USDA

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA

Dietary Guidelines for Americans

#DietaryGuidelines

Welcome

Eve Stoody, PhD

Designated Federal Officer

2020 Dietary Guidelines Advisory Committee

DietaryGuidelines.gov




2020 Dietary Guidelines Advisory Committee

Meeting on Draft Report

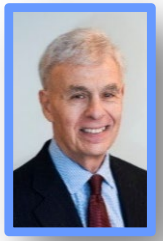
Webcast Only

DietaryGuidelines.gov




2020 Dietary Guidelines Advisory Committee

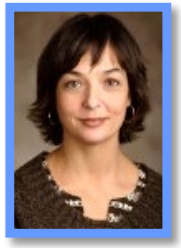
Barbara Schneeman, PhD
University of California-Davis
Chair



Ronald Kleinman, MD*
Harvard Medical School
Vice Chair

Jamy Ard, MD
Wake Forest School of Medicine

Regan Bailey, PhD, MPH, RD
Purdue University



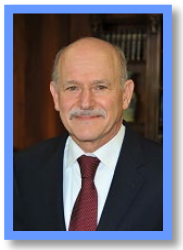
Lydia Bazzano, MD, PhD
Tulane University

Carol Boushey, PhD, MPH, RD
University of Hawaii

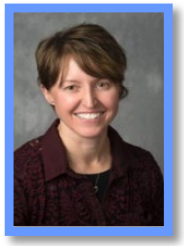
Teresa Davis, PhD
Baylor College of Medicine

Kathryn Dewey, PhD
University of California-Davis

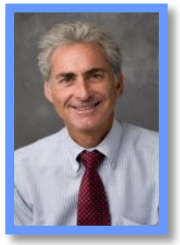
Sharon Donovan, PhD, RD
University of Illinois



Steven Heymsfield, MD
Louisiana State University



Heather Leidy, PhD
University of Texas



Richard Mattes, PhD, MPH, RD
Purdue University

Elizabeth Mayer-Davis, PhD, RD
University of North Carolina

Timothy Naimi, MD, MPH
Boston University

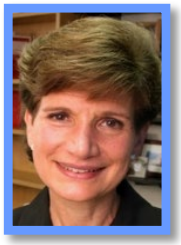
Rachel Novotny, PhD, RDN, LD
University of Hawaii

Joan Sabaté, DrPH, MD
Loma Linda University

Linda Snetselaar, PhD, RD
University of Iowa

Jamie Stang, PhD, MPH, RDN
University of Minnesota

Elsie Taveras, MD, MPH*
Harvard University



Linda Van Horn, PhD, RDN, LD
Northwestern University

*Massachusetts General Hospital

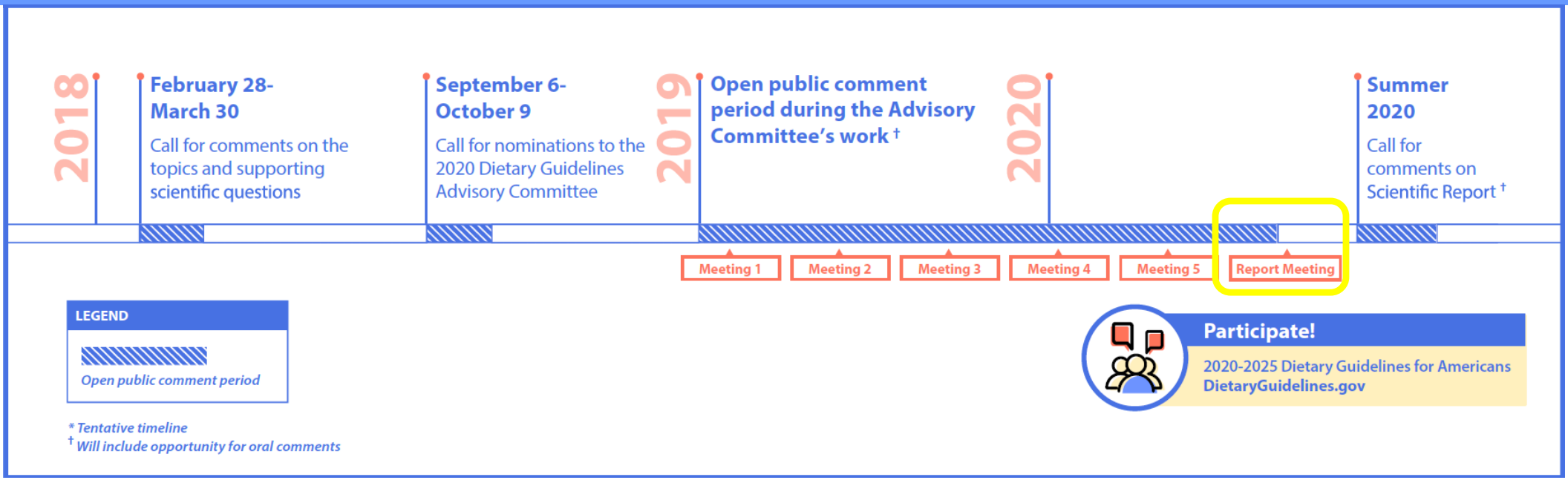
Remote attendance

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

Charge to the 2020 Dietary Guidelines Advisory Committee

- Examine the evidence on specific topics and scientific questions identified by the Departments of Agriculture and Health and Human Services;
- Develop a report that outlines its science-based review and recommendations to the Departments with rationale; and
- Submit its report to the Secretaries of USDA and HHS for consideration as the Departments develop the *2020-2025 Dietary Guidelines for Americans*.

2020 Dietary Guidelines Advisory Committee Timeline*



- Meeting on Draft Report originally scheduled for Monday, May 11 with Committee's Report requested by the end of May 2020
- Timeline extended by 1 month in consideration of new demands on schedules due to COVID-19

2020 Dietary Guidelines Advisory Committee

Meeting on Draft Report

Wednesday, June 17, 2020 (11:00am – 7:00pm Eastern)

Agenda and Links at DietaryGuidelines.gov




2020 Dietary Guidelines Advisory Committee

Remote attendance

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee

Chair Remarks

Barbara Schneeman, PhD

DietaryGuidelines.gov

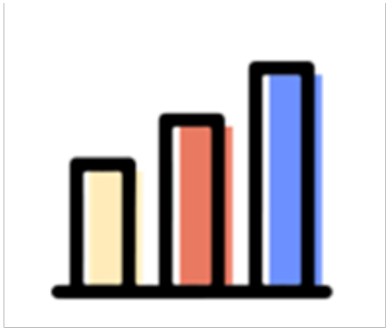
Today's Agenda

Purpose: To bring work to the full Committee for discussion and decisions.

1. Updates on Committee's NESR systematic reviews
2. Discussion and decisions regarding our draft advisory report

The Committee will finalize our advisory report based on the discussion at this meeting and submit our final report to the Secretaries of USDA and HHS at the end of June 2020.

Approaches to Examine the Evidence



Data Analysis

Food Pattern Modeling

NESR Systematic Reviews

- The Committee answered questions on diet and health using one of three approaches.
- Each of these approaches has its own rigorous, protocol-driven methodology, and plays a unique, complementary role in examining the science.

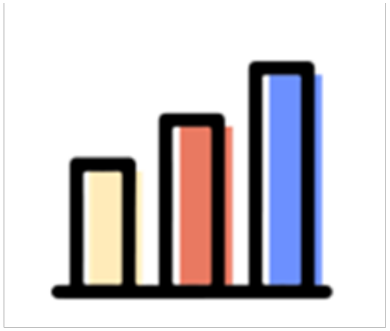
Approaches to Examine the Evidence

Data Analysis
A collection of analyses that uses national data sets to help us understand the current health and dietary intakes of Americans. These data help make our advice practical, relevant, and achievable.

Food Pattern Modeling
Analysis that helps us understand how changes to the amounts or types of foods and beverages in a pattern might impact meeting nutrient needs across the U.S. population.

NESR Systematic Review
Research project that answers a question on diet and health by searching for, evaluating, and synthesizing all relevant, peer-reviewed studies.

Approaches to Examine the Evidence



Data Analysis

Food Pattern Modeling

NESR Systematic Reviews

- The Committee made all decisions required to develop the protocols that guided how each approach would be used to examine the evidence for each question.
- USDA and HHS staff provided invaluable support implementing these approaches.
- The conclusions reached are those of the Committee.
- *Final protocols and draft conclusion statements were posted in May at DietaryGuidelines.gov.*

Updates on Committee's NESR Systematic Reviews

- At Meeting 5, the Committee provided an update on our work, including the NESR systematic reviews.
- Following Meeting 5, Subcommittees continued work on their reviews, and NESR systematic reviews completed peer review.
- Today, we will provide updates on questions with new conclusion statements or when the grade of a conclusion has changed and allow for discussion by the members.

Note: Members have had access to the draft conclusion statements and are currently reviewing the draft report. As such, brief updates on each question will be provided followed by the opportunity for questions or comments from members.

Updates on Committee's NESR Systematic Reviews: Topics for Discussion

- Human milk and/or infant formula and overweight and/or obesity
- Seafood during pregnancy and neurocognitive development
- Seafood during childhood and adolescence and neurocognitive development
- Dietary fats and cardiovascular disease
- Maternal diet and child food allergies and atopic allergic disease
- Omega-3 fatty acid supplements during pregnancy and lactation and neurocognitive development
- Dietary patterns and bone health and neurocognitive health
- Diets based on macronutrient distribution: Growth, size, body composition, and risk of overweight and obesity; type 2 diabetes; cardiovascular disease; and sarcopenia
- Alcohol and all-cause mortality

Question – Human Milk/Infant Formula and Overweight and Obesity

What is the relationship between the duration, frequency, and volume of exclusive human milk and/or infant formula consumption and overweight and obesity?

Approach to Answer Question: NESR Systematic Review
Birth to 24 Months Subcommittee

Presented by Kay Dewey, PhD

Approach for Synthesizing the Evidence

- Examine overweight and obesity starting at age 2 years
- Augment our review of the most recent evidence (i.e., Jan 2011-Sept 2019) with a review of within-family sibling analyses from Jan 1980 to Sept 2019

  Sibling studies help overcome residual confounding, which is pervasive in observational research, because of siblings' shared genetic and environmental factors

  To our knowledge, this is a novel contribution in the field

Description of the Evidence

We specified 6 exposures of interest.
Almost all of the evidence was about the first 2.

1. **Ever vs never consuming human milk**:
   30 articles = 21 independent cohorts, including 4 studies with within-family analyses of siblings
2. **Duration of any human milk consumption among infants fed human milk**:
   21 articles = 1 cluster randomized controlled trial + 18 independent cohorts, including 4 studies with within-family analyses of siblings
3. Duration of exclusive human milk consumption prior to the introduction of infant formula: 2 articles
4. Intensity, proportion, or amount of human milk consumed by mixed-fed infants: 0 articles
5. Intensity, proportion, or amount of human milk consumed at the breast vs by bottle in infants fed human milk as their only source of milk: 0 articles
6. Consuming human milk or infant formula (i.e., a single substance) vs human milk and infant formula (i.e., both substances, e.g., "topping up") during a single feeding session: 0 articles

DRAFT Conclusion Statements and Grade:
Exposures With Scant or No Evidence

Conclusion statement:

Insufficient evidence is available to determine the relationship between the **duration of exclusive human milk consumption prior to the introduction of infant formula** and overweight and obesity at 2 years of age and older.

No evidence is available to determine the relationship between the **intensity, proportion, or amount of human milk consumed by mixed-fed infants** and overweight and obesity at 2 years of age and older

No evidence is available to determine the relationship between the **intensity, proportion, or amount of human milk consumed at the breast vs by bottle in infants fed human milk as their only source of milk** and overweight and obesity at 2 years of age and older

No evidence is available to determine the relationship between **consuming human milk or infant formula (i.e., a single substance) vs human milk and infant formula (i.e., both substances, e.g., "topping up") during a single feeding session** and overweight and obesity at 2 years of age and older

Grade: Grade not assignable

Summary of the Evidence Synthesis:
Ever vs Never Consuming Human Milk

Consistency	14 of the 21 studies reported significant associations, all indicating that ever consuming human milk (vs never) is associated with lower risk of overweight and/or obesity at 2+ years In 5 of 7 studies that compared different durations of “ever” with “never” consuming human milk (e.g., <6 months vs never, ≥6 months vs never), longer durations were associated with significantly lower risk of overweight and/or obesity, but shorter durations were not Within-family analyses of siblings: 1 study reported significant associations in sibling analyses 3 studies suggested an attenuation of the significant associations found in full-sample analyses
Precision	14 of 21 studies had sufficient power to detect significant associations, 1 study reported a marginal association (same direction, similar magnitude), 6 studies likely had insufficient statistical power

Summary of the Evidence Synthesis:
Ever vs Never Consuming Human Milk (continued)

Directness	Most articles reported objectives related to examining human milk consumption and overweight and/or obesity
Generalizability	11 of 21 studies were conducted in the US (nationally representative samples, samples with racial and ethnic diversity, and samples from families with low income)
	Evidence from the remaining 9 studies (mostly from Europe) may be less generalizable because the US may have higher risk of overweight/obesity
	Most of the evidence was in children; 5 studies examined outcomes in adolescents and 1 examined outcomes in adults
Risk of bias	4 studies (with within-family analyses of siblings) were designed to reduce bias from confounding but had other risks of bias (e.g., recall bias, self-report of height and weight)
	None of the remaining 17 studies controlled for all of the key confounders (especially complementary feeding practices and childhood diet)

DRAFT Conclusion Statement and Grade:
Ever vs Never Consuming Human Milk

Conclusion statement:

Moderate evidence from observational studies indicates that ever, compared with never, consuming human milk is associated with lower risk of overweight and obesity at 2 years of age and older, particularly if the duration of human milk consumption is 6 months or longer.

Grade: Moderate

DRAFT Conclusion Statement and Grade:

Duration of Any Human Milk Consumption Among Infants Fed Human Milk

Consistency	5 studies reported significant inverse associations 3 studies reported significant positive associations 1 study reported significant associations in opposite directions at 2 and 6 years of age 10 studies reported no significant associations 4 of the 5 studies reporting significant inverse associations between duration and overweight/obesity were conducted in the US and all 3 studies reporting significant positive associations were conducted in Europe Within-family analyses of siblings: 0 of 4 studies reported significant associations Cluster-RCT (intervention resulted in significantly higher rates of any human milk consumption measured at 3, 6, 9, and 12 months): Reported higher risk of overweight and/or obesity in intervention group, compared with the control group, at 11.5 and 16 years
Precision	Highly inconsistent, lacked precision

Summary of the Evidence Synthesis:

Duration of Any Human Milk Consumption Among Infants Fed Human Milk (cont.)

Directness	Most articles reported objectives related to examining human milk consumption and overweight and/or obesity
Generalizability	7 of 19 studies were conducted in the US and the rest were from Europe (authors of the cluster-RCT specifically noted the difference in obesity prevalence between the US and Belarus) Most of the evidence was for outcomes in children; 6 studies examined outcomes in adolescents and 1 examined outcomes in adults
Risk of bias	4 studies (with within-family analyses of siblings) were designed to reduced bias from confounding but had other risks of bias (e.g., recall bias, self-report of height and weight), 1 study was a cluster-RCT None of the remaining 14 studies controlled for all of the key confounders

DRAFT Conclusion Statement and Grade:

Duration of Any Human Milk Consumption Among Infants Fed Human Milk

Conclusion statement:

Insufficient evidence is available to determine the relationship between the duration of any human milk consumption, among infants fed human milk, and overweight and obesity at 2 years of age and older; the available evidence was inconsistent.

Grade: Grade not assignable

Question – Seafood during Pregnancy and Neurocognitive Development

What is the relationship between seafood consumption during pregnancy and lactation and neurocognitive development in the child?

Approach to Answer Question: NESR Systematic Review
Dietary Fats and Seafood Subcommittee

Presented by Linda Snetselaar, PhD RDN

Follow-Up from Meeting 5: Revised Conclusion Statements

CS as presented at the March 2020 meeting (Cognitive Development):

Limited evidence suggests that seafood intake during pregnancy may be associated favorably with measures of cognitive development in the child. **Grade:** Limited

Revised CS (Cognitive Development):

Moderate evidence **indicates** that seafood intake during pregnancy **is** associated favorably with measures of cognitive development in **young children**. **Grade: Moderate**

Question – Seafood during Childhood-Adolescence and Neurocognitive Development

What is the relationship between seafood consumption during childhood and adolescence (up to 18 years of age) and neurocognitive development?

Approach to Answer Question: NESR Systematic Review
Dietary Fats and Seafood Subcommittee

Presented by Linda Snetselaar, PhD RDN

Follow-Up from Meeting 5: Revised Conclusion Statements

CS as presented at the March meeting (Cognitive Development):

- **Insufficient** evidence is available to determine whether seafood intake during childhood and adolescence is favorably associated with measures of cognitive development in children and adolescents. **Grade: Grade not assignable (favorable association)**
- **Moderate** evidence suggests that seafood intake during childhood and adolescence has no unfavorable association with measures of cognitive development in children and adolescents. **Grade: Moderate (no unfavorable association)**

***Revised CS based on committee feedback (Cognitive Development)*:**

- **Insufficient** evidence is available to determine whether there is a favorable **relationship** between seafood intake during childhood and adolescence and measures of cognitive development in children and adolescents. **However, no unfavorable relationships** were found between seafood consumption during childhood and adolescence and measures of cognitive development. **Grade: Grade not assignable**

Follow-Up from Meeting 5: Revised Conclusion Statements

CS as presented at the March meeting (Language and Communication Development):

- **Insufficient** evidence is available to determine whether seafood intake during childhood and adolescence is favorably associated with measures of language and communication development in children and adolescents. **Grade: Grade not assignable (favorable association)**
- **Moderate** evidence suggests that seafood intake during childhood and adolescence has no unfavorable association with measures of language and communication development in children and adolescents. **Grade: Moderate (no unfavorable association)**

Revised CS based on feedback (Language and Communication Development):

- **Insufficient** evidence is available to determine whether there is a favorable **relationship** between seafood intake during childhood and adolescence and measures of language and communication development in children and adolescents. **However, no unfavorable relationships were found** between seafood consumption during childhood and adolescence and measures of language and communication development. **Grade: Grade not assignable**

Question – Dietary Fat and Cardiovascular Disease

What is the relationship between types of dietary fat consumed and risk of cardiovascular disease?

Approach to Answer Question: NESR Systematic Review
Dietary Fats and Seafood Subcommittee

Presented by Linda Snetselaar, PhD RDN

Summary of the Evidence Synthesis: Endpoint Outcomes

- **Total:** 94 articles (90 from 47 PCSs, 4 from 3 NCC studies)
- **n-6 PUFA** *(16 articles)*
  - Associations between total n-6 PUFA intake in adults and CVD were predominantly null
  - In the few articles that specifically assessed linoleic acid and arachidonic acid separately, beneficial associations were more often observed for linoleic acid compared to arachidonic acid in adults
- **Dietary Cholesterol** *(11 articles)*
  - Few articles (with inconsistent results) assessed the independent relationship between dietary cholesterol intake in adults and CVD endpoint outcomes, thereby further confounding meaningful conclusions.
  - Due to the co-occurrence of dietary cholesterol and saturated fat in animal source foods, disentangling independent associations between dietary cholesterol in adults and CVD endpoint outcomes in these observational studies is challenging.

DRAFT Conclusion Statement and Grade

Conclusion statements

Limited evidence suggests that intake of linoleic acid, but not arachidonic acid, during adulthood may be associated with lower risk of cardiovascular disease, including cardiovascular disease mortality.

Grade: Limited

Insufficient evidence is available from randomized controlled trials to quantify an independent relationship between dietary cholesterol intake in adults and overall risk of cardiovascular disease.

Grade: Grade Not Assignable

Description of the Evidence: Intermediate Outcomes (Blood Lipids)

- **Total:** 97 articles (47 from parallel RCTs, 46 from crossover RCTs, and 5 from non-RCTs) *(Note: one crossover design RCT also analyzed as a parallel design RCT)*
- **Participant characteristics:**
  - Studies primarily conducted in the U.S. (~40%) and a variety of countries across Europe
  - Predominantly middle-aged or older adults with overweight/obesity
- **Interventions:**
  - Foods that varied in fatty acid content
  - 28% were controlled feeding trials

Summary of the Evidence Synthesis: Intermediate Outcomes (Blood Lipids)

- **Replacement of SFA**
  - Over half of articles (*17 of 29*) pertaining to replacement of SFA with MUFA in adults reported a beneficial effect of MUFA intake on total and LDL cholesterol; most articles reported null effects on HDL cholesterol and triglycerides
  - Over half of articles (*6 of 10*) pertaining to replacement of SFA with PUFA in adults reported a beneficial effect of PUFA intake on total and LDL cholesterol; most articles reported null effects on HDL cholesterol and triglycerides
  - Only 2 articles examined replacement of SFA with carbohydrates in adults and effects on blood lipids were mixed
  - This systematic review builds and expands on work of 2015 DGAC and was broadly consistent with conclusions drawn by the 2015 DGAC; the 2020 DGAC concurred with and updated these conclusions regarding replacement of SFA with MUFA, PUFA, or carbohydrates

DRAFT Conclusion Statement and Grade

Conclusion statement

Strong and consistent evidence from randomized controlled trials demonstrates that replacing saturated fatty acids with unsaturated fats, especially polyunsaturated fatty acids, in adults significantly reduces total and low-density lipoprotein cholesterol. Replacing saturated fatty acids with carbohydrates (sources not defined) also reduces total and low-density lipoprotein cholesterol, but significantly increases triglycerides and reduces high-density lipoprotein cholesterol. Since the 2015 Dietary Guideline Advisory Committee review, evidence remains inadequate to differentiate among sources of carbohydrate and their impact on blood lipids.

Grade: Strong

Summary of the Evidence Synthesis: Intermediate Outcomes (Blood Lipids)

- **Dietary cholesterol** *(9 articles)*
  - Most articles reported null effects of dietary cholesterol in adults on blood lipids
  - Among the few articles that found significant results, higher intake of dietary cholesterol significantly increased or resulted in higher levels of total and LDL cholesterol
  - In several articles, it was not possible to isolate independent effects of dietary cholesterol on blood lipids due to simultaneous changes in the amount of fat or proportion of different types of fatty acids in the study diet.

DRAFT Conclusion Statement and Grade

Conclusion statement

Limited evidence suggests that lower intake of dietary cholesterol in adults may reduce total and low-density lipoprotein cholesterol.

Grade: Limited

Question – Maternal Diet and Food Allergy and Atopic Allergic Diseases

What is the relationship between maternal diet during pregnancy and lactation and risk of child food allergies and atopic allergic diseases?

Approach to Answer Question: NESR Systematic Review
Pregnancy and Lactation Subcommittee

Presented by Sharon Donovan, PhD, RD

Description of the Evidence: Asthma

- 20 articles from 2 RCTs and 9 prospective cohort studies (PCSs) examined the relationship between maternal diet and risk of asthma in the child from 2-18 y of age
  - 8 PCSs (16 articles) examined diet during pregnancy
  - 2 RCTs (3 articles) examined diet during pregnancy and lactation
  - 1 PCS (1 article) examined diet during lactation

- Studies examined maternal dietary patterns and avoidance and/or consumption of cow milk products, eggs, fish, soybean, peanuts, tree nuts, soybean, wheat, and other foods not commonly considered to be allergens

Summary of the Evidence Synthesis: Asthma

Food	Timing of Exposure		
	Pregnancy	Preg and Lact	Lactation
Cow Milk Products	Limited	Insufficient	Insufficient
Egg	Limited (Presented at Mtg 5)	No evidence	No evidence
Fish	Limited (Presented at Mtg 5)	No evidence	Insufficient
Peanuts	Insufficient	No evidence	No evidence
Tree Nuts	Insufficient	No evidence	No evidence
Soybean	Insufficient	No evidence	No evidence
Wheat	Insufficient	No evidence	No evidence
Dietary Patterns	Insufficient	No evidence	No evidence
Fruit	Insufficient	No evidence	No evidence
Vegetables	Insufficient	No evidence	No evidence
Beverages	Insufficient	No evidence	No evidence
Margarine	Insufficient	No evidence	Insufficient
Meat and meat products	No evidence	No evidence	Insufficient
Oil, butter and butter-spreads	No evidence	No evidence	Insufficient
Seeds	No evidence	No evidence	No evidence

DRAFT Conclusion Statement and Grade: Cow Milk Products During Pregnancy and Asthma

Conclusion statement

Limited evidence suggests that a lower consumption of cow milk products during pregnancy *does not reduce* risk of asthma in the child.

Grade: Limited

Question – Omega-3 and Neurocognitive Development

What is the relationship between omega-3 fatty acids from supplements consumed before and during pregnancy and lactation and developmental milestones, including neurocognitive development, in the child?

Approach to Answer Question: NESR Systematic Review
Pregnancy and Lactation Subcommittee

Presented by Sharon Donovan, PhD, RD

Description of the Evidence

Omega-3 consumed during pregnancy

- **Cognitive Development** (18 articles)**:** 5 of 8 RCTs found a favorable effect of supplementation on at least one measure
- **Language** (11 articles)**, motor** (8 articles)**, visual** (5 articles)**, and social-emotional** (11 articles) **development:** 9 RCTs
  - Inconsistent findings. Although all studies reported **no effect** on at least one measure, the number and direction of statistically significant findings varied across the body of evidence.
- **Academic Performance** (1 article): 1 RCT
- **ADD/ADHD** (2 articles)**:** 1 RCT
- **ASD** (2 articles)**:** 1 RCT and 1 PCS

Description of the Evidence

Omega-3 consumed during pregnancy and lactation

- **Cognitive** (5 articles)**, language** (1 article)**, motor** (3 articles)**, and social-emotional** (1 article) **development:** 3 RCTs
  - Few studies and inconsistent findings. Although all studies reported **no effect** on at least one measure, the number and direction of statistically significant findings varied across the body of evidence.

Omega-3 consumed during lactation

- **Cognitive, language, motor, and visual development** (2 articles)**:** 1 RCT

Summary of the Evidence Synthesis

Outcome	Timing of Exposure		
	Pregnancy	Pregnancy and Lactation	Lactation
Cognitive Development	Limited	Insufficient	Insufficient
Language	Insufficient	Insufficient	Insufficient
Motor	Insufficient	Insufficient	Insufficient
Visual	Insufficient	Insufficient	Insufficient
Social-Emotional	Insufficient	Insufficient	No evidence
Academic Performance	Insufficient	No evidence	No evidence
ADD/ADHD	Insufficient	No evidence	No evidence
ASD	Insufficient	No evidence	No evidence
Anxiety/Depression	No evidence	No evidence	No evidence

Omega-3 and Developmental Milestones

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

DRAFT Conclusion Statements and Grades: Pregnancy and Cognitive Development

Conclusion statement

Limited evidence suggests that omega-3 fatty acid supplements consumed during pregnancy may result in favorable cognitive development in the child.

Grade: Limited

Question – Dietary Patterns and Bone Health

What is the relationship between dietary patterns consumed and bone health?

Approach to Answer Question: NESR Systematic Review
Dietary Patterns Subcommittee

Presented by Carol Boushey, PhD, MPH, RD

Summary of the Evidence Synthesis – Bone Health

- This systematic review update included 7 prospective cohort studies published between January 2014 and November 2019 that examined dietary patterns in adults and bone health
  - All examined risk of fractures, mainly hip, in older adults
  - The evidence consistently showed that healthier dietary patterns were associated with reduced risk of hip fractures
  - The studies were generalizable, had few risks of bias, and had large analytic sample sizes with a sufficient number of hip fracture cases

DRAFT Conclusion Statement and Grade – Bone Health

Conclusion statement

Dietary Patterns: Adults

Moderate evidence suggests that a dietary pattern higher in vegetables, fruits, legumes, nuts, low-fat dairy, whole grains, and fish, and lower in processed meats, added sugar, and sugar-sweetened beverages is associated with favorable bone health outcomes in adults, primarily decreased risk of hip fracture.

Grade: Adults: Moderate

Status relative to existing review: This update builds upon the conclusion drawn by the 2015 Committee, which determined that limited evidence suggests a relationship between dietary patterns and bone health in adults

Question – Dietary Patterns and Cardiovascular Disease

What is the relationship between dietary patterns consumed and risk of cardiovascular disease?

