | Current Dietary Guidelines | Work Under Way | lated Projects | Most Popular Questions

Work Under Way

Dietary Guidelines for Americans | Work Under Way

Learn About the Process

The *Dietary Guidelines for Americans, 2025-2030 (Dietary Guidelines)* is developed using a scientifically rigorous, multi-year process. The U.S. Departments of Health and Human Services (HHS) and Agriculture (USDA) are committed to providing clear information to the public and providing opportunities for public participation during the process. Visit this page to learn more about the *Dietary Guidelines* development process.

Learn More

Opening Remarks

Paul Reed, MD
Rear Admiral, U.S. Public Health Service

Deputy Assistant Secretary for Health and
Director, Office of Disease Prevention and Health Promotion
Office of the Assistant Secretary for Health
U.S. Department of Health and Human Services

May 10, 2023

DietaryGuidelines.gov

Update on Related Projects

Eve Stoody, PhD
Director, Nutrition Guidance and Analysis Division
Center for Nutrition Policy and Promotion
Food and Nutrition Service
U.S. Department of Agriculture

May 10, 2023

DietaryGuidelines.gov

Updates

- Healthy Eating Index
- Alcoholic beverages and health
- Applicability of systems science in the *Dietary Guidelines* development process
- Dietary Reference Intakes
- Sustainability and Nutrition

Healthy Eating Index (HEI)-2020 and HEI-Toddlers-2020

- Tool designed to evaluate how well a set of foods and beverages aligns with dietary patterns recommendations in the *Dietary Guidelines for Americans*
- Developed in a partnership between the HHS/NIH/National Cancer Institute and USDA/FNS/Center for Nutrition Policy and Promotion
- HEI-2015 score is made up of 13 components that reflect recommendations in the 2015 edition of the DGA
- HEI-2020 is expected to be published in the *Journal of the Academy of Nutrition and Dietetics* in September and will reflect recommendations in the 2020 edition of the DGA
  - HEI-2020: New name, but same components as HEI-2015; for ages 2 years and older
  - HEI-Toddlers-2020: New tool reflecting new guidance for ages 12 through 23 months
- Public webinar will be planned and cross-promoted through our *Dietary Guidelines* listserv

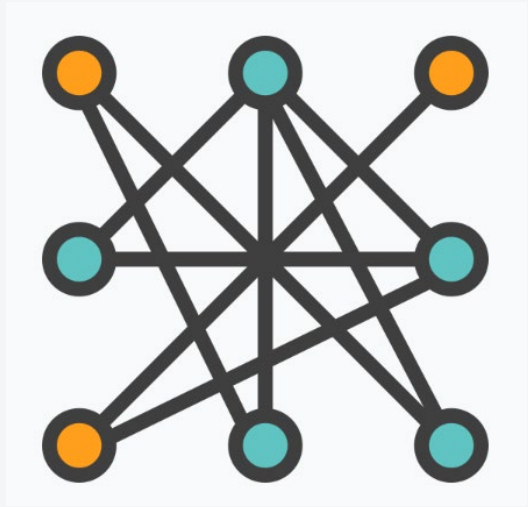
https://epi.grants.cancer.gov/hei/
https://www.fns.usda.gov/healthy-eating-index-hei

Alcoholic Beverages and Health

- Requires specific expertise and has unique considerations
- Will be examined separate from the 2025 Dietary Guidelines Advisory Committee
- Interagency Coordinating Committee on the Prevention of Underage Drinking (ICCPUD) led by the HHS Substance Abuse and Mental Health Services Administration (SAMHSA) will support a technical subcommittee with expertise in adult alcohol consumption to review evidence on alcohol intake and health and make recommendations on adult alcohol consumption
  - Subcommittee report will be published and available to the public in 2025
- 2023 Appropriations Act mandated USDA to enter a contract with the National Academies of Sciences, Engineering, and Medicine (NASEM) to conduct a series of systematic reviews on alcoholic beverages and health; contract process has been initiated through USDA/FNS/CNPP
  - Study is expected to begin this summer
  - Findings from the NASEM study will be considered by SAMHSA subcommittee in developing alcohol recommendations

Systems Science

- One of the recommendations from the NASEM study on the process to develop the *Dietary Guidelines* was to explore strategies to implement systems approaches into the DGA
- USDA/FNS/CNPP has a contract underway to gain insights from Federal and nonfederal experts on the applicability of systems mapping and modeling before, during, and after the DGA development process
- Workshop held in Washington, DC in March
- Report expected by the end of 2023, will be posted publicly



Dietary Reference Intakes (DRI): Energy and Macronutrients

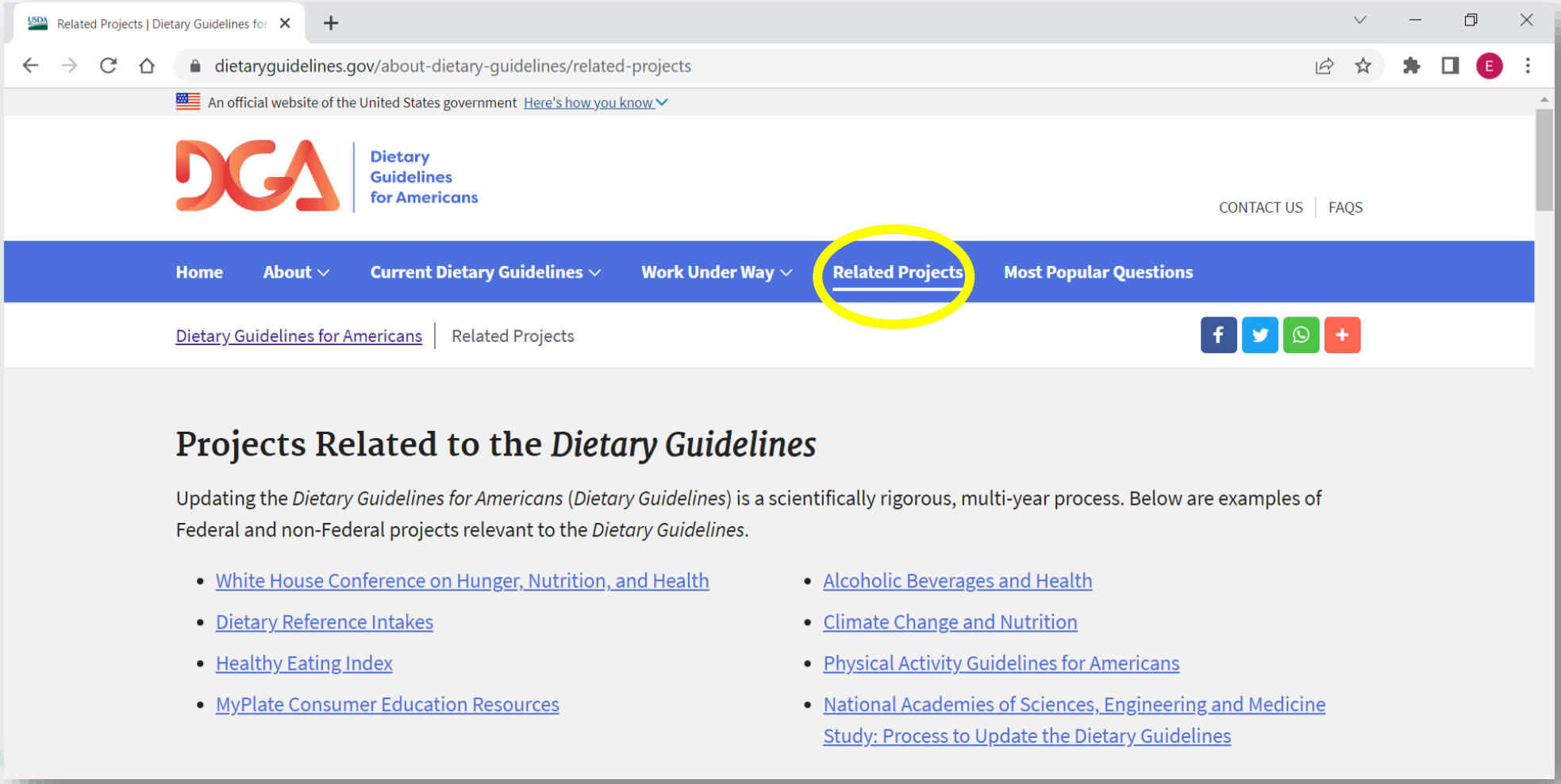
DRIs provide nutrient recommendations, whereas the *Dietary Guidelines* provides food-based recommendations

- Used as inputs in the *Dietary Guidelines*
- Established by NASEM
- Supported by the Joint U.S.-Canadian DRI Working Group
  - Representatives from USDA, HHS, DoD, and Health Canada
  - Prioritized the review of the DRI values for energy and the macronutrients
- Updates:
  - New DRIs for energy are now available
  - Commissioned systematic reviews by the HHS Agency for Healthcare Research and Quality (AHRQ) on (1) dietary protein and (2) digestible carbohydrates

Sustainability and Nutrition

- HHS and USDA have activities underway on this topic to inform work across the Departments. For example:
  - "Agriculture and Diet: Value Added for Nutrition, Translation, and Adaptation in a Global Ecology: ADVANTAGE"
    - Led by NIH Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)
    - Exploring research to better understand the intersection of food systems, diet, nutrition, and health in a changing environment
    - Virtual meeting series open to the public
    - https://www.nichd.nih.gov/about/meetings/2023/041423
  - USDA and HHS will convene a Federal Workgroup tasked with assessing merits and viability of various pathways to consider integrating sustainability in future editions of the *Dietary Guidelines*
    - Established through the Interagency Committee on Human Nutrition Research (ICHNR)
    - Public meetings will be held
    - Workgroup's recommendations for approaches will be released publicly

DietaryGuidelines.gov provides updates on related projects



2025 Dietary Guidelines Advisory Committee Chair and Vice-Chair Remarks

Sarah Booth, PhD and
Angela Odoms-Young, PhD, MS

May 10, 2023

DietaryGuidelines.gov

Overview

- Committee progress since Meeting 1
- Subcommittee and Working Group structure
- Question refinement and prioritization criteria
- Description of protocol elements
- Next steps

Committee Disclosures

- All members are in compliance with the federal ethics laws and regulations governing conflicts of interest.
- In addition to the requirements under the Federal ethics laws and regulations, the individual Committee members are voluntarily disclosing relationships, activities, and interests that may potentially be related to the content of the Committee's scientific review, as defined by the International Committee of Medical Journal Editors.
- The disclosures represent a commitment to transparency and do not necessarily indicate a bias.
- The Committee works together to review the evidence on diet and health and to provide its advice.
- The decisions of the Committee are collective, and therefore, the Committee is providing its disclosures collectively.

https://www.dietaryguidelines.gov/sites/default/files/2023-04/2025_DGAC_Disclosures.pdf

Progress Since Meeting 1

- Committee divided into four topic area Working Groups. Each Working Group:
  - Discussed the scientific questions related to the topic area proposed to the Committee
  - Refined and prioritized questions
  - Identified the order it will develop protocols
- Working Groups transitioned to four Subcommittees with minor shifts in membership. Each Subcommittee:
  - Began drafting protocols for scientific reviews
- Health Equity Working Group formed to discuss how to incorporate health equity principles
- Meta-analyses Working Group formed to refine protocols for a limited number of questions that will be answered using systematic reviews with meta-analyses
- Prioritized questions, draft protocols, and other updates will be brought to the full Committee for discussion today

2025 Dietary Guidelines Advisory Committee Subcommittee and Workgroup Structure and Membership

Health Equity Working Group
Chair: Sameera Talegawkar **Chair/Vice Chair:** Angela Odoms-Young and Sarah Booth **Members:** Cheryl Anderson, Heather Eicher-Miller, Jennifer Fisher, Deanna Hoelscher, Valarie Jernigan, Hollie Raynor

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
Chair: Deanna Hoelscher **Chair/Vice Chair Rep:** Sarah Booth **Members:** Cheryl Anderson Andrea Deierlein Teresa Fung Christopher Gardner Edward Giovannucci Hollie Raynor Fatima Cody Stanford Sameera Talegawkar Chris Taylor Deirdre Tobias	**Chair:** Jennifer Fisher **Chair/Vice Chair Rep:** Angela Odoms-Young **Members:** Steve Abrams Aline Andres Carol Byrd-Bredbenner Heather Eicher-Miller Andrea Deierlein Cristina Palacios	**Food Pattern Modeling Chair:** Chris Taylor **Data Analysis Chair:** Heather Eicher-Miller **Chair/Vice Chair Rep:** Sarah Booth **Members:** Steve Abrams Carol Byrd-Bredbenner Teresa Fung Valarie Jernigan Sameera Talegawkar Deirdre Tobias	**Chair:** Cristina Palacios **Chair/Vice Chair Rep:** Angela Odoms-Young **Members:** Cheryl Anderson Aline Andres Jennifer Fisher Christopher Gardner Edward Giovannucci Deanna Hoelscher Valarie Jernigan Hollie Raynor Fatima Cody Stanford

Meta-Analysis Working Group
Members: Aline Andres, Carol Byrd-Bredbenner, Andrea Deierlein, Jennie Fisher, Cristina Palacios, Deirdre Tobias

Approaches to Examine the Evidence

Systematic Review

Most questions examined by the Committee will be answered using systematic review methodology; focus of the first three Subcommittee presentations

Food Pattern Modeling

Data Analysis

Examined by the Food Pattern Modeling and Data Analysis Subcommittee; work to date has focused on food pattern modeling activities, which will be discussed in the final Subcommittee presentation

Coverage of Topics in Committee's Review

- Important to consider the work of the Committee collectively, not individual questions or Subcommittees in isolation

- Some topics and life stages are covered by more than one Subcommittee
  - For example, *dietary patterns* are covered in Subcommittee 1, Subcommittee 2, and Subcommittee 3 and *older adults* are included in reviews across Subcommittee 1, Subcommittee 3, and Subcommittee 4

- Some topics may not be covered in one Subcommittee, but are in another
  - For example, dietary patterns with varying amounts of *ultra-processed foods* will be examined by Subcommittee 1 but not other Subcommittees, and *foods with added sugars* will be explored in questions on beverages in Subcommittee 1 and in food pattern modeling and data analyses in Subcommittee 3

Criteria for Question Refinement and Prioritization

Working Groups refined and prioritized its scientific questions, considering:

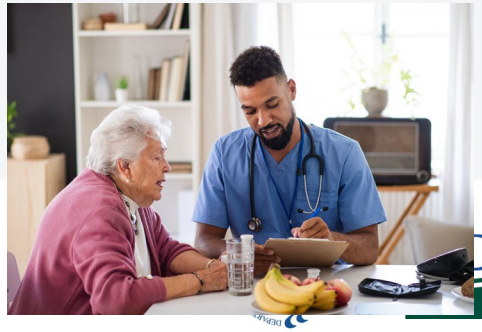
- Relevance
- Importance to public health
- Potential impact to federal food and nutrition programs
- Avoiding duplication of federal efforts
- Research availability