Approach to Answer Question: NESR Systematic Review
Dietary Patterns Subcommittee

Presented by Carol Boushey, PhD, MPH, RD

Summary of the Evidence Synthesis - CVD

Diets Based on Macronutrient Distribution: Children: No evidence was identified

Diets Based on Macronutrient Distribution: Adults

- 49 articles (19 randomized controlled trials (RCT), 30 prospective cohort studies (PCS)) were included in the review
- Most enrolled participants who were overweight or obese, or had features of metabolic syndrome
- The majority of RCTs reported no significant effects of macronutrient distributions on intermediate cardiovascular disease (CVD) outcomes
- Many PCSs reported no significant associations between macronutrient distributions compared and risk of CVD
- Limitations include:
  - Inconsistent magnitude of effects; Risk of bias (e.g., confounding)
  - Diets based on macronutrient distribution that were associated with favorable CVD outcomes, typically came from dietary patterns or diets with higher relative to poorer diet quality overall, where reported

DRAFT Conclusion Statement and Grade - Diets Based on Macronutrient Distribution and CVD

Conclusion statement

Diets Based on Macronutrient Distribution: Children

No evidence was available to determine the relationship between diets based on macronutrient distribution consumed in childhood and concurrent or future development of cardiovascular disease.

Diets Based on Macronutrient Distribution: Adults

Limited evidence suggests non-energy restricted diets based solely on macronutrient distribution with either carbohydrate, fat, and/or protein proportions outside of the Acceptable Macronutrient Distribution Range, are neither beneficial nor detrimental regarding risk of cardiovascular disease in adults, primarily among those at high-risk, such as those with overweight, obesity or features of metabolic syndrome. Grade: Limited

Grade: Children: Grade: Grade Not Assignable; Adults: Limited

Question – Dietary Patterns and Type 2 Diabetes

What is the relationship between dietary patterns consumed and risk of type 2 diabetes?

Approach to Answer Question: NESR Systematic Review
Dietary Patterns Subcommittee

Presented by Carol Boushey, PhD, MPH, RD

Summary of the Evidence Synthesis – T2DM

Diets Based on Macronutrient Distribution: Children: No evidence identified

Diets Based on Macronutrient Distribution: Adults

- 23 articles (2 randomized controlled trials (RCT), 21 prospective cohort studies (PCS)) were included in the review
- Reported diets with macronutrient distributions outside the acceptable macronutrient distribution range (AMDR) tended to have higher amounts of saturated fat, trans fat, and/or animal-based sources of protein and fat, such as processed meat, red meat, butter, and cheese, as well as refined grains, sugar-sweetened beverages, and lower-fiber cereals and breads
- Limitations:
  - Studies rarely compared different macronutrients distribution within a constant dietary pattern
  - Risk of bias (e.g., potential for selection bias related to studies excluding participants with prevalent type 2 diabetes (T2DM), CVD, cancer, or other medical conditions at baseline)
  - Macronutrient differences between exposure groups were limited in magnitude, in a similar direction, modestly different from the AMDR, or only relevant for a subset of the population

DRAFT Conclusion Statement and Grade - Diets Based on Macronutrient Distribution and T2DM

Conclusion statement

Diets Based on Macronutrient Distribution: Children

No evidence is available to determine a relationship between diets based on macronutrient distribution consumed during childhood and risk of type 2 diabetes.

Diets Based on Macronutrient Distribution: Adults

Insufficient evidence is available to determine the relationship between macronutrient distributions with proportions of energy falling outside of the Acceptable Macronutrient Distribution Range for at least 1 macronutrient and risk of type 2 diabetes, due to methodological limitations and inconsistent results.

Grade: Children: Grade: Grade Not Assignable; Adults: Grade Not Assignable

Question – Dietary Patterns and Growth, Size, Body Composition, and Risk of Overweight or Obesity (GSBCO)

What is the relationship between dietary patterns consumed and growth, size, body composition, and risk of overweight or obesity?

Approach to Answer Question: NESR Systematic Review
Dietary Patterns Subcommittee

Presented by Carol Boushey, PhD, MPH, RD

Summary of the Evidence Synthesis - GSBCO

Diets Based on Macronutrient Distribution: Children: No evidence was identified

Diets Based on Macronutrient Distribution: Adults

- 31 articles (22 randomized controlled trials (RCT), 9 prospective cohort studies (PCS)) were included in the review
- Several studies included participants with and without overweight, obesity, or features of metabolic syndrome
- Most articles compared macronutrient distributions that generally compared poorer quality diets to higher quality alternatives
- Limitations:
  - Studies rarely compared a different distribution of macronutrients within a constant dietary pattern
  - Risk of bias (e.g., diet assessed only once at baseline and lack of accounting for possible changes in dietary intake over follow-up)
  - Macronutrient differences between intervention arms were limited in magnitude, in a similar direction (e.g., all arms below the acceptable macronutrient distribution range (AMDR)), modestly different from the AMDR, or only relevant for a subset of the population

DRAFT Conclusion Statement and Grade - Diets Based on Macronutrient Distribution and GSBCO

Conclusion statement

Diets Based on Macronutrient Distribution: Children

No evidence is available to determine a relationship between diets based on macronutrient distribution consumed during childhood and growth, size, body composition, and risk of overweight or obesity.

Diets Based on Macronutrient Distribution: Adults

Insufficient evidence is available to determine the relationship between macronutrient distributions with proportions of energy falling outside of the Acceptable Macronutrient Distribution Range for at least 1 macronutrient and growth, size, body composition, and risk of overweight or obesity, due to methodological limitations and inconsistent results.

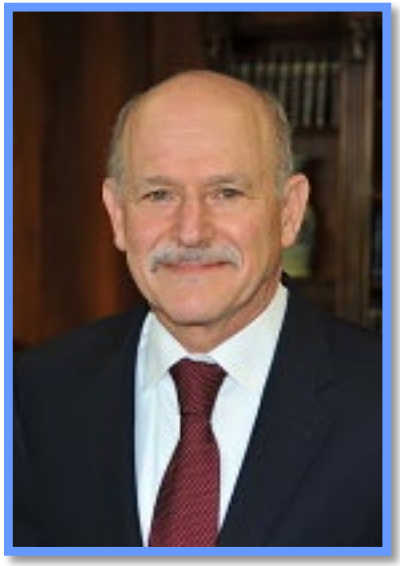
Grade: Children: Grade: Grade Not Assignable; Adults: Grade Not Assignable

Question – Dietary Patterns and Sarcopenia

What is the relationship between dietary patterns consumed and risk of sarcopenia?

Approach to Answer Question: NESR Systematic Review
Dietary Patterns Subcommittee

Presented by Steve Heymsfield, MD



Summary of the Evidence Synthesis - Sarcopenia

- 2 of 4 studies (all prospective cohort studies) included in the review examined macronutrient distributions and risk of sarcopenia
- In both studies, the % energy from fat was above the acceptable macronutrient distribution range (AMDR)
- Limitations:
  - Relatively small sample sizes with few cases of sarcopenia
  - Risk of bias (e.g., lack of adjustment for all potential confounders; diet assessed only once at baseline; potential for selection bias due to enrolled participants likely representing healthier individuals (e.g., those able to walk, take public transportation, or interested in reducing risk of falling)
  - Studies were inconsistent in how dietary intake was assessed and the results that were reported

DRAFT Conclusion Statement and Grade – Diets Based on Macronutrient Distribution and Sarcopenia

Conclusion statement

Diets Based on Macronutrient Distribution

Insufficient evidence was available to determine the relationship between diets based on macronutrient distribution and sarcopenia.

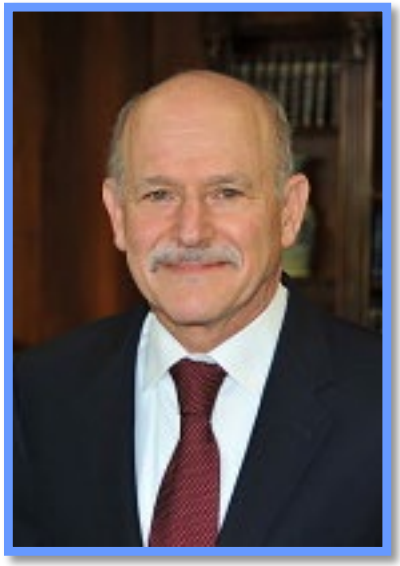
Grade: Grade Not Assignable

Question – Dietary Patterns and Neurocognitive Health

What is the relationship between dietary patterns consumed and neurocognitive health?

Approach to Answer Question: NESR Systematic Review
Dietary Patterns Subcommittee

Presented by Steve Heymsfield, MD



Summary of the Evidence Synthesis – Neurocognitive Health

- 26 articles (4 randomized controlled trials (RCT), 21 prospective cohort studies (PCS); 1 nested-case control) were included
- The majority of significant findings reported healthier dietary patterns were associated with improved measures of cognitive impairment and/or lower risk of cognitive impairment or dementia.
- Non-significant findings or those reporting mixed associations reported dietary patterns consumed during adulthood that did not worsen cognitive outcomes.
- Limitations include:
  - Lack of RCTs
  - Risk of bias (e.g., lack of adjustment for potential confounding)
  - Considerable variation across the body of evidence (e.g. testing methods, dietary patterns examined, outcomes reported)

DRAFT Conclusion Statement and Grade – Dietary Patterns and Neurocognitive Health

Conclusion statement

Limited evidence suggests that dietary patterns containing vegetables, fruits, unsaturated vegetable oils and/or nuts, legumes, and fish or seafood consumed during adulthood are associated with lower risk of age-related cognitive impairment and/or dementia.

Grade: Limited

Status relative to existing review: This update concurs and builds upon the conclusion drawn by the 2015 Committee, which conducted a systematic review that identified 30 articles from a wide range of study designs using different methods to measure neurocognitive outcomes, but produced relatively consistent findings.

Question – Alcohol and All-Cause Mortality

What is the relationship between alcohol consumption and all-cause mortality?

Approach to Answer Question: NESR Systematic Review
Beverages and Added Sugars Subcommittee

Presented by Timothy Naimi, MD, MPH

Description of the Evidence

- **60 studies**: 58 prospective cohort studies, 1 retrospective cohort study, 1 Mendelian randomization study
- **Population**: Most studies enrolled broad range of adult ages, though ~1/3 enrolled only adults over age 50
- **Exposure**: Average consumption or pattern of consumption (e.g., number of drinks per drinking day or drinks per drinking occasion)
- **Comparator**:
  - **Primary Comparison:** differing average alcohol consumption or patterns among those who currently drink
  - **Secondary Comparison:** between those who currently drink and those who have never consumed alcohol (i.e., lifetime abstainers)

Summary of the Evidence Synthesis: Primary Comparison

- Studies used widely varying Definitions of 'low' and 'moderate' consumption
- Among those that currently drink, evidence consistently reported that:
  - Higher average volume of alcohol consumption was significantly associated with and higher risk of all-cause mortality
  - More frequent binge drinking was significantly associated with higher risk of all-cause mortality
- Studies directly assessed the relationship between alcohol consumption and all-cause mortality using large samples
- Limitations: generalizability of older cohorts (survival bias), inadequate adjustment for confounders, inconsistency in exposure measurement and definitions

DRAFT Conclusion Statement and Grade

Primary comparison (among those who drink)

Conclusion statement

Moderate evidence indicates that higher average alcohol consumption is associated with an increased risk of all-cause mortality compared with lower average alcohol consumption among those who drink.

Grade: Moderate

DRAFT Conclusion Statement and Grade

Primary comparison (among those who drink)

Conclusion statement

Moderate evidence indicates that binge drinking (consuming 5 or more drinks for men or 4 or more drinks for women during a drinking occasion) is associated with increased risk of all-cause mortality, and that more frequent binge drinking is associated with increased risk of all-cause mortality compared with less frequent or no binge drinking among those who drink.

Grade: Moderate

Summary of the Evidence Synthesis: Secondary Comparison

- 25 studies examined never drinkers vs low average consumption
- Roughly half reported significantly reduced risk of all-cause mortality for low average consumption compared with never drinking alcohol (i.e., lifetime abstention)
- About half showed no significant association between low average consumption vs never consuming alcohol on all-cause mortality
- Two studies showed greater all-cause mortality with low average consumption compared to never drinking alcohol
- Limitations: misclassification of 'never' drinkers (e.g., potential inclusion of former drinkers), single exposure assessment, inadequate adjustment for confounders, limited generalizability

DRAFT Conclusion Statement and Grade

Secondary comparison (between those who currently drink and those who never drank)

Conclusion statement

Limited evidence suggests that low average alcohol consumption, particularly without binge drinking, is associated with a lower risk of all-cause mortality compared with never drinking alcohol. However, in light of the many scientific and public health issues associated with alcoholic beverages, any conclusions about low average consumption compared to never drinking alcohol require careful consideration.

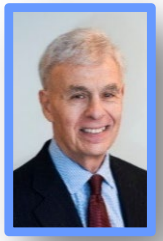
Grade: Limited

Discussion: Secondary Comparison

- Findings don't translate into a recommendation to begin drinking alcohol for better health
  - Initiating alcohol consumption involves risk
  - No RCTs randomizing those who never drank, or don't currently drink, to initiate alcohol consumption for any mortality or morbidity outcome
  - Compared to those who might begin to drink, established low volume drinkers enrolled in cohort studies are a select group who didn't die prematurely, didn't become heavy drinkers, didn't quit drinking
  - In addition to differences in alcohol consumption, lifetime abstainers differ in many ways from established low volume drinkers

2020 Dietary Guidelines Advisory Committee

Barbara Schneeman, PhD
University of California-Davis
Chair



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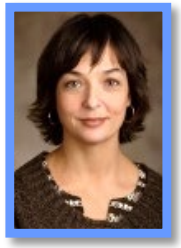

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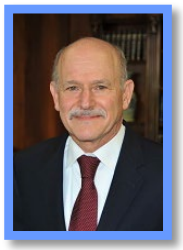

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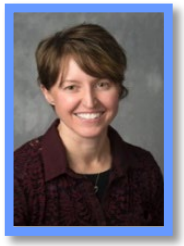

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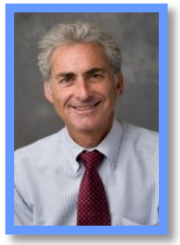

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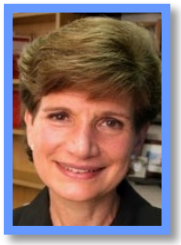

Linda Van Horn, PhD, RDN, LD
Northwestern University

*Massachusetts General Hospital

Remote attendance

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee

Outline of the Committee's Report

Barbara Schneeman, PhD

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Scientific Report of the 2020 Dietary Guidelines Advisory Committee

PART A: EXECUTIVE SUMMARY

PART B: SETTING THE STAGE AND INTEGRATING THE EVIDENCE*

PART C: METHODOLOGY

PART D: EVIDENCE ON DIET AND HEALTH*

PART E: FUTURE DIRECTIONS

PART F: APPENDICES

***Focus of today's discussion**

PART D: EVIDENCE ON DIET AND HEALTH

Current Dietary Intakes Through the Life Course

Chapter 1: Current Intakes of Foods, Beverages, and Nutrients

Diet and Health Relationships: Pregnancy and Lactation

Chapter 2: Food, Beverage, and Nutrient Consumption During Pregnancy

Chapter 3: Food, Beverage, and Nutrient Consumption During Lactation

Diet and Health Relationships: Birth to Age 24 Months

Chapter 4: Duration, Frequency, and Volume of Exclusive Human Milk and/or Infant Formula Feeding

Chapter 5: Food and Beverages Consumed During Infancy and Toddlerhood

Chapter 6: Nutrients from Dietary Supplements During Infancy and Toddlerhood

Chapter 7: USDA Food Patterns for Children Younger than Age 24 Months

Diet and Health Relationships: Individuals Ages Two Years and Older

Chapter 8: Dietary Patterns

Chapter 9: Dietary Fats and Seafood

Chapter 10: Beverages

Chapter 11: Alcoholic Beverages

Chapter 12: Added Sugars

Chapter 13: Frequency of Eating

Chapter 14: USDA Food Patterns for Individuals 2 Years and Older

PART D: CHAPTER TEMPLATE

INTRODUCTION

LIST OF QUESTIONS

METHODOLOGY

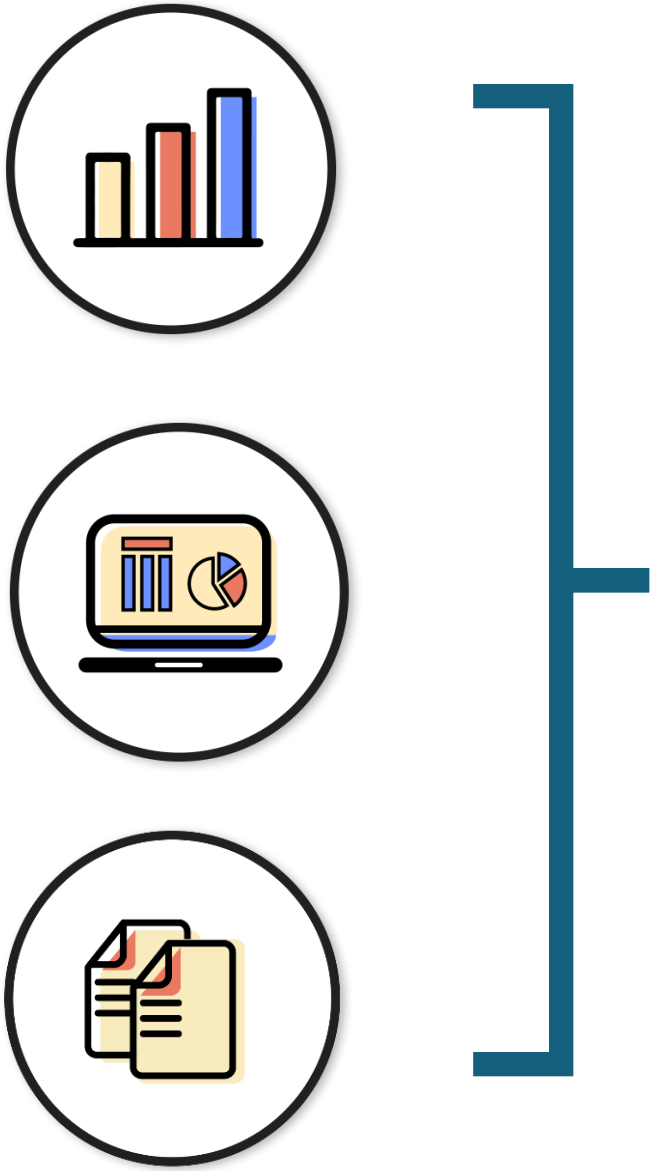
REVIEW OF THE SCIENCE

DISCUSSION

SUMMARY → ***Committee's Evidence-Based Advice to the Departments***

REFERENCES

From Conclusion Statements to Advice



The Committee looks across *all* of the conclusion statements – the totality of our scientific review – to develop overarching advice for USDA and HHS to consider as the Departments develop the *2020-2025 Dietary Guidelines*.

Today's Discussion
Times are Tentative

Current Dietary Intakes Through the Life Course
Pregnancy and Lactation

1:00-1:30 pm ET - Break

Birth to 24 Months

3:00-3:30 pm ET - Break (3:30 pm ET – New webcast link)

Two Years and Older
Integrating the Evidence and Future Directions
Next Steps and Closing Remarks

7:00 pm ET - Adjourn

2020 Dietary Guidelines Advisory Committee: DRAFT - Part D. Chapter 1: Current Intakes of Foods, Beverages, and Nutrients

Members Involved in Drafting this Chapter:

Regan Bailey

Jamy Ard

Teresa Davis

Timothy Naimi

Jaime Stang

Chair/Vice Chair Rep: Barbara Schneeman

This chapter includes questions examined by the Data Analysis Food Pattern Modeling Working Group

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LIST OF QUESTIONS

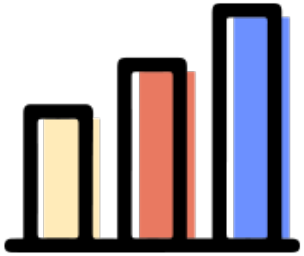
1. What is the current prevalence of nutrition-related chronic health conditions?
2. What are the current intakes of food groups?
3. What are the current patterns of food and beverage intake?
4. Which nutrients present a substantial public health concern because of underconsumption or overconsumption?
5. How does dietary intake, particularly dietary patterns, track across life stages from the introduction of foods, into childhood, and through older adulthood?

REVIEW OF THE SCIENCE

- 6 draft conclusion statements across the 5 questions.
- Approximately 155 different analyses, were reviewed.
- Data analyses reflected the most current NHANES cycle available and combined cycles when needed for sufficient sample sizes.
- Sample sizes were small for infants and toddlers and for women who were pregnant or lactating.
- All data are cross-sectional.
- Conclusion statements were not graded but take into consideration strengths and limitations of analyses.

METHODOLOGY

All questions were answered using data analysis



Final protocols and draft conclusion statements available at DietaryGuidelines.gov

DISCUSSION

- Most Americans have one or more chronic health conditions that are related to dietary intake across the life course, including overweight and obesity, heart disease, stroke, Type 2 diabetes, hypertension, liver disease, certain types of cancer, dental caries, and metabolic syndrome.
- Racial and socioeconomic status disparities exist with regard to chronic diseases

DISCUSSION

- The American dietary landscape has not changed appreciably over the last decade
- Patterns of food group intakes across the life course contribute to higher than recommended intakes of added sugars, sodium, and saturated fats.
- Lower than recommended dietary intakes of fruits, vegetables, and whole grains were noted for almost all Americans.

DISCUSSION: Pregnancy & Lactation

- While HEI scores were higher in pregnancy and lactation than in women of similar ages, many dietary deficits were noted.
- Iron deficiency in 1 in 10 pregnant women, with estimates highest in the third trimester (~25 percent), and being more prevalent in Hispanic, Mexican, and non-Hispanic black women
- Urinary iodine concentrations suggest iodine is also of concern
- Folate/folic acid intakes in the first trimester

DISCUSSION: Older infants (6 to 12 months)

- Most U.S. infants are introduced to complementary foods before 6 months of age.
- The primary mode of feeding is associated with the timing of introduction of CFB and the types of foods and beverages that are consumed.
- Formula-fed infants are more likely to be introduced to CFB at earlier ages and tend consume different amounts and types of food

CFB= Complementary foods and beverages

Older infants (6 to 12 months)

Public Health Concern

- Based on proportion of **human milk fed infants** with intakes (human milk and CFB) below EAR
  - Iron

Pose special challenges

- Based on estimated mean nutrient intakes **for all infants** from CFB compared to the proportion of AI expected to come from CFB
  - Potassium
  - Vitamin D
  - Choline

- Based on percent of **FMF infants** with intakes above the UL
  - Zinc
  - Retinol

Toddlers (12 to 24 months)

- By 12 months most infants cease to consume human milk or infant formula.

- Patterns of food group intakes and sources of food groups and energy among toddlers are similar to those of the U.S. population ages 2 years and older.

Toddlers (12 to 24 months)

Proposed nutrient or food component of public health concern (from meeting 4)

- potassium
- fiber
- vitamin D
- sodium
- added sugars

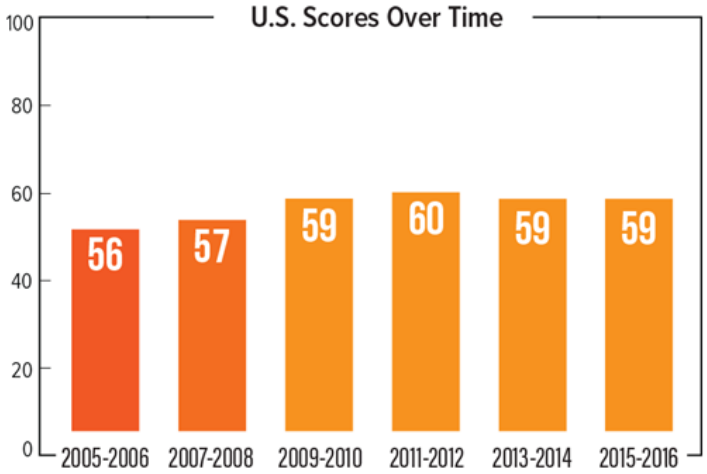
Proposed nutrient or food component that pose special challenges

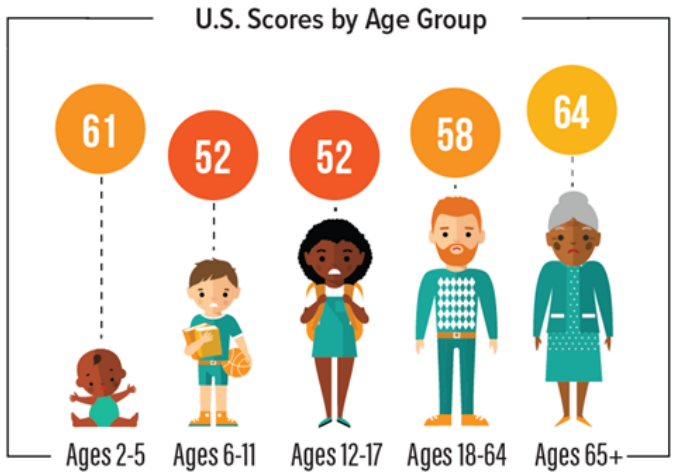
- choline
- linoleic acid

Many 1 y olds exceed recommendations for zinc and retinol from foods alone.

Dietary Quality by Life stage

How Healthy Is the American Diet?





Data source for Healthy Eating Index scores: What We Eat in American, National Health and Nutrition Examination Survey. (Undated data are from 2015-2016).

Americans, 2 years and older

Food Components of Public Health Concern

- Based on nutrient intake distributions, taken into consideration with biological endpoints and prevalence of clinical outcomes
  - vitamin D
  - calcium
  - dietary fiber
  - potassium
  - sodium
  - saturated fat
  - added sugars

DISCUSSION: Adolescents

- Using the life-course approach, the Committee recognized that pre-teens and adolescents may be at particular nutritional risk

DISCUSSION: Older Adults

- While older adults have higher relative HEI scores, additional concerns for vitamin B12 and protein are observed and warrant consideration for tailoring specific guidance.
- Protein and B6 may also be of concern among older women
- Osteoporosis and sarcopenia are chief concerns for older Americans, especially women.

Needs and Gaps

- Standardize definitions of life stages at the Federal level
- Develop HEI for those less than 2 years
- External ways to examine diet quality independent of HEI
- Identify what dietary patterns exist
- Over sampling populations at risk or where little data are available

Needs and Gaps

- Biomarker data that are current and national in scope are needed to adequately describe the nutritional status of Americans, particularly those who are currently underrepresented in national data (i.e. infants and toddlers, reproductive-aged females, pregnant and lactating women, and certain race and ethnic groups).
- A process is needed to identify topics that can be carried forward into a future cycle of the DGA without additional review by the advisory committee.

Needs and Gaps

- An accurate and current database of representative values for the energy and nutrient composition of human milk.

- Updated Dietary Reference Intake values from infants and young children are needed to best characterize potential dietary inadequacy and excess.

Needs and Gaps

- Americans may need tools and technologies to help manage weight, analyze and plan their diets. Without such resources, it is difficult for individuals to follow the Dietary Guidelines.

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

- Diet is a modifiable factor that is critically relevant to the primary and secondary prevention of most non-communicable diseases and the leading cause of disability and death affecting Americans.
- Dietary intake is also an important determinant of body weight and risk of overweight and obesity. Overweight and obesity begin early in life and remain public health problems in all age groups.

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

- The diet is quite complex, and the implications of dietary intake on risk of disease in the moment or later in life can be difficult to quantify.
- In order to both encourage and facilitate a healthier diet, the focus needs to be not only on what Americans choose to eat, but also on the social, economic, and environmental contexts that determine our dietary patterns. These contexts also drive dietary and health disparities that exist in the US.
- In addition to establishing optimal dietary patterns early in life, efforts should continue to ensure energy balance early in life and maintenance of energy balance over the life course.

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

- The 2015 Dietary Guidelines Advisory Committee described a need to understand how food security shapes dietary intakes.
- Future Committees may wish to examine optimal nutrition for prevention of cognitive decline in older adults.
- Include a review of public health-based strategies that have been successful in promoting higher quality dietary intakes, especially in key populations that are at high risk.

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

- Americans need to make shifts in their diets that do not add calories but make substitutions with more nutrient-dense foods or beverages.
- The Committee also recommends that the 2020-2025 Dietary Guidelines for Americans provide very specific messaging around beverage intakes, with a focus on sweetened beverages and alcohol.