Subcommittees will present information on scientific questions that were prioritized for review based on this step of question refinement and prioritization

Subcommittees will also present questions that were not prioritized with rationale

Cross-Cutting Question Refinement

- Several questions proposed to the Committee had the outcome of: “Growth, size, body composition, risk of overweight and obesity, and weight loss and weight maintenance”
- Across questions, the wording of this outcome has been refined to “growth, body composition, and risk of obesity”
  - **Original Wording:** What is the relationship between dietary patterns consumed and growth, size, body composition, risk of overweight and obesity, and weight loss and weight maintenance?
  - **New Wording:** What is the relationship between dietary patterns consumed and growth, body composition, and risk of obesity?
- **Rationale for Change:** Clarity and consistency with other scientific questions
- Full range of related outcomes will still be addressed:
  - Growth and size for infants, toddlers, children, and adolescents (e.g., height, height-for-age, weight, weight-for-age)
  - Body composition (e.g., fat mass, lean mass, waist circumference, waist-to-hip ratio)
  - Risk of obesity (e.g., BMI, overweight/obesity status, weight gain)
  - Weight loss and maintenance in adults and older adults
  - Pregnancy and post-partum related weight change



Protocols for systematic reviews and food pattern modeling

- Plan for how the scientific approach will be used to examine evidence related to one question
- Created for each question before the Committee examines any evidence
- Draft protocols will be discussed by each Subcommittee
- As needed, protocols will be refined after today's meeting to reflect the Committee discussion
- Will be posted online for the public to view to better understand the approach used to answer a specific scientific question
- Draft protocols are expected to be posted at DietaryGuidelines.gov and NESR.usda.gov in early June

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

NESR Systematic Review Protocols: Overview

- A protocol is a **prespecified** plan for how NESR's methodology will be used to conduct a systematic review. Each protocol describes the methods that will be used and includes:
  - an analytic framework that defines the core elements of the systematic review
    - **P**opulation
    - **I**ntervention and/or exposure and the **C**omparator
    - **O**utcomes
    - Key confounders
    - Definitions of key terms
  - A synthesis plan that outlines how the evidence will be organized
  - Inclusion and exclusion criteria that are used to determine which articles will be included in each review

- Protocols discussed today will be posted online to provide transparency, guard against selective reporting, and facilitate public comment: https://nesr.usda.gov/protocols

Inclusion/Exclusion Criteria: Standard criteria applied across the Committee's reviews

Category	Inclusion Criteria	Exclusion Criteria
Study design	• Randomized controlled trials • Non-randomized controlled trials[1] • Prospective cohort studies • Retrospective cohort studies • Nested case-control studies	• Uncontrolled trials[2] • Case-control studies • Cross-sectional studies • Ecological studies • Modeling and simulation studies • Narrative reviews • Systematic reviews • Meta-analyses
Population: Study participants	Human	Non-human
Publication status	Peer-reviewed articles published in research journals	Non-peer reviewed articles, unpublished data or manuscripts, pre-prints, reports, and conference abstracts or proceedings
Language	Published in English	Not published in English
Country[3]	Studies conducted in countries classified as high or very high on the Human Development Index the year(s) the intervention/exposure data were collected	Studies conducted in countries classified as medium or low on the Human Development Index the year(s) the intervention/exposure data were collected

[1] Including quasi-experimental and controlled before-and-after studies;
[2] Including uncontrolled before-and-after studies;
[3] Protocols include comprehensive detail on how the Human Development Index is applied with this criteria

Inclusion/Exclusion Criteria: Standard criteria applied across the Committee's reviews, continued....

Category	Inclusion Criteria	Exclusion Criteria
Population: Health status This criteria has been tailored to each question to ensure its applicability to the life stages of interest.	Studies that exclusively enroll participants not diagnosed with a disease Studies that enroll some participants: • diagnosed with a disease; • diagnosed with a disorder that affects feeding/eating (e.g., autism, eating disorders) or growth; • with severe undernutrition, failure to thrive/underweight, stunting, or wasting; • born preterm, with low birth weight, and/or small for gestational age; • and/or with the outcome of interest	Studies that exclusively enroll participants: • diagnosed with a disease*; • diagnosed with a disorder that affects feeding/eating (e.g., autism, eating disorders) or growth; • with severe undernutrition, failure to thrive/underweight, stunting, or wasting; • born preterm, with low birth weight, and/or small for gestational age; • and/or with the outcome of interest (i.e., studies that aim to treat participants who have already been diagnosed with the outcome of interest) • who become pregnancy using Assisted Reproductive Technologies; • with multiple gestation pregnancies; • receiving pharmacotherapy to treat obesity; • pre- or post-bariatric surgery • and/or hospitalized for an illness, injury, or surgery *Studies that exclusively enroll participants with obesity will be included

Public Comments

- The Committee has received approximately 300 written public comments since January
- Comment on protocols discussed today are welcome. Please submit them to the Committee by the end of June
- Written public comment period will remain open throughout the Committee's work, ending in fall 2024

www.dietaryguidelines.gov/get-involved

Today's Agenda

- **Health Equity Working Group,** Sameera Talegawkar, PhD
- **Subcommittee 1: Dietary Patterns and Specific Dietary Components Across Life Stages,** Deanna Hoelscher, PhD, RDN, LD, CNS, FISBNPA
- **Subcommittee 2: Diet in Pregnancy and Birth Through Adolescence,** Jennifer Orlet Fisher, PhD
- 12:15 p.m.-1:00 p.m. Lunch
- **Subcommittee 4: Strategies for Individuals and Families Related to Diet Quality and Weight Management,** Cristina Palacios, PhD, MSc
- **Subcommittee 3: Food Pattern Modeling and Data Analysis,** Heather Eicher-Miller, PhD and Chris Taylor, PhD, RDN, LD, FAND
- **Committee Discussion**
- 3:30 p.m. Adjourn

Health Equity Working Group

Working Group Chair:

Sameera Talegawkar, PhD

May 10, 2023

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2025 Dietary Guidelines Advisory Committee: Health Equity Working Group

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

Support Staff	
Meghan Adler	Julie Obbagy
Kara Beckman	Chinwe Obudulu
Gisela Butera	Julia Quam
Carolyn Chung	Elizabeth Rahavi
Dana DeSilva	Kelley Scanlon
Stephenie Fu	Sara Scinto-Madonich
Molly Higgins	Colleen Sideck
Tessa Lasswell	Ali Webster
Julie Nevins	
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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

Working Definition of Health Equity

Working Definition of Equity

Equity is the consistent and systematic treatment of all individuals in a fair, just, and impartial manner, including individuals who belong to communities that have often been denied such treatment, such as Black, Latino, Indigenous and Native American, Asian American, Native Hawaiian and Pacific Islander persons, and other persons of color; members of religious minorities; women and girls; LGBTQI+ persons; persons with disabilities; persons who live in rural areas; persons who live in United States Territories; persons with stigmatized health conditions; persons otherwise adversely affected by persistent poverty or inequality; and individuals who belong to multiple such communities.

**Adapted from "Executive Order on Further Advancing Racial Equity and Support for Underserved Communities Through the Federal Government", The White House (E.O. 14091 of Feb 16, 2023, 88 FR 10825)*

Working Definition of Equity

It means recognizing that people's frustrations run deep and are rooted in their own daily battles—to make ends meet, to practice and prioritize health promoting behaviors like healthful dietary selection, to put food on their tables, and to give their children a shot at economic opportunity. Furthermore, it means recognizing that the ability to select foods and beverages is often limited by income, environment, and other constraints that are not within the individual's control. Therefore, promoting equity means promoting healthful dietary selection for individuals, organizations, and environments, focusing on groups and contexts where healthful dietary selection is most limited.

**Adapted from "Making Equity a Priority", USDA*

Working Definition of Health Equity

Health equity is the state in which everyone has a fair and just opportunity to attain their highest level of health. Achieving this requires ongoing societal efforts to:

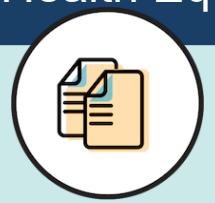
- Address historical and contemporary injustices;
- Remove economic, social, and other obstacles to food, food access, health, and health care, such as poverty, discrimination, and their consequences, including powerlessness and lack of access to good jobs with fair pay, quality education and housing, safe environments, and healthcare; and,
- Eliminate preventable health disparities.

**Adapted from "Heath Equity", Centers for Disease Control and Prevention, and "What is Health Equity", Robert Wood Johnson Foundation*

Operationalizing Health Equity: Three Approaches to Examine the Evidence

Health Equity in the Evidence Review

Health Equity Considerations in the Committee's Review of the Evidence



NESR Systematic Reviews

Identify key variables of interest related to health equity to include in the search for, description, evaluation, synthesis, and grading of the strength of the eligible body of evidence, where applicable and feasible.

Food Pattern Modeling

Food Group Flexibilities:
Ex. dairy; staple carbohydrate foods; protein foods

Simulated Diet Modeling:
Test applicability of dietary patterns across cultural foodways and consider if refinements are needed to the dietary patterns to improve cultural inclusion.

Data Analysis

Utilize demographic subgroups and other variables from nationally representative datasets

Examined in 2020: Sex, race/ethnicity, socioeconomic status (e.g., income, poverty-to-income ratio, education, age/life stage

NESR Systematic Reviews

Develop a Protocol:

- Identify key variables of interest related to health equity to consider throughout the review process

Extract Data and Assess Risk of Bias:

- Extract descriptive data for health equity-related variables to the extent possible
- Address health equity-related key confounders and other variables in risk of bias assessment

Synthesize Evidence, Develop Conclusion Statements, and Grade the Strength of the Evidence:

- Consider specific sub-groups when synthesizing the evidence and developing conclusion statements
- Consistently operationalize and evaluate generalizability when grading of the strength of the evidence
- Document research recommendations that address gaps and limitations in the evidence

Food Pattern Modeling

Food Group Flexibilities:

- Ex. dairy; staple carbohydrate foods; protein foods

Simulated Diet Modeling:

- Test applicability of dietary patterns across cultural foodways and consider if refinements are needed to the dietary patterns to improve cultural inclusion

Health Equity in Data Analysis

Demographic subgroups examined by the 2020 Committee:

- Sex
- Race/Ethnicity
- Socioeconomic Status (family income, income to poverty ratio, education)
- Age/Life Stage

Health Equity in Data Analysis

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- Sex
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- Age/Life Stage

Additional data collected by NHANES that could potentially be considered as variables for exploration:

Health Equity in Data Analysis

Demographic subgroups examined by the 2020 Committee:

- Sex
- Race/Ethnicity
- Socioeconomic Status (family income, income to poverty ratio, education)
- Age/Life Stage

Additional data collected by NHANES that could potentially be considered as variables for exploration:

- Food security category – Household, adult, child
- Country of birth (Born in U.S. or outside of U.S)
- Health insurance coverage and type
- Living in urban or rural areas
- ~~Social vulnerability index~~
- Household food benefit – SNAP, WIC, emergency food
- Disability status
- ~~Acculturation – language spoken at home (English, Spanish, other)~~
- ~~Length of time in U.S.~~

Next Steps

- Continue to refine topics related to health equity to be considered by the Committee during their review of the evidence
- Incorporate health equity considerations into the Committee's review of the scientific evidence
- Develop an outline for incorporating health equity into the Scientific Report

Thank you!

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Subcommittee 1: Dietary Patterns and Specific Dietary Pattern Components Across Life Stages

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

Additional Presenters: Deirdre Tobias, ScD; Edward Giovannucci, MD, ScD; Hollie Raynor, PhD, RD, LDN

May 10, 2023

DietaryGuidelines.gov

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

Members	
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Kevin Kuczynski	Ali Webster
Janet de Jesus (DFO)	Eve Stoody (DFO Rep)

Scientific Question Refinement and Prioritization

Prioritized Scientific Questions: Dietary Patterns

- What is the relationship between dietary patterns consumed and:
  - growth, body composition, and risk of obesity (includes gestational weight gain and postpartum weight change)?
  - risk of cardiovascular disease?
  - risk of type 2 diabetes?
- What is the relationship between consumption of dietary patterns with varying amounts of ultra-processed foods and growth, body composition, and risk of obesity?
- What is the relationship between dietary patterns consumed and:
  - risk of certain types of cancer (breast, colorectal, prostate)?
  - ***Proposed by Subcommittee 1*:** risk of depression?
    - **Rationale:** Federal stakeholders and public comments expressed interest in relationship between diet and mental health outcomes, and new evidence is available in adults since the previous review was conducted by the 2015 DGAC
  - risk of cognitive decline, mild cognitive impairment, dementia, and Alzheimer's disease?
  - bone health?

Prioritized Scientific Questions: Specific Dietary Components

- What is the relationship between beverage consumption and growth, body composition, and risk of obesity?
  - **Beverage types prioritized for review:** Beverage patterns, dairy milk and milk alternatives, 100% juice, sugar-sweetened beverages, low- or no-calorie sweetened beverages, coffee and tea

- What is the relationship between beverage consumption and risk of type 2 diabetes?
  - **Beverage types prioritized for review:** Dairy milk and milk alternatives, 100% juice, sugar-sweetened beverages, low- or no-calorie sweetened beverages, coffee and tea

- What is the relationship between food sources of saturated fat consumed and risk of cardiovascular disease?

Questions Not Prioritized for Review

Question	Rationale for Not Prioritizing
Dietary patterns and risk of sarcopenia	Lack of research available to update the existing NESR review
Dietary patterns and all-cause mortality	The recent existing NESR review conducted by the 2020 DGAC had a conclusion statement graded as "strong" and the Subcommittee chose to prioritize other outcomes
Dietary patterns before/during pregnancy and lactation and developmental milestones	Lack of research available to update the existing NESR review
Dietary patterns and risk of lung cancer	Lack of research available to update the existing NESR review; challenges with smoking as a confounder
Food sources of added sugars and: growth, body composition, and risk of obesity; risk of type 2 diabetes	Lack of research available on food sources other than SSBs; SSBs will be addressed via beverages and complementary feeding questions
Water consumption and: growth, body composition and risk of obesity; risk of type 2 diabetes	Lack of research available; challenges with assessing water as an exposure Water will be included as a comparator across other beverage types examined
Beverage patterns and risk of type 2 diabetes	Lack of research available

Draft Protocols

DietaryGuidelines.gov

Draft Protocols for Committee Review

- Dietary patterns and:
  - Growth, body composition, and risk of obesity
  - Risk of cardiovascular disease
  - Risk of type 2 diabetes
  - Risk of certain types of cancer (breast, colorectal, prostate)
  - Risk of depression
- Dietary patterns with varying amounts of ultra-processed foods and growth, body composition, and risk of obesity
- Beverages and:
  - Growth, body composition, and risk of obesity
  - Risk of type 2 diabetes

Protocols presented today will be available at DietaryGuidelines.gov later this month.

Standard Inclusion/Exclusion Criteria

- All protocols presented today use standard criteria for:
  - Study design
  - Population: Study participants
  - Publication status
  - Language
  - Country
  - Population: Health Status

Key Definition: 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.

Inclusion/Exclusion Criteria: Dietary Patterns

Category	Inclusion Criteria	Exclusion Criteria
Intervention/ Exposure - Dietary Patterns	Studies that examine consumption of and/or adherence to a dietary pattern [i.e., 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], including, at a minimum, a description of the foods and beverages in the pattern. Multi-component intervention in which the isolated effect of the intervention of interest on the outcome(s) of interest is provided or can be determined despite multiple components	Studies that do not provide a description of the dietary pattern, which at minimum, must include the foods and beverages in the pattern (i.e., studies that examine a labeled dietary pattern, but do not describe the foods and beverages consumed) Multi-component intervention in which the isolated effect of the intervention of interest on the outcome(s) of interest is not provided or cannot be determined due to multiple components
Comparator	Consumption of and/or adherence to a different dietary pattern Different levels of consumption of and/or adherence to a dietary pattern	N/A

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

Approach: Update to Existing NESR Systematic Review

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 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)	

Inclusion/Exclusion Criteria: What is the relationship between dietary patterns consumed and **growth, body composition, and risk of obesity**?

Category	Inclusion Criteria	Exclusion Criteria
Publication Date	January 1980—Present	Before January 1980
Study Duration (not applied to pregnancy and postpartum studies)	Intervention length ≥12 weeks Follow-up duration ≥ 6 months for weight loss Follow-up duration ≥ 12 months for weight maintenance	Intervention length <12 weeks Follow-up duration < 6 months for weight loss Follow-up duration < 12 months for weight maintenance
Size of Study Groups (not applied to pregnancy and postpartum studies)	For intervention studies: • ≥30 participants per study group for between-subject analyses, • or a power calculation indicating that the study is appropriately powered for the outcome(s) of interest For observational studies: • Analytic sample size of ≥1000 participants (only for adults and older adults)	For intervention studies: • <30 participants per study group for between-subject analyses, • and no power calculation indicating that the study is appropriately powered for the outcome(s) of interest For observational studies: • Analytic sample size n<1000 (for adults and older adults)

Analytic Framework: What is the relationship between dietary patterns consumed and **risk of cardiovascular disease**?

Approach: Update to Existing NESR Systematic Review

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Infants and toddlers (Birth to 24 months) Children and adolescents (2 to 19 years) Adults and older adults (19 years and older)	Consumption of a dietary pattern	Different dietary pattern(s) Different adherence/ consumption levels to the same dietary pattern	In infants and toddlers, children and adolescents, adults and older adults: • LDL cholesterol • HDL cholesterol • Triglycerides • Hyperlipidemia • Blood pressure (systolic, diastolic) • Hypertension • CVD morbidity (e.g., myocardial infarction, coronary heart disease, coronary artery disease, congestive heart failure, peripheral artery disease) or combined CVD morbidity and mortality • Stroke • CVD-related mortality	•Sex •Age •Physical activity •Anthropometry •Race/ethnicity •Socioeconomic position •Smoking (adults, older adults) •Alcohol intake (adults, older adults)

Inclusion/Exclusion Criteria: What is the relationship between dietary patterns consumed and **risk of cardiovascular disease**?

Category	Inclusion Criteria	Exclusion Criteria
Publication Date	January 1980—Present	Before January 1980
Study Duration (not applied to pregnancy and postpartum studies)	Intervention length ≥12 weeks	Intervention length <12 weeks
Size of Study Groups (not applied to pregnancy and postpartum studies)	For intervention studies: • ≥30 participants per study group for between-subject analyses, • or a power calculation indicating that the study is appropriately powered for the outcome(s) of interest For observational studies: • Analytic sample size of ≥1000 participants (only for adults and older adults)	For intervention studies: • <30 participants per study group for between-subject analyses, • and no power calculation indicating that the study is appropriately powered for the outcome(s) of interest For observational studies: • Analytic sample size n<1000 (for adults and older adults)

Analytic Framework: What is the relationship between dietary patterns consumed and **risk of type 2 diabetes**?

Approach: Update to Existing NESR Systematic Review

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Infants and toddlers (Birth to 24 months) Children and adolescents (2 to 19 years) Adults and older adults (19 years and older)	Consumption of a dietary pattern	Different dietary pattern(s) Different adherence/ consumption levels to the same dietary pattern	In infants and toddlers: • Fasting blood glucose • Fasting insulin • Glucose tolerance/insulin resistance • HbA1C In children and adolescents: • Fasting blood glucose • Fasting insulin • Glucose tolerance/insulin resistance • HbA1C • Prediabetes • Type 2 diabetes In adults and older adults: • HbA1C • Prediabetes • Type 2 diabetes	• Sex • Age • Physical activity • Anthropometry • Socioeconomic position • Race/ethnicity • Family history of diabetes • Smoking (adults, older adults) • Alcohol intake (adults, older adults)

Inclusion/Exclusion Criteria: What is the relationship between dietary patterns consumed and **risk of type 2 diabetes**?

Category	Inclusion Criteria	Exclusion Criteria
Publication Date	January 1980—Present	Before January 1980
Study Duration	Intervention length ≥12 weeks	Intervention length <12 weeks
Size of Study Groups	For intervention studies: • ≥30 participants per study group for between-subject analyses, • or a power calculation indicating that the study is appropriately powered for the outcome(s) of interest For observational studies: • Analytic sample size of ≥1000 participants (only for adults and older adults)	For intervention studies: • <30 participants per study group for between-subject analyses, • and no power calculation indicating that the study is appropriately powered for the outcome(s) of interest For observational studies: • Analytic sample size n<1000 (for adults and older adults)

Committee Discussion

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Analytic Framework: What is the relationship between dietary patterns consumed and **risk of breast cancer**?

Approach: Update to Existing NESR Systematic Review

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	Incident cases of breast cancer (in infants; toddlers; children; adolescents; adults; older adults)	Sex Age Physical activity Race/ethnicity Socioeconomic position Smoking (adults, older adults) Alcohol intake (adults, older adults) Anthropometry **Screening for breast cancer** **Postmenopausal hormone therapy**
Children and adolescents (2 to 19 years)				
Adults and older adults (19 years and older)				

Analytic Framework: What is the relationship between dietary patterns consumed and **risk of colorectal cancer**?

Approach: Update to Existing NESR Systematic Review

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	Incident cases of colorectal cancer (in infants; toddlers; children; adolescents; adults; older adults)	Sex Age Physical activity Race/ethnicity Socioeconomic position Smoking (adults, older adults) Alcohol intake (adults, older adults) Anthropometry **Screening for colorectal cancer**
Children and adolescents (2 to 19 years)				
Adults and older adults (19 years and older)				

Analytic Framework: What is the relationship between dietary patterns consumed and **risk of prostate cancer?**

Approach: Update to Existing NESR Systematic Review

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	Incident cases of prostate cancer (in infants; toddlers; children; adolescents; adults; older adults)	Age Physical activity Race/ethnicity Socioeconomic position Smoking (adults, older adults) Alcohol intake (adults, older adults) Anthropometry **Screening for prostate cancer**
Children and adolescents (2 to 19 years)				
Adults and older adults (19 years and older)				

Inclusion/Exclusion Criteria: What is the relationship between dietary patterns consumed and **risk of certain types of cancer**?

Category	Inclusion Criteria	Exclusion Criteria
Publication Date	January 2000—Present	Before January 2000
Study Duration	Intervention length ≥12 weeks	Intervention length <12 weeks

Analytic Framework: What is the relationship between dietary patterns consumed[3] and **risk of depression**?

Approach: Update to Existing NESR Systematic Review

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Adults and older adults (19 years and older, including individuals during pregnancy)	Consumption of a dietary pattern	Different dietary pattern(s) Different adherence/ consumption levels to the same dietary pattern	• Depression (in adults & older adults) • Postpartum depression (during postpartum)	Sex Age Physical activity Race/ethnicity Socioeconomic status Smoking (adults, older adults, pregnancy) Alcohol intake (adults, older adults) Anthropometry **History of depressive symptoms**

Inclusion/Exclusion Criteria: What is the relationship between dietary patterns consumed and **risk of depression**?

Category	Inclusion Criteria	Exclusion Criteria
Publication Date	January 1980-present	Before January 1980
Study Duration (not applied to pregnancy and postpartum studies)	Intervention length ≥12 weeks	Intervention length <12 weeks
Size of Study Groups (not applied to pregnancy and postpartum studies)	For intervention studies: • ≥30 participants per study group for between-subject analyses, • or a power calculation indicating that the study is appropriately powered for the outcome(s) of interest	For intervention studies: • <30 participants per study group for between-subject analyses, • and no power calculation indicating that the study is appropriately powered for the outcome(s) of interest

Analytic Framework: What is the relationship between dietary patterns **with varying amounts of ultra-processed foods** and **growth, body composition, and risk of obesity**?

Approach: New NESR Systematic Review

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Infants and toddlers (Birth to 24 months)	Consumption of a dietary pattern **with varying amounts of ultra-processed food (UPF)**	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 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)	

Inclusion/Exclusion Criteria: What is the relationship between dietary patterns **with varying amounts of ultra-processed foods** and **growth, body composition, and risk of obesity**?

Category	Inclusion Criteria	Exclusion Criteria
Publication Date	January 2000—Present	Before January 2000
Intervention/ Exposure - Dietary Patterns with varying amounts of ultra-processed foods	Studies that examine consumption of and/or adherence to a dietary pattern [i.e., 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], *with varying amounts of ultra-processed foods,* including, at a minimum, a description of the foods and beverages in the pattern. Multi-component intervention in which the isolated effect of the intervention of interest on the outcome(s) of interest is provided or can be determined despite multiple components	Studies that do not provide a description of the dietary pattern, which at minimum, must include the foods and beverages in the pattern (i.e., studies that examine a labeled dietary pattern, but do not describe the foods and beverages consumed) Multi-component intervention in which the isolated effect of the intervention of interest on the outcome(s) of interest is not provided or cannot be determined due to multiple components
Study Duration	Intervention length ≥12 weeks Follow-up duration ≥ 6 months for weight loss Follow-up duration ≥ 12 months for weight maintenance	Intervention length <12 weeks Follow-up duration < 6 months for weight loss Follow-up duration < 12 months for weight maintenance
Size of Study Groups (not applied to pregnancy and postpartum studies)	For intervention studies: • ≥30 participants per study group for between-subject analyses, • or a power calculation indicating that the study is appropriately powered for the outcome(s) of interest For observational studies: • Analytic sample size of ≥1000 participants (only for adults and older adults)	For intervention studies: • <30 participants per study group for between-subject analyses, • and no power calculation indicating that the study is appropriately powered for the outcome(s) of interest For observational studies: • Analytic sample size n<1000 (for adults and older adults)

Committee Discussion

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Key Definition: Beverages

- **Beverage patterns:** the quantities, proportions, variety, or combination of different beverages in diets, and the frequency with which they are habitually consumed.

Inclusion/Exclusion Criteria: Beverages Intervention/Exposure

Category	Inclusion Criteria	Exclusion Criteria
Intervention/ Exposure: Beverage Consumption	Consumption of a beverage pattern Individual beverage consumption • Dairy milk and milk alternatives • 100% juice • Low- or no-calorie sweetened beverage (LNCSB) • Sugar-sweetened beverage (SSB) • Coffee and/or tea	Infant milk, infant formula, toddler formula/milks Other beverage types, including nutritional beverages (e.g., protein shakes, smoothies) Studies focusing on specific nutrients added to beverages instead of a beverage as a whole (i.e., studies where beverages are the delivery mechanism for a nutrient) Beverages that are not commercially available (e.g., experimentally manipulated beverages) Supplements Alcohol Soups

Inclusion/Exclusion Criteria: Beverages Intervention/Exposure

Category	Inclusion Criteria	Exclusion Criteria
Comparator	Beverage Patterns: • Consumption of or adherence to a different beverage pattern • Different levels of consumption of or adherence to a beverage pattern All Beverage Types: • Consumption of a different amount of [beverage type] (including no consumption and versions diluted with water) • [Beverage type] vs. water Specific Comparisons: • Dairy milk and milk alternatives with different amounts of fat and/or sweetener • Coffee and/or tea with different amounts of fat and/or sweetener • 100% juice vs. solid • SSB vs. low- or no-calorie sweetened beverages	• No comparator

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

Approach: New NESR Systematic Review

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)	

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

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Children and adolescents (2 to 19 years)	Dairy milk and milk alternative consumption	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	**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)	

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

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)	

Analytic Framework: What is the relationship between **sugar-sweetened beverage** consumption and **growth, body composition, and risk of obesity**?

Approach: Update to Existing NESR Systematic Review

<table>
<tr><th>Population</th><th>Intervention/ Exposure</th><th>Comparator</th><th colspan="2">Outcome</th><th>Key Confounders</th></tr>
<tr><td>Infants and toddlers (Birth up to 2 years)</td><td rowspan="4">Sugar-sweetened beverage (SSB) consumption</td><td rowspan="4">Consumption of a different amount of SSB (including no consumption and versions diluted with water)

SSB vs. water

SSB vs. low- or no-calorie sweetened beverages</td><td>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)</td><td>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="4">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</td></tr>
<tr><td>Children and adolescents (2 to 19 years)</td></tr>
<tr><td>Adults and older adults (19 years and older)</td><td colspan="2">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 colspan="2">Pregnancy and Postpartum-related Weight Change:
• Gestational weight gain (during pregnancy)
• Postpartum weight change (during postpartum)</td></tr>
</table>

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

Approach: Update to Existing NESR Systematic Review

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)	

Analytic Framework: What is the relationship between **coffee and/or tea** consumption and **growth, body composition, and risk of obesity**? [86]

Approach: New NESR Systematic Review

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Children and adolescents (2 to 19 years)	Coffee and/or tea consumption	Consumption of a different amount of coffee and/or tea (including no consumption and versions diluted with water) Coffee and/or tea with varying levels of fat or sweetener Coffee and/or tea 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)	

Inclusion/Exclusion Criteria: What is the relationship between **beverage consumption** and **growth, body composition, and risk of obesity?**

Category	Inclusion Criteria	Exclusion Criteria
Publication Date	January 2000—Present	Before January 2000
Study Duration	• Intervention length ≥12 weeks • Follow-up length ≥6 months from baseline for weight loss • Follow-up length ≥12 months from baseline for weight maintenance	• Intervention length <12 weeks • Follow-up length <6 months from baseline for weight loss • Follow-up length <12 months from baseline for weight maintenance

Analytic Framework: What is the relationship between **dairy milk and milk alternative** consumption and **risk of type 2 diabetes**?