DRAFT - Part D. Chapter 1: Current Intakes of Foods, Beverages, and Nutrients
USDA/HHS Staff Who Supported this Chapter

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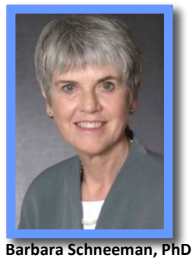
2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 1: Current Intakes of Foods, Beverages, and Nutrients



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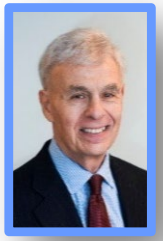

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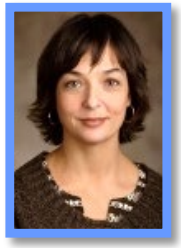

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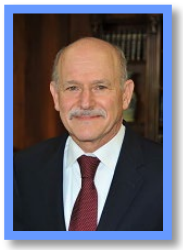

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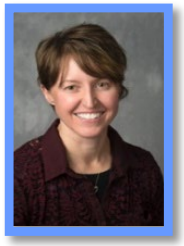

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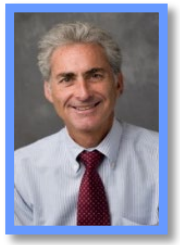

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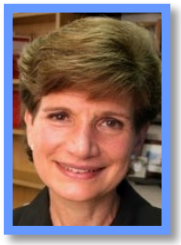

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*Massachusetts General Hospital

Remote attendance

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee: DRAFT - Part D. Chapter 2: Pregnancy

Members Involved in Drafting this Chapter:

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Kathryn Dewey
Rachel Novotny
Jamie Stang
Elsie Taveras
Ron Kleinman (Vice Chair Rep)

This chapter includes questions examined by the *Pregnancy and Lactation*, *Beverages and Added Sugars*, *Dietary Fats and Seafood*, and *Frequency of Eating* subcommittees

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INTRODUCTION (1 of 3)

- Pregnancy is a critical period of life for both a mother and her child.
- Physiological and metabolic changes that occur during pregnancy can predispose some women to developing sometimes life-threatening health conditions, such as gestational diabetes mellitus and hypertensive disorders.
- Excessive gestational weight gain is relatively common, particularly in women with a high prepregnancy BMI, and retention of excess body weight postpartum places a woman at higher risk for chronic diseases in subsequent pregnancies and later in life.

INTRODUCTION (2 of 3)

- The Developmental Origins of Health and Disease hypothesis posits that environmental exposures during early developmental stages increase the risk of developing metabolic and neurodegenerative disorders during later life.

- A mother's health and nutritional status during the first 1,000 days of an infant and child's life, beginning at conception and continuing through the second year of life, are crucial for ensuring optimal physical, social, and psychomotor growth and development and lifelong health.

- The *2020-2025 Dietary Guidelines for Americans* will take a lifespan approach with a new focus on the first 1,000 days of life and will specifically focus on pregnant and lactating women and infants from birth to 24 months.

INTRODUCTION (3 of 3)

- The 2015 Dietary Guidelines Advisory Committee report included some discussion of nutrients of public health concern specific to women who are pregnant, and dietary patterns during pregnancy that are linked to risk of congenital anomalies, but it did not include a substantial emphasis on food or beverage intake and maternal-fetal outcomes of pregnancy.
- The systematic reviews included in this report are the first to assess questions that specifically examine relationships between food and beverage patterns or micronutrients during pregnancy and maternal-fetal outcomes that affect large groups of women and their children.

LIST OF QUESTIONS (#1-5)

1. What is the relationship between **dietary patterns** consumed during pregnancy and risk of **gestational diabetes mellitus**?
2. What is the relationship between **dietary patterns** consumed during pregnancy and risk of **hypertensive disorders during pregnancy**?
3. What is the relationship between **dietary patterns** consumed during pregnancy and **gestational weight gain**?
4. What is the relationship between **frequency of eating** during pregnancy and **gestational weight gain**?
5. What is the relationship between **dietary patterns** during pregnancy and **gestational age at birth**?

LIST OF QUESTIONS (#6-9)

6. What is the relationship between **dietary patterns** consumed during pregnancy and **birth weight** standardized for gestational age and sex?
7. What is the relationship between **beverage consumption** during pregnancy and **birth weight** standardized for gestational age and sex?
8. What is the relationship between **maternal diet during pregnancy** and risk of child **food allergies and atopic allergic diseases, including atopic dermatitis, allergic rhinitis, and asthma**?
9. What is the relationship between **seafood consumption** during pregnancy and **neurocognitive development in the child**?

LIST OF QUESTIONS (#10-11)

10. What is the relationship between **omega-3 fatty acids from supplements** consumed before and during pregnancy and **developmental milestones, including neurocognitive development** in the child?
11. What is the relationship between **folic acid from supplements and/or fortified foods** consumed before and during pregnancy and 1) **maternal micronutrient status**, 2) **gestational diabetes**, 3) **hypertensive disorders**, 4) **human milk composition**, and 5) **neurocognitive development** in the child?

METHODOLOGY

- Four of the systematic reviews included in this body of evidence, specifically those that examined the impact of dietary patterns during pregnancy on maternal and birth outcomes (**Questions 1, 2, 5 and 6**), were undertaken by the USDA and HHS as part of the Pregnancy and Birth to 24 Months Project.
  - These previously completed systematic reviews, which were published in 2019, were adopted by the 2020 Dietary Guidelines Advisory Committee as they directly addressed the questions given.

- Remaining questions (**3, 4, 7, 8, 9, 10, and 11**) were answered using new NESR systematic reviews.

REVIEW OF THE SCIENCE

- 65 draft conclusion statements across the 11 questions.
- Over 160 articles, representing over 110 studies, were included in the new NESR systematic reviews and 51 articles, representing 38 studies, were included in the existing NESR systematic reviews.
- Conclusion statements were graded from Strong to Grade Not Assignable, although the subcommittee was unable to grade most (69%) conclusion statements due to insufficient evidence.
- Notable gaps in research have been identified and specific research recommendations to address these gaps will be discussed in the report.

SUMMARY OF CONCLUSIONS (Questions 1-7)

Question	Grade*
1. DP before and during pregnancy and risk of **GDM**	• Before pregnancy (limited)
2. DP before and during pregnancy and risk of **hypertensive disorders**	• Before and during pregnancy in healthy White women (limited)
3. DP during pregnancy and **GWG**	• During pregnancy (limited)
4. Frequency of eating *during pregnancy and* ***GWG***	• *No evidence*
5. DP before and during pregnancy and **gestational age at birth**	• During pregnancy (limited)
6. DP *before and during pregnancy and* ***birthweight***	• *No conclusion for during pregnancy*
7. Beverage consumption *during pregnancy and* ***birthweight***	• *Insufficient for any beverage*

**** All others: Insufficient or no evidence unless otherwise noted (Q4, 6 and 7)***

SUMMARY OF CONCLUSIONS (Question 8)

Question	Grade*
8. Maternal diet during pregnancy and:	***No Relationship* or *No Reduction in Risk***
• **Food Allergy**	• **Soy** consumption (limited)
• **Atopic Dermatitis**	• Lower/restricted **cow milk products** or **egg** (moderate) • **Fish** consumption (limited) • **Dietary patterns** (limited)
• **Allergic Rhinitis**	• Lower/restricted **egg** (moderate) • **Dietary patterns** (limited)
• **Asthma**	• Lower/restricted **cow milk products** (limited) • **Fish or egg** consumption (limited)

**** All others: Insufficient or no evidence***

SUMMARY OF CONCLUSIONS (Questions 9-11)

Question	Grade*
9. Seafood consumption during pregnancy and neurocognitive outcomes	• Favorable for cognitive development (moderate) • Favorable for language and communication (limited)
10. Omega-3 FA from supplements during pregnancy and neurocognitive outcomes	• Favorable for cognitive development (limited)
11. Folic acid supplements before or during pregnancy:	
• Maternal folate status (serum, plasma, RBC)	• Positive association (strong)
• Hypertensive disorders	• Reduced risk if consumed during early pregnancy by high risk women (limited) • No benefit in low risk women (moderate)

All others: Insufficient or no evidence

DISCUSSION (1 of 3)

- The Committee found that certain dietary patterns are associated with a modest reduction in the risk of excessive gestational weight gain, gestational diabetes mellitus, hypertensive disorders, and preterm birth.

- The components of these dietary patterns align with dietary patterns associated with lower overall chronic disease risk in women who are not pregnant or lactating.

DISCUSSION (2 of 3)

Food Components of Dietary Patterns that are Associated with a Modest Reduction in Risk

Reduced Risk	Excessive GWG	GDM	Hypertensive Disorders	Gestational Age
Higher in:				
Vegetables	X	X	X	X
Fruits	X	X	X	X
Whole grains		X	X	X
Nuts	X	X	X	X
Legumes/Seeds	X	X	X	X
Fish	X	X	X	Preterm birth
Veg Oils			X	
Lower in:				
Red and processed meat	X	X	X (Specifically Processed Meat)	X
Refined grains			X	
Added sugars	X			
Fried Foods				X

DISCUSSION (3 of 3)

- Frequency of eating is a component of dietary patterns that may play a role in maternal-fetal outcomes of pregnancy.
  - The 1992 Implementation Guide for the 1990 Institute of Medicine gestational weight gain guidelines recommended that women who are pregnant eat 3 meals and 2 or more snacks each day. This eating pattern aims to ensure that women are able to consume the extra nutrients needed during pregnancy, while minimizing common gastrointestinal complaints.

- Existing literature suggests that eating patterns change during pregnancy, moving from a main-meal focused pattern during the second trimester to a snack-dominant pattern by the beginning of the third trimester.

- More research is needed to determine how frequency and macronutrient content of eating and drinking occasions affect gestational weight gain and other pregnancy outcomes.

SUMMARY (1 of 2)

- The evidence reviewed by the Committee reinforces the importance of nutrition for women of reproductive age and women who are pregnant for optimal maternal and fetal outcomes.

- Each of the 3 Food Patterns (**Healthy U.S.-Style; Healthy Vegetarian or Healthy Mediterranean-Style)** described in Chapter 14* is expected to meet nutrient needs for women who are pregnant *with the possible exception of:*
  - Choline
  - Iron
  - Vitamin D
  - Vitamin E

*see ***Part D. Chapter 14-USDA Food Patterns for 2 Years and Older)***

SUMMARY (2 of 2)

- For some women who are pregnant, iron supplementation may be needed to meet iron needs.

- Folic acid supplementation improves maternal folate status and may reduce the risk of hypertensive disorders in high risk individuals.
  - Folic acid supplementation should begin prior to conception to reduce the risk of neural tube defects and hypertensive disorders.

SUMMARY: Draft Strategies for Women of Reproductive Age (#1 of 7 strategies)

1. Encourage women to achieve a healthy weight before pregnancy, and to strive for gestational weight gain within the 2009 Institute of Medicine's recommendations. Previous Committees have made this recommendation, and this Committee concurs. The increased energy needs during pregnancy can best be met through the consumption of a varied, nutrient-dense diet.

SUMMARY: Draft Strategies for Women of Reproductive Age (#2 and #3 of 7)

2. Encourage women before and during pregnancy to choose dietary patterns that are higher in vegetables, fruits, whole grains, nuts, legumes, seafood, and vegetable oils, and lower in added sugars, refined grains, and red and processed meats.

3. Encourage women to consume foods and beverages that are good sources of iron, folate, calcium, choline, magnesium, protein, fiber, and other potential shortfall nutrients.

SUMMARY: Draft Strategies for Women of Reproductive Age (#4 and #5 of 7)

4. Encourage women to not avoid potential allergenic foods during pregnancy unless it is medically warranted to protect the mother's health.

5. Encourage women who are pregnant to consume seafood in accordance with recommendations by the *2015-2020 Dietary Guidelines for Americans*, the Food and Drug Administration, and the Environmental Protection Agency: at least 8 and up to 12 ounces of a variety of seafood per week, from choices that are lower in methyl mercury.

SUMMARY: Draft Strategies for Women of Reproductive Age (#6 of 7)

6. Encourage women who are or may be pregnant to follow guidance from the *2015-2020 Dietary Guidelines for Americans* that "Women who are or who may be pregnant should not drink alcohol. Drinking during pregnancy, especially in the first few months of pregnancy, may result in negative behavioral or neurological consequences in the children. No safe level of alcohol consumption during pregnancy has been established.

SUMMARY: Draft Strategies for Women of Reproductive Age (#7 of 7)

7. Encourage women who are pregnant to select foods in accordance with food safety recommendations outlined in previous scientific reports of the Dietary Guidelines Advisory Committee and editions of the *Dietary Guidelines for Americans*, including avoiding unpasteurized milk and soft cheeses, undercooked meats, and limiting processed meats.

SUMMARY: Draft Support for Federal Programs

1. The Committee supports efforts by Federal programs, such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), to encourage pregnant women to take advantage of available nutrition counseling services.

2. The Committee supports further development of surveillance systems and databases to report dietary and beverage intakes of diverse subgroups of women who are pregnant.

DRAFT - Part D. Chapter 2: Pregnancy
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2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 2: Pregnancy

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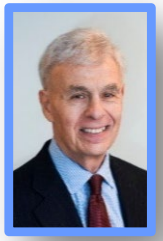

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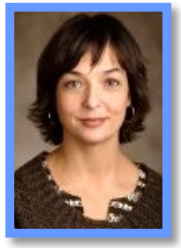

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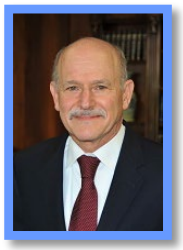

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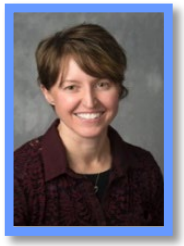

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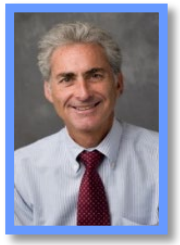

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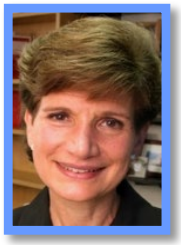

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2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee: DRAFT - Part D. Chapter 3: Lactation

Members Involved in Drafting this Chapter:

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Kathryn Dewey
Rachel Novotny
Jamie Stang
Elsie Taveras
Ron Kleinman (Vice Chair Rep)

This chapter includes questions examined by the Pregnancy and Lactation, Dietary Fats and Seafood, and Frequency of Eating Subcommittees

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INTRODUCTION (1 of 3)

- Maternal nutrition is a key factor influencing the health of both the lactating woman and her child
- Nutrient requirements during lactation are intended to support the nutritional status of the woman and to provide the additional amounts of energy and nutrients associated with milk synthesis and the secretion of nutrients into human milk
- For many nutrients, the requirements during lactation differ from those during pregnancy, so women who are lactating should adapt their dietary choices and supplement use to meet those needs
  - 70% of women who are lactating use dietary supplements
  - 50% of the women continued to use prenatal supplements during lactation
- In well-nourished women, the energy requirements for lactation take into account mobilization of maternal fat stores, which may assist women in postpartum weight loss

INTRODUCTION (2 of 3)

- Concentrations of some micronutrients in human milk, but not all, are correlated with maternal nutrient status and can be influenced by diet and supplement use

- Human milk has a unique array of nutrients and bioactive substances that support optimal infant growth and development and may influence neurocognitive development and the risk of atopic diseases

INTRODUCTION (3 of 3)

- For the first time, the *2020-2025 Dietary Guidelines for Americans* will specifically focus on guidelines for women who are lactating.

- Previous Committees (2005, 2010, 2015) have provided some guidance on specific foods, food components, or nutrients and lactation outcomes.

- This Committee re-examined seafood consumption and omega-3 fatty acid supplements. In addition, several new relationships were examined, focusing mainly on maternal dietary patterns during lactation and specific health outcomes.

LIST OF QUESTIONS (1-4)

1. What is the relationship between **dietary patterns** consumed during lactation and **postpartum weight loss**?
2. What is the relationship between **frequency of eating** during lactation and **postpartum weight loss**?
3. What is the relationship between **dietary patterns** consumed during lactation and **human milk composition and quantity**?
4. What is the relationship between **maternal diet during lactation** and risk of **child food allergies and atopic allergic diseases, including atopic dermatitis, allergic rhinitis, and asthma**?

LIST OF QUESTIONS (5-8)

5. What is the relationship between **dietary patterns** consumed during lactation and **developmental milestones, including neurocognitive development** in the child?
6. What is the relationship between **seafood consumption** during lactation and **neurocognitive development** in the child?
7. What is the relationship between **omega-3 fatty acids from supplement**s consumed during lactation **and developmental milestones, including neurocognitive development in the child**?
8. What is the relationship between **folic acid from supplements and/or fortified foods** consumed during lactation and 1) maternal micronutrient status, 2) human milk composition, and 3) developmental milestones, including neurocognitive development in the child?

METHODOLOGY

- All questions were answered using new NESR systematic reviews.

REVIEW OF THE SCIENCE

- More than 30 articles, representing over 25 studies, were included in 6 out of 8 NESR systematic reviews. No studies were identified that met the inclusion criteria for Questions 5 and 6.
- 37 draft conclusion statements across the 8 questions.
- The Subcommittees were unable to grade 33 of the 37 conclusion statements due to insufficient evidence.
- Notable gaps in research have been identified and specific research recommendations to address these gaps will be discussed in the report.

REVIEW OF THE SCIENCE – Key Findings (1 of 2)

3. What is the relationship between dietary patterns consumed during lactation and human milk composition and quantity?

- Limited evidence suggests that the maternal consumption of diets higher in fat (>35 percent fat) and lower in carbohydrate during lactation is related to higher total fat in human milk collected in maternal postprandial period.

- Limited evidence suggests that certain maternal dietary patterns during lactation, including diets based on macronutrient distributions, are related to the relative proportions of saturated fat and monounsaturated fat in human milk, and of polyunsaturated fats in human milk collected in the maternal postprandial period.

REVIEW OF THE SCIENCE – Key Findings (2 of 2)

8. What is the relationship between folic acid from supplements and/or fortified foods consumed during lactation and 1) maternal micronutrient status, 2) human milk composition, and 3) developmental milestones, including neurocognitive development in the child?

- Moderate evidence indicates that folic acid supplements consumed during lactation are positively associated with red blood cell folate, and may be positively associated with serum or plasma folate.

- Moderate evidence indicates that folic acid supplements consumed during lactation do not influence folate levels in human milk.

DISCUSSION (1 of 3)

- The 2020 Committee was unable to draw conclusions regarding maternal dietary patterns or frequency of eating during lactation and PPWL due to a lack of evidence.
- No conclusions regarding maternal dietary patterns and human milk composition other than total fat and fatty acid composition were drawn
- No conclusions regarding relationships between maternal dietary patterns, seafood intake, omega-3 fatty acid supplementation or folic acid supplementation and neurocognitive outcomes in the child could be drawn due to a lack of evidence

DISCUSSION (2 of 3)

- The Committee did find evidence to recommend certain dietary patterns during *pregnancy*, the components of which align with dietary patterns associated with lower overall chronic disease risk in women who are *not pregnant or lactating*, supporting relatively consistent dietary patterns associated with healthy outcomes in women of reproductive age.
- Each of the 3 Food Patterns (**Healthy U.S.-Style; Healthy Vegetarian or Healthy Mediterranean-Style)** described in ***Chapter 14: USDA Food Patterns for Individuals Ages 2 Years and Older*** is expected to meet nutrient needs for women who are lactating *with the possible exception of:*
  - Vitamin A
  - Choline
  - Vitamin D
  - Vitamin E

DISCUSSION (3 of 3)

- Despite the lack of evidence found to determine the relationship between seafood consumption during lactation and neurocognitive outcomes in the child, seafood choices are important components of a healthy dietary pattern for women who are not pregnant or lactating, as well as for those who are pregnant.
- Additionally, seafood may increase the DHA content of human milk and provides potential shortfall nutrients for women who are lactating

SUMMARY: Draft Strategies for Women Who Are Lactating (#1 and #2 of 8)

1. Encourage women who are lactating to consume a wide variety of foods that are consistent with the dietary patterns described in ***Chapter 14: USDA Food Patterns for Individuals Ages 2 Years and Older***

2. Encourage consumption of foods and beverages that are good sources of potential shortfall nutrients identified in ***Chapter 1: Current Intakes of Foods, Beverages, and Nutrients*** or that or that are lower than recommended for women who are lactating in the USDA Food Patterns, including choline, magnesium, protein, fiber, and vitamins A, D and E.

SUMMARY: Draft Strategies for Women Who Are Lactating (#3 and #4 of 8)

3. Encourage women to discontinue the use of prenatal supplements during lactation unless they are medically indicated, as these supplements are usually formulated to meet the high iron requirements of pregnant women, not to meet the nutritional requirements for lactating women, and can therefore result in iron intakes above the UL.

4. Encourage women to not avoid potential allergenic foods during lactation, unless it is medically indicated to protect the mother's health.

SUMMARY: Draft Strategies for Women Who Are Lactating (#5 and #6 of 8)

5. Encourage women to follow guidance from the 2015 Dietary Guidelines Advisory Committee and the AAP that, "women who are breastfeeding should consult with their health care provider regarding alcohol consumption." This Committee did not review evidence regarding alcoholic beverage consumption by lactating women, but supports this prior guidance.

6. Encourage women to follow guidance from the 2015 Dietary Guidelines Advisory Committee that "…those who are breastfeeding should consult their health care providers for advice concerning caffeine consumption." This Committee did not review evidence regarding caffeine consumption by lactating women, but supports this prior guidance.

SUMMARY: Draft Strategies for Women Who Are Lactating (#7 of 8)

7. Encourage women who are breastfeeding to consume seafood in accordance with recommendations by the 2015-2020 Dietary Guidelines for Americans, the Food and Drug Administration, and the Environmental Protection Agency: at least 8 and up to 12 ounces of a variety of seafood per week, from choices that are lower in methyl mercury.

SUMMARY: Draft Strategies for Women Who Are Lactating (#8 of 8)

8. Encourage women to maintain a healthy pre-pregnancy weight, achieve appropriate weight gain during pregnancy, initiate and maintain breastfeeding throughout their child's infancy, and return to a healthy weight during the postpartum period. This Committee did not review evidence regarding relationships of maternal BMI or GWG to lactation success; however, existing evidence shows that high prepregnancy BMI and excess GWG are risk factors for suboptimal breastfeeding outcomes.

SUMMARY:
Draft Support for Federal Programs (1 of 3)

1. The Committee supports efforts by Federal programs, such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), to encourage women who are lactating to take advantage of available nutrition counseling services. In addition, policy, systems, and environmental change strategies and competitive pricing of healthy food and beverage choices can help ensure that women of all economic strata can afford them. Similar healthy foods and beverages should be routinely stocked and distributed by food pantries and other food assistance venues and recommended by food assistance programs.

SUMMARY:
Draft Support for Federal Programs (2 of 3)

2. Given the documented health benefits for the mother and infant, the Committee supports broader implementation of Federal programs that promote, protect and support breastfeeding.

SUMMARY:
Draft Support for Federal Programs (3 of 3)

3. The Committee supports efforts to further develop surveillance systems and databases to report food and beverage intakes of women who are lactating.
   - Represent diverse subgroups of women
   - Include effects of food security and economic status on food intake
   - Include food and beverage composition and supplement data that can show how fortified foods and supplemental sources of nutrients contribute to overall nutrient intake and dietary quality during lactation, and ideally should be linked to data on nutrient composition of human milk.

FUTURE RESEARCH NEEDS

- Despite the importance of the questions examined in this chapter for the long-term health of the mother and child, the available evidence for most questions was insufficient to form conclusion statements.

- Many questions remain to be answered regarding the content and pattern of the diet of women during lactation and the influence on PPWL, human milk composition and quantity, and child outcomes, in addition to other questions that the Committee was not asked to address

DRAFT - Part D. Chapter 3: Lactation
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2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 3: Lactation

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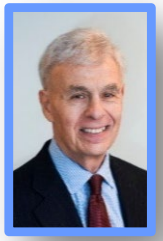

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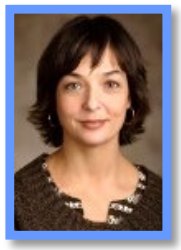

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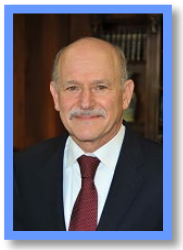

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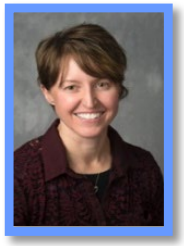

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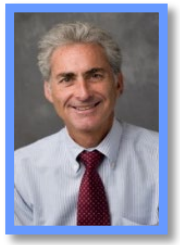

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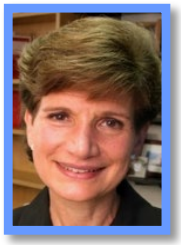

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2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee:

DRAFT - Part D. Chapter 4: Duration, Frequency, and Volume of Exclusive Human Milk and/or Infant Formula Consumption

Members Involved in Drafting this Chapter:

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This chapter includes questions examined by the Birth to 24 Months Subcommittee

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LIST OF QUESTIONS

1. What is the relationship between the duration, frequency, and volume of exclusive human milk and/or infant formula consumption and **overweight and obesity**?
2. What is the relationship between the duration, frequency, and volume of exclusive human milk and/or infant formula consumption and **long-term health outcomes**?
3. What is the relationship between the duration, frequency, and volume of exclusive human milk and/or infant formula consumption and **nutrient status**?
4. What is the relationship between the duration, frequency, and volume of exclusive human milk and/or infant formula consumption and **food allergies and atopic allergic diseases**?

BREADTH OF TOPICS

	OWOB	Food allergies & atopic allergic diseases				Long-term health		Nutrient status					
Duration/ frequency/ volume of human milk/ infant formula ↓	OW, OB	Food allergy	Atopic dermatitis	Allergic rhinitis	Asthma	CVD, intermed. outcomes	T1D, T2D, intermed. outcomes	Iron	Zinc	Iodine	B12	D	Fatty acids
Ever vs never	●	●	●	●	●	●	●	●	●	●	●	●	●
Duration of any human milk	●	●	●	●	●	●	●	●	●	●	●	●	●
Duration of exclusive human milk	●	●	●	●	●	●	●	●	●	●	●	●	●
Intensity of human milk in mixed-feeding	●	●	●	●	●	●	●	●	●	●	●	●	●
Breast vs bottle	●	●	●	●	●								
"Topping up"	●												

Part D. Chapter 4:
Duration, Frequency, and Volume of Exclusive Human Milk and/or Infant Formula Feeding
2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

METHODOLOGY

- The questions on overweight/obesity and nutrient status were answered using new NESR systematic reviews.
- The questions on long-term health and food allergies/atopic diseases were answered using existing NESR systematic reviews from the Pregnancy and Birth to 24 Months Project, published in 2019.

REVIEW OF THE SCIENCE

- Over 200 articles were included in the NESR systematic reviews (over 150 from the existing reviews and over 60 from the new reviews).
- Conclusion statements were graded from Moderate to Grade Not Assignable.
- Most evidence compared infants who ever consumed human milk with infants who never consumed human milk, or infants who consumed human milk for different durations.
- Most evidence measured outcomes during childhood.
- Most evidence consisted of observational studies, with the notable exception of a cluster RCT (Promotion of Breastfeeding Intervention Trial) that provided evidence for overweight/obesity, atopic disease, and long-term health outcomes.
- Human milk consumption was sometimes associated with a beneficial outcome (e.g., overweight/obesity, asthma, type 1 diabetes) and was sometimes not associated with an outcome (e.g., atopic dermatitis). In no case was consuming human milk associated with an adverse outcome.

DISCUSSION

Key Findings

Ever (vs. never) being fed human milk was related to lower risk of:

- **Overweight or obesity**
- **Type 1 diabetes**
- **Asthma**

A longer duration of human milk feeding was related to lower risk of:

- **Type 1 diabetes**
- **Asthma**

A longer duration of exclusive human milk feeding was related to lower risk of:

- **Type 1 diabetes**

DISCUSSION

Overweight and obesity

- Ever vs never fed human milk: causality difficult to determine because of the risk of confounding in observational studies, and the limitations of the sibling-pair studies.
- Other systematic reviews and meta-analyses have generally come to similar conclusions.
  - A systematic review of systematic reviews (Patro-Gołąb 2016 – *Obes Rev)* concluded that breastfeeding is consistently associated with a reduction in the odds of overweight or obesity in childhood and adulthood, by about 13% in high-quality studies, but residual confounding could not be ruled out.
  - The same review stated that "there are some indications that breastfeeding of very short duration has a lesser protective effect than breastfeeding of longer duration on the later risk of overweight and obesity, although residential confounding cannot be excluded."

DISCUSSION

Overweight and obesity, continued

Potential biological mechanisms

- Rapid weight gain during infancy consistently related to subsequent risk of overweight or obesity
  - Rapid weight gain more likely among formula-fed infants
- Infant self-regulation of energy intake may differ between breast- and formula-fed infants
- Higher protein intake among formula-fed infants drives hormonal differences that may stimulate greater weight gain and fat deposition
  - RCTs of reduced-protein formulas: less rapid infant weight gain and reduced obesity at school age
  - Precise mechanisms not yet clear

DISCUSSION

Overweight and obesity, continued

Potential biological mechanisms, continued

- Concentrations of free amino acids in human milk vs formula also may be important
  - Free glutamate (high in human milk) is a key signal for satiation.
  - Experimental study (formula with higher free glutamate content vs. standard infant formula) reported a significant difference in early rapid weight gain (Mennella 2018 – *Am J Clin Nutr*).
- Overfeeding of formula-fed infants also a possibility
  - Feeding by bottle may make it more difficult for the infant to communicate satiety signals, and the caregiver may urge the infant to finish the bottle so as to avoid wastage.
  - Differences in the dyadic approach of caregivers and infants during feeding may have longer term implications for programming of appetite regulation.