Approach: New NESR Systematic Review

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Infants and toddlers (birth up to 24 months) Children and adolescents (2 to 19 years) Adults and older adults (19 years and older)	Dairy milk and milk alternative consumption	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	In infants and toddlers, children and adolescents, adults and older adults: • Fasting blood glucose • Fasting insulin • Glucose tolerance/insulin resistance • Hemoglobin A1C • Prediabetes • Type 2 diabetes	Sex Age Race/ethnicity Socioeconomic position Anthropometry Physical activity **Family history of diabetes** Smoking (adults, older adults) **Alcohol intake** (adults, older adults)

Analytic Framework: What is the relationship between **100% juice** consumption and **risk of type 2 diabetes**?

Approach: New NESR Systematic Review

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Infants and toddlers (birth up to 24 months)	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	In infants and toddlers, children and adolescents, adults and older adults: • Fasting blood glucose • Fasting insulin • Glucose tolerance/insulin resistance • Hemoglobin A1C • Prediabetes • Type 2 diabetes	Sex Age Race/ethnicity Socioeconomic position Anthropometry Physical activity Family history of diabetes Smoking (adults, older adults) Alcohol intake (adults, older adults)
Children and adolescents (2 to 19 years)				
Adults and older adults (19 years and older)				

Analytic Framework: What is the relationship between **sugar-sweetened beverage** consumption and **risk of type 2 diabetes**?

Approach: New NESR Systematic Review

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Infants and toddlers (birth up to 24 months)	Sugar-sweetened beverage (SSB) consumption	Consumption of a different amount of SSB (including no consumption and versions diluted with water) SSB vs. water SSB vs. low- or no-calorie sweetened beverages	In infants and toddlers, children and adolescents, adults and older adults: • Fasting blood glucose • Fasting insulin • Glucose tolerance/insulin resistance • Hemoglobin A1C • Prediabetes • Type 2 diabetes	Sex Age Race/ethnicity Socioeconomic position Anthropometry Physical activity Family history of diabetes Smoking (adults, older adults) Alcohol intake (adults, older adults)
Children and adolescents (2 to 19 years)				
Adults and older adults (19 years and older)				

Analytic Framework: What is the relationship between **low- or no-calorie sweetened beverage** consumption and **risk of type 2 diabetes**?

Approach: New NESR Systematic Review

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Infants and toddlers (birth up to 24 months)	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	In infants and toddlers, children and adolescents, adults and older adults: • Fasting blood glucose • Fasting insulin • Glucose tolerance/insulin resistance • Hemoglobin A1C • Prediabetes • Type 2 diabetes	Sex Age Race/ethnicity Socioeconomic position Anthropometry Physical activity Family history of diabetes Smoking (adults, older adults) Alcohol intake (adults, older adults)
Children and adolescents (2 to 19 years)				
Adults and older adults (19 years and older)				

Analytic Framework: What is the relationship between **coffee and/or tea** consumption and **risk of type 2 diabetes**?

Approach: New NESR Systematic Review

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Infants and toddlers (birth up to 24 months)	Coffee and/or tea consumption	Consumption of a different amount of coffee and/or tea (including no consumption and versions diluted with water) Coffee and/or tea with varying levels of fat or sweetener Coffee and/or tea vs. water	In infants and toddlers, children and adolescents, adults and older adults: • Fasting blood glucose • Fasting insulin • Glucose tolerance/insulin resistance • Hemoglobin A1C • Prediabetes • Type 2 diabetes	Sex Age Race/ethnicity Socioeconomic position Anthropometry Physical activity Family history of diabetes Smoking (adults, older adults) Alcohol intake (adults, older adults)
Children and adolescents (2 to 19 years)				
Adults and older adults (19 years and older)				

Inclusion/Exclusion Criteria: What is the relationship between **beverage consumption** and **risk of type 2 diabetes**?

Category	Inclusion Criteria	Exclusion Criteria
Publication Date	January 2000—Present	Before January 2000
Study Duration	Intervention length ≥12 weeks for hemoglobin A1C, prediabetes, and type 2 diabetes Intervention length ≥4 weeks for fasting blood glucose, fasting insulin, and glucose tolerance/insulin resistance	Intervention length <12 weeks for hemoglobin A1C, prediabetes, and type 2 diabetes Intervention length <4 weeks for fasting blood glucose, fasting insulin, and glucose tolerance/insulin resistance

Next Steps

- Develop protocols for the questions:
  - Dietary patterns and:
    - Risk of cognitive decline, mild cognitive impairment, dementia, and Alzheimer's disease
    - Bone health
  - Food sources of saturated fat and risk of cardiovascular disease

- Refine and implement protocols for the questions:
  - Dietary patterns and:
    - Growth, body composition, and risk of obesity
    - Risk of cardiovascular disease
    - Risk of type 2 diabetes
    - Risk of certain types of cancer (breast, colorectal, prostate)
    - Risk of depression
  - Dietary patterns with varying amounts of ultra-processed foods and growth, body composition, and risk of obesity
  - Beverages and:
    - Growth, body composition, and risk of obesity
    - Risk of type 2 diabetes

Committee Discussion

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Meeting Break

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Subcommittee 2: Diet in Pregnancy and Birth through Adolescence

Subcommittee Chair: Jennifer Orlet Fisher, PhD

Additional Presenter: Andrea Deierlein, PhD, MPH, MS

May 10, 2023

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

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Tessa Lasswell	Kelley Scanlon
Emily Madan	Colleen Sideck
Shabnam Momin	Nancy Terry
Janet de Jesus (DFO)	Eve Stoody (DFO rep)

Scientific Question Refinement and Prioritization

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Proposed Scientific Questions: Pregnancy

- What is the relationship between dietary patterns consumed during pregnancy and
  - Risk of hypertensive disorders of pregnancy?
  - Risk of gestational diabetes mellitus?
  - Gestational age at birth?
  - Birth weight?

Prioritized Scientific Questions: Birth through Adolescence

- What is the relationship between
  - Complementary feeding and growth, body composition, and risk of obesity?
  - Repeated exposure to foods and food acceptance?
  - 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 better aligned with *the Dietary Guidelines for Americans*?

Question Not Prioritized for Review

Question	Rationale for Not Prioritizing
Complementary feeding and iron and zinc status	Lack of research available to update the existing NESR review

Draft Protocols

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Draft Protocols for Committee Review

- Dietary patterns during pregnancy and:
  - Risk of gestational diabetes
  - Risk of hypertensive disorders of pregnancy
  - Gestational age at birth
  - Birth weight
- Complementary feeding and growth, body composition, and risk of obesity
- Repeated exposures to food and food acceptance
- 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**

Protocols presented today will be available at DietaryGuidelines.gov later this month.

Standard Inclusion/Exclusion Criteria

- All protocols presented today use standard criteria for:
  - Study design
  - Population: Health status
  - Population: Study participants
  - Publication status
  - Language
  - Country

Dietary Patterns During Pregnancy

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Key Definition: 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.

Inclusion/Exclusion Criteria: Dietary Patterns

Category	Inclusion Criteria	Exclusion Criteria
Intervention/ Exposure - Dietary Patterns	• Studies that examine consumption of and/or adherence to a dietary pattern [i.e., 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], including, at a minimum, a description of the foods and beverages in the pattern. • Dietary patterns may be measured or derived using a variety of approaches, such as adherence to a priori patterns (indices/scores), data driven patterns (factor or cluster analysis), reduced rank regression, or other methods, including clinical trials • Multi-component intervention in which the isolated effect of the intervention of interest on the outcome(s) of interest is provided or can be determined despite multiple components	• Studies that do not provide a description of the dietary pattern, which at minimum, must include the foods and beverages in the pattern (i.e., studies that examine a labeled dietary pattern, but do not describe the foods and beverages consumed) • Multi-component intervention in which the isolated effect of the intervention of interest on the outcome(s) of interest is not provided or cannot be determined due to multiple components
Comparator	• Consumption of and/or adherence to a different dietary pattern • Different levels of consumption of and/or adherence to a dietary pattern	• N/A

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

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/ethnicity • Socioeconomic position • Anthropometry (pre-pregnancy BMI) • Smoking • Parity • Diabetes mellitus in the current pregnancy • History of hypertensive disorders of pregnancy

Analytic Framework: What is the relationship between dietary patterns consumed during pregnancy and risk of gestational diabetes mellitus?

Approach: Update to Existing NESR Systematic Review

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: • Hemoglobin A1C • Fasting blood glucose • Glucose tolerance/insulin resistance • Gestational diabetes mellitus	• Age • Race/ethnicity • Socioeconomic position • Anthropometry (pre-pregnancy BMI) • Smoking • Parity • History of gestational diabetes mellitus

Analytic Framework: What is the relationship between dietary patterns consumed during pregnancy and gestational age at birth?

Approach: Update to Existing NESR Systematic Review

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 infants at birth: • Gestational age at birth	• Age • Race/ethnicity • Socioeconomic position • Anthropometry (pre-pregnancy BMI) • Smoking • Parity • Diabetes mellitus in the current pregnancy • Hypertensive disorders in the current pregnancy

Analytic Framework: What is the relationship between dietary patterns consumed during pregnancy and birth weight?

Approach: Update to Existing NESR Systematic Review

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: • Intrauterine growth restriction (IUGR) In infants at birth: • Birth weight	• Age • Race/ethnicity • Socioeconomic position • Anthropometry (pre-pregnancy BMI) • Smoking • Parity • Diabetes mellitus in the current pregnancy • Hypertensive disorders in the current pregnancy

Inclusion/Exclusion Criteria: Dietary patterns consumed during pregnancy

Category	Inclusion Criteria	Exclusion Criteria
Publication Date	• January 1980 – Present	• Before January 1980
Population: Life stage	At intervention or exposure and outcome: • Individuals during pregnancy	At intervention or exposure and outcome: • Individuals before pregnancy • Individuals during postpartum

Population: Health Status	• Studies that exclusively enroll participants not diagnosed with a disease
	• Studies that enroll some participants:
	  • diagnosed with a disease;
	  • and/or with the outcome of interest
		• Studies that exclusively enroll participants:
		  • diagnosed with a disease;
		  • with the outcome of interest (i.e., studies that aim to treat participants who have already been diagnosed with the outcome of interest);
		  • who became pregnant using Assisted Reproductive Technologies;
		  • with multiple gestation pregnancies;
		  • and/or hospitalized for an illness, injury, or surgery;

Population: Analytic approach	• Studies that enroll both singleton and multiple gestation pregnancies and present uncombined findings	• Studies that enroll both singleton and multiple gestation pregnancies and only present aggregate findings

Committee Discussion

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Complementary Feeding

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Key Definitions: Complementary Feeding and Foods and Beverages

- **Complementary Feeding:** The process that starts when human milk or infant formula is complemented by other foods and beverages. The complementary feeding period typically continues to 24 months as the young child transitions to family foods.
- **Complementary Foods and Beverages:** Foods and beverages (liquids, semisolids, and solids) other than human milk or infant formula provided to an infant or young child to provide nutrients and energy

Analytic Framework: What is the relationship between complementary feeding and growth, body composition, and risk of obesity?

Approach: Update to Existing NESR Systematic Review

Population	Intervention/Exposure	Comparator	Outcome	Key Confounders
Infants and toddlers (birth up to 24 months)	Timing of the first introduction of *any* complementary food or beverage (CFB)	Different timing of the first introduction of *any* CFB	**Growth** (in infants and toddlers, children and 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 and toddlers, children and adolescents, adults and older adults): • Skinfold thickness • Fat mass, ectopic fat • Fat-free, lean mass • Waist circumference, waist-to-hip ratio **Risk of obesity** (in children and adolescents, adults and older adults): • BMI • Overweight and obesity • Underweight • Normal/healthy weight	• Socioeconomic position • Sex • Maternal age • Race/ethnicity • Milk feeding practices (human milk, infant formula, or both) • Baseline anthropometry • Gestational age
	Timing of the first introduction of a *specific type* of CFB: • Fruit, including 100% fruit juice • Vegetables • Grains • Protein foods • Dairy, including fluid cow's milk • Food/beverage sources of added sugars • Other CFB	Different timing of the first introduction of a *specific type* of CFB		
	Types and amounts of CFB: • Fruit, including 100% fruit juice • Vegetables • Grains • Protein foods • Dairy, including fluid cow's milk • Food/beverage sources of added sugars • Other CFB	Different amount of the same CFB Different type of CFB		

Inclusion/Exclusion Criteria: What is the relationship between complementary feeding and growth, body composition, and risk of obesity?

Category	Inclusion Criteria	Exclusion Criteria

Intervention/ Exposure	• Timing of the first introduction of *any* complementary food or beverage (CFB)
	• Timing of the first introduction of a *specific type* of CFB
	• Types and amounts of CFB
		• Isolated consumption of human milk, infant formulas (e.g., milk-based, soy, partially hydrolyzed, extensive-hydrolyzed, amino acid based), or vitamin and mineral supplements (e.g., iron drops)
		• For timing of the first introduction of a specific type of CFB and types and amounts of CFB
		  • Dietary patterns
		  • Type and/or amount of food or beverage not described

Comparator	• Different timing of the first introduction of *any* CFB
	• Different timing of the first introduction of a *specific type* of CFB
	• Different types and amounts of CFB
	  • Consumption of a different amount of the same CFB
	  • Consumption of a different type of CFB
		• No comparator

Inclusion/Exclusion Criteria: What is the relationship between complementary feeding and growth, body composition, and risk of obesity? (continued)

Category	Inclusion Criteria	Exclusion Criteria
Publication Date	• January 1980 – Present	• Before January 1980

Population: Life stage	• At intervention or exposure:
	  • Infants and toddlers (birth up to 24 months)
	• At outcome:
	  • Infants and toddlers (birth up to 24 months)
	  • Children and adolescents (2 up to 19 years)
	  • Adults and older adults (19 years and older)
		• At intervention or exposure:
		  • Children and adolescents (2 up to 19 years)
		  • Adults and older adults (19 years and older)

Repeated Exposures

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Key Definitions: Repeated Exposure to Foods and Food Acceptance

- **Repeated exposure:** child is exposed to a target food/food-type multiple times. Includes number, duration, and frequency

- **Taste exposure:** taste exposure to the target food.