DISCUSSION

Type 1 diabetes mellitus

- Although the prevalence of type 1 diabetes is low, small increases in the risk of type 1 diabetes may have public health implications.
- The autoimmune destruction of insulin-producing beta cells in the pancreas that results in type 1 diabetes occurs in genetically susceptible individuals, but is likely triggered by environmental agents early in life.
- Potential biological mechanisms for the protective effect of breastfeeding: differences in composition of human milk vs. infant formula
  - Biologically active components in human milk may play a role in:
    - reducing gut permeability and early enterovirus infections
    - promoting a healthier infant gut microbiota

DISCUSSION

Asthma

The conclusion that human milk is related to reduced risk of asthma is supported by previous meta-analyses.

- Odds ratio for breastfeeding: 0.70 (95% CI: 0.60, 0.81) (Gdalevich 2001 – *J Pediatr*)
  - OR=0.52 (95% CI: 0.35, 0.79) in children with atopic first-degree relatives
  - OR=0.99 (95% CI: 0.48, 2.03) in those without a family history

Potential biological mechanisms

- Breastfeeding associated with reduced number of respiratory tract infections in infancy
- Exclusive breastfeeding may be beneficial for lung function
  - Infants exclusively breastfed for 4 months or more had better lung function at 8 years (measured by peak expiratory flow) than those breastfed less than 4 months.
- Breastfeeding may mediate these effects through protecting the lungs from viral infections or by promoting maturation of the infant immune system and microbiome

DISCUSSION

Scope of reviews

- Reviews limited to selected outcomes: overweight/obesity, long-term health, nutrient status, and atopic or allergic diseases in the offspring
- Not included:
  - Child infectious diseases (e.g., gastrointestinal, respiratory and ear infections), cancer, mortality, or development
  - Maternal outcomes related to initiation or duration of lactation, including reduced risk of:
    - breast, ovarian, and endometrial cancers
    - hypertension and cardiovascular disease
    - non-alcoholic fatty liver disease
    - type 2 diabetes mellitus
- Feeding recommendations should take into account all outcomes.

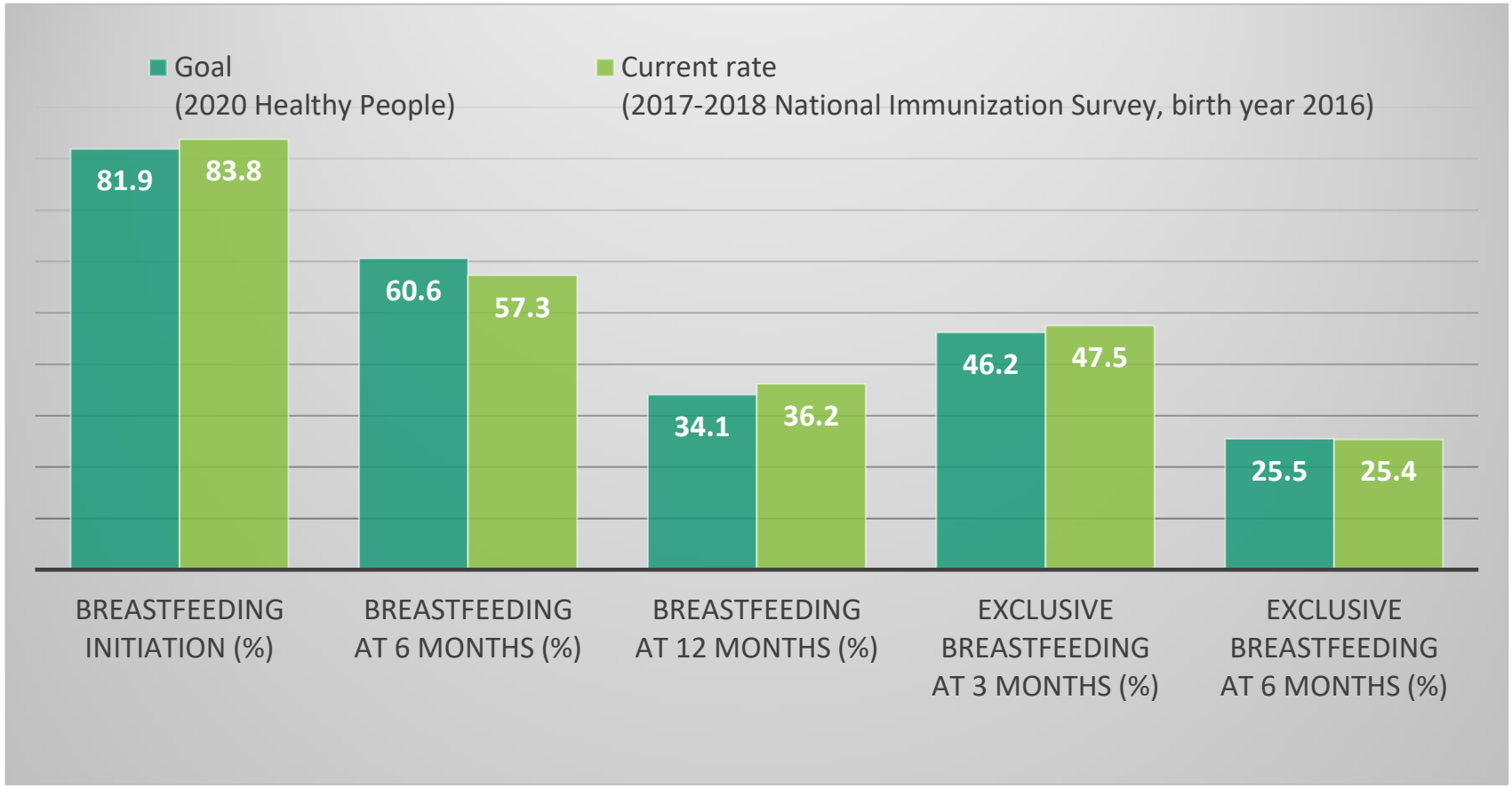
SUMMARY

The evidence is consistent with existing recommendations for breastfeeding in the U.S. and globally, including many other high-income countries, which generally advise:

- Exclusive breastfeeding until about age 6 months
- Continued breastfeeding thereafter, together with appropriate complementary feeding, until at least 12 months (AAP) or 24 months of age (WHO).

However, current breastfeeding rates in the U.S. indicate considerable room for improvement.

BREASTFEEDING RATES IN THE U.S. COMPARED TO 2020 HEALTHY PEOPLE GOALS



These percentages represent national data, and marked disparities in infant feeding exist based on geography, income, education, and race and ethnicity.

Part D. Chapter 4:
Duration, Frequency, and Volume of Exclusive Human Milk and/or Infant Formula Feeding
2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

SUMMARY:
Draft Evidence-Based Advice to USDA and HHS

Therefore, the Committee supports the following recommendations:

Encourage exclusive breastfeeding, ideally for the first 6 months of life, with continued breastfeeding through the first year of life or longer as desired by the mother and infant.

Encourage the broader implementation of policies and programs that promote, protect, and support breastfeeding to benefit both the health of the mother and the infant.

DRAFT - Part D. Chapter 4: Duration, Frequency, and Volume of Exclusive Human Milk and/or Infant Formula Feeding
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2020 Dietary Guidelines Advisory Committee:

DRAFT - Part D. Chapter 4: Duration, Frequency, and Volume of Exclusive Human Milk and/or Infant Formula Consumption

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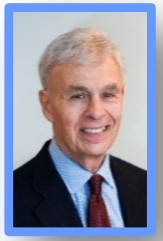

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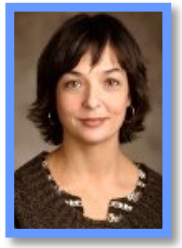

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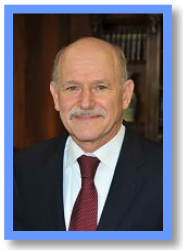

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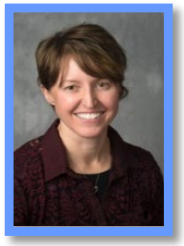

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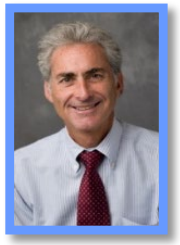

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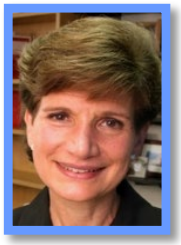

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2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 5: Food and Beverages Consumed During Infancy and Toddlerhood

Members Involved in Drafting this Chapter:

Kay Dewey
Lydia Bazzano
Teresa Davis
Sharon Donovan
Elsie Taveras
Ron Kleinman

This chapter includes questions examined by the Birth to 24 Months Subcommittee

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LIST OF QUESTIONS, part 1

1. What is the relationship between complementary feeding and **growth, size, and body composition**?
2. What is the relationship between complementary feeding and **developmental milestones, including neurocognitive development**?
3. What is the relationship between complementary feeding and **nutrient status**?
4. What is the relationship between complementary feeding and **bone health**?
5. What is the relationship between complementary feeding and **food allergies and atopic allergic diseases**?

METHODOLOGY, part 1

- Questions 1 through 5 were answered using existing NESR systematic reviews from the Pregnancy and Birth to 24 Months Project, published in 2019.

Final protocols and draft conclusion statements available at DietaryGuidelines.gov
Part D. Chapter 5: Food and Beverages Consumed During Infancy and Toddlerhood
2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

LIST OF QUESTIONS, part 2

6. What is the relationship between added sugars consumption during infancy and toddlerhood and risk of cardiovascular disease?
7. What is the relationship between types of dietary fats consumed during infancy and toddlerhood and risk of cardiovascular disease?
8. What is the relationship between seafood consumption during infancy and toddlerhood and risk of cardiovascular disease and neurocognitive development?

METHODOLOGY, part 2

- Questions 6 through 8 were part of the scope of new NESR systematic reviews conducted by the Beverages and Added Sugars Subcommittee and the Dietary Fats and Seafood Subcommittee; the questions examined intake of added sugars, types of dietary fats, and seafood in populations that included infants and toddlers

Final protocols and draft conclusion statements available at DietaryGuidelines.gov
Part D. Chapter 5: Food and Beverages Consumed During Infancy and Toddlerhood
2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

REVIEW OF THE SCIENCE

- Over 230 articles were included in the NESR systematic reviews.
- Conclusion statements were graded from Strong to Grade Not Assignable.
- Most articles were from 10 existing NESR systematic reviews that examined the timing of introduction and/or types and amounts of complementary foods and beverages consumed and health outcomes.
- Articles that examined the birth to 24 months population in new NESR systematic reviews were also considered:
  - 1 article on added sugars and cardiovascular disease
  - 3 articles on types of dietary fats and cardiovascular disease
  - No studies were identified on seafood consumption and cardiovascular disease or neurocognitive development
- Most evidence measured outcomes during childhood
- Most evidence consisted of observational studies, and many reviews also included RCTs

DISCUSSION

Timing of complementary food and beverage (CFB) introduction

The evidence suggests that:

- CFB should not be introduced to infants before 4 months of age
  - Findings consistent with a recent meta-analysis (Wang 2016 – *Nutr Res*) indicating that introducing CFB before 4 months was associated with increased risk of overweight and obesity at 2-12 years.
- CFB introduction at age 4-5 months vs 6 months does not offer long-term advantages or disadvantages with regard to:
  - Growth, size, body composition, overweight or obesity
  - Iron status
  - Risk of food allergy, atopic dermatitis/eczema, or asthma during childhood
- Formula-fed infants may be at particular risk of excess energy intake when CFB are introduced early, as they appear to exhibit less self-regulation of energy intake than is observed among breastfed infants

DISCUSSION

Types and amounts of CFB & growth, size, body composition

- Growth and body composition were generally unrelated to intakes of meat, cereals or CFB differing in fat content or composition
  - Consistent with the conclusions of a recent umbrella review : no evidence to suggest associations between certain types or patterns of CFB and subsequent body composition, overweight, or obesity (Patro-Gołąb 2016 – *Obes Rev)*.
  - Umbrella review also found no relationship between total fat or polyunsaturated fatty acid intake in the first years of life and these outcomes.
- Consumption of sugar-sweetened beverages is associated with an increased risk of obesity in childhood, but evidence is limited
- Juice intake is positively associated with infant weight-for-length and child BMI z-scores, but evidence is limited and most studies did not specify the type or percentage of fruit in the juice

DISCUSSION

Types and amounts of CFB & iron status

- Strong evidence showed that iron-rich or iron-fortified CFB (e.g., meats, iron-fortified cereals) can help maintain adequate iron stores or prevent iron deficiency during the first year of life among infants with insufficient iron stores or breastfed infants who are not receiving adequate iron from another source.
- Benefit for infants with sufficient iron stores (e.g., those consuming iron-fortified infant formula) is less evident.
- Consistent with recommendations of numerous authoritative organizations regarding the need for an adequate source of dietary iron after 6 months, when iron stores at birth may become depleted.
- Iron is particularly important for normal neurological development and immune function.

DISCUSSION

Types and amounts of CFB & zinc status

- Some evidence that CFB with substantial zinc (e.g., meats, cereals fortified with zinc) can support zinc status during the 1st year of life, particularly among breastfed infants not receiving adequate zinc from another source.
- Benefit less evident for infants consuming fortified infant formula.
- Zinc concentration in human milk declines sharply during lactation; by 6 months zinc intake from human milk is a very small proportion of the estimated requirements.
- Thus, both iron and zinc are considered "problem nutrients" for breastfed infants at 6-12 months
  - CFB nutrient densities (per 100 kcal of food) required for breastfed infants at 6-9 months are 9x higher for iron and 4x higher for zinc compared to the nutrient densities required for an adult male

DISCUSSION

Types and amounts of CFB & fatty acid status

- Moderate evidence indicates that CFB with differing fatty acid profiles, particularly long-chain polyunsaturated fatty acids, can influence fatty acid status.
- Particular attention to the fat content and composition of CFB is needed, because polyunsaturated fatty acids are key nutrients for brain development (most rapid from conception to age 24 months).

DISCUSSION

Types and amounts of CFB & food allergies and atopic allergic diseases

- Atopic diseases are relatively common in the US, and infancy may be a critical period for development of tolerance to food antigens
- Strong evidence: introducing peanut in the 1st year of life (after 4 months) may reduce risk of food allergy to peanuts; evidence is strongest for infants with highest risk, but also applicable to others
  - Conclusions consistent with other reviews
  - AAP now endorses introduction to peanut in 1st year of life
- Egg in the first year of life may also be beneficial
- Less strong evidence on early introduction of other foods containing common dietary antigens and prevention of allergies/atopic diseases
  - However, AAP states that there is no evidence that *delaying* introduction of allergenic foods (e.g., peanuts, eggs, fish) beyond 4-6 months prevents atopic disease.

SUMMARY:

Draft Evidence-Based Advice to USDA and HHS for Timing of Introduction of CFB

CFB should not be introduced to infants before 4 months of age. Introduction at age 4 to 5 months, as compared to 6 months, does not offer long-term advantages or disadvantages with regard to the outcomes reviewed.

- Infant feeding guidelines from authoritative sources in high-income countries generally recommend that CFB should be introduced at "about" or "around" 6 months, although some recommend an age range of 4 to 6 months
- Recommendations should ideally take into account the benefits and risks related to all relevant outcomes. The Committee's reviews did not include:
  - Infant infectious diseases
  - Maternal outcomes that may be related to duration of exclusive breastfeeding (and, hence, age of introduction of CFB among breastfed infants)

SUMMARY:

Draft Evidence-Based Advice to USDA and HHS for Types and Amounts of CFB and Nutrient Status

Provide foods that are rich in iron and zinc, either intrinsically (e.g., meats) or due to fortification (e.g., iron fortified infant cereal), particularly during the second 6 months of life among breastfed infants.

Provide CFB that contain adequate amounts of polyunsaturated fatty acids, given their critical role in brain development and the link between dietary intake and the child's fatty acid status. Although human milk is an important source of key fatty acids, milk concentrations are influenced by maternal dietary intake. Thus, both mother and child should consume diets adequate in these nutrients.

- Guidelines from several high-income countries emphasize the need for foods rich in iron and zinc, with some recommending that these be the first CFB introduced
- Canadian authorities emphasize that higher-fat CFB that are nutrient-rich are key components of a healthy diet under 2 years

SUMMARY:

Draft Evidence-Based Advice to USDA and HHS for Types and Amounts of CFB and Food Allergy and Atopic Diseases

Introduce peanut and egg in the first year of life, after CFB are introduced.

For other types of food allergy (to fish, shellfish, cow milk products, tree nuts, seeds, wheat, and soy), the evidence for protective effects is less clear, but the Committee found no evidence that avoiding such foods in the first year of life is beneficial with regard to preventing food allergies or other atopic or allergic diseases.

- Recent guidelines from high-income countries are generally consistent in recommending that introduction of potentially allergenic foods should not be delayed beyond the first year of life.

SUMMARY:

Draft Evidence-Based Advice to USDA and HHS for Sugar-Sweetened Beverages and Juice

Avoid consumption of sugar-sweetened beverages by children younger than age 2 years.

The evidence for avoiding/limiting juice intake by children younger than age 2 years is less clear.

- Consensus is widespread among authoritative bodies in high-income countries that SSB should not be consumed by children < 2 years, for several reasons:
  - The energy from SSB may displace energy from nutritious CFB, leading to nutrient gaps.
  - SSB consumption by infants and young children is related to risk of child overweight.
  - Intake of SSB in early life may set the stage for greater intake of SSB later in life.
- A consensus statement from four organizations recommended that juice not be given in the first year of life, and that no more than 4 ounces per day of 100% fruit juice should be consumed at ages 1 to 3 years.

SUMMARY:
Future Dietary Guidelines Advisory Committee Topics

- The 2020 Committee was asked to address several questions related to "what to feed" infants and young children. These represent only a portion of all the feeding questions that are relevant to infants and toddlers from birth to age 24 months.
- Questions of "how to feed" were not among the topics selected to be addressed by the 2020 Committee, but are of critical importance with regard to building healthy eating habits that can be maintained throughout life. These key issues should be taken up by the next Dietary Guidelines Advisory Committee.

DRAFT - Part D. Chapter 5: Food and Beverages Consumed During Infancy and Toddlerhood
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2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 5: Food and Beverages Consumed During Infancy and Toddlerhood

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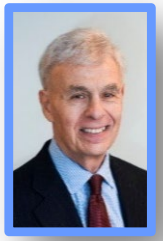
Chair



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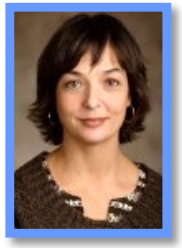

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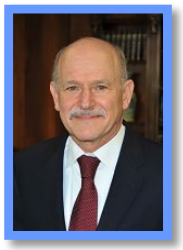

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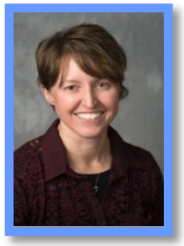

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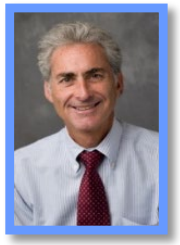

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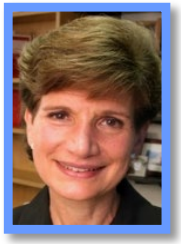

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2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 6: Nutrients from Dietary Supplements During Infancy and Toddlerhood

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Ron Kleinman

This chapter includes questions examined by the Birth to 24 Months Subcommittee

DietaryGuidelines.gov

LIST OF QUESTIONS

1. What is the relationship between iron from supplements consumed during infancy and toddlerhood and growth, size, and body composition?
2. What is the relationship between vitamin D from supplements consumed during infancy and toddlerhood and bone health?

METHODOLOGY

- Both questions were answered using new NESR systematic reviews.

Final protocols and draft conclusion statements available at DietaryGuidelines.gov

REVIEW OF THE SCIENCE

- 16 articles were included in the NESR systematic reviews.
- Conclusion statements were graded from Moderate to Grade Not Assignable.
- Most evidence consisted of RCTs.
- For the iron question, all of the evidence focused on growth and/or size outcomes (not body composition) in infants and toddlers (not older ages)
- For the vitamin D question, most of the evidence focused on bone mass and biomarkers of bone metabolism (not rickets or fracture) in infants and toddlers (not older ages)

DISCUSSION

Introduction to iron supplementation

- American Academy of Pediatrics (AAP, 2010) recommends iron supplementation for breastfed infants from 4 months until iron-containing complementary foods are introduced
- Other authoritative organizations (e.g., Canada, UK, New Zealand) recommend against ***routine*** supplementation of breastfed infants, and instead recommend supplementation for high-risk groups or those with a diagnosis of iron deficiency; some also note the importance of delayed umbilical cord clamping
- "Double-edged sword"?
  - Iron is important to prevent anemia and support development, and supplementation can be highly beneficial for iron-deficient infants
  - However, excess iron intake among iron-replete infants may be harmful

DISCUSSION

Key findings: iron and growth

- Results of review:
  - **No positive effects, and possibly negative effects, on growth** when iron supplements were given to breastfed infants younger than age 9 months, compared with infants not given iron or given a placebo
- The potentially adverse effects of iron supplements on growth of infants and children younger than age 2 years are **consistent with other findings**:
  - In a meta-analysis of children 4-24 months from both high-income and lower-income countries, infants and children randomized to receive iron supplements had less length gain and weight gain than those who did not receive iron (Pasricha 2013 – *Lancet Glob Health*)

DISCUSSION

Potential mechanisms: iron and growth

- **Potential mechanisms** by which iron may adversely affect growth among iron-replete children:
  - increased gastrointestinal illness
  - impaired zinc or copper status
  - pro-oxidative or pro-inflammatory effects
  - disturbances in the gut microbiota
- Before 6 months of age, iron homeostasis appears to be absent/limited → supplemental iron likely to be absorbed even if iron-replete
- After 6 months, infants appear to be able to downregulate iron absorption appropriately

SUMMARY:

Draft Evidence-Based Advice to USDA and HHS related to iron from supplements during infancy and toddlerhood

Routine iron supplementation of all breastfed infants may not be advisable. An alternative could be to screen for iron deficiency among higher-risk infants <6 months, and provide iron supplements only to those with iron deficiency.

After 6 months, other sources of iron can be provided, such as iron-rich or iron-fortified complementary foods, so iron supplementation is generally not needed.

DISCUSSION

Introduction to vitamin D supplementation

- Vitamin D deficiency most likely in those living at high latitudes, with dark skin, with inadequate sunlight exposure.
- AI for infants is 400 IU/day; RDA for children 1y+ is 600 IU/day.
- Average human milk vitamin D concentration is only ~20 IU/L.
- Maternal high-dose vitamin D supplementation may increase human milk concentration, but risks/benefits not fully evaluated.
- AAP recommends vitamin D supplements for breastfed infants:

  "Because human milk contains inadequate amounts of vitamin D (unless the lactating mother is taking supplements of approximately 6,000 IU/d), breastfed and partially breastfed infants should be supplemented with **400 IU of vitamin D per day** beginning in the first few days of life and continued until the infant has been weaned and is drinking at least 1 L/d of vitamin D-fortified infant formula or cow milk".

DISCUSSION

Key findings: vitamin D and bone health

- Existing recommendations regarding vitamin D supplementation during infancy are based on a body of evidence compiled largely before 2000, the starting date for this review.
- The limited evidence available since 2000 suggests that doses higher than 400 IU per day (the current AAP recommendation for infants) do not result in differences in biomarkers of bone metabolism.

SUMMARY:

Draft Evidence-Based Advice to USDA and HHS related to vitamin D from supplements during infancy and toddlerhood

At this time, the evidence does not provide a basis for recommending vitamin D supplementation above 400 IU per day during infancy.

DRAFT - Part D. Chapter 6: Nutrients from Dietary Supplements During Infancy and Toddlerhood
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2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 6: Nutrients from Dietary Supplements During Infancy and Toddlerhood

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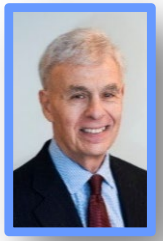

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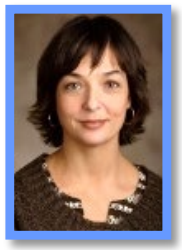

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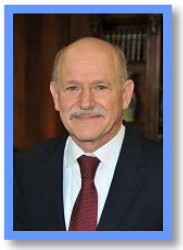

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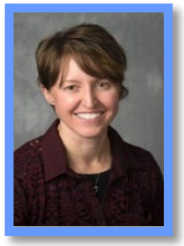

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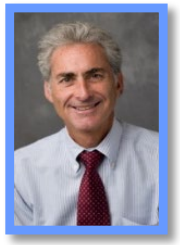

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2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee: DRAFT - Part D. Chapter 7: USDA Food Patterns For Children Younger Than Age 24 Months

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This chapter includes questions examined by the Data Analysis Food Pattern Modeling Working Group and the Birth to 24 Months Subcommittee

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LIST OF QUESTIONS

Can USDA Food Patterns be established based on the relationships identified in the systematic reviews?

If so, how well do USDA Food Pattern variations meet nutrient recommendations for infants and toddlers?

If nutrient needs are not met, is there evidence to support supplementation and/or consumption of fortified foods to meet nutrient adequacy?

INTRODUCTION – Birth to 24 Months

- Characterized by major changes in feeding patterns and dietary intake
  - Exclusive breastfeeding recommended for ~6 months (AAP 2020)
  - For infants not fed human milk or mixed-fed (i.e., both human milk and infant formula), commercial infant formula generally recommended until 12 months (AAP 2020)
  - Around 6 months of age - transition from sole consumption of human milk and/or infant formula to a varied diet that includes nutrient-rich complementary foods and beverages (CFB) (AAP 2020)
- Committee decided that USDA Food Patterns are not necessary for infants younger than age 6 months, and began food pattern modeling at age 6 months

Final protocols and draft conclusion statements available at DietaryGuidelines.gov

Part D. Chapter 7: USDA Food Patterns Younger Than 24 Mo.

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

INTRODUCTION – Milk Source

Human milk differs from infant formula in:

- Nutritional composition
- Bioavailability of nutrients
- Presence of bioactive substances

- Composition of human milk changes across time and in response to maternal diet
- Energy and nutrients needed from CFB vary by infant milk source

INTRODUCTION – 6 to 12 Months

- First goal was combinations of CFB to meet nutrient needs of infants whose milk source is human milk (i.e., no infant formula)
  - Infant formula is fortified, so intakes of certain key nutrients considerably higher (e.g., iron)
- Then estimated the expected nutrient intakes of infants fed infant formula if they consumed the same types and combinations of CFB

***Note**: provision of key nutrients is only one of the ways in which human milk influences infant health and development - many health benefits of breastfeeding for the mother as well as the child.*

*Food pattern modeling results for infants should not be interpreted as an evaluation of the value of human milk compared to infant formula; they are intended to demonstrate ways that nutritional goals can be met through CFB that **take into account** the milk source(s) in the child's diet.*

Final protocols and draft conclusion statements available at DietaryGuidelines.gov

INTRODUCTION – 12 to 24 Months

Food pattern modeling (FPM) for 12-24 months conducted separately:

- RDAs established for most nutrients for ages 12 months and older
- Infant formula is not recommended after 12 months
- Most infants (66%) in the U.S. no longer receive human milk after age 12 months

Final protocols and draft conclusion statements available at DietaryGuidelines.gov
Part D. Chapter 7: USDA Food Patterns Younger Than 24 Mo.
2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

INTRODUCTION – Role of Complementary Feeding

Complementary feeding is important not only for providing nutrients, but also for:

- Introducing food types and textures that can be beneficial for:
  - Developing manual dexterity, hand-eye coordination, and dexterity of mechanical features involved in chewing and swallowing
  - Supporting the development of appropriate feeding and eating behaviors during childhood
  - Reducing risk of food allergies (e.g., peanut, egg)
- Implementing responsive feeding practices, modeling of healthy eating behaviors, and bonding through food and mealtimes

FPM focuses on nutrient intake and is not designed to address these other important aspects of complementary feeding.

Final protocols and draft conclusion statements available at DietaryGuidelines.gov

Part D. Chapter 7: USDA Food Patterns Younger Than 24 Mo.

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

METHODOLOGY

- All questions were answered using food pattern modeling.
- Analytic framework and food modeling process was presented at March meeting.

Final protocols and draft conclusion statements available at DietaryGuidelines.gov

Part D. Chapter 7: USDA Food Patterns Younger Than 24 Mo.

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

METHODOLOGY
Steps in Food Pattern Modeling 6-24 Months

1. Establish Energy Levels

- DRI formulas for Estimated Energy Requirements (EER)
  - Account for energy deposition for the growing child (IOM 2005)
- Determined appropriate energy levels for each age-sex group
  - Based on age in months, reference body lengths, median body weights, and sex
- Five energy levels from 600 to 1,000 kcal, at 100 kcal "step" intervals, were chosen to cover the energy needs for the majority of the population ages 6 to 24 months

METHODOLOGY (continued)
Steps in Food Pattern Modeling 6-24 Months

2. Establish Nutritional Goals

- Specific nutritional goals selected based on the age-sex group(s)
- DRI goals (RDA or AI)
  - Energy
  - 3 macronutrients
  - 3 fatty acids
  - 12 vitamins
  - 9 minerals
- Other goals could include potential recommendations of the 2020 Committee

METHODOLOGY (continued)
Steps in Food Pattern Modeling 6-24 Months

3. Establish Food Groupings and Food Group Amounts

- Informed by existing food groups and subgroups in the USDA Food Patterns for ages 2 years and older published in the *2015-2020 Dietary Guidelines for Americans.*
- Options with different proportions of energy from human milk or infant formula created, and remaining energy for CFB calculated.
- Energy from human milk was modeled at 3 levels (low, average, and high) and applied to each of 3 age intervals (6 to 9 months, 9 to 12 months, and 12 to 24 months).
- Energy from infant formula also modeled at 3 levels, but only applied to 2 age intervals (6-9 and 9-12 months).

DRAFT Table. Energy from Human Milk Modeled at Three Levels (Low, Average, and High) Applied to Each of Three Age Intervals (6 to 9, 9 to 12, and 12 to 24 Months) and the Amount of Energy Available for Complementary Foods and Beverages at 5 Estimated Energy Needs from 600 to 1,000 Kcal

Energy level (kcal)	600		700		800		900		1,000	
	CFB[2] kcal	HM[2] kcal	CFB kcal	HM kcal	CFB kcal	HM kcal	CFB kcal	HM kcal	CFB kcal	HM kcal
6 to 9 months										
HM level high (100% HM)	NA[2]	600	NA	700	NA	800				
HM level average (80% HM)	120	480	140	560	160	640				
HM level low (65% HM)	210	390	245	455	280	520				
9 to 12 months										
HM level high (70% HM)	180	420	210	490	240	560	270	630		
HM level average (55% HM)	270	330	315	385	360	440	405	495		
HM level low (40% HM)	360	240	420	280	480	320	540	360		
12 to 24 months										
HM level high (50% HM)			350	350	400	400	450	450	500	500
HM level average (35% HM)			455	245	520	280	585	315	650	350
HM level low (20% HM)			560	140	640	160	720	180	800	200

METHODOLOGY (continued)
Steps in Food Pattern Modeling 6-24 Months

3. Establish Food Groupings and Food Group Amounts

- Started with food group amounts for the 1,000-kcal level pattern established in the Healthy U.S.-Style Food Patterns in the 2015-2020 Dietary Guidelines for Americans.
- When total energy < 1,000 kcal, amounts of each food group were decreased such that the food group density in the pattern remained similar to the food group density of the 1,000 kcal Pattern.
- Modified combinations of CFB to reach all or most of the specified nutrient goals.

METHODOLOGY (continued)
Steps in Food Pattern Modeling 6-24 Months

4. Determine the Amounts of Nutrients that Would be Obtained by Consuming Various Foods Within Each Group

- Nutrient profiles for each food group or subgroup created, based on intake data for ages 6-24 months from WWEIA, NHANES 2015-2016
- Nutrient profiles calculated using weighted average of nutrient-dense forms of foods representing each food item cluster
- Representative foods in the dairy group differed from those used for ages 2+ because of the importance of adequate fat intake at 6-24 months.

METHODOLOGY (continued)
Steps in Food Pattern Modeling 6-24 Months

5. Evaluate Nutrient Level in Each Modeling Exercise Against Nutritional Goals

- Using the updated nutrient profiles for ages 6 to 24 months, the nutrients provided in each modeling exercise were compared to the goals, e.g., ≥ 90% of the RDA or AI

6. Adjust and Re-Evaluate to Align with Goals

- If nutrient goals not met, step-wise iterative approach used to make additional adjustments

RESULTS OF FOOD PATTERN MODELING EXERCISES – Infants Fed Human Milk 6-12 mo

- In first step, with food group amounts in proportion to amounts in the 1,000-kcal Pattern for ages 2+, many nutrient gaps:
  - Low in iron and zinc, as expected, but also magnesium, phosphorus, potassium, sodium, choline, niacin, and vitamins A, B_6, C, D, and E
  - Iron content ~1-2 mg at 6-9 months and 1-4 mg at 9-12 months (far below the RDA of 11 mg).
  - Zinc content 1.4-2.5 mg at 6-9 months and 2-4 mg at 9-12 months (RDA = 3 mg).
- Thus, second step was to replace 56 kcal of grains with 56 kcal of fortified infant cereal (0.5 oz eq/day).
  - Iron content ~8-9 mg at 6-9 months and ~8-11 mg at 9-12 months. Still low for most energy levels and human milk proportion options.
  - Zinc content adequate (3-5 mg).
- Third step was to examine how much energy remained for other CFB, after including 56 kcal of fortified infant cereal.

Table. Energy (Kcal) Provided by Human Milk or Infant Formula Plus 0.5 Oz Eq of Fortified Infant Cereal (HM + IC) and Remaining Energy Available for Other Complementary Foods and Beverages for Infants, by Age and Three Levels of Human Milk or Infant Formula Intake[1]

Energy level (kcal)		600			700			800			900			1,000		
Age (mo)	Energy Source	H[2]	A[2]	L[2]	H	A	L	H	A	L	H	A	L	H	A	L
6 to 9	HM[2] (or IF[2])	600	480	390	700	560	455	800	640	520						
	Total CFB[2]	0	120	210	0	140	245	0	160	280						
	Infant Cereal	0	56	56	0	56	56	0	56	56						
	Remaining CFB	0	64	154	0	84	189	0	104	224						
9 to 12	HM (or IF)	420	330	240	490	385	280	560	440	320	630	495	360			
	Total CFB	180	270	360	210	315	420	240	360	480	270	405	540			
	Infant Cereal	56	56	56	56	56	56	56	56	56	56	56	56			
	Remaining CFB	124	214	304	154	259	364	184	304	424	214	349	484			
12 to 24	HM (or IF)				350	245	140	400	280	160	450	315	180	500	350	200
	Total CFB				350	455	560	400	520	640	450	585	720	500	650	800
	Infant Cereal				56	56	56	56	56	56	56	56	56	56	56	56
	Remaining CFB				294	399	504	344	464	584	394	529	664	444	594	744

H, high; A, average; L, low; HM, human milk; IC, infant cereal; IF, infant formula; CFB, complementary foods and beverages

RESULTS OF FOOD PATTERN MODELING EXERCISES – Infants Fed Human Milk 6-12 mo (continued)

Final step: examined how the remaining energy for CFB could be allocated across food groups and subgroups to move closer to nutrient adequacy for iron, zinc, potassium, and choline (the nutrients with the most critical gaps).

- Food combinations set up to include a minimum amount of seafood, eggs, and nuts, in accordance with recommendations to introduce these foods during this age period.
- A maximum for dairy (no more than 0.5 cup eq per day) was set, given that infants at this age are receiving human milk or infant formula.
- Remaining nutrient gaps were filled to the extent possible by prioritizing protein foods, particularly meat, because of the relatively high content and bioavailability of iron and zinc in red meats in particular.

Table. Approximate amounts of food groups and subgroups in example combinations of complementary foods and beverages for ages 6 to 12 months

	6 to 9 months		9 to 12 months	
Food Groups	Daily amounts	Weekly amounts	Daily amounts	Weekly amounts
Total fruits (cup eq)	⅛ to ¼	---	⅛ to ½	---
Total vegetables (cup eq)	⅛ to ¼	---	⅛ to ½	---
Red and orange	---	¼ to ⅔	---	½ to 1½
Starchy	---	¼ to ½	---	⅓ to 1
Dark green	---	Small amounts[1]	---	¼
Legumes	---	Small amounts[1]	---	¼
Other	---	¼ to ½	---	¼ to ¾
Total grains (oz eq)[2]	½ to ¾	---	½ to 1	---
Fortified infant cereals	½	---	½	---
Other grains including whole and refined	0 to ¼	---	0 to 1[2]	---
Total protein foods (oz eq)[3]	¾ to 2⅔	---	2 to 3	---
Meats	---	4⅔ to 16	---	8½ to 15½
Poultry	---	½ to 1¼	---	1
Seafood	---	≥3	---	≥3
Eggs	---	>1	---	≥1
Nuts and seeds	---	≥½	---	≥½
Total dairy (cup eq)	¼	---	½	---
Total added oils/fats (g)	0	---	0 to 7¾	---

1: "Small amounts" refer to less than ⅛ cup eq per week.
2: At least half of other grains as whole grains
3: Total protein foods includes a majority from meats rather than poultry because meat has higher iron content than poultry.

Abbreviations: eq, equivalents; d, day; wk, week; oz, ounce; g, gram

Part D. Chapter 7: USDA Food Patterns Younger Than 24 Mo.
2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

RESULTS OF FOOD PATTERN MODELING EXERCISES – Infants Fed Infant Formula 6-12 mo

For infants fed infant formula, human milk was replaced with infant formula in the models.

- Because these models included fortified infant cereal as well as infant formula, they had few shortfall nutrients, except for vitamin D and omega-3 fatty acids at some energy levels.
- However, the potential for excess intakes of certain nutrients exists.
  - Iron reaches 150-175% of the RDA at 6-9 months and 134-194% of the RDA at 9-12 months, though none of these estimates exceeded the UL for iron (40 mg).
  - Zinc reaches 226-302% (7 to 9 mg, respectively) of the RDA at ages 6-9 months and 232-339% (7 to 10 mg, respectively) of the RDA at ages 9 to 12 months. These estimates all exceed the UL for zinc (5 mg), though this UL has been challenged as being too low.
- Formula-fed infants do not need the extra iron and zinc from fortified infant cereal if formula intake is > 760 mL at 6-9 months or 690 mL at 9-12 months.
- Could substitute other grain products (preferably whole grain) for the 0.5 oz eq of fortified infant cereal.

RESULTS OF FOOD PATTERN MODELING EXERCISES: Draft Conclusion Statements

Ages 6 to 12 Months

- The Committee was not able to establish a recommended food pattern for infants ages 6 to 12 months because of uncertainty about nutrient requirements for this age range and challenges in meeting the Recommended Dietary Allowance for iron through complementary foods and beverages.

- However, examples of potential combinations of complementary foods and beverages that come close to meeting almost all nutrient recommendations are described for a variety of scenarios differing in the proportion of energy coming from human milk or infant formula and complementary foods and beverages at ages 6 to 9 months and 9 to 12 months.

- The example combinations of complementary foods and beverages described by the Committee support consumption of fortified infant foods to meet nutrient adequacy for infants whose milk source is human milk (i.e., no infant formula).

Part D. Chapter 7: USDA Food Patterns Younger Than 24 Mo.

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

RESULTS OF FOOD PATTERN MODELING EXERCISES: Draft Conclusion Statements (continued)

Ages 6 to 12 Months (continued)

- Formula-fed infants who also consume iron-fortified infant cereals may consume up to 2 times the Recommended Dietary Allowance for iron (22 milligrams per day) at ages 6 to 12 months, although iron intakes are not likely to exceed the Tolerable Upper Intake Level of 40 milligrams per day.
- Further work is needed to determine the feasibility of meeting all nutrient recommendations for infants fed human milk at ages 6 to 12 months from diets that do not include any fortified foods (e.g., fortified infant cereal, infant formula).
- With the exception of vitamin D, supplementation should not be necessary if fortified foods with appropriate levels of fortification are included in the diet of infants whose milk source is human milk. Vitamin D supplementation guidance from the American Academy of Pediatrics is provided in Part D. Chapter 6: Nutrients from Dietary Supplements During Infancy and Toddlerhood.

RESULTS OF FOOD PATTERN MODELING EXERCISES – Ages 12 to 24 months

Toddlers Fed *Neither* Human Milk Nor Infant Formula

- The first step was to set up a model that included food group amounts in proportion to the amounts in the 1,000 kcal Pattern for ages 2 years and older.

- Subsequent steps were designed to fill nutrient gaps evident in the first step models, e.g. for iron and calcium. Also set seafood at 3 oz eq/week, and increased whole grains (for potassium) and oils (for omega-3 and omega-6 fatty acids).

Table. Amount from Each Food Group or Subgroup in the Healthy U.S.-Style Pattern Developed for Ages 12 to 24 Months Without Any Human Milk or Infant Formula

ENERGY LEVEL (kcal)	1,000	900	800	700
FRUITS (cup eq[1]/d[1])	1.00	1.00	0.75	0.50
VEGETABLES				
Total Vegetables (cup eq/d)	1.00	1.00	0.75	0.65
subgroup amounts in cup eq per week				
Dark green (cup eq/wk[1])	0.50	0.50	0.33	1.0
Red Orange (cup eq/wk)	2.50	2.50	1.75	1.00
Legumes (cup eq/wk)	0.50	0.50	0.33	0.75
Starchy (cup eq/wk)	2.00	2.00	1.50	1.00
Other (cup eq/wk)	1.50	1.50	1.25	0.75
GRAINS				
Total Grains (oz[1] eq/d)	3.00	2.50	2.25	1.75
Whole grains (oz eq/d)	2.00	2.00	2.00	1.50
Refined grains (oz eq/d)	1.00	0.50	0.25	0.25
PROTEIN FOODS				
Total Protein Foods (oz eq/d)	2.00	2.00	2.00	2.00
subgroup amounts in oz eq per week				
Meats and Poultry (oz eq/wk)	7.70	7.00	7.00	8.75
Eggs (oz eq/wk)	2.25	2.25	2.75	2.00
Seafood (oz eq/wk)	3.00	3.00	3.00	3.00
Nuts, Seeds and Soy (oz eq/wk)	1.25	1.25	1.00	1.00
DAIRY (cup eq/d)	2.00	2.00	1.75	1.66
OILS (g[1]/d)	13	8	9	9

1: eq, equivalents; d, day; wk, week; oz, ounce; g, gram

Table. Summary of Energy, Macronutrient Distributions, and Select Nutrient Amounts and Percent of RDA or AI for the Healthy U.S.-Style Pattern Intended for Infants Ages 12 To 24 Months Without Any Human Milk or Infant Formula

		Energy Pattern			
		1,000	900	800	700
Energy	kcal	1,001	907	804	704
Protein	% of kcal	18%	19%	19%	23%
Fat	% of kcal	34%	32%	34%	35%
Carbohydrate	% of kcal	50%	51%	48%	44%
Calcium	mg	782	772	675	612
	% RDA[1]	112%	110%	96%	87%
Iron	Mg	8.43	7.88	7.16	6.20
	% RDA	120%	113%	102%	88%
Potassium	Mg	1,797	1,772	1,488	1,299
	% AI[1]	90%	89%	74%	65%
Zinc	Mg	7	7	7	6
	% RDA	243%	236%	220%	198%
Vitamin E	mg AT[1]	4.9	4.1	3.8	3.6
	% RDA	81%	69%	63%	60%
Vitamin D	IU[1]	260	258	235	214
	% RDA	43%	43%	39%	36%
Choline	mg	199	195	188	169
	% AI	100%	98%	94%	84%
Omega-3	g	1.2	0.9	0.9	0.9
	% AI	178%	135%	133%	130%
Omega-6	g	8.6	6.4	6.5	6.1
	% AI	123%	91%	93%	87%

1: RDA, Recommended Dietary Allowance; AI, Adequate Intake; AT, alpha tocopherol; IU, international units

RESULTS OF FOOD PATTERN MODELING EXERCISES – Ages 12 to 24 months

Toddlers Fed Human Milk

- First step was a model with food group amounts in proportion to the amounts in the 1,000 kcal Pattern for ages 2 years and older.
- Adjustments to protein foods made, similar to those made for human milk-fed infants at 9-12 months, to increase iron and calcium.
- Adjustments made to vegetable subgroups to emphasize good sources of calcium and/or iron, including increases in dark green vegetables, legumes, red and orange vegetables, and other vegetables, and a corresponding decrease in starchy vegetables.
- Refined grains generally reduced to ¼ cup eq per day & adjustments made to dairy to allow for reallocation of some energy to oils (2-11 g/day) to increase fatty acid adequacy.
- Nutrient shortfalls still present for several nutrients.

Table. Approximate amounts of food groups and subgroups in example combinations of complementary foods and beverages for toddlers ages 12 to 24 months fed human milk

	12 to 24 months	
Food Groups	Daily amounts	Weekly amounts
Total fruits (cup eq)	⅓ to ¾	---
Total vegetables (cup eq)	⅔	---
Red and orange	---	1½
Starchy	---	½ to ¾
Dark green	---	1 to 1½
Legumes	---	½
Other	---	¾
Total grains (oz eq)[1]	1 ¼ to 2 ¼	---
Total protein foods (oz eq)[2]	2 ¼ to 3	---
Meats	---	9 ¼ to 15 ¾
Poultry	---	1 to 3
Seafood	---	≥3
Eggs	---	≥1 to 2
Nuts and seeds	---	≥½ to 1
Total dairy (cup eq)[3]	¼ to 1¾	---
Total added oils/fats (g)[4]	2 to 11	---

1: Emphasis on whole grains ranging from 1-2 oz eq
2: Total protein foods includes a majority from meats rather than poultry because meat has higher iron content than poultry.
3: Dairy is zero in combinations where the human milk proportion is high and energy for complementary foods and beverages is small.
4: Grams of oils are lower when proportions of human milk are high and energy for complementary foods and beverages is small.

Abbreviations: eq, equivalents; d, day; wk, week; oz, ounce; g, gram

RESULTS OF FOOD PATTERN MODELING EXERCISES – Ages 12 to 24 months (continued)

Toddlers Fed a Lacto-Ovo Vegetarian Diet, and Fed Neither Human Milk Nor Infant Formula

- Started with the Healthy Vegetarian Style Pattern at the 1,000 kcal level. Nutrient shortfalls included choline, potassium, vitamin E, vitamin D, and omega-3 and omega-6 fatty acids.
- Adjusted to include 3 eggs per week to achieve choline.
- Grains shifted to emphasize whole grains.

Table. Amount from Each Food Group or Subgroup in the Healthy Vegetarian Style Pattern Developed for Ages 12 to 24 Months Without Any Human Milk or Infant Formula

ENERGY LEVEL (kcal)	1,000	900	800	700
FRUITS (cup eq[1]/d[1])	1	1	0.75	0.5
VEGETABLES				
Total Vegetables (cup eq/d)	1	1	1	1
subgroup amounts in cup eq per week				
Dark green (cup eq/wk[1])	0.5	0.5	0.5	0.5
Red Orange (cup eq/wk)	2.5	2.5	2.5	2.5
Legumes (cup eq/wk)	0.75	0.75	0.75	0.75
Starchy (cup eq/wk)	2	2	2	2
Other (cup eq/wk)	1.5	1.5	1.5	1.5
GRAINS				
Total Grains (oz[1] eq/d)	3	2.75	2.25	1.75
Whole grains (oz eq/d)	2	2	1.75	1.25
Refined grains (oz eq/d)	1	0.75	0.5	0.5
PROTEIN FOODS				
Total Protein Foods (oz eq/d)	1	1	1	1
subgroup amounts in oz eq per week				
Eggs (oz eq/wk)	3.5	3.5	3.5	3.5
Nuts, Seeds and Soy (oz eq/wk)	4	4	4	4
DAIRY (cup eq/d)	2	1.75	1.75	1.5
OILS (g[1]/d)	15	10	8.5	9

1: eq, equivalents; d, day; wk, week; oz, ounce; g, gram

Table. Summary of Energy, Macronutrient Distributions, and Select Nutrient Amounts and Percent of RDA or AI for the Healthy Vegetarian Pattern Intended for Infants Ages 12 to 24 Months Without Any Human Milk or Infant Formula

ENERGY LEVEL (kcal)		1,000	900	800	700
Energy	kcal	999	898	810	703
Protein	% of kcal	16%	17%	18%	18%
Fat	% of kcal	36%	33%	34%	36%
Carbohydrate	% of kcal	51%	54%	52%	49%
Calcium	mg	805	726	707	609
	% RDA[1]	115%	104%	101%	87%
Iron	mg	9.0	9.0	7.6	6.3
	% RDA	126%	122%	108%	89%
Potassium	mg	1732	1649	1537	1330
	% AI[1]	87%	82%	77%	66%
Zinc	mg	6.7	6.4	5.9	4.9
	% RDA	224%	213%	198%	163%
Vitamin E	mg AT[1]	5.6	4.8	4.5	4.3
	% RDA	93%	80%	74%	71%
Vitamin D	IU[1]	239	214	211	183
	% RDA	40%	36%	35%	31%
Choline	mg	204	195	190	175
	% AI	102%	98%	95%	88%
Omega-3	g	1.4	1.0	0.9	0.9
	% AI	196%	148%	133%	129%
Omega-6	g	9.6	7.3	6.5	6.3
	% AI	137%	105%	92%	90%

1: RDA, Recommended Dietary Allowance; AI, Adequate Intake; AT, alpha tocopherol; IU, international units

RESULTS OF FOOD PATTERN MODELING EXERCISES: Draft Conclusion Statements

Ages 12 to 24 Months

- For toddlers fed neither human milk nor infant formula, the Committee developed a Food Pattern for ages 12 to 24 months that is consistent with the proportions of food groups and subgroups recommended for children ages 2 years and older.

- This food pattern requires careful choices of foods and beverages but does not require inclusion of fortified products specifically formulated for infants or toddlers to meet nutrient recommendations.

RESULTS OF FOOD PATTERN MODELING EXERCISES: Draft Conclusion Statements (continued)

Ages 12 to 24 Months (continued)

- For toddlers who receive at least 20 percent of total energy from human milk at ages 12 to 24 months, the Committee was not able to establish a recommended food pattern because of uncertainty about nutrient requirements for this age range and challenges in meeting the Recommended Dietary Allowances.

- However, examples of potential combinations of complementary foods and beverages that come close to meeting almost all nutrient recommendations are described for a variety of scenarios differing in the proportions of energy coming from human milk and from complementary foods and beverages at ages 12 to 24 months.

RESULTS OF FOOD PATTERN MODELING EXERCISES: Draft Conclusion Statements (continued)

Ages 12 to 24 Months (continued)

- For toddlers fed a lacto-ovo vegetarian diet and fed neither human milk nor infant formula at ages 12 to 24 months, the Committee developed a Healthy Vegetarian Pattern that includes regular consumption of eggs, dairy products, soy products, and nuts or seeds, in addition to fruits, vegetables, grains, and oils.

- This Food Pattern requires careful choices of foods and beverages but does not require inclusion of fortified products specifically formulated for infants or toddlers to meet nutrient recommendations.

RESULTS OF FOOD PATTERN MODELING EXERCISES: Draft Conclusion Statements (continued)

Additional Considerations for Ages 6 to 24 Months Regarding Added Sugars

- The combinations of foods needed to achieve recommended intakes of key nutrients for ages 6 to 24 months leave virtually no remaining dietary energy for added sugars, apart from the very small amounts (less than 3 grams per day) already inherent in the foods used in modeling.

DISCUSSION

Overview of Approach

- Challenging to develop recommended food patterns for infants and toddlers ages 6 to 24 months
  - Nutrient needs high relative to energy requirements
  - Amounts of CFB consumed are relatively low, especially at the younger ages
- Opted to start with modeling the contributions of food groups in proportion to the amounts in the 1,000 kcal Pattern for ages 2 years and older, with adaptations to correspond to estimated energy intakes and nutritional goals for 6-24 months.
- This has the advantage of developing Patterns that are feasible with respect to the types of foods consumed in the U.S., and that become consistent with the Patterns recommended for older age groups by age 24 months.
- However, the results do not necessarily represent the optimal combinations of foods and beverages for meeting nutritional goals, which requires a different modeling approach.

DISCUSSION (continued)

Strengths of the Approach

- Modeled various scenarios regarding the potential contribution from human milk or infant formula
- USDA Food Patterns provide examples of amounts of food groups and subgroups to consume, but do not dictate the specific types of foods. Flexibility allows for:
  - Foods to be tailored to an individual's needs and preferences
  - Cultural preferences
  - Cost considerations

Limitations of the Approach

- Uncertainty regarding the nutrient composition of human milk.
- Nutritional goals in the models for 6-12 months based mainly on AI values, because RDAs available only for protein, iron, and zinc

DISCUSSION (continued)

Iron is a key nutrient at 6-12 months

- Iron was the most limiting nutrient for infants fed human milk at 6-12 months. It was not possible to meet the RDA without including iron-fortified infant foods.
  - Iron-fortified infant foods have been an important strategy for reducing iron deficiency among infants in the U.S. for several decades.
- Fortified infant foods are not necessarily the only way for infants fed human milk to achieve the RDA.
  - Red meat is a good source of iron (and heme iron is better absorbed than non-heme iron), but obtaining required amounts solely from red meat (not including liver) may not be feasible.
  - Further work is needed to estimate the quantities of animal-source foods that would be needed by infants fed human milk to support adequate iron status without fortified foods.
- Infants fed infant formula have the potential for excess intakes of iron
  - Iron content of formulas most commonly used in the U.S. is relatively high (~1.8 mg/100 kcal), about 40 times the iron content of human milk.

DISCUSSION (continued)

Potassium

- It was challenging to meet the AI for potassium (860 mg at ages 7 to 12 months; 2,000 mg at ages 1 to 3 years) in all of the models.
  - There are uncertainties regarding the AI values
  - Nonetheless, choosing potassium-rich foods is important at these ages

Iodine

- Iodine intakes could not be predicted because food composition data are not available for iodine.
- In situations in which neither the mother nor the infant consumes iodized salt or obtains adequate iodine from other sources (e.g., dairy products), iodine intakes of infants could be deficient.
- Underconsumption of iodine during infancy has important potential consequences for brain development, especially if maternal intake was also low during pregnancy.

CONCLUSIONS: 6-12 months

- For infants ages 6 to 12 months, the Committee was not able to establish a recommended food pattern.
- Further work is needed to explore various options for meeting all nutrient recommendations during that age range, using tools such as linear programming and taking into account differences in iron bioavailability from different sources.
- The modeling exercises revealed the importance of prioritizing certain food groups and making careful food choices within food groups.
  - Certain animal-source foods are important sources of key "shortfall" nutrients at this age, including iron, zinc, choline, and long-chain polyunsaturated fatty acids.
  - Fortified infant cereals can contribute a substantial amount of some of these nutrients, particularly iron and zinc, but prioritizing consumption of meat, egg, and seafood is an important strategy for providing all of these crucial nutrients.