- **Non-taste exposure:** Sensory exposure to the target food without tasting. Non-taste sensory exposure includes smell, tactile and visual exposure. Visual exposure could include looking at target food or a picture of a target food.

Analytic Framework: What is the relationship between repeated exposure to foods and food acceptance?

Approach: Update to Existing NESR Systematic Review

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Infants and toddlers (Birth to 24 months) Young children (2 up to 6 years) School-aged children (6 up to 12 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	In infants and toddlers, young children, and school-aged children Food acceptance of the exposed food • 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/ethnicity • Socioeconomic position

Inclusion/Exclusion Criteria: What is the relationship between repeated exposure to foods and food acceptance?

Category	Inclusion Criteria	Exclusion Criteria

Intervention/ Exposure	• Repeated exposure to target food(s): child is exposed to a target food/food-type multiple times
	• Repeated exposure may address:
	  • Number of exposures: times target food is exposed
	  • Duration of exposure period
	  • Frequency or number of exposure (per unit of time; per day, per week etc.)
	  • Type of repeated exposure:
	  • Taste and non-taste sensory exposure (smell, tactile, visual)
	  • Single food: A single target food is presented during each exposure period
	  • Multiple foods: More than one target food is presented during exposure period
	  • A single target food is presented within an exposure session; the target food may differ from session to session
	  • Child is exposed to multiple target foods within each exposure session
	• Multi-component interventions in which the isolated effect of repeated food exposure on food acceptance is provided or can be determined despite multiple components
		• Multi-component intervention in which the isolated effect of repeated food exposure on food acceptance is not provided or cannot be determined due to multiple components
		• Food or flavor exposure in utero or via breastmilk
		• Intervention assessing exposure to taste and flavor (e.g. salty, bitter, sweet) versus food
		• Nutrient intake (e.g., sodium)

Comparator	• Pre-exposure versus post-exposure (within-subject) • No exposure versus exposure (between subjects) • Taste exposure versus non-taste sensory exposure (between subjects)	• N/A

Inclusion/Exclusion Criteria: What is the relationship between repeated exposure to foods and food acceptance?

Category	Inclusion Criteria	Exclusion Criteria
Outcome	Acceptance of food as measured by • Amount of target or novel food consumed as measured by research staff or reported by caregiver • Length of feeding of target or novel food during infant-led feeding • Facial response (expressions made during feeding of target or novel food) • Caregiver or investigator's perception of infants' enjoyment of the target or novel food • Willingness to try/taste • Hedonic responses • Child's verbal indication of liking of food	• Acceptance to taste and flavor (e.g., sweet, salty etc.) versus food • Nutrient intake (e.g., sodium)
Publication Date	• Infants and toddlers: January 1980 - Present • Young children and school-aged children: January 2000 – Present	• Infants and toddlers: Before Jan 1980 • Young and school-aged children: Before Jan 2000
Population: Life Stages	At intervention/exposure • Infants and toddlers (birth up to 24 months) • Young children (2 up to 6 years) • School-aged children (6 up to 12 years) At outcome • Infants and toddlers (birth up to 24 months) • Children and adolescents (2 up to 19 years)	At intervention/exposure and outcome: • Adolescents (12 up to 19 years) (for intervention/exposure only) • Adults (19 years and older) • Older adults (65 years and older)

Parental and Caregiver Feeding Styles and Practices

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Key Definition: Parental and Caregiver Feeding Styles and Practices

- **Caregiver:** A parent or guardian who provides direct care to a child in the home setting (e.g., mother, father, grandparent, and guardian).

Feeding practices in infants and toddlers

- **Feeding practices:** the strategies or behaviors parents or caregivers use to direct child eating.
- **Responsive feeding** is characterized by caregiver guidance and recognition of the child's cues of hunger and satiety.
- **Non-responsive feeding** is dominated by a lack of reciprocity between the parent and child, with the caregiver taking excessive control of the feeding situation (forcing/pressuring or restricting food intake), the child completely controlling the feeding situation (indulgent feeding), or the caregiver being completely uninvolved during meals (uninvolved feeding/ laissez-faire), using feeding as a default first response to infant distress (feeding to soothe).

Key Definitions: Caregiver feeding styles and practices across developmental stages

- **Parental feeding styles:** reflect the overall attitude and emotional climate which characterize child eating occasions and reflect differences in parental demandingness and responsiveness. This includes authoritative, authoritarian, indulgent, and uninvolved feeding styles.

- **Food parenting/feeding practices:** goal-oriented food-specific behaviors or actions carried out by parents (intentional or unintentional) that affect their child's attitudes, behaviors, or beliefs. This includes coercive control, autonomy support, and structure.

Inclusion/Exclusion Criteria: Parental and Caregiver Feeding Styles and Practices [129]

Category	Inclusion Criteria	Exclusion Criteria
Intervention/ Exposure	• Measured parental or caregiver feeding style(s) or feeding practice(s) that include responsive and non-responsive feeding practices (in infants and toddlers) assessed using objective (observations) or subjective (self-reported questionnaire) or ecological momentary assessment methods • Multi-component interventions which isolated effect or association of caregiver feeding style(s) or practice(s) on growth, body composition or risk of obesity.	• Childcare and school-based interventions/exposures • Multi-component interventions in which the isolated effect of caregiver feeding style(s) and practice(s) on the growth, body composition and risk of obesity is not provided or cannot be determined due to multiple components
Comparator	• Different degrees of caregiver and parental feeding style(s) and practice(s) including responsive and non-responsive feeding (in infants and toddlers), • Different caregiver and parental feeding style(s) or practice(s) (feeding practices) including responsive/non-responsive feeding in infants and toddlers	• N/A

Analytic Framework: What is the relationship between parental and caregiver feeding styles and practices during childhood and adolescents and growth, body composition, and risk of obesity?

Approach: Update to Existing NESR Systematic Review

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders
Infants and toddlers (Birth to 24 months) Young children (2 up to 6 years) School-aged children (6 up to 12 years) Adolescents (12 up to 19 years)	Parental and caregiver feeding style(s) and practice(s)	Different degree of parental and caregiver feeding style(s) and practice(s) Different parental and caregiver feeding style(s) and practice(s)	**Growth** *(infants, toddlers, children and 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*** *(infants, toddlers, children, and adolescents; adults and older adults)* • Skinfold thickness • Fat mass, ectopic fat • Fat-free mass, lean mass • Waist circumference, waist-to-hip ratio **Risk of obesity** *(children and adolescents; adults and older adults)* • BMI • Overweight and obesity • Underweight • Healthy/normal weight • Weight loss, maintenance, gain	•Socioeconomic position •Race/ethnicity •Child's anthropometry at baseline

Analytic Framework: What is the relationship between parental and caregiver feeding styles and practices during childhood and adolescence and consuming a dietary pattern that is more aligned with the *Dietary Guidelines for Americans*?

Approach: New NESR Systematic Review

Population	Intervention/ Exposure	Comparator	Outcome	Key Confounders

Toddlers (12 to 24 months)
Children and adolescents (2 to 19 years)
School-aged children (6 up to 12 years)
Adolescents (12 up to 19 years)
	Parental and caregiver feeding style(s) and practice(s)	Different degree of parental and caregiver feeding style(s) and practice(s)
		
		Different parental and caregiver feeding style(s) and practice(s)
			In toddlers, young children, school-aged children, adolescents, and adults and older adults
			• Diet quality as measured by the Healthy Eating Index (HEI), including versions jointly released by USDA and HHS starting in 2008 (HEI-2005, HEI-2010, and HEI-2015)
			• Dietary intake of
			  ○ Fruit and vegetables
			  ▪ Fruit
			  ▪ Vegetables
			  ○ Whole grains
			  ○ Sugar-sweetened beverages (SSBs)
				• Socioeconomic position
				• Race/ethnicity
				• Baseline dietary intake for food components assessed as outcomes
				• Child's anthropometry

Inclusion/Exclusion Criteria: Parental and caregiver feeding styles and practices during childhood and adolescents and growth, body composition, and risk of obesity

Category	Inclusion Criteria	Exclusion Criteria
Publication Date	• Birth – 24 months: Jan 1980 – Present • Ages 2 up to 19 years: Jan 2000 – Present	• Birth – 24 months: Before Jan 1980 • Ages 2 up to 19 years: Before Jan 2000
Population: Life stage	At intervention or exposure: • Infants and toddlers (birth up to 24 months) • Children and adolescents (2 up to 19 years) At outcome: • Infants and toddlers (birth up to 24 months) • Children and adolescents (2 up to 19 years) • Adults and older adults (19 years and up)	At intervention or exposure: • Adults and older adults (19 years and up)

Inclusion/Exclusion Criteria: Parental and caregiver feeding styles and practices during childhood and adolescents and consuming a dietary pattern that is more aligned with the *Dietary Guidelines for Americans*

Category	Inclusion Criteria	Exclusion Criteria
Publication Date	• Jan 2000 - Present	• Before Jan 2000
Population: Life stage	At intervention or exposure: • Toddlers (1 up to 2 years) • Young children (2 up to 6 years) • School-aged children (6 up to 12 years) • Adolescents (12 up to 19 years) At outcome: • Toddlers (1 up to 2 years) • Children and adolescent (2 up to19 years) • Adults and older adults (19 years and older)	At intervention or exposure: • Infants (birth to 12 months) • Adults and older adults (19 years and older)

Next Steps

- Refine and implement protocols for the questions:
  - What is the relationship between dietary patterns consumed during pregnancy and
    - Risk of hypertensive disorders of pregnancy;
    - Risk of gestational diabetes mellitus;
    - Gestational age at birth; and
    - Birth weight?
  - What is the relationship between complementary feeding and growth, body composition, and risk of obesity?
  - What is the relationship between repeated exposure to foods and food acceptance?
  - What is the relationship between parental and caregiver feeding styles and practices during childhood and adolescence and:
    - Growth, body composition, and risk of obesity; and
    - Consuming a dietary pattern that is more aligned with the *Dietary Guidelines for Americans*?

Thank you!

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Committee Discussion

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Meeting Break

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Subcommittee 4: Strategies for Individuals and Families Related to Diet Quality and Weight Management

Subcommittee Chair: Cristina Palacios, PhD, MS

Additional Presenter: Cheryl Anderson, PhD, MPH, MS

May 10, 2023

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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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Scientific Question Refinement and Prioritization

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Proposed Scientific Questions

1. What is the relationship between timing of eating occasions (e.g., eating breakfast, limiting eating late in the day, snacking, intermittent fasting, time-restricted eating) and:
    - growth, size, body composition, risk of overweight and obesity, and weight loss and maintenance?
    - consuming a dietary pattern that is better aligned with the *Dietary Guidelines for Americans*?

2. What is the relationship between specific food-based strategies during adulthood and body composition, risk of overweight and obesity, and weight loss and maintenance?

Several timing of eating occasions and food-based strategies were considered by the subcommittee, and those selected best fit the prioritization criteria of relevance to the scope of the *Dietary Guidelines*, importance to public health concerns, potential impact to federal programs, avoiding duplication of other federal guidance, as well as research availability.

Prioritized Scientific Questions

1. What is the relationship between frequency of meals and/or snacking and:
   - growth, body composition, and risk of obesity?
   - consuming a dietary pattern that is better aligned with the *Dietary Guidelines for Americans*?
   - energy intake?

2. What is the relationship between portion size and:
   - growth, body composition, and risk of obesity?
   - energy intake?

- Other strategies being explored are:
  - Home food availability
  - Cultural and traditional foods

Draft Protocols

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Draft Protocols for Committee Review

- Frequency of meals and/or snacking and:
  - Growth, body composition, and risk of obesity
  - Consuming a dietary pattern that is better aligned with the *Dietary Guidelines for Americans*
  - Energy intake

- Portion size and:
  - Growth, body composition, and risk of obesity
  - Energy intake

Protocols presented today will be available at DietaryGuidelines.gov later this month.

Standard Inclusion/Exclusion Criteria

All protocols presented today use standard criteria for:

- Study design
- Publication date: January 2000 - Present
- Population: Study participants
- Population: Health status
- Intervention/Exposure: Multi-component interventions where the independent effect of the intervention of interest can be determined
- Publication status
- Language
- Country

Inclusion/Exclusion Criteria: Frequency of Meals and/or Snacking

Category	Inclusion Criteria	Exclusion Criteria
Intervention/ Exposure	Frequency of meals and/or snacking. Definitions will vary across studies and include occasion-based measures such as: • Breakfast • Snacking • Number of eating occasions	Studies that only examine frequency of intake of a single food, beverage or category of foods and/or beverages (e.g., frequency of cereal consumption, frequency of dairy consumption, frequency of snack foods)

Analytic Framework: What is the relationship between frequency of meals and/or snacking and growth, body composition, and risk of obesity?

Approach: New NESR Systematic Review

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	**Growth (in toddlers, children, and 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 toddlers, children, and adolescents; adults and 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 and adolescents; adults and older adults),** *list of outcomes as stated above* • BMI • Underweight • Normal weight • Overweight and/or obesity • Weight gain	• Sex • Age • Physical activity • Race/ethnicity • Socioeconomic position • Anthropometry at baseline • 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 and older adults),** *list of outcomes as stated above* **Risk of obesity (in adults and older adults),** *list of outcomes as stated above* • Weight loss and maintenance	
Individuals during pregnancy and postpartum			**Pregnancy and postpartum-related weight change:** • Gestational weight gain (during pregnancy) • Postpartum weight change (during postpartum)	

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

Inclusion/Exclusion Criteria: What is the relationship between frequency of meals and/or snacking and growth, body composition, and risk of obesity?

Category	Inclusion Criteria	Exclusion Criteria
Study Duration	• Intervention length ≥12 weeks • Follow-up duration ≥ 6 months for weight loss • Follow-up duration ≥ 12 months for weight maintenance	• Intervention length <12 weeks • Follow-up duration < 6 months for weight loss • Follow-up duration < 12 months for weight maintenance

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

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/ethnicity • Socioeconomic position • Diet quality at baseline • 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)				
Individuals during pregnancy and postpartum				

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

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

Approach: New NESR Systematic Review

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/ethnicity • Socioeconomic position • Anthropometry • 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)				
Individuals during pregnancy and postpartum				

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

Committee Discussion

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Portion Size Protocols: Key Definitions

- Portion size: the amount of food or beverage served at one time in one eating occasion
- Energy density: the amount of calories (energy) in a given weight of food

Analytic Framework: What is the relationship between portion size and growth, body composition, and risk of obesity?