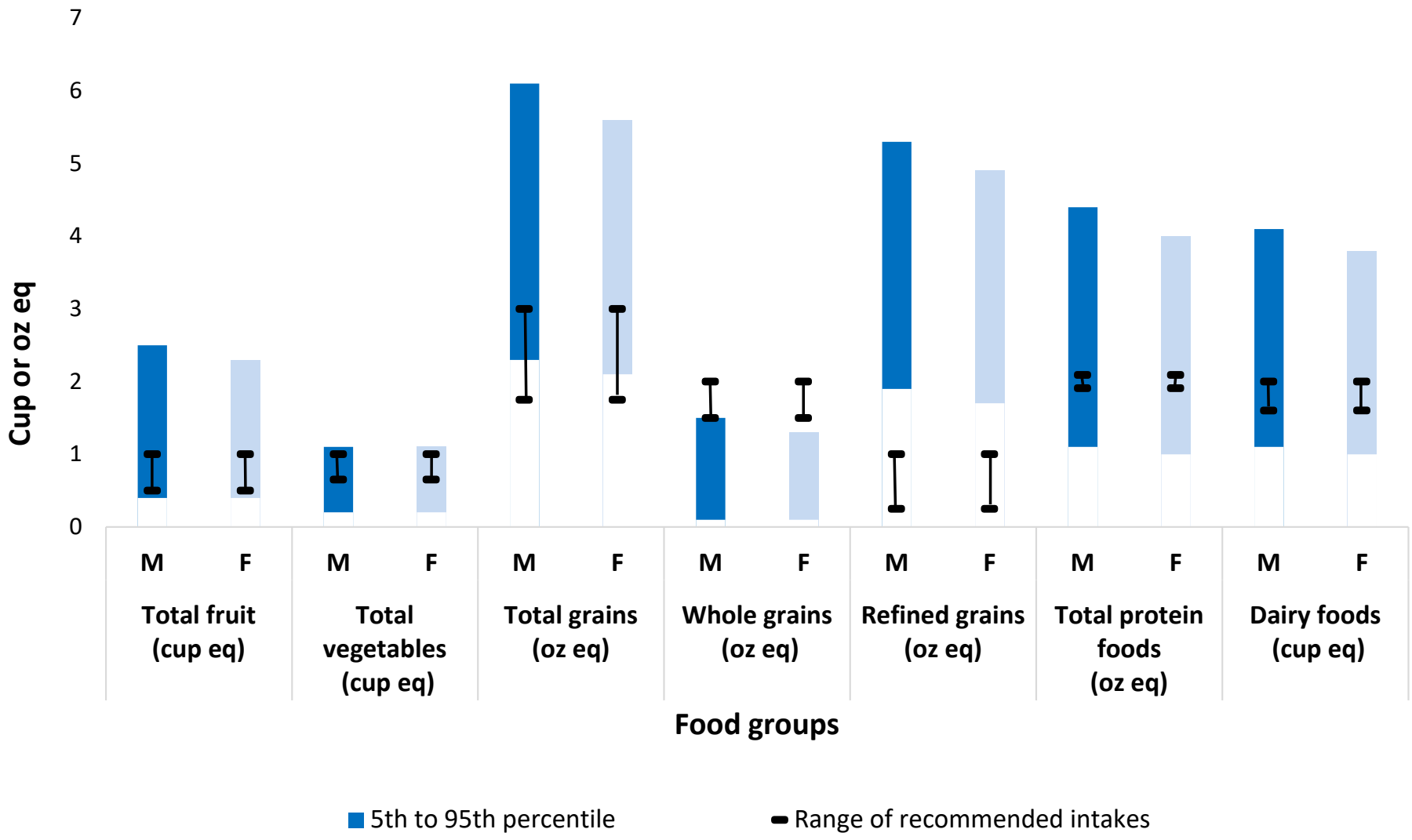
CONCLUSIONS: 6-12 months (continued)

- By contrast, dairy products (such as yogurt and cheese) are less crucial than other types of animal-source foods at ages 6 to 12 months because infants are still receiving human milk or infant formula, and dairy products tend to have low amounts of iron.
- Prioritizing fruits and vegetables, particularly those that are rich in potassium, vitamin A, and vitamin C, is another key element of healthy complementary food diets at ages 6 to 12 months, not only to provide adequate nutrition but also to foster acceptance of these healthy foods.
- In addition, introduction of peanut products and egg in the first year of life is advised, to build tolerance to food antigens (i.e., help prevent food allergies) and to provide good sources of fatty acids and choline.

CONCLUSIONS: 12-24 months

- The Committee was able to establish a recommended Food Pattern for toddlers 12-24 months fed neither human milk nor infant formula that resembles the Pattern established for ages 2 and older.
- The Pattern allows for a variety of nutrient-rich animal-source foods, including meat, poultry, seafood, eggs, and dairy products, as well as nuts and seeds, fruits, vegetables, and grain products.
- Key aspects to emphasize include choosing potassium-rich fruits and vegetables, prioritizing seafood, making whole grains the predominant type of grains offered, and choosing oils over solid fats.
- In these Patterns, energy allocated to oils is minimal (6-13 g/d) and no energy remains for added sugars not already inherent in the Patterns.

Range of Recommended Food group Amounts in the Healthy U.S.-Style Food Pattern Compared to the 5th to 95th Percentiles of Intakes in the Population for Children Ages 12 to 24 Months



Part D. Chapter 7: USDA Food Patterns Younger Than 24 Mo.

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

CONCLUSIONS: 12-24 months (continued)

- For toddlers fed human milk at ages 12 to 24 months, the Committee was not able to establish a recommended food pattern but provides examples of potential combinations of CFB that come close to meeting almost all nutrient recommendations.

- Further work is needed to examine predicted nutrient intakes of toddlers fed human milk that take into account mineral bioavailability under various conditions.

CONCLUSIONS: 12-24 months (continued)

- For toddlers fed lacto-ovo vegetarian diets and fed neither human milk nor infant formula at ages 12 to 24 months, a Pattern was established that includes regular consumption of eggs, dairy products, soy products, and nuts or seeds, in addition to fruits, vegetables, grains, and oils.
- Because of concerns about iron bioavailability in the vegetarian pattern, the Committee recommends further modeling work that takes this into account.
- Careful choices of CFB within vegetarian diets are very important to meet nutrient needs.
  - The Healthy Vegetarian Eating Pattern developed is not a vegan diet, as the former includes substantial amounts of animal-source foods (egg and dairy).
  - Without supplements and/or fortified products, it is not possible to meet all nutrient goals with a vegan diet at this age.

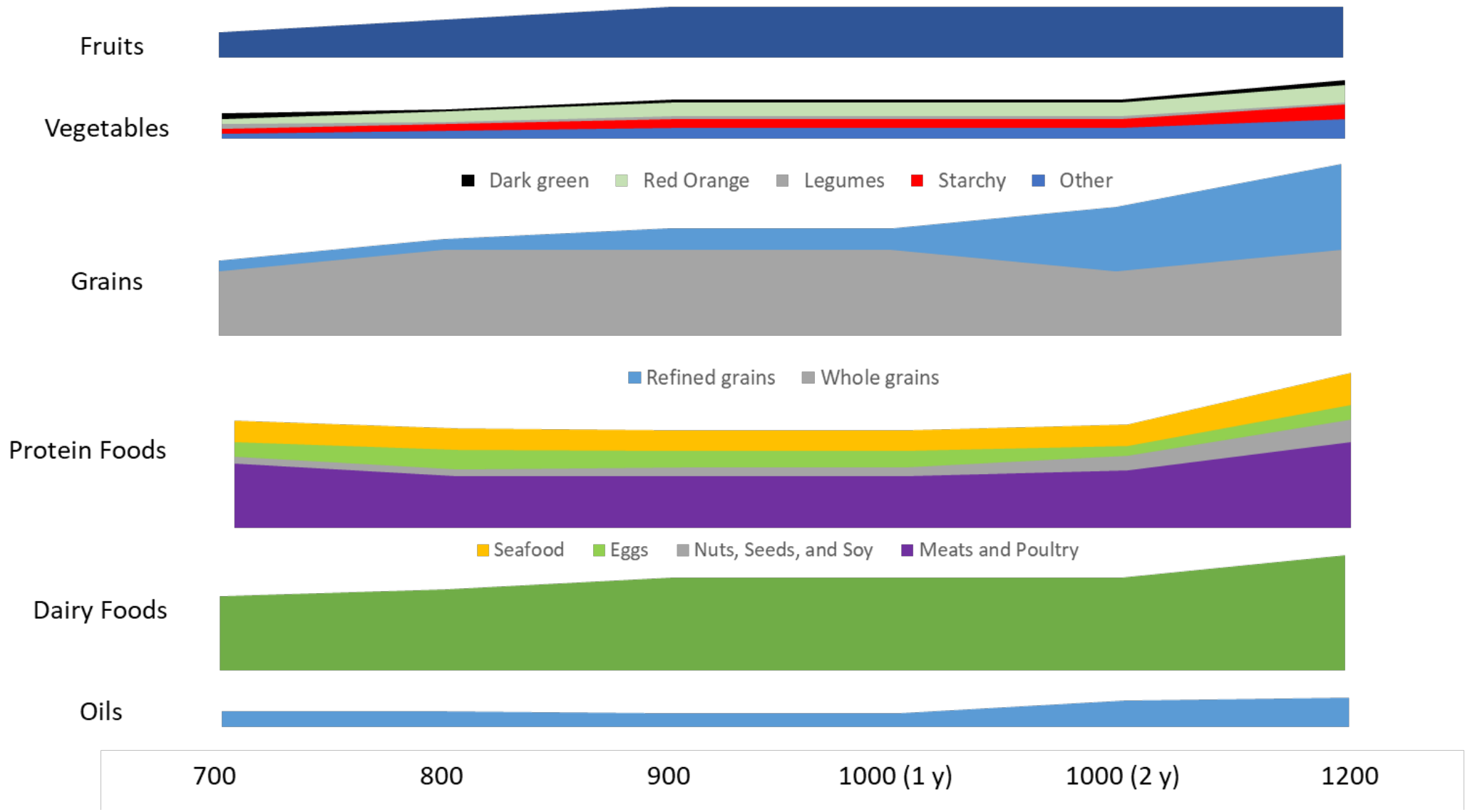
CONCLUSIONS (continued)

- These findings are not intended to provide a combination of CFB or food pattern that is right for every infant or toddler, because children develop at different rates, and many different circumstances influence feeding needs and decisions.

- Toddlers with relatively low energy intakes may benefit from food combinations that resemble those for 6-12 months, with a gradual shift to the patterns presented for 12-24 months.

- A general principle is to view the period from 6 to 24 months as a continuous transition from diets appropriate for infants to diets that resemble family food patterns.

Transition from complementary food[1] patterns appropriate for infants to food patterns for ages 2 years and older: relative amounts of food groups and subgroups across energy levels in HUSS patterns



[1] Inclusive of CFB and not human milk or infant formula, modeled complementary food includes fluid milk, calcium fortified soy beverage, and 100% fruit and vegetable juice

SUMMARY:
Draft Evidence-Based Advice to USDA and HHS: Recommendations for Advice to Caregivers

1. Provide a variety of animal-source foods (meat, poultry, seafood, eggs and dairy), fruits and vegetables, nuts and seeds, and whole grain products, beginning at 6-12 months and continuing thereafter, to provide key nutrients, foster acceptance of a variety of nutritious foods, and build healthy dietary habits.
2. For infants fed human milk at 6-12 months, consider providing iron-fortified infant cereals or similar products to ensure adequate iron intake.
3. Provide good sources of omega-3 and omega-6 fatty acids, such as seafood, beginning at ages 6 to 12 months. To limit exposure to methylmercury for groups at risk, consult the U.S. Food and Drug Administration and the U.S. Environmental Protection Agency guidance regarding the types of seafood to choose.

SUMMARY: (continued)
Draft Evidence-Based Advice to USDA and HHS: Recommendations for Advice to Caregivers

4. Introduce peanut products and egg between 6 and 12 months. Be careful to choose forms of peanut that do not present a choking risk. Evidence regarding benefits of introducing other potentially allergenic foods (e.g., tree nuts, shellfish, fish) in the first year of life is limited, but there is no reason to avoid them.
5. For toddlers 12-24 months whose diets do not include meat, poultry, or seafood, provide eggs and dairy products on a regular basis, along with soy products and nuts or seeds, fruits, vegetables, grains, and oils.

SUMMARY: (continued)
Draft Evidence-Based Advice to USDA and HHS: Recommendations for Advice to Caregivers

6. Avoid foods and beverages with added sugars during the first 2 years of life.
   - The energy in such products is likely to displace energy from nutrient-dense foods, increasing the risk of nutrient inadequacies.
   - Moreover, consumption of sugar-sweetened beverages is linked with increased risk of overweight or obesity.
   - Because food preferences and patterns are beginning to form during this developmental stage, and taste and flavor preferences appear to be more malleable in this life stage than in older children, it is important that caregivers limit consumption of foods that contain added sugars, while encouraging consumption of nutrient-dense foods.

SUMMARY:
Draft Evidence-Based Advice to USDA and HHS: Recommendations for Federal Agencies

- Develop communication and dissemination strategies that effectively address common misconceptions about diets for infants and children younger than age 24 months.
  - The importance of carefully choosing CFB may not be fully appreciated by the public. For example, the rhyme that "food before one is just for fun" implies that the only goal during infancy is fostering pleasant eating experiences, and that the nutritional contribution of CFB is not critical.
  - A more appropriate message is that "every bite counts," emphasizing the nutrients of concern for potential inadequacy and excess, while also conveying the need to make eating enjoyable and the importance of responsive feeding practices.
- Consider strategies for assisting caregivers and program managers to use the information about the CFB combinations and patterns described in this chapter.
  - In particular, guidance will be needed on how to operationalize providing the recommended amounts of food groups and subgroups shown in the tables online. This information is provided by energy level, but the energy intake of an infant or toddler is generally unknown by caregivers.

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DietaryGuidelines.gov

2020 Dietary Guidelines Advisory Committee: DRAFT - Part D. Chapter 7: USDA Food Patterns For Children Younger Than Age 24 Months

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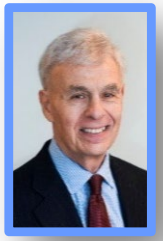

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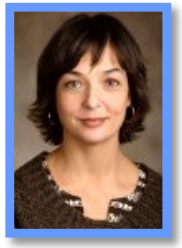

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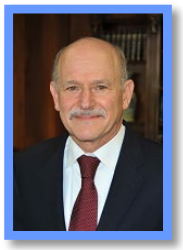

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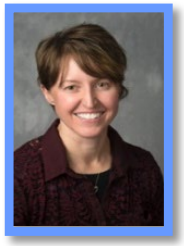

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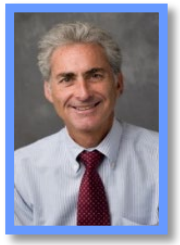

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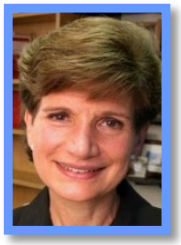

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2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee: DRAFT - Part D. Chapter 8: Dietary Patterns

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This chapter includes questions examined by the Dietary Patterns Subcommittee

DietaryGuidelines.gov

LIST OF QUESTIONS

1. What is the relationship between dietary patterns consumed and risk of cardiovascular disease (CVD)?
2. What is the relationship between dietary patterns consumed and growth, size, body composition, and risk of overweight and obesity (GSBCO)?
3. What is the relationship between dietary patterns consumed and risk of type 2 diabetes (T2DM)?
4. What is the relationship between dietary patterns consumed and bone health?
5. What is the relationship between dietary patterns consumed and risk of certain types of cancer?
6. What is the relationship between dietary patterns consumed and neurocognitive health (Neuro)?
7. What is the relationship between dietary patterns consumed and sarcopenia?
8. What is the relationship between dietary patterns consumed and all-cause mortality (ACM)?

METHODOLOGY

- Questions 1 through 3 were answered by:
  - updating an existing NESR systematic review (i.e., dietary patterns in children and adolescents),
  - using existing NESR systematic reviews (i.e., dietary patterns and adults), and
  - conducting new NESR systematic reviews (i.e., diets based on macronutrient distribution).
- Questions 4 through 6 were answered by updating existing NESR systematic reviews conducted by the 2015 Committee
- Questions 7 and 8 were answered by conducting new NESR systematic reviews

REVIEW OF THE SCIENCE

- 23 draft conclusion statements across the 8 questions
- Nearly 500 articles were included in the NESR systematic reviews
- For dietary patterns, most conclusions revealed consistency across questions and were graded from Strong to Limited
  - The majority were graded Moderate
- For diets based on macronutrient distribution, most conclusions revealed insufficient evidence is available to determine the relationship to health outcomes.
  - One conclusion was Limited, while the rest were Grade Not Assignable
- Most evidence was found for middle-aged adults than other age groups
  - This is likely a function of endpoint outcomes of interest presenting later in life (e.g., sarcopenia, all-cause mortality, cardiovascular disease)
  - Most evidence was generalizable to the U.S. population, including those at higher risk of overweight or obesity
- Many studies examined were prospective cohort studies, and randomized controlled trials were included in most of the reviews

DISCUSSION - Overview

- The evidence base for associations between dietary patterns and specific health outcomes has grown considerably since the previous reviews by the 2015 Dietary Guidelines Advisory Committee

- Many dietary patterns were identified in the evidence base with the most common ones defined using indices or scores, such as HEI-2015, DASH, Mediterranean, or vegetarian patterns, and data-driven approaches

DISCUSSION – Overview, cont.

- For adults, the association between dietary patterns and…
  - …All-cause mortality and cardiovascular disease was strong
  - …Growth, size, body composition, and risk of overweight and obesity; type 2 diabetes; bone health; and post-menopausal breast cancer and colorectal cancer was moderate
- For adults, the association between dietary patterns and neurocognitive health and cancers of the prostate and lung were limited.
- For adults, insufficient evidence was available to evaluate dietary patterns and sarcopenia.

DISCUSSION – Dietary pattern components commonly identified in conclusion statements as having positive association with health, for adults

Dietary Pattern Components in the Committee's Conclusion Statements that are Associated with the Health Outcomes of Interest

Component	ACM	CVD	GSBCO	T2DM	Bone Health	Colorectal Cancer	Breast Cancer (Post-menopausal)	Lung Cancer	Neuro
Fruits	X	X	X	X	X	X	X	X	X
Vegetables	X	X	X	X	X	X	X	X	X
Whole grains/ cereal	X	X	X	X	X	X	X	X	
Legumes	X	X	X		X	X		X	X
Nuts	X	X			X				X
Low-fat dairy	X	X	X		X	X		X	
Fish and/or seafood	X	X	X		X	X		X	X
Unsaturated vegetable oils	X	X	X						X
Lean meat	X					X		X	
Poultry	X								

DISCUSSION – Dietary pattern components commonly identified in conclusion statements as being negatively associated with health, for adults

Dietary Pattern Components in the Committee's Conclusion Statements that are Associated with the Health Outcomes of Interest

Component	ACM	CVD	GSBCO	T2DM	Bone Health	Colorectal Cancer	Breast Cancer (Post-menopausal)	Lung Cancer	Neuro
Red meat	X	X	X	X		X			
Processed meat	X	X	X	X	X	X			
High-fat meat								X	
High fat dairy	X			X					
Animal-based products							X		
Saturated fats		X	X			X			
Sugar sweetened beverages and/or foods	X	X	X	X	X	X			
Refined grains	X	X	X	X			X		
Fried potatoes/French fries and potatoes						X			
Added sugars					X				
Sodium		X	X						

DISCUSSION – Overview, children

- The Committee also considered evidence for dietary patterns and 4 health outcomes in children: overweight and obesity, type 2 diabetes, CVD risk factors, and bone health. Overall, the evidence was limited for overweight and obesity and CVD risk factors
- The characteristics of dietary patterns associated with overweight and obesity and CVD risk factors were similar to adults, including dietary patterns that are higher in fruits, vegetables, whole grains and low-fat dairy and lower in added sugars (for example, sugar-sweetened beverages) and processed meats
- Type 2 diabetes and bone health both had insufficient evidence and were both classified as grade not assignable

DISCUSSION – Diets Based on Macronutrient Distribution

- 5 of the 8 questions evaluated the relationship between diets based on macronutrient distribution and CVD, GSBCO, T2DM, Sarcopenia, and ACM
- The Committee reviewed studies where at least 1 macronutrient was outside of the acceptable macronutrient distribution range (AMDR) and provide the entire distribution of macronutrients in the diet. Studies did not need to report the foods/food groups consumed
- The AMDR is set by the National Academies of Sciences
  - (For example, in adults: protein, 10 to 35 percent; fat, 20 to 35 percent; carbohydrate, 45 to 65 percent of total energy intake)
- The Committee excluded interventions designed to induce weight loss or treat overweight and obesity through energy-restriction/hypocaloric diets for the purposes of treating additional or other medical conditions.

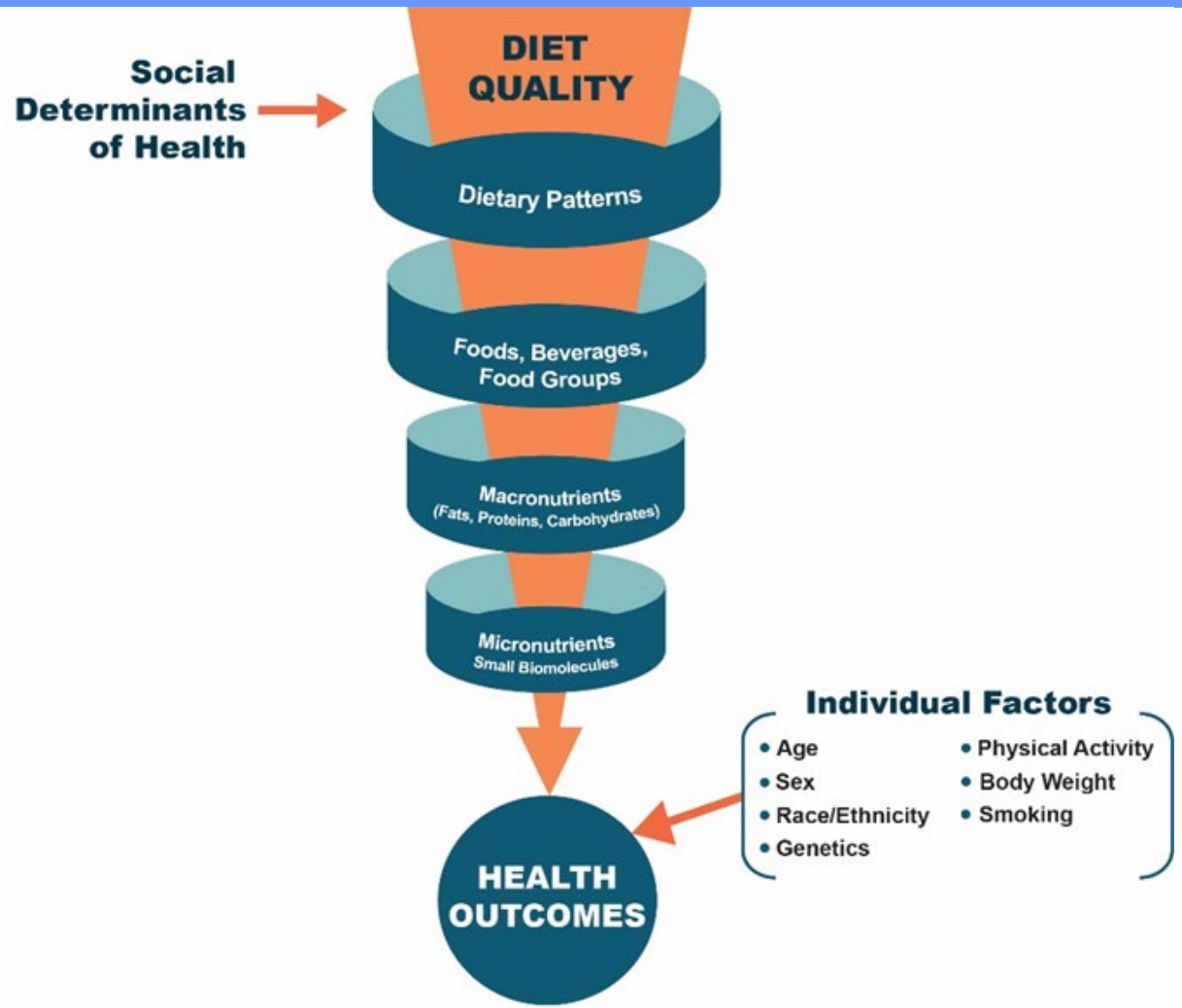
DISCUSSION – Diets Based on Macronutrient Distribution

- The resulting literature was ultimately unable to address the specific outcomes of T2DM, GSBCO and ACM, and for CVD the evidence was graded only as Limited
- Approximately 100 articles across the specific outcomes were examined and many challenges were identified in the evidence base
- To adequately address the question of how differences in macronutrient distribution affect key health outcomes, studies should be designed to isolate the effects of macronutrients within the context of a constant dietary pattern

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

- A consistent dietary pattern associated with beneficial outcomes was present across 7 out of 8 the reviewed questions
- Higher intake of vegetables, fruits, legumes, whole grains, low- or non-fat dairy, lean meat, seafood, nuts and unsaturated vegetable oils; low consumption of red and processed meats, sugar-sweetened foods and drinks, and refined grains.
- Dietary patterns associated with adverse or detrimental outcomes included higher intake of red and processed meats, sugar-sweetened foods and beverages, and refined grains.

SUMMARY: Dietary Patterns and Health Outcomes - Figure



This figure depicts the connection between dietary patterns and its component parts. It demonstrates how food, beverages, food groups, macronutrient and micronutrients are components of dietary patterns. Diet quality runs throughout each component of the pattern. As adherence to a healthier dietary pattern increases the pattern can play a protective role in health, and conversely, less healthy patterns can negatively influence health. The figure also recognizes that social determinants of health, such as food access, food security, settings and environments can play a role in influencing the diet quality of a dietary pattern. Additionally, individual factors also impact health outcomes.

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

- The Committee's reviews supports the use of recommending dietary patterns to the U.S. population
- The Committee's review conveys a public health message reflecting key foods across studies that in common comprise a healthy diet that promotes optimum growth and development while minimizing risk factors underlying the onset of chronic diseases
- These public health messages are vital in an era undergoing an epidemic of non-communicable diseases, including obesity, type 2 diabetes, CVD, cancer, sarcopenia, and dementias, and that pose potential further immunological risks associated with infectious diseases as well
- These chronic diseases often have their origins early in life, highlighting the importance of initiating and maintaining a healthy diet across the life course

DRAFT - Part D. Chapter 8: Dietary Patterns
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2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 8: Dietary Patterns

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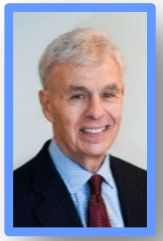

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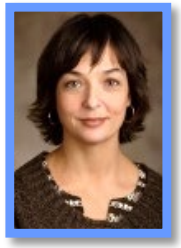

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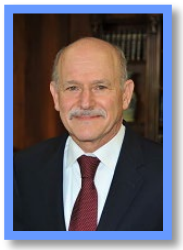

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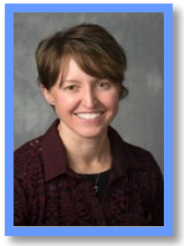

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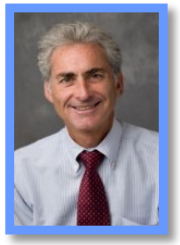

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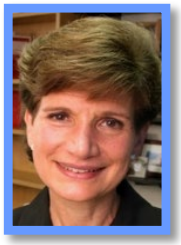

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2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee: DRAFT - Part D. Chapter 9: Dietary Fats & Seafood

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Regan Bailey

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This chapter includes questions examined by the Dietary Fats & Seafood Subcommittee

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LIST OF QUESTIONS

1. What is the relationship between types of **dietary fat** consumed and risk of **cardiovascular disease**?
2. What is the relationship between **seafood consumption** during childhood and adolescence (up to 18 years of age) and risk of **cardiovascular disease**?
3. What is the relationship between **seafood consumption** during childhood and adolescence (up to 18 years of age) and **neurocognitive development**?