Approach: New NESR Systematic Review

Population	Intervention/ Exposure*	Comparator	Outcome	Key Confounders
Toddlers, children, and adolescents (1 up to 19 years)	Portion size that considers energy density, nutrient density and/or the quality or type of food served or consumed Pre-portioned foods	Different portion size served or consumed	**Growth (in toddlers, children, and 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 toddlers, children, and adolescents; adults and 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 and adolescents; adults and older adults),** *list of outcomes as stated above* • BMI • Underweight • Normal weight • Overweight and/or obesity • Weight gain	• Sex • Age • Physical activity • Race/ethnicity • Socioeconomic position • Anthropometry at baseline • Smoking (adults, older adults) • 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 and older adults),** *list of outcomes as stated above* **Risk of obesity (in adults and older adults),** *list of outcomes as stated above* • Weight loss and maintenance	
Individuals during pregnancy and postpartum	*Liquid meal replacements will be excluded		**Pregnancy and postpartum-related weight change:** • Gestational weight gain (during pregnancy) • Postpartum weight change (during postpartum)	

Inclusion/Exclusion Criteria: What is the relationship between portion size and growth, body composition, and risk of obesity?

Category	Inclusion Criteria	Exclusion Criteria
Study Duration	• Intervention length ≥12 weeks • Follow-up duration ≥ 6 months for weight loss • Follow-up duration ≥ 12 months for weight maintenance	• Intervention length <12 weeks • Follow-up duration < 6 months for weight loss • Follow-up duration < 12 months for weight maintenance

Analytic Framework: What is the relationship between portion size and energy intake?

Approach: New NESR Systematic Review

Population	Intervention/ Exposure*	Comparator	Outcome	Key Confounders
Toddlers, children, and adolescents (1 up to 19 years)	Portion size that considers energy density, nutrient density and/or the quality or type of food served Pre-portioned foods	Different portion size served	Energy intake	• Sex • Age • Race/ethnicity • Socioeconomic position • Physical activity • Anthropometry • Smoking (adults, older adults) • 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)				
Individuals during pregnancy and postpartum	*Liquid meal replacements will be excluded			

Next Steps

- Continue discussions on home food availability and cultural and traditional foods

- Refine and implement the protocols discussed:
  - Frequency of meals and/or snacking and:
    - Growth, body composition, and risk of obesity
    - Consuming a dietary pattern that is better aligned with the *Dietary Guidelines for Americans*
    - Energy intake
  - Portion size and:
    - Growth, body composition, and risk of obesity
    - Energy intake

Committee Discussion

Thank you!

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Subcommittee 3: Food Pattern Modeling and Data Analysis

Subcommittee Chairs:

Chris Taylor, PhD, RDN, LD, FAND

Heather Eicher-Miller, PhD

May 10, 2023

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

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	Eve Stoody (DFO rep)

Approaches to Examine the Evidence

Systematic Review

A gold standard evidence synthesis project that answers a nutrition question of public health importance using systematic, transparent, rigorous, and protocol-driven methods to search for, evaluate, synthesize, and grade the strength of the eligible body of evidence.

Data Analysis

A collection of analyses that uses national data sets to describe the current health and dietary intakes of Americans. These data help make the *Dietary Guidelines* practical, relevant, and achievable.

Food Pattern Modeling

Food pattern modeling is a way to evaluate the impact of specific changes in amounts or types of foods and beverages in a dietary pattern on energy and nutrient needs while reflecting health-promoting patterns identified in systematic reviews. These food pattern modeling analyses inform USDA's development of relevant dietary patterns for the American population.

Data Analysis

A collection of analyses that uses national data sets to describe the current health and dietary intakes of Americans. These data help make the *Dietary Guidelines* practical, relevant, and achievable.

Data Analysis – Scientific Questions*

What are the current patterns of food and beverage intake?

What are the current intakes of food groups, nutrients, and dietary components?

Which nutrients and/or dietary components present a substantial public health concern because of underconsumption or overconsumption?

What is the current prevalence of nutrition-related chronic health conditions?

* Additional data analysis questions may be added to complement the Committee's scientific review.

Federal Data Sources

- National Health and Nutrition Examination Survey (NHANES)
- What We Eat in America, National Health and Nutrition Examination Survey (WWEIA, NHANES)*
  - USDA Food and Nutrient Database for Dietary Studies (FNDDS)
  - USDA Food Pattern Equivalents Database (FPED)
  - WWEIA Food Categories
- National Health Interview Survey (NHIS)
- Surveillance, Epidemiology and End Results (SEER)
- National Vital Statistics System (NVSS)
- National Immunization Surveys (NIS)

* WWEIA, NHANES 2017-2018 provides the most complete data available to the 2025 Committee.

Data Analysis Progress

- Analyses will be completed using updated data
- A formal data analysis plan is forthcoming
- Considerations will be made for incorporation of additional variables to the analyses
- Scan for dietary intake data during the COVID-19 pandemic
- Data analysis progress is ongoing with more to come, subcommittee focus has been on food pattern modeling protocols

Food Pattern Modeling

Food pattern modeling is a methodology used to illustrate how changes to the amounts or types of foods and beverages in a dietary pattern might affect meeting nutrient needs and to develop quantitative dietary patterns that reflect health-promoting patterns identified in systematic reviews and meet energy and nutrient needs.

Scientific Question Refinement and Prioritization

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Prioritized Scientific Question: Food Pattern Modeling

- Considering each life stage, should changes be made to the USDA Dietary Patterns (Healthy U.S.-Style, Healthy Mediterranean-Style, and/or Healthy Vegetarian), and should additional Dietary Patterns be developed/proposed based on:
  - Findings from systematic reviews, data analysis, and/or food pattern modeling analyses; and/or
  - Population norms (e.g., starchy vegetables are often consumed interchangeably with grains), preferences (e.g., emphasis on one staple grain versus another), or needs (e.g., lactose intolerance) of the diverse communities and cultural foodways within the U.S. population?

  Changes to Dietary Patterns may include:
  - increases or decreases in amounts of food groups/subgroups;
  - recategorization of food groups/subgroups;
  - subsequent changes to calories available for other uses, including for added sugars.

Prioritized Analysis Topics for Subcommittee

1 Questions/Analyses

Basis of Dietary Patterns

- Assessing the contribution of foods and beverages with lower nutrient-density to nutrient profiles
- Testing food group and subgroup quantity modifications

2 Questions/Analyses

Application of the Proposed Dietary Patterns

- Accommodating foods and beverages with lower nutrient-density
- Simulated diets

Prioritized Topic: Revised Nutrient Profiles

1 Questions/Analyses

Basis of Dietary Patterns

- Assessing the contribution of foods and beverages with lower nutrient-density to nutrient profiles

Protocol 1: Should foods and beverages with lower nutrient density (i.e., those with added sugars, saturated fat, and sodium) contribute to item clusters, representative foods, and therefore the nutrient profiles for each food group and subgroup used in modeling the USDA Dietary Patterns?

Prioritization of Protocols

1 Questions/Analyses

Basis of Dietary Patterns

- Testing food group and subgroup quantity modifications

Discussed Analysis Topics	Prioritized Order	Rationale
Ultra-processed foods	N/A	Limitations for classification within existing data; varying definitions of UPF
Food group and subgroup quantity modifications	Protocol 2	Identify potential pattern flexibilities
Staple carbohydrate foods	Protocol 3	Test flexibilities related to sources of carbohydrates with cultural relevance
Protein foods	Protocol 4	Test flexibility related to types and amounts of protein food sources
Dairy	Protocol 5	Test low or no dairy flexibility and feasibility of dairy alternatives
Vegan	Protocol 6	Assessment of nutrient adequacy
Low carbohydrate	Protocol 7	Assessment of nutrient adequacy

Prioritized Topic: Inclusion of Foods with Lower Nutrient Density

2 **Questions/Analyses**

Application of the Proposed Dietary Patterns

- Accommodating foods and beverages with lower **nutrient density**

Protocol 8: What quantities of foods and beverages lower in nutrient density can be accommodated in the USDA Dietary Patterns while meeting nutrient recommendations within calorie levels?

Prioritized Topics: Diet Simulations

2 **Questions/Analyses**

Application of the Proposed Dietary Patterns

- Simulated diets

Protocol 9: Do simulated diets that meet the updated USDA Dietary Patterns and reflect variation in dietary intakes achieve nutrient adequacy?

Presentation of Draft Protocol 1

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Draft of Protocol 1 for Committee Review

1 Phase 1 Analyses

Basis of Dietary Patterns

- Assessing the contribution of foods and beverages with lower **nutrient density** to nutrient profiles

Protocol 1: Should foods and beverages with lower nutrient density (i.e., those with added sugars, saturated fat, and sodium) contribute to item clusters, representative foods, and therefore the nutrient profiles for each food group and subgroup used in modeling the USDA Dietary Patterns?

Rationale for Question

Nutrient profiles are needed to estimate the nutrients represented by quantities of food groups and subgroups in a Food Pattern Modeling exercise and test for nutrient adequacy.

- The patterns the DGAC recommends to the Departments are intended to meet the DRIs for each life stage.

Current approach includes all foods or beverages to develop nutrient profiles.

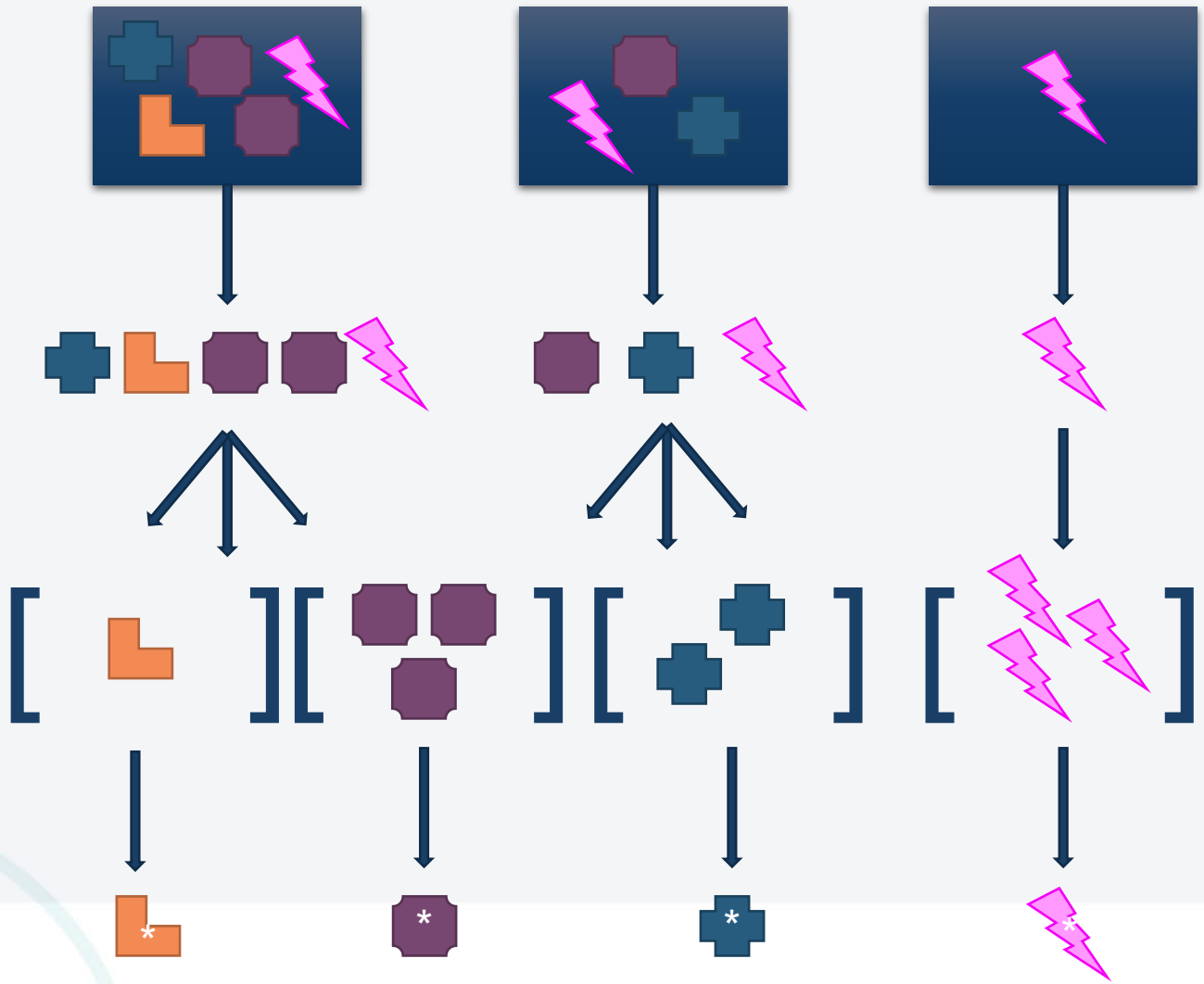
Testing a revised nutrient profile will focus on foods and beverages with higher nutrient density.

Creates a nutrient profile for optimizing the nutrient contributions of food groups, while limiting the contribution of calories, saturated fat, added sugars, and sodium.

Key Definitions

- **Nutrient Profiles:** The anticipated average nutrient composition for each food group and subgroup that could be obtained by eating a variety of foods in each food group in nutrient-dense forms. The nutrient profiles are based on a weighted average of nutrient-dense forms of foods. The weighted average calculation considers a range of American food choices, but in nutrient-dense forms and results in a food pattern that can be adapted to fit an individual's preferences.
- **Item Clusters:** Identified groupings of the same or similar foods or beverages within each food group and subgroup. Item clusters are used to calculate the weighted average consumption for use in calculating a nutrient profile for each food group and subgroup used in USDA Food Pattern Modeling.
- **Nutrient-Dense Representative Foods:** For the purpose of USDA's food pattern modeling, each item cluster is assigned a nutrient-dense representative food which are those foods or beverages that represent the forms with the least amounts of added sugars, sodium, and saturated fats. The nutrient composition of the nutrient-dense representative food is used to represent the nutrient composition of the entire item cluster when calculating the nutrient profile for a food group or subgroup.

Review: Nutrient Profile Development Steps



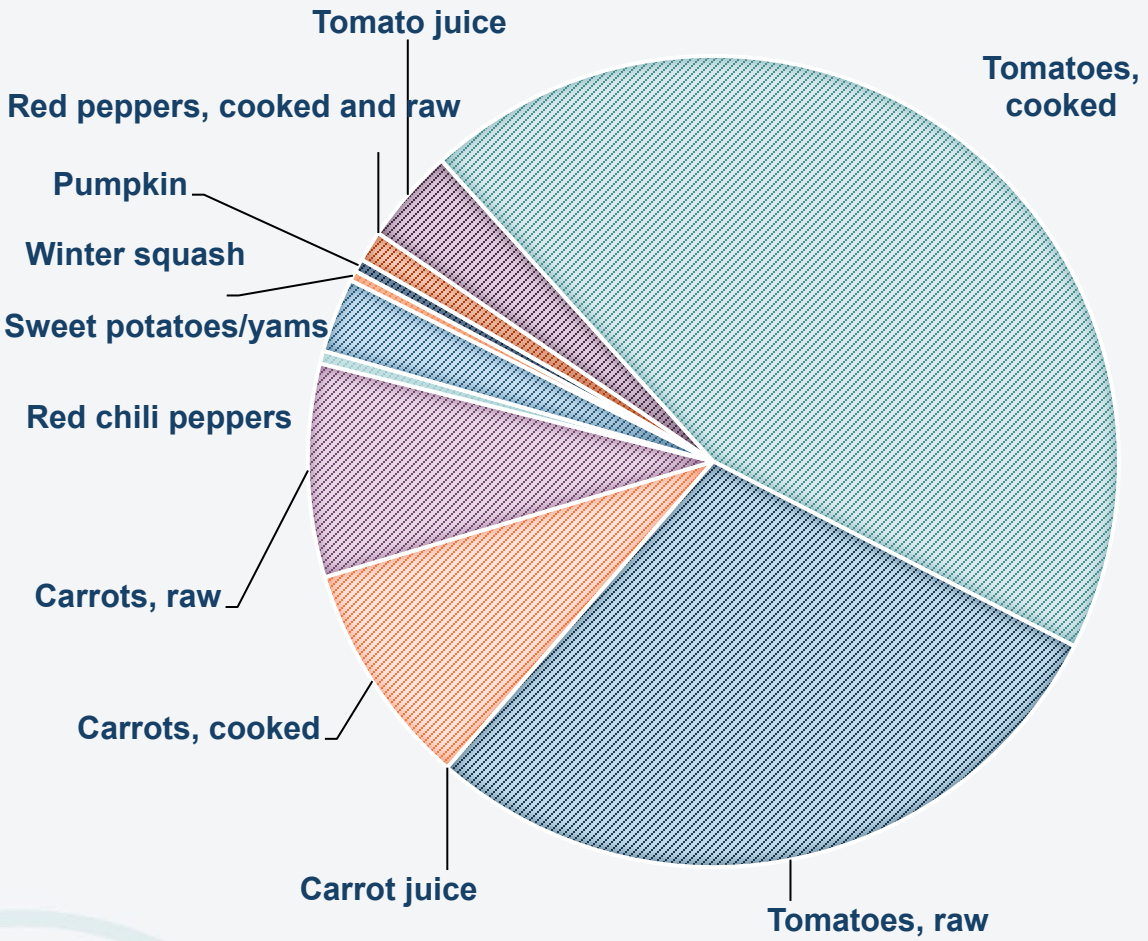
FOODS: All foods consumed from WWEIA, NHANES 2017-2018

INGREDIENTS: Foods disaggregated into ingredients contributing to each food group or subgroup

ITEM CLUSTERS: Ingredients aggregated into ~ 400 “item clusters”

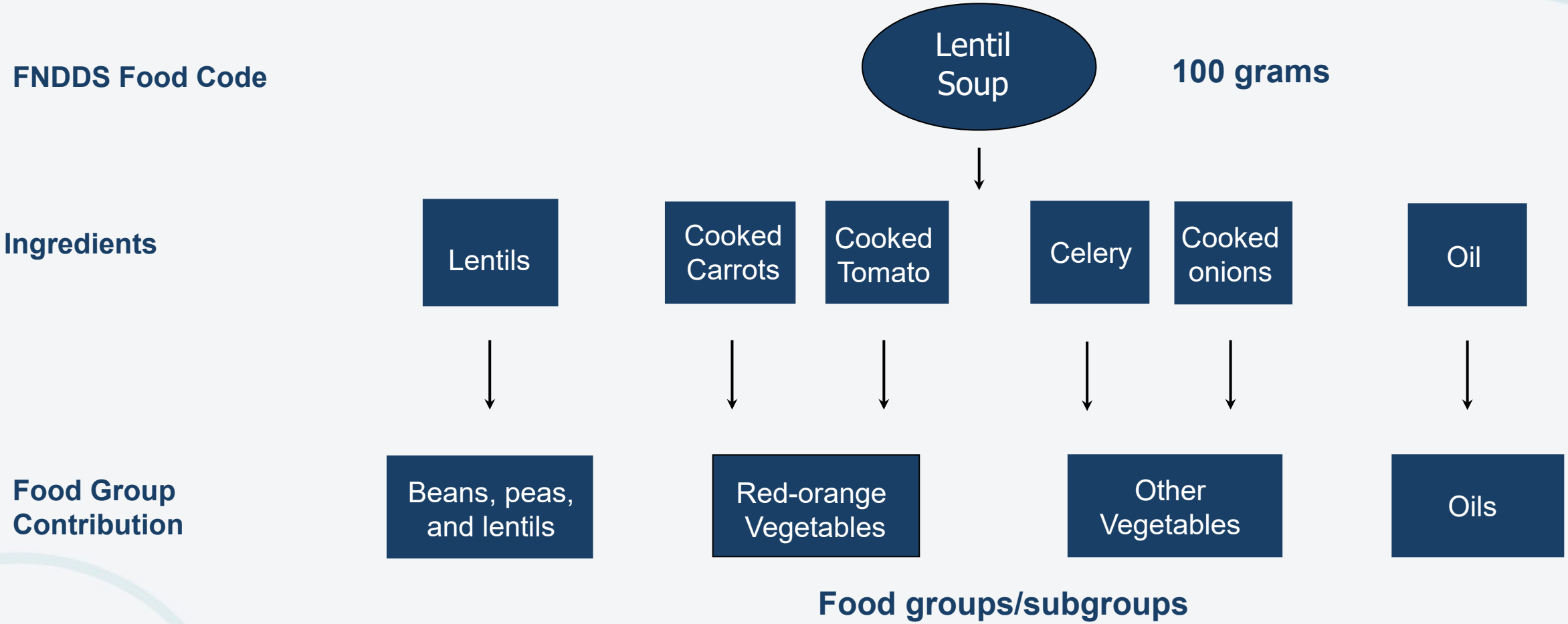
REPRESENTATIVE FOOD: For each item cluster, one *nutrient-dense* representative food is selected

Developing the Nutrient Profiles for Red/Orange Vegetables

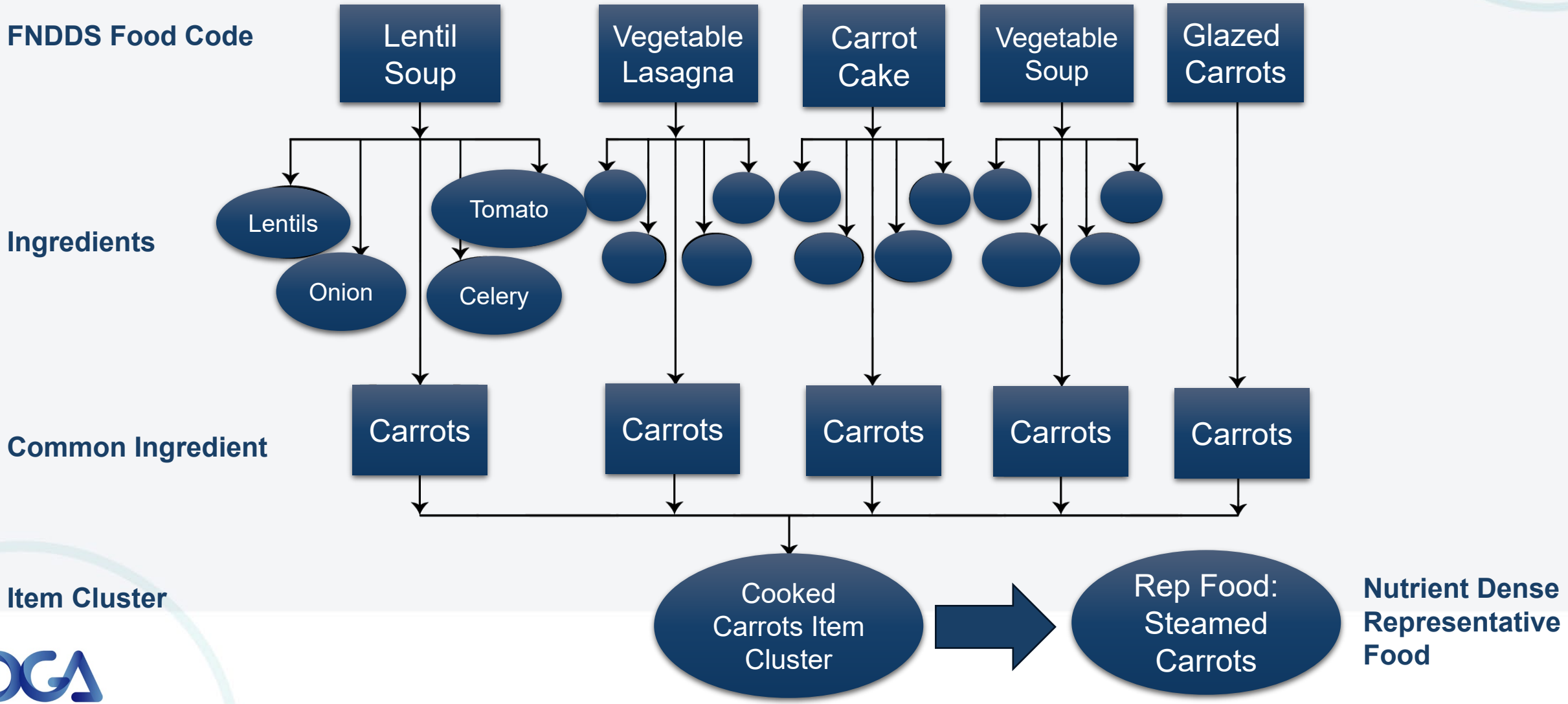


- ***Nutrient Profiles:*** The anticipated average nutrient composition for each food group and subgroup that could be obtained by eating a variety of foods in each food group in nutrient-dense forms. The nutrient profiles are based on a weighted average of nutrient-dense forms of foods. The weighted average calculation considers a range of American food choices, but in nutrient-dense forms and results in a food pattern that can be adapted to fit an individual's preferences.

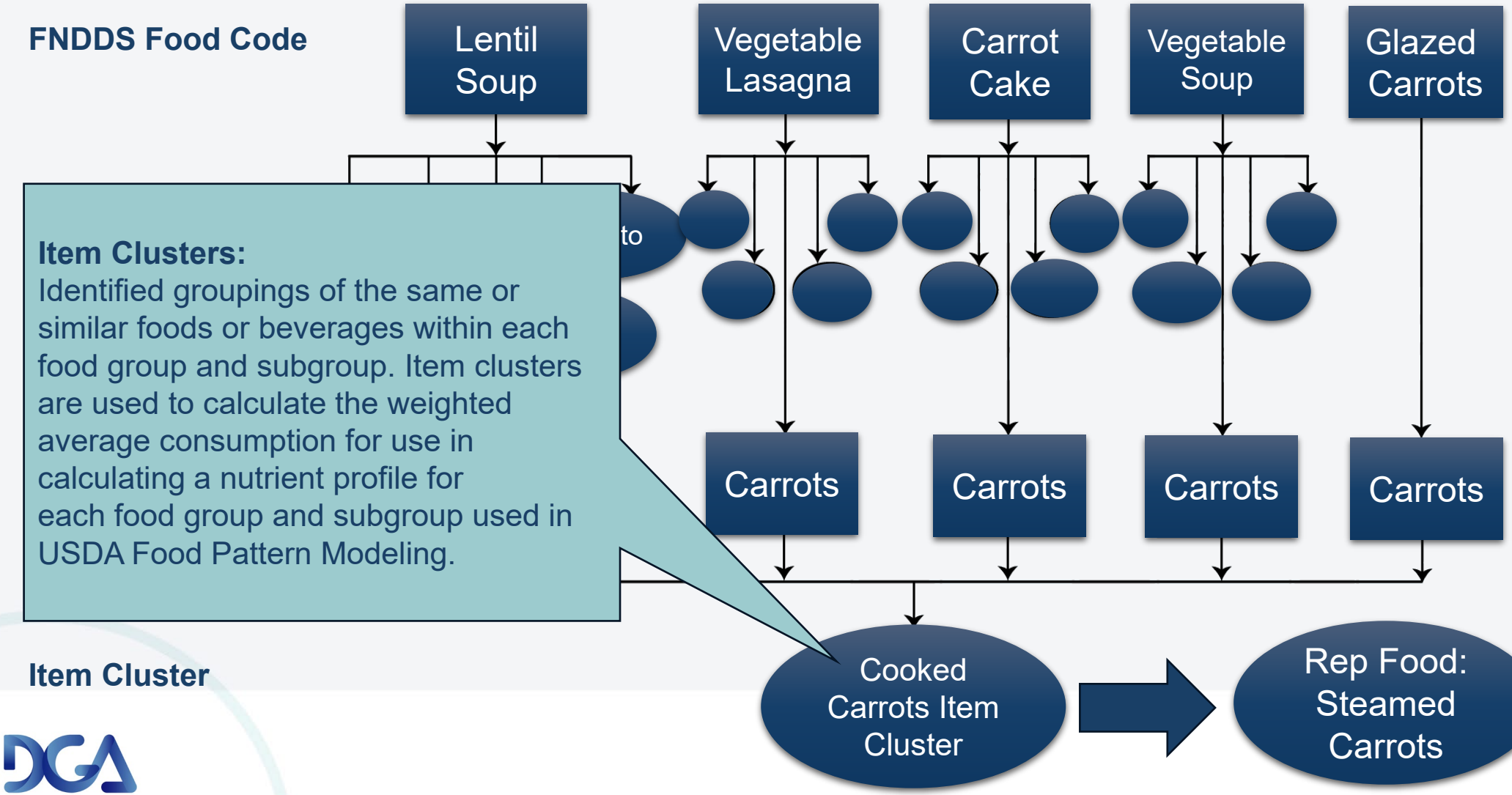
Isolation of Ingredients Contributing to Food Group composition: disaggregation of lentil soup ingredients into food groups/subgroups



Food Group Item Clusters: Aggregation of red-orange vegetables into item clusters