METHODOLOGY

- The question on dietary fats and cardiovascular disease was answered using a new NESR systematic review conducted to build on evidence reviewed by the 2015 Committee.
- The questions on seafood were answered using new NESR systematic reviews

REVIEW OF THE SCIENCE

- 23 draft conclusion statements across the 3 questions
- Dietary Fats and CVD:
  - 228 articles from 164 studies (~60% RCTs), were included
  - Built upon the 2015 Advisory Committee's review of saturated fats
  - Conclusion statements were graded from Strong to Insufficient but there was consistency in the findings across age groups and outcomes.
- Seafood consumption during childhood and adolescence:
  - Risk of CVD: 4 articles from 4 studies (50% RCTs), were included
  - Neurocognitive outcomes: 13 articles, representing 9 studies (~33% RCTs), were included
  - "Insufficient evidence" or "No evidence" determined for all outcomes

DISCUSSION: Dietary Fats & CVD Studies in Children & Adolescents

Children & Adolescents

- Diets lower in saturated fat and dietary cholesterol and higher in PUFA had beneficial effects on total and/or LDL cholesterol
- Need for more longitudinal RCTs involving dietary intervention among growing children

DISCUSSION: Dietary Fats & CVD Studies in Adults

Adults

- Built off of 2015 Committee's review of saturated fat
- Current evidence consistent with 2015 findings
- Blood lipids:
  - Diets higher in unsaturated fats, especially PUFA reduces total and LDL cholesterol
  - New evidence remains inadequate to differentiate between sources/types of CHOs as replacement for SFA and their impact on blood lipids
  - Diets lower in dietary cholesterol may reduce total and LDL cholesterol
- CVD endpoint outcomes:
  - Diets replacing saturated fats with PUFA are associated with reductions in risk for coronary heart disease and CVD mortality
  - Diets replacing saturated fat with MUFA may confer CVD health benefits
  - "Insufficient evidence" to differentiate types/sources of CHO as replacement for SFA and risk of CVD
  - Small body of evidence on dietary cholesterol; need for additional research to isolate independent effect of dietary cholesterol

DISCUSSION: Seafood during childhood

- Insufficient evidence was available to make conclusions about the relationship between seafood intake during childhood and adolescence and outcomes examined
- Risk of CVD
  - An inadequate number of studies available and several had serious methodological limitations
- Neurocognitive development
  - Most studies showed a null or favorable association
  - The vast majority of analyses showed no detrimental relationship
  - Inadequate number of studies, inconsistency in results, risk of bias in classification of exposures, and heterogeneity in some outcome assessment measures

SUMMARY: Draft Evidence-Based Advice to USDA and HHS – Saturated Fat

- Saturated Fat:
  - Continue current Dietary Guidelines recommendation: Intake of saturated fats should be limited to **less than 10% of energy** per day by replacing them with unsaturated fats
    - Applies to adults and children 2 years and older
    - Majority of Americans (77%) consume saturated fat in amounts higher than 10% of total energy
    - Because of the high incidence of CVD in the United States, the health effects of reducing saturated fat in the diet is of particular public health importance.
  - Replace saturated fat intake with unsaturated fat by substituting some animal protein sources, especially processed meats and certain dairy products, with sources of polyunsaturated fats, such as seafood, seeds, nuts, legumes, and appropriate vegetable oils

SUMMARY: Draft Evidence-Based Advice to USDA and HHS – Dietary Cholesterol

- Dietary Cholesterol:
  - Continue current Dietary Guidelines recommendation: Individuals should eat **as little dietary cholesterol as possible** while consuming a healthy dietary pattern
  - Dietary cholesterol intakes have decreased from levels in the 1980s when the DGAs first recommended lowering cholesterol intake
  - Mean dietary cholesterol intakes have increased in recent years

Dietary Cholesterol (mean daily intake)	Males 2+	Females 2+	All 2+
NHANES 2011-12	315 mg/d	221 mg/d	267 mg/d
NHANES 2015-16	321 mg/d	245 mg/d	282 mg/d

SUMMARY: Draft Evidence-Based Advice to USDA and HHS - Seafood

- Seafood intake for children
  - **Two or more servings of cooked seafood* per week** are recommended for ages 2 years and older to ensure intake of key nutrients and as part of an overall healthy dietary pattern.
    - Serving size varies depending upon child's age
    - ~5% of US youth report consuming seafood two times/week
  - Increased seafood intake with emphasis on species higher in omega-3 polyunsaturated fatty acids and with low methylmercury content is advised
  - Non-seafood options: flaxseeds, walnuts, soy oil, algae and eggs that contain n-3 fatty acids

*Seafood includes marine animals that live in the sea and in freshwater lakes and rivers. Seafood includes fish (e.g., salmon, tuna, trout, tilapia) and shellfish (e.g., shrimp, crabs, oysters)

DRAFT - Part D. Chapter 9: Dietary Fats & Seafood
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2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 9: Dietary Fats & Seafood

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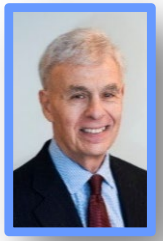

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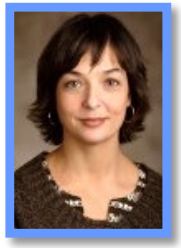

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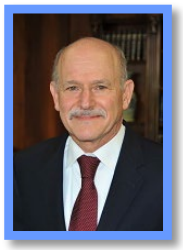

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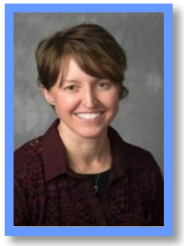

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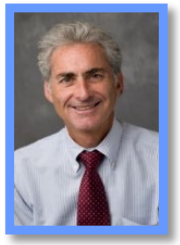

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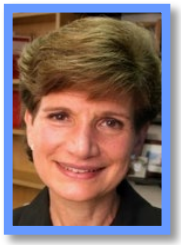

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2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee: DRAFT - Part D. Chapter 10: Beverages

Members Involved in Drafting this Chapter:

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Timothy Naimi
Rachel Novotny
Barbara Schneeman

This chapter includes questions examined by the Beverages and Added Sugars Subcommittee and the Data Analysis and Food Pattern Modeling Working Group

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LIST OF QUESTIONS & METHODOLOGY

1. What is the relationship between beverage consumption and achieving nutrient and food group recommendations?
   - Answered using data analyses

2. What is the relationship between beverage consumption and growth, size, body composition, and risk of overweight and obesity?
   - Answered using NESR systematic reviews

Final protocols and draft conclusion statements available at DietaryGuidelines.gov

Part D. Chapter 10: Beverages

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

QUESTION 1: What is the relationship between beverage consumption and achieving nutrient and food group recommendations? (Data analysis)

Overview

- Federal data were reviewed for infancy through older adults, including women who are pregnant and lactating
- Analyses reflected the most current NHANES cycle available
- Presented at public meeting #4 and #5

Overall Findings

- Beverages such as 100% fruit juice, plain milk, and plain milk substitutes can contribute positively to under-consumed foods groups (i.e., dairy, fruit) and nutrients (e.g., potassium, calcium, vitamin D)
- Beverages also contribute a substantial amount of energy and added sugars in the diet
  - Contribution to total energy: 13 to 18% across age groups
  - Contribution to added sugars intake: 32 to 58% across age groups
- Soda, fruit drinks, sports and energy drinks, and coffee and tea with their additions are top beverage sources of added sugars
  - SSB contribute the highest percent of energy from beverages to the diet, but typically contribute very little toward meeting nutrient and food group recommendations

QUESTION 1: What is the relationship between beverage consumption and achieving nutrient and food group recommendations? (Data analysis)

Infants and Toddlers

- Older infants (6 to 12 mo) consume predominately human milk and/or infant formula; 1/3 consume 100% fruit juice
- Toddlers (12 to 24 mo) consume a greater beverage variety: over half consume 100% juice, and the majority consume cow milk
- 29% of toddlers consume sweetened beverages which account for 27% of added sugars intake

Children

- The proportion of children consuming milk declines with age: 65% for ages 2-5 to 34% ages 12-19
- Milk and 100% juice account for nearly 50% of vitamins C and D for children ages 2-5 and ~40% for older children
- The contribution of SSB to total beverage energy intake increases with age from ~19% to 44%
- Sweetened beverages account for 32% of added sugars for ages 2-5, 39% for ages 6-11, and 49% for ages 12-19

QUESTION 1: What is the relationship between beverage consumption and achieving nutrient and food group recommendations? (Data analysis)

Adults

- Water is consumed more than any other beverage type (53 fl oz/d)
- Total volume of daily beverage intake is 88 fl oz for adults ages 20-64 years and reduces to 66 fl oz for adults ages 65 years and older
- About 50% of adults ages 20 to 64 years consume sweetened beverages
- 15% of adults consume diet beverages
- Only 17% of adults ages 20-64 years consume milk or milk substitutes – a slightly higher proportion (21%) of older adults 65+ consume these beverages

QUESTION 2: What is the relationship between beverage consumption and growth, size, body composition, and risk of overweight and obesity? (Systematic review)

- Beverage types reviewed:
  - Milk
  - 100% Juice
  - Sugar-sweetened beverages (SSB)
  - Low and no-calorie sweetened beverages (LNCSB)
- Milk, 100% juice, and LNCSB reviews included evidence from 2000 through 2019
- SSB review included evidence from 2012 through 2019
  - 2015 DGAC reviewed evidence on added sugars and health outcomes through 2012: Intake of added sugars (from food and/or SSB) was associated with excess body weight in children and adults
  - 2020 DGAC focused on SSB and health outcomes rather than analyzing the data as an extension of the 2015 analysis
  - Note: SSB are also considered in *Chapter 12. Added Sugars*
- NESR systematic reviews: 12 draft conclusion statements from 152 unique articles (presented during public meeting #5)

QUESTION 2: What is the relationship between beverage consumption and growth, size, body composition, and risk of overweight and obesity? (Systematic review)

- Milk and 100% juice were not associated with indices of adiposity, but the strength of the evidence was limited

- Among the beverages examined, only SSB intake was associated with greater adiposity (Grade: moderate in children, limited in adults)
  - The majority of studies found a significant effect between SSB and at least 1 adiposity outcome; however, results of different outcome measures within a study often varied, with few studies finding significant associations across all reported outcomes

- No significant association was observed between LNCSB and adiposity outcomes in children, but LNCSB intake was associated with reduced adiposity in adults (Grade: limited)

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

- When nutrient-rich beverages (e.g. milk, 100% juice) are incorporated into the diet, it will be important to be mindful of their contribution to total energy intake
- Encourage only limited intake of SSB
  - Note: SSB are also considered in *Chapter 12. Added Sugars* where additional recommendations relating to added sugars including SSBs are presented
- Although limited evidence, it is important to acknowledge LNCSB may be a useful aid in weight management in adults
- The role beverages play in diet quality and energy balance varies across the life span, so recommendations should be tailored appropriately

SUMMARY: Draft Evidence-Based Advice to USDA and HHS (Future Directions)

- Need for additional research on beverage patterns, which were not examined due to a lack of available literature
  - Defined as the quantities, proportions, variety or combinations of different beverages in the diet
- Beverage intake behaviors are also important factors to consider when developing guidelines
  - Predominant time of day of use, frequency of ingestion, typical and range of portion sizes, and whether they are consumed alone or in association with foods
- Future research should address whether the form of food (solid, liquid) and mode of ingestion (e.g., drink, spoon delivery) hold unique implications for health

DRAFT - Part D. Chapter 10: Beverages
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2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 10: Beverages

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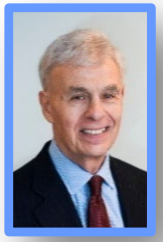

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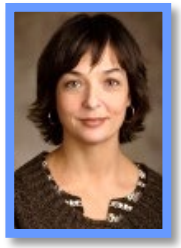

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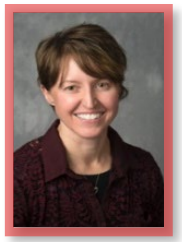

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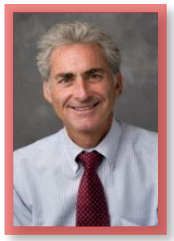

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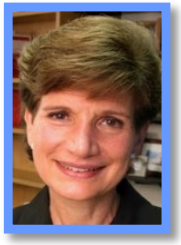

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2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee: DRAFT - Part D. Chapter 11: Alcoholic Beverages

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This chapter includes questions examined by the Beverages and Added Sugars Subcommittee and the Data Analysis and Food Pattern Modeling Working Group

DietaryGuidelines.gov

LIST OF QUESTIONS & METHODOLOGY

1. What is the relationship between alcohol consumption and achieving nutrient and food group recommendations?
   - Answered using data analyses
   - Reviewed Federal data from NHANES and the NSDUH for adults of legal drinking age, including women who are pregnant or lactating
   - Used the most current data cycles available

2. What is the relationship between alcohol consumption and all-cause mortality?
   - Answered using a NESR systematic review

Final protocols and draft conclusion statements available at DietaryGuidelines.gov

REVIEW OF THE SCIENCE

- NESR systematic review: 3 draft conclusion statements on alcohol and all-cause mortality from 60 articles
  - Primary comparison: different levels of consumption among those who currently drink alcohol
  - Secondary comparison: those who currently drink alcohol with those who have never consumed alcohol
- Most of the studies examined were prospective cohort studies and enrolled a broad range of adult ages
- Conclusion statements were graded from Limited to Moderate

DISCUSSION

- Previous *Dietary Guidelines for Americans* provided advice for those who drink alcohol and recommended that individuals do not begin drinking or drink more for any reason
  - Therefore, never drinking alcohol (i.e., zero consumption) was designated as a secondary comparison in the review of alcohol and all-cause mortality
- Prioritized all-cause mortality over CVD and cancer as outcomes for NESR systematic review due to time constraints, and because alcohol and CVD has been reviewed by DGAC before
- Considered Mendelian randomization (MR) studies on CVD and cancer to provide additional supporting evidence, given that these are leading contributors to all-cause mortality

DISCUSSION: MR Studies Overview

- MR studies assess genetic variants (genotypes) of alcohol metabolism genes that associate with higher or lower alcohol consumption; these genotypes are then related to outcomes of interest (e.g., risk of CVD)

Strengths	Limitations
• Reduced confounding • Reduced selection bias • No reverse causation • No exposure misclassification	• Lack of robust association between genotype and alcohol consumption • Genetic variant may have an effect independent of alcohol consumption • Genetic variant may be associated with other favorable genes

DISCUSSION: MR Studies Findings

- Genotypes associated with lower alcohol consumption have no protective association for CHD or ischemic stroke, including among those with low volume consumption
  - Inconsistent with observational studies, which find "J-shaped" associations (non-drinkers have higher risks than low volume drinkers, with risk increasing above low levels)
- MR studies indicate that alcohol consumption is positively associated with 3 types of cancer
  - Consistent with observational studies

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

- Many U.S. adults exceed *2015-2020 Dietary Guidelines for Americans* recommended limits for "drinking in moderation" during days when alcohol is consumed
- Excessive alcohol consumption is a leading behavioral risk factor for a variety of morbidity and mortality outcomes, social harms, and economic costs
- Apart from energy (calories), ethanol has no nutritional value
- The preponderance of evidence finds that all-cause mortality risks increase at levels above *1 drink per day* on average for both men and women

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

Should the *Dietary Guidelines for Americans* continue to recommend against initiating alcohol consumption for health reasons for those who don't currently drink?

- Alcohol is a substance that is intoxicating, potentially addictive, and a leading preventable cause of death and other harms
- The observational evidence base is insufficient to recommend drinking initiation at any level
- Non-drinkers or never drinkers should not begin to drink on the basis of the notion that alcohol would improve their health

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

Are current recommended limits of no more than 2 drinks per day for men and no more than 1 drink per day for women (i.e., 2/1 consumption limits) reasonable?

- The 2/1 consumption limits, present since 1990, aligned with an early and influential meta-analyses on alcohol and all-cause mortality
- The 2/1 consumption limits constitute reasonably low risk
- However, more recent evidence justifies tightening guidelines for men in particular

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

Why is tightening recommendations for men justified?

- Consuming 2 drinks/day among men is associated with a modest but meaningful increase in all-cause mortality risk compared to 1 drink/day based on existing observational data
  - Consistent with findings from the Committee's systematic review
  - Supported by meta-analyses, survival analyses, and modeling studies
  - Different recommendations for men and women are not supported because risk difference is small at lower levels of alcohol consumption

- Risk of low volume consumption for all-cause mortality may have been underestimated previously
  - Recent observational studies and meta-analyses find reduced risk reduction or no risk reduction for low volume alcohol consumption
  - MR studies do not find protective effects for low volume alcohol consumption on CVD

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

Recommendations about advice to the public in the next *Dietary Guidelines for Americans*:

- Do not begin to drink alcohol or purposefully continue to drink because you think it will make you healthier
- If you drink alcohol, at all levels of consumption, drinking less is generally better for health than drinking more
- For those who drink alcohol, recommended limits for better health are up to 1 drink per day for both women and men

SUMMARY: Draft Evidence-Based Advice to USDA and HHS (Future Directions)

- Need for more studies with stronger research designs, including RCTs, more MR studies, and intervention studies with mortality and morbidity outcomes
- For observational studies, more research is needed to:
  - Disentangle associations of average consumption from those based on quantity consumed per drinking day and frequency of consumption (i.e., patterns of consumption)
  - Understand relationships between various levels of consumption and patterns of consumption with other dietary and beverage consumption characteristics
  - Assess effects of changing alcohol consumption and consumption patterns over the life course in relation to health outcomes

DRAFT - Part D. Chapter 11: Alcoholic Beverages USDA/HHS Staff Who Supported this Chapter

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2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 11: Alcoholic Beverages

Barbara Schneeman, PhD
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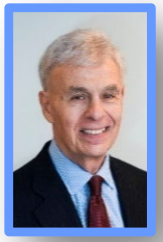

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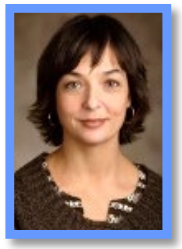

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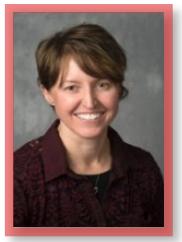

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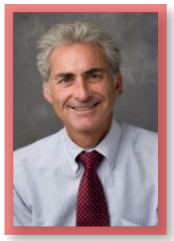

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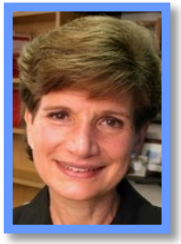

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2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee: DRAFT - Part D. Chapter 12: Added Sugars

Members Involved in Drafting this Chapter:

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Heather Leidy
Richard Mattes
Timothy Naimi
Rachel Novotny
Barbara Schneeman

This chapter includes questions examined by the Beverages and Added Sugars Subcommittee and the Data Analysis and Food Pattern Modeling Working Group

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LIST OF QUESTIONS & METHODOLOGY

1. What is the relationship between added sugars consumption and achieving nutrient and food group recommendations?
   - Answered using data analyses

2. What is the relationship between added sugars consumption and risk of cardiovascular disease?
   - Answered using a NESR systematic review

3. How much added sugars can be accommodated in a healthy diet while still meeting food group and nutrient needs?
   - Answered using food pattern modeling

Final protocols and draft conclusion statements available at DietaryGuidelines.gov
Part D. Chapter 12: Added Sugars
2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

QUESTION 1: ADDED SUGARS AND ACHIEVING FOOD AND NUTRIENT RECOMMENDATIONS: DATA ANALYSIS

Federal data were reviewed for infancy through older adults

- Reflected the most current NHANES cycle available
- Earlier cycles were used to compare changes in added sugars consumption over time

Main findings:

- In the U.S. population ages 1 and older, mean usual consumption of added sugars was **13%** of daily energy intake in 2013-2016
- The estimated proportion of the population that met the guidance to consume less than 10% of energy from added sugars has ***increased*** from 30% in 2007-2010 to 37% in 2013-2016
- Nearly 70 percent of added sugars intake comes from 5 food categories:
  - sweetened beverages
  - desserts and sweet snacks
  - coffee and tea (with their additions)
  - candy and sugars
  - breakfast cereals and bars

QUESTION 2: ADDED SUGARS AND CVD: REVIEW OF THE SCIENCE

What is the relationship between added sugars consumption and risk of cardiovascular disease?

- Answered using a NESR systematic review of literature published September 2012—September 2019
- 2015 Committee examined literature January 2000—August 2012

- 23 articles (3 in children; 20 in adults), representing 20 studies were included
  - Most of the studies examined were prospective cohort studies, although this review also included some randomized controlled trials
- **Limited** evidence of a relationship between greater consumption of added sugars and increased risk of cardiovascular disease mortality (8 studies)
  - Most of these studies were based primarily on SSB
- **Insufficient** evidence in children to answer this question (3 studies)
- **Insufficient** evidence in adults for: CVD risk profile (6 studies), ischemic cardiovascular events (3 studies), peripheral artery disease (2 studies), stroke (1 study), or heart failure (1 study)

QUESTION 3: ACCOMODATING ADDED SUGARS: FOOD PATTERN MODELING EXERCISE 1

Estimating the number of calories in the base USDA Food Patterns that can be used for added sugars

Methods

- Identify the amount of essential calories in the base USDA Food Patterns
- Assign the remaining calories exclusively to solid fats and added sugars

Definitions and Assumptions:

- The base USDA Food Patterns are constructed using nutrient-dense representative foods that contain low or no saturated fat, added sugars, and sodium.
- "Essential calories" is the energy associated with the foods and beverages ingested to meet nutritional goals through choices that align with the USDA Food Patterns in forms with the least amounts of saturated fat, added sugars, and sodium.

QUESTION 3: ACCOMODATING ADDED SUGARS: FOOD PATTERN MODELING EXERCISE 1 (continued)

Essential Calories and Limit on Solid Fats and Added Sugars Across Calorie Levels in the Base USDA Food Patterns for Ages 2 Years and Older

Calories	Essential Calories[1]	Percent Essential Calories[1]	Calorie Limit for Solid Fats and Added Sugars[2]	Calories Assigned to Solid Fats[3]	Calories Assigned to Added Sugars[3]	Grams of Solid Fats[4]	Grams of Added Sugars[4]	Percent Calories Added Sugars
Level	kcal	% kcal	kcal	kcal	kcal	g	g	%
1,000	872	87	128	70	57	8	14	6
1,200	1127	94	73	40	33	5	8	3
1,400	1318	94	82	45	37	5	9	3
1,600	1505	94	95	52	43	6	11	3
1,800	1665	93	135	74	61	9	15	3
2,000	1770	88	230	127	104	15	26	5
2,200	1960	89	240	132	108	16	27	5
2,400	2094	87	306	168	138	20	34	6
2,600	2265	87	335	184	151	22	38	6
2,800	2446	87	354	195	159	23	40	6
3,000	2574	85	426	235	192	28	48	6
3,200	2635	82	565	311	254	37	64	8

[1] Calories in pattern if all foods are consumed in nutrient-dense forms, without additional solid fats or added sugars

[2] Calculated from pattern calorie level minus essential calories

[3] Calculated as 55 percent of calories from solid fats and 45 percent from added sugars, based on mean population intakes 2013-2016

[4] Calculated using caloric values of 8.4 kcal per 1 gram of solid fats and 4 kcal per 1 gram of added sugars

QUESTION 3: ACCOMODATING ADDED SUGARS: FOOD PATTERN MODELING EXERCISE 1 (continued)

Essential Calories and Limit on Solid Fats and Added Sugars Across Calorie Levels in the Base USDA Food Patterns for Ages 2 Years and Older

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QUESTION 3: ACCOMODATING ADDED SUGARS: FOOD PATTERN MODELING EXERCISE 1 (continued)

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QUESTION 3: ACCOMODATING ADDED SUGARS: FOOD PATTERN MODELING EXERCISE 1- Conclusion Statement

- Energy required to meet food group and nutrient needs using nutrient-dense foods:
  - ≥85% more of total energy across most energy levels
- Assuming the remaining energy is distributed exclusively to solid fats and added sugars according to population-level proportional intakes:
  - ≤6% additional calories available for the consumption of added sugars for most energy levels
  - ≤8% additional calories would be available for only the highest energy level analyzed (3,200 calories/day)
- These scenarios assume:
  - individuals consume only recommended amounts of nutrient-dense foods and beverages and no calories from alcohol

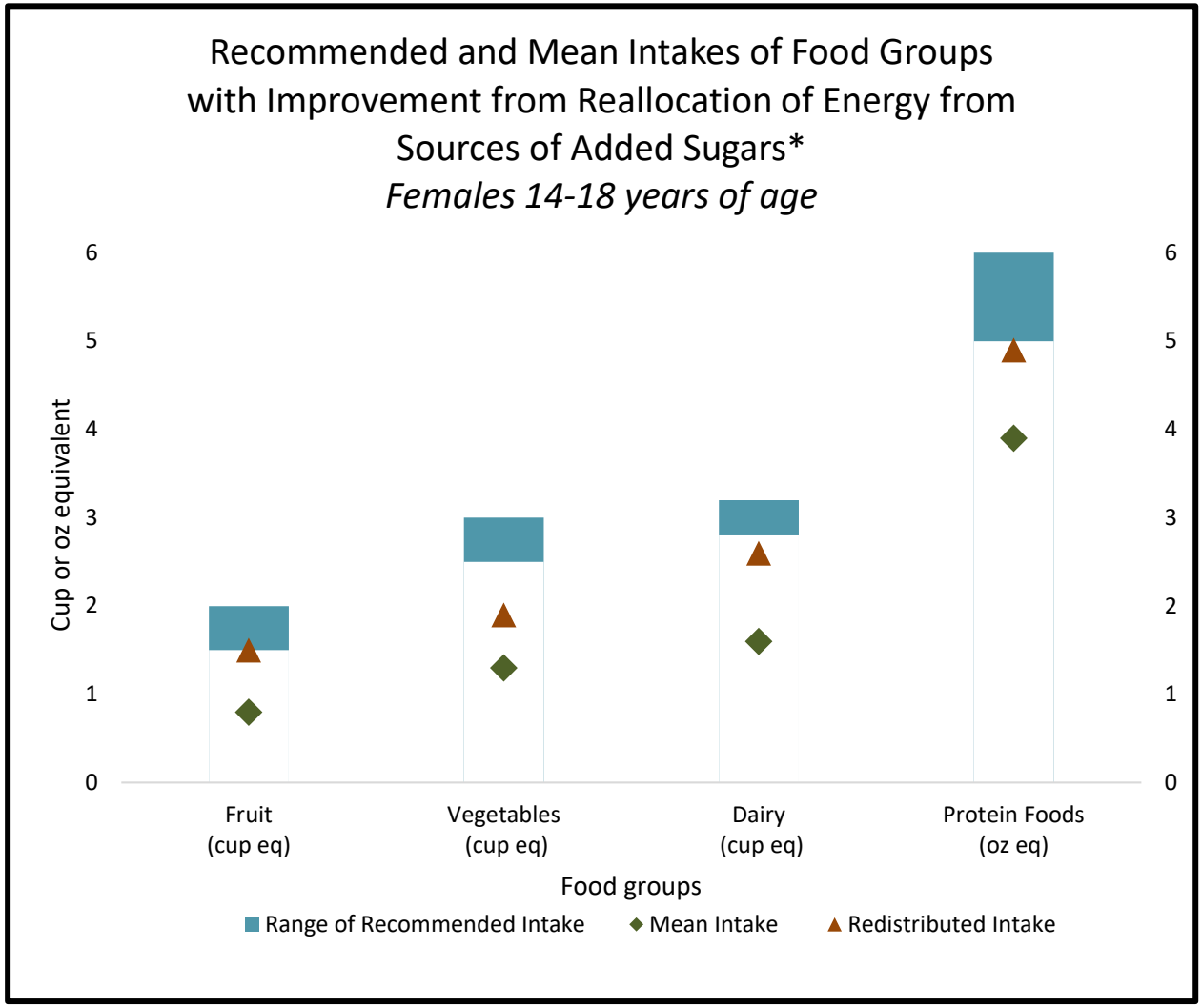
QUESTION 3: REDISTRIBUTING ADDED SUGARS: FOOD PATTERN MODELING EXERCISE 2

Redistributing calories from the top reported sources of added sugars to foods and beverages that achieve food group and nutrient goals

Methods (for each age-sex group)

- Calculate calories from the 5 top contributing food/beverage sources of added sugars
- Quantify current mean intakes across the 5 food groups and identify those under-consumed
- Reassign calories from food/beverage sources of added sugars to increase intake of under-consumed food groups

QUESTION 3: REDISTRIBUTING ADDED SUGARS: FOOD PATTERN MODELING EXERCISE 2 (continued)



*The analyses assume energy is redistributed to nutrient-dense food choices low in added sugars, solid fat, and sodium

Theoretical Improvement in Nutrient Intake with Reallocation of Energy from Sources of Added Sugars* to Nutrient-Dense Fruits, Vegetables, Dairy, and Protein Foods

Females 14-18 years of age

Nutrient	Nutritional Goal	Contribution from Reallocation of Energy from Sources of Added Sugars
Calcium	1,300 mg	490 mg
Iron	15 mg	2 mg
Potassium	4700 mg	1178 mg
Protein	46 g	18 g