Defining Food Group Item Clusters



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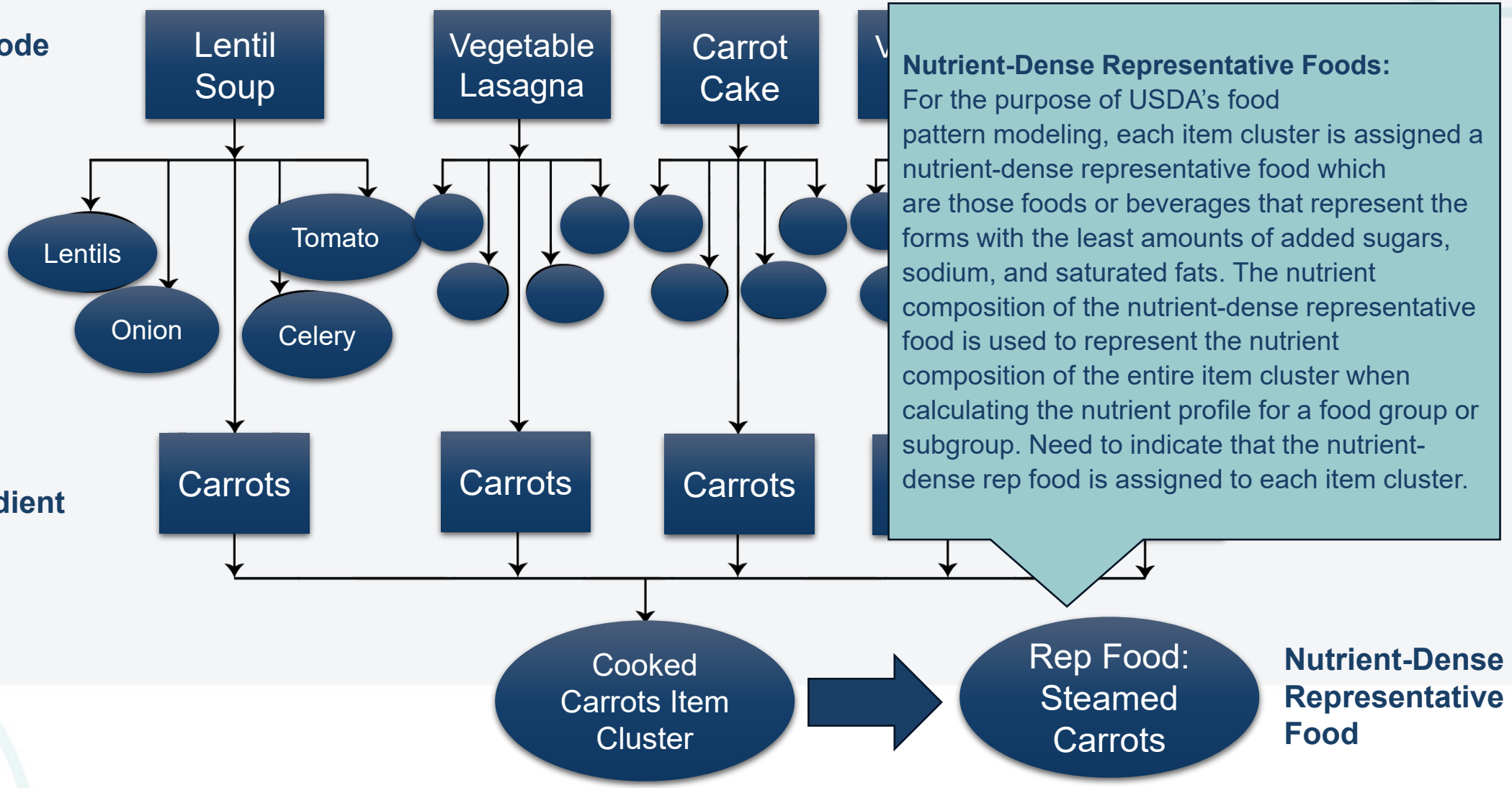
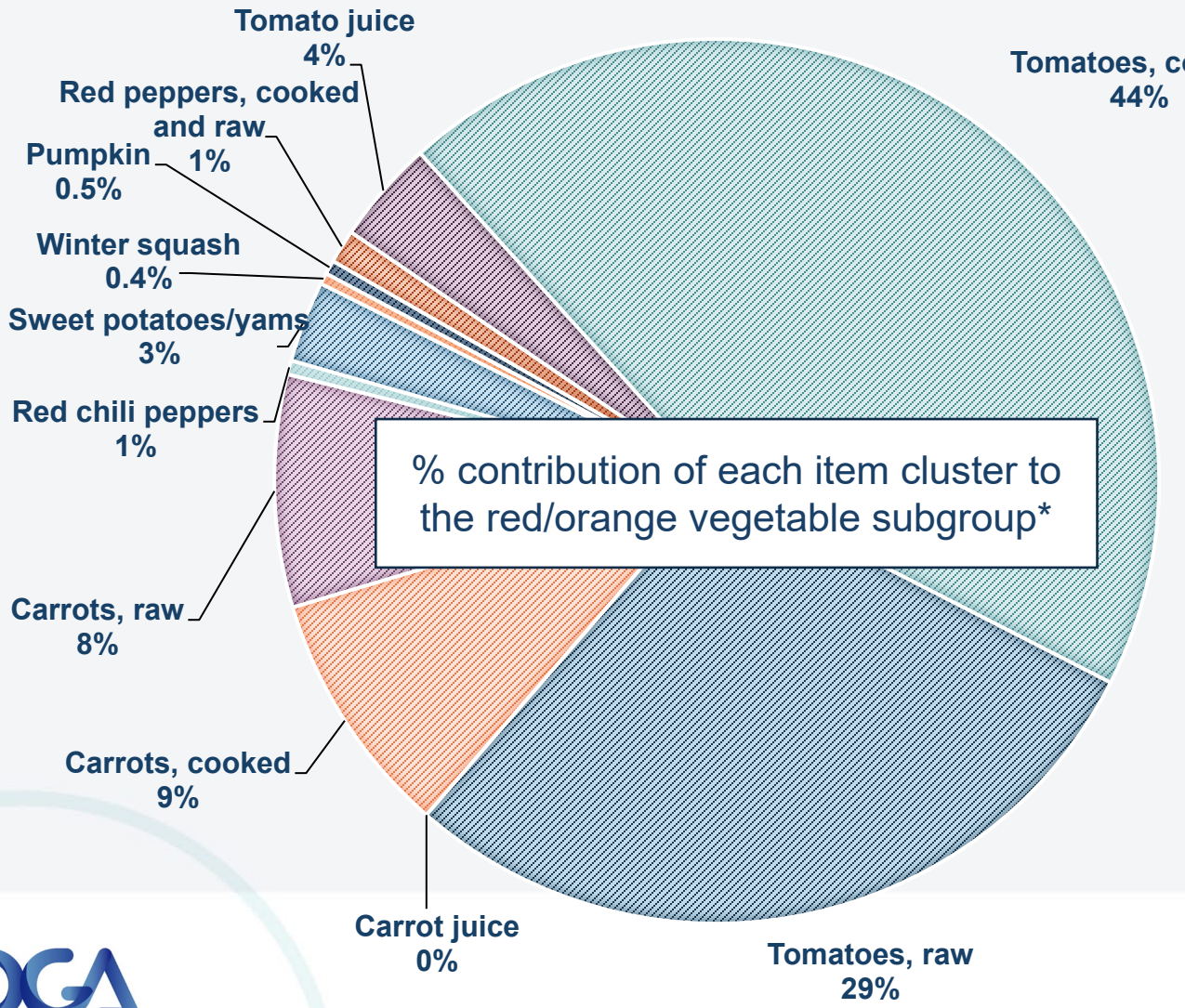
Defining Nutrient-Dense Representative Foods



Review: Calculating a Nutrient Profile



Nutrient profile =
∑ (% contribution of each item cluster X nutrients in the representative food)

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*2020 FPM Report 2+: https://www.dietaryguidelines.gov/sites/default/files/2020-07/FoodPatternModeling_Report_2YearsandOlder.pdf

Sample Partial Nutrient Profile: Red-Orange Vegetable Subgroup

	Red-Orange Vegetable Subgroup 1 cup equivalent
Calories, kcal	45.15
Protein, g	1.86
Carbohydrate, g	10.15
Fiber, total dietary, g	2.38
Total lipid (fat), g	0.31
Vitamin A, mcg_RAE	340.11
Vitamin C, mg	42.55

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*Adapted from Table 4.2: Nutrient Profiles for Food Groups and Subgroups in the 2020 USDA Food Patterns, ages 2 years and older
https://www.dietaryguidelines.gov/sites/default/files/2020-07/FoodPatternModeling_Report_2YearsandOlder.pdf

Healthy U.S.-Style Dietary Pattern

12 through 23 months

CALORIE LEVEL OF PATTERN[a]	700	800	900	1,000
FOOD GROUP OR SUBGROUP[b,c]	Daily Amount of Food From Each Group[d] (Vegetable and protein foods subgroup amounts are per week.)			
Vegetables (cup eq/day)	⅔	¾	1	1
	Vegetable Subgroups in Weekly Amounts			
Dark-Green Vegetables (cup eq/wk)	1	⅓	½	½
Red and Orange Vegetables (cup eq/wk)	1	1 ¾	2 ½	2 ½
Beans, Peas, Lentils (cup eq/wk)	¾	⅓	½	½
Starchy Vegetables (cup eq/wk)	1	1 ½	2	2
Other Vegetables (cup eq/wk)	¾	1 ¼	1 ½	1 ½
Fruits (cup eq/day)	½	¾	1	1
Grains (ounce eq/day)	1 ¾	2 ¼	2 ½	3
Whole Grains (ounce eq/day)	1 ½	2	2	2
Refined Grains (ounce eq/day)	¼	¼	½	1
Dairy (cup eq/day)	1 ⅔	1 ¾	2	2
Protein Foods (ounce eq/day)	2	2	2	2
	Protein Foods Subgroups in Weekly Amounts			
Meats, Poultry (ounce eq/wk)	8 ¾	7	7	7 ¾
Eggs (ounce eq/wk)	2	2 ¾	2 ¼	2 ¼
Seafood (ounce eq/wk)[e]	2-3	2-3	2-3	2-3
Nuts, Seeds, Soy Products (ounce eq/wk)	1	1	1 ¼	1 ¼
Oils (grams/day)	9	9	8	13

Ages 2 years and older

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%

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Protocol 1 Review:

Should foods and beverages with lower nutrient density (i.e., those with added sugars, saturated fat, and sodium) contribute to item clusters, representative foods, and therefore the nutrient profiles for each food group and subgroup used in modeling the USDA Dietary Patterns?

Analytic Framework: Population

Population:

- The nutrient profiles tested in these food pattern modeling analyses are based on dietary intake data among the U.S. population ages 1 year and older.
- The patterns tested in these food pattern modeling analyses are intended to apply to the U.S. population ages 1 year and older
  - Analyses will consider nutrient profiles specific to:
    - Ages 12 through 23 months
    - Ages 2 and older

Analytic Framework: Overview

Overall Food Pattern Modeling Methodology:

1. Identify appropriate energy levels for the patterns
2. Identify nutritional goals for the patterns
3. Establish food groupings and food group amounts
4. **Determine the amounts of energy and nutrients that would be provided by consuming various foods within each food group or subgroup**
5. Evaluate nutrient levels in each pattern against nutritional goals
6. Multiple iteration and re-evaluation of revised nutrient profiles may be required to test differences in the exclusions of foods and beverages lower in nutrient density from being used to calculate nutrient profiles (described in #4).

Data Sources

Dietary intake

- What We Eat in America, National Health and Nutrition Examination Survey (WWEIA, NHANES), 2017-2018

Food composition

- USDA Food and Nutrient Database for Dietary Studies (FNDDS) 2017-2018
- USDA Food Patterns Equivalents Databases and Datasets (FPED) 2017-2018
- USDA National Nutrient Database for Standard Reference (SR), Release 28 (Slightly revised)
- USDA What We Eat in America Food Categories 2017-2018

Nutritional goals

- Dietary Reference Intakes (2023, 2019, 2011, 2006)
- *Dietary Guidelines for Americans, 2020-2025*

Energy levels

- Dietary Reference Intakes for energy (2023)
- Height and Weight for U.S. population, based on NHANES 2015–2018, estimated for age group

Primary Analytic Framework

Proposed Protocol Analyses

- Calculate nutrient profiles using existing methods
- **Identify foods and beverages lower in nutrient density currently contributing to nutrient profile development**
- Calculate revised nutrient profiles that excludes contribution of identified foods and beverages lower in nutrient density
- Compare existing and revised nutrient profiles
- Test existing and revised nutrient profiles in the Healthy U.S.-Style Dietary Pattern (12-23 months & 2+)
- Iteration and re-evaluation of revised nutrient profiles
- Determine if existing or revised nutrient profiles will be used for subsequent analyses

Analytic Plan - Revised approach:

Identify foods and beverages lower in nutrient density that are contributing to nutrient profiles

Step 1: Exclude foods/beverages based on **WWEIA Food Categories** and **companion item clusters**

Step 2: Exclude foods/beverages with less than [defined proportion] of the total ingredients contributing to a food group/subgroup

Step 3: Exclude item clusters when a nutrient-dense representative food would not be a practical, nutrient-dense alternative for the foods and beverages within an item cluster.

Step 4: Exclude item clusters when the representative food is an outlier compared to other nutrient-dense representative foods for its contribution of added sugars, saturated fat, and/or sodium.

Analytic Framework for Refinement (continued)

Proposed Protocol Analyses

- Calculate nutrient profiles using existing methods
- Identify foods and beverages lower in nutrient density currently contributing to nutrient profile development
- **Calculate revised nutrient profiles that excludes contribution of identified foods and beverages lower in nutrient density**
- **Compare existing and revised nutrient profiles**
- **Test existing and revised nutrient profiles in the Healthy U.S.-Style Dietary Pattern (12-23 months & 2+)**
- **Iteration and re-evaluation of revised nutrient profiles**
- **Determine if existing or revised nutrient profiles will be used for subsequent analyses**

Next Steps for Food Pattern Modeling

- Develop Protocols 2-9:
  - Food group and subgroup quantity modifications
  - Staple carbohydrate foods
  - Dairy
  - Protein foods
  - Vegan
  - Low carbohydrate
  - Accommodating less nutrient-dense foods
  - Simulated diets
- Refine and implement Protocol 1:
  - Nutrient profiles

Thank you!

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Committee Discussion

Sarah Booth, PhD and Angela Odoms-Young, PhD, MS

May 10, 2023

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Thank You!

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Next Steps

Janet M. de Jesus, MS, RD

May 10, 2023

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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 13)

2024

Advisory Committee Meetings
- Meeting 4 (January 25)
- 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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Next steps

- Draft protocols will be posted on DG.gov later this month
- Public comments on protocols are appreciated by the end of June
- Subcommittees/Working Groups will continue conducting their evidence reviews
- Meeting 3: September 13 - includes oral comment opportunity

Thank You!

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