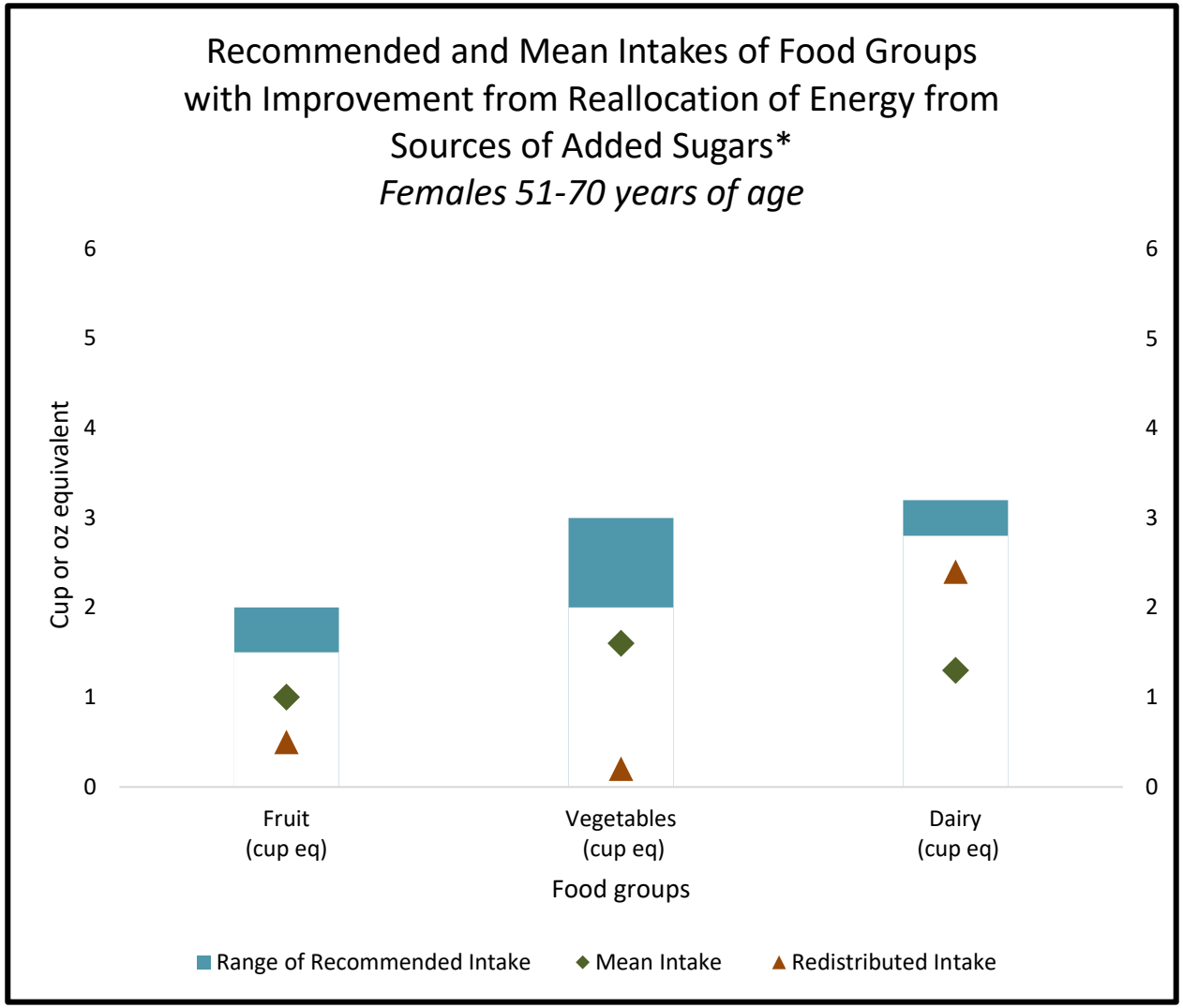
217 Calories Redistributed

Part D. Chapter 12: Added Sugars

Redistributing calories from the top reported sources of added sugars

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

QUESTION 3: REDISTRIBUTING ADDED SUGARS: FOOD PATTERN MODELING EXERCISE 2 (continued)



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Theoretical Improvement in Nutrient Intake with Reallocation of Energy from Sources of Added Sugars to Nutrient-Dense Fruits, Vegetables, Dairy and Protein Foods

Females 51-70 years of age

Nutrient	Nutritional Goal	Contribution from Reallocation of Energy from Sources of Added Sugars
Calcium	1,200 mg	350 mg
Fiber	22.4 g	2 g
Potassium	4700 mg	480 mg
Vitamin B12	2.4 mcg	1.0 mcg

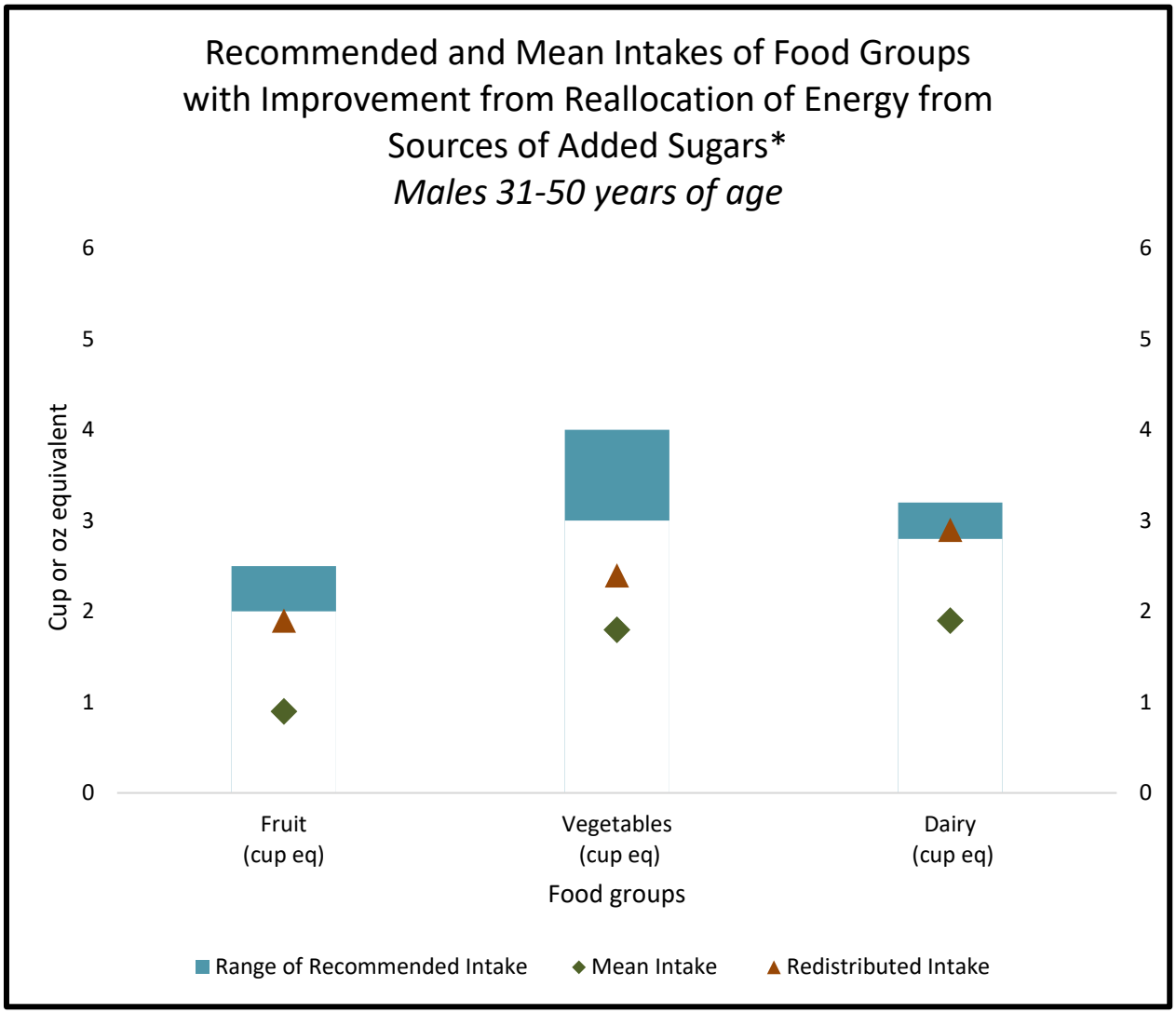
150 Calories Redistributed

Part D. Chapter 12: Added Sugars

Redistributing calories from the top reported sources of added sugars

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

QUESTION 3: REDISTRIBUTING ADDED SUGARS: FOOD PATTERN MODELING EXERCISE 2 (continued)



*The analyses assume energy is redistributed to nutrient-dense food choices low in added sugars, solid fat and sodium

Theoretical Improvement in Nutrient Intake with Reallocation of Energy from Sources of Added Sugars to Nutrient-Dense Fruits, Vegetables, Dairy and Protein Foods *Males 31-50 years of age*		
Nutrient	Nutritional Goal	Contribution from Reallocation of Energy from Sources of Added Sugars
Calcium	1,000 mg	349 mg
Fiber	25.2 g	5.3 g
Potassium	4700 mg	862 mg

230 Calories Redistributed

Part D. Chapter 12: Added Sugars

Redistributing calories from the top reported sources of added sugars

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QUESTION 3: REDISTRIBUTING ADDED SUGARS: FOOD PATTERN MODELING EXERCISE 2 – Conclusion Statement

- 5 food categories contribute the majority of added sugars in the U.S. population and
  - Often energy-dense foods with low amounts of key dietary nutrients
- Redistributing energy from these 5 food categories to underconsumed food groups and nutrients
  - Could have a significant positive impact on overall diet quality and nutrient status
  - Age-sex groups could better meet food group recommendations for fruits, vegetables, and dairy
  - Could also increase consumption of key nutrients contained in these food groups

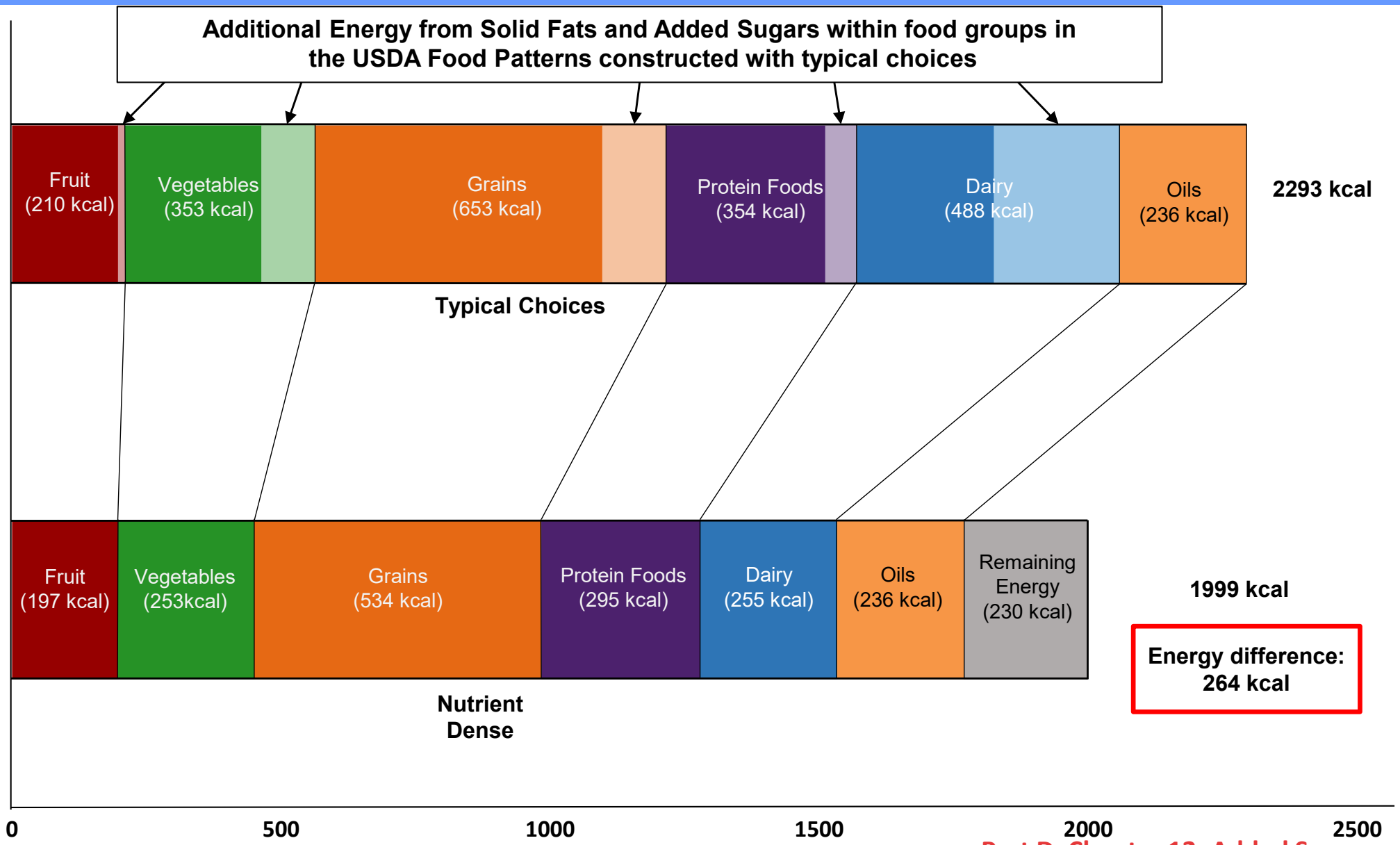
QUESTION 3: TYPICAL CHOICES ANALYSIS: FOOD PATTERN MODELING EXERCISE 3

Estimating excess calories from added sugars when USDA Food Patterns are met with typical vs nutrient-dense choices

Methods

- Calculate the USDA Food Patterns with typical rather than nutrient-dense choices
- Identify the contribution of added sugars to total energy in the USDA Food Patterns constructed with typical choices

QUESTION 3: TYPICAL CHOICES ANALYSIS: FOOD PATTERN MODELING EXERCISE 3



Part D. Chapter 12: Added Sugars

Estimating excess calories when USDA Food Patterns are constructed with typical choice vs nutrient dense

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

QUESTION 3: TYPICAL CHOICES ANALYSIS: FOOD PATTERN MODELING EXERCISE 3 – Conclusion Statement

- When the USDA Food Patterns are constructed with typical choices rather than nutrient-dense foods, the contribution of added sugars to total energy increases.
- If consumers eat the recommended quantities from each food group or subgroup, but do not choose nutrient-dense foods lower in added sugars, total energy will exceed daily needs.

DISCUSSION

- A high proportion of total energy is accounted for by added sugars
- The totality of the evidence suggests limiting the consumption of added sugars to, at most, very low amounts
- Limitations within the available body of evidence should be considered:
  - Challenges in exposure assessment
    - Most studies focus on SSBs
  - Limited observational studies assessing intake over time
  - Limited RCTs
- Recent systematic reviews and meta-analyses provide additional supporting evidence of adverse effects of added sugars, particularly SSB, that may contribute to unhealthy weight-gain and obesity-related health outcomes

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

- The *2015-2020 Dietary Guidelines for Americans* recommended consumption of added sugars be limited to 10% or less of total energy intake

- The prevalence of overweight and obesity is high and added sugars provide energy, generally without contributing additional nutrient content

- Based on updated analyses of dietary intake, model-based estimations of discretionary calories available for added sugars, and evidence for the potential health impacts, this Committee suggests:

  Less than 6% of energy from added sugars is more consistent with a dietary pattern that is nutritionally adequate while avoiding excess energy intake than is a pattern with less than 10% of energy from added sugars

- Reducing the amount of added sugars in the diet, through changes in consumer behavior, how food is produced and sold, and food policies, is an achievable objective that could improve population health

DRAFT - Part D. Chapter 12: Added Sugars
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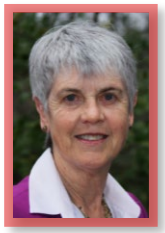
2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 12: Added Sugars



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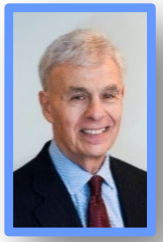

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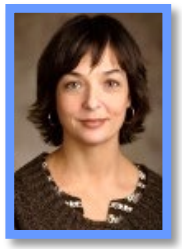

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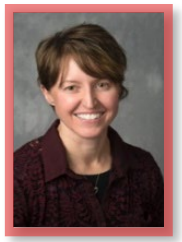

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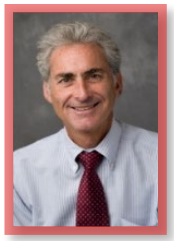

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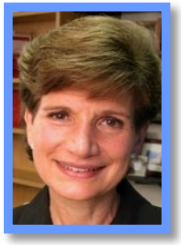

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2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee: DRAFT - Part D. Chapter 13: Frequency of Eating

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This chapter includes questions examined by the Frequency of Eating and the Data Analysis and Food Pattern Modeling Subcommittees

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LIST OF QUESTIONS

1. What is the relationship between the frequency of eating and achieving nutrient and food group recommendations?
2. What is the relationship between the frequency of eating and growth, size, body composition, and risk of overweight and obesity?
3. What is the relationship between the frequency of eating and all-cause mortality?
4. What is the relationship between the frequency of eating and risk of cardiovascular disease?
5. What is the relationship between the frequency of eating and risk of type 2 diabetes?

METHODOLOGY

- Question 1 was answered using data analysis.
- Questions 2, 3, 4 and 5 were answered using NESR systematic reviews.

REVIEW OF THE SCIENCE

- Eating patterns vary by frequency and timing in the United States, and are shaped by age, race/ethnicity, and income. On average, the U.S. population reports 5.7 eating occasions per day, occurring most often at noon or "evening."
- Most of the U.S. population report consuming 3 meals (64% of the population) or 2 meals (28% of the population) per day. When compared with 2 meals, Americans who consume 3 meals per day tend to have approximately 5-point higher Healthy Eating Index scores.
- Snacking is ubiquitous, occurring in 93% of the U.S. population. Snacks provide 22 to 23% of total energy consumed and 2 to 3 snacking events are reported on average per day. Late-night eating events often include alcohol intake (in adults), and intakes of added sugars, sodium, and saturated fats in adolescents and adults.
- 11 studies were identified as meeting inclusion criteria for NESR systematic review but provided insufficient evidence for answering questions on frequency of eating and health (Questions 2-5)

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

- The NESR review did not yield specific answers to the questions 2-5 concerning the relationship between frequency of eating and health outcomes of obesity, all-cause mortality, risk of cardiovascular disease, or risk of type 2 diabetes. This was primarily due to the limited availability of high-quality data. **The Committee cannot therefore make recommendations to the Departments on frequency of eating and health.**

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

- The Committee recommends…
  - the scientific community raise the standardization of frequency of eating terms to a high priority and ensures adequate data collection to evaluate habitual or usual eating frequency
  - the 2025 Dietary Guidelines Advisory Committee consider separate questions examining how the timing of ingestive events influences health
  - See additional future recommendations in the draft report

DRAFT - Part D. Chapter 13: Frequency of Eating
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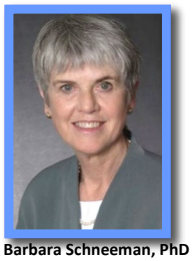
2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 13: Frequency of Eating



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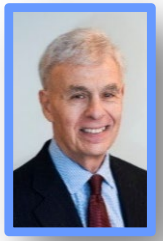

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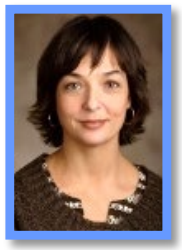

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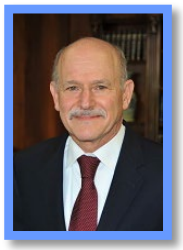

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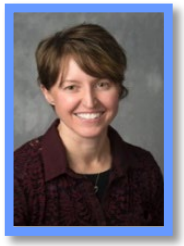

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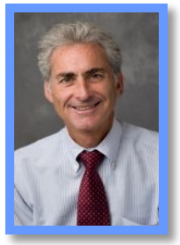

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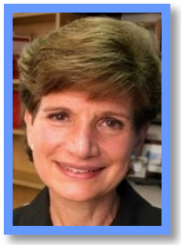

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2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee: DRAFT - Part D. Chapter 14: USDA Food Patterns For Individuals Ages 2 Years and Older

Members Involved in Drafting this Chapter:

Jamy Ard

Regan Bailey

Teresa Davis

Timothy Naimi

Jaime Stang

Chair/Vice Chair Rep: Barbara Schneeman

This chapter includes questions examined by the Data Analysis Food Pattern Modeling Working Group

DietaryGuidelines.gov

LIST OF QUESTIONS

Are changes to the USDA Food Patterns needed based on the relationships identified in the systematic reviews?

If so, how well do USDA Food Pattern variations meet nutrient recommendations for each stage of life?

If nutrient needs are not met, is there evidence to support supplementation and/or consumption of fortified foods to meet nutrient adequacy?

FOOD PATTERN MODELING METHODOLOGY

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 meeting food group recommendations and nutrient needs to inform development of sample dietary patterns for Americans that reflect established existing health-promoting patterns or novel patterns that were examined in systematic reviews.

Final protocols and draft conclusion statements available at DietaryGuidelines.gov
Part D. Chapter 14: USDA Food Patterns Ages 2+

METHODOLOGY

- Analytic framework and food modeling process presented at March meeting
- Developed nutrient profiles specific for each age group:
  - 2-3 years
  - 4-18 years
  - 19-70 years
  - 71+ years
- Age-specific nutrient profiles based on proportional intake of an item cluster for each age grouping
- Applied nutrient profiles to evaluate patterns against nutritional goals (RDA or AI) by age-sex group

RESULTS OF FOOD PATTERN MODELING EXERCISES: Draft Conclusion Statement Part 1

Are Changes to the USDA Food Patterns Needed Based on the Relationships Identified in the Systematic Reviews?

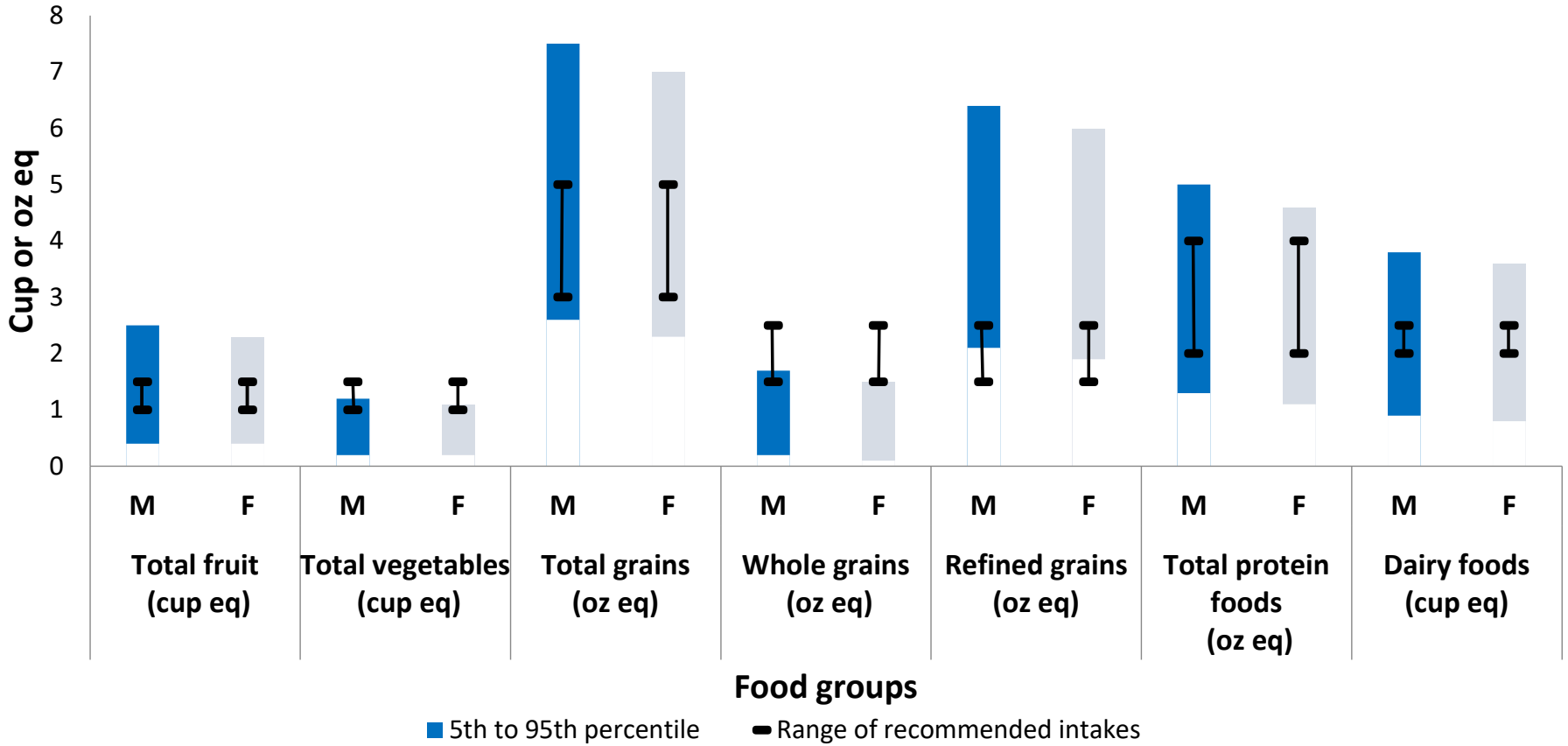
- No major changes to the existing 3 USDA Food Patterns were needed based on the relationships identified in the systematic reviews conducted by the Committee.
  - Healthy U.S.-Style Eating Pattern
  - Healthy Vegetarian Eating Pattern
  - Healthy Mediterranean-Style Eating Pattern

RESULTS OF FOOD PATTERN MODELING EXERCISES: Draft Conclusion Statement Part 2

How Well Do USDA Food Pattern Variations Meet Nutrient Recommendations for Each Stage of Life?

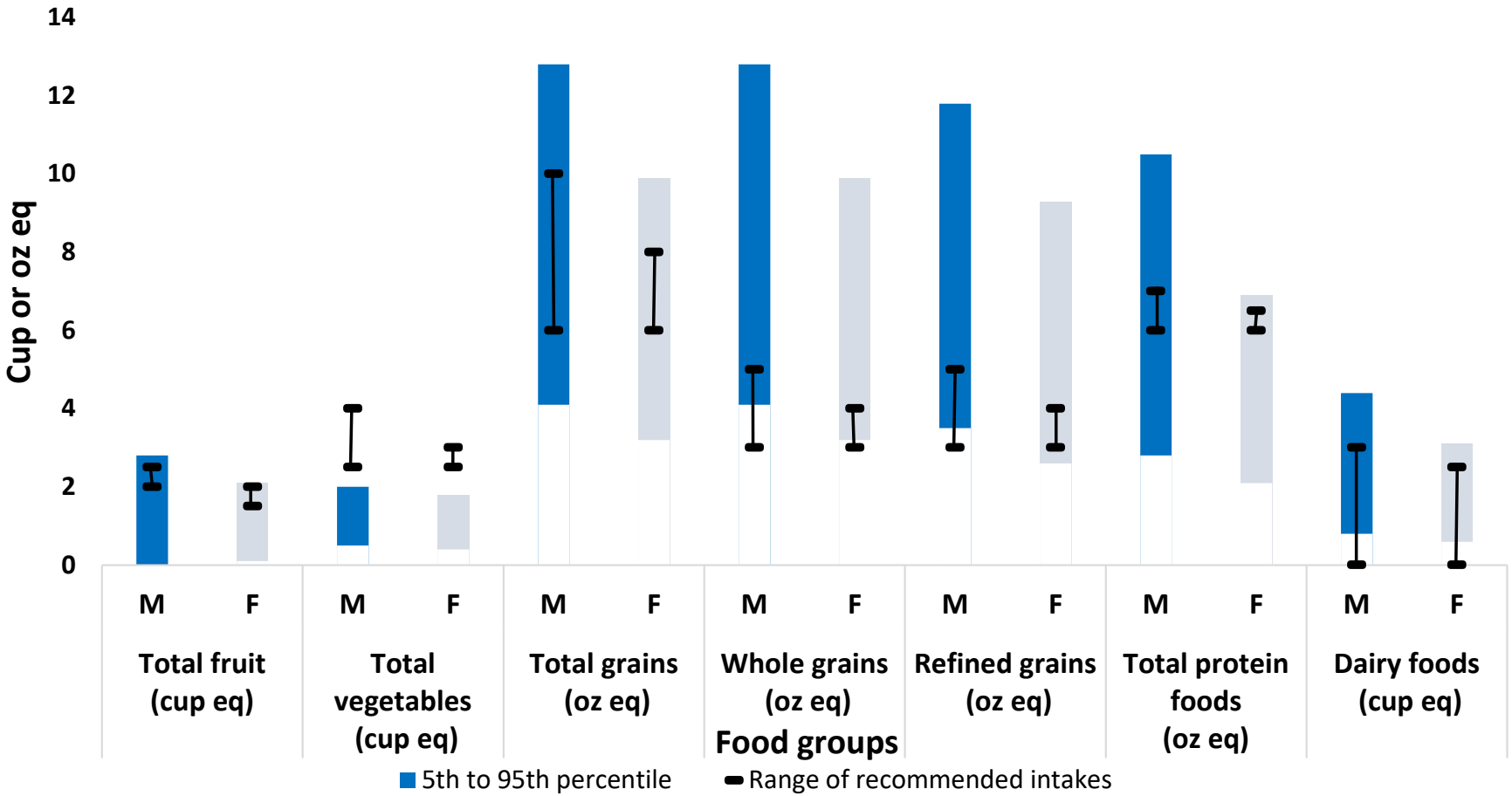
- The 3 USDA Food Patterns meet the RDA or AI goals and stay within limits for the UL or the CDRR target for the majority of nutritional goals for ages 2 years and older, including women who are pregnant or lactating
- Will present data primarily on the Healthy US Style Pattern today

Range of Recommended Food Group Amounts in the Healthy U.S. Style Pattern Compared to the 5th to 95th Percentiles of Intake in the Population of Children Ages 2 to 3 years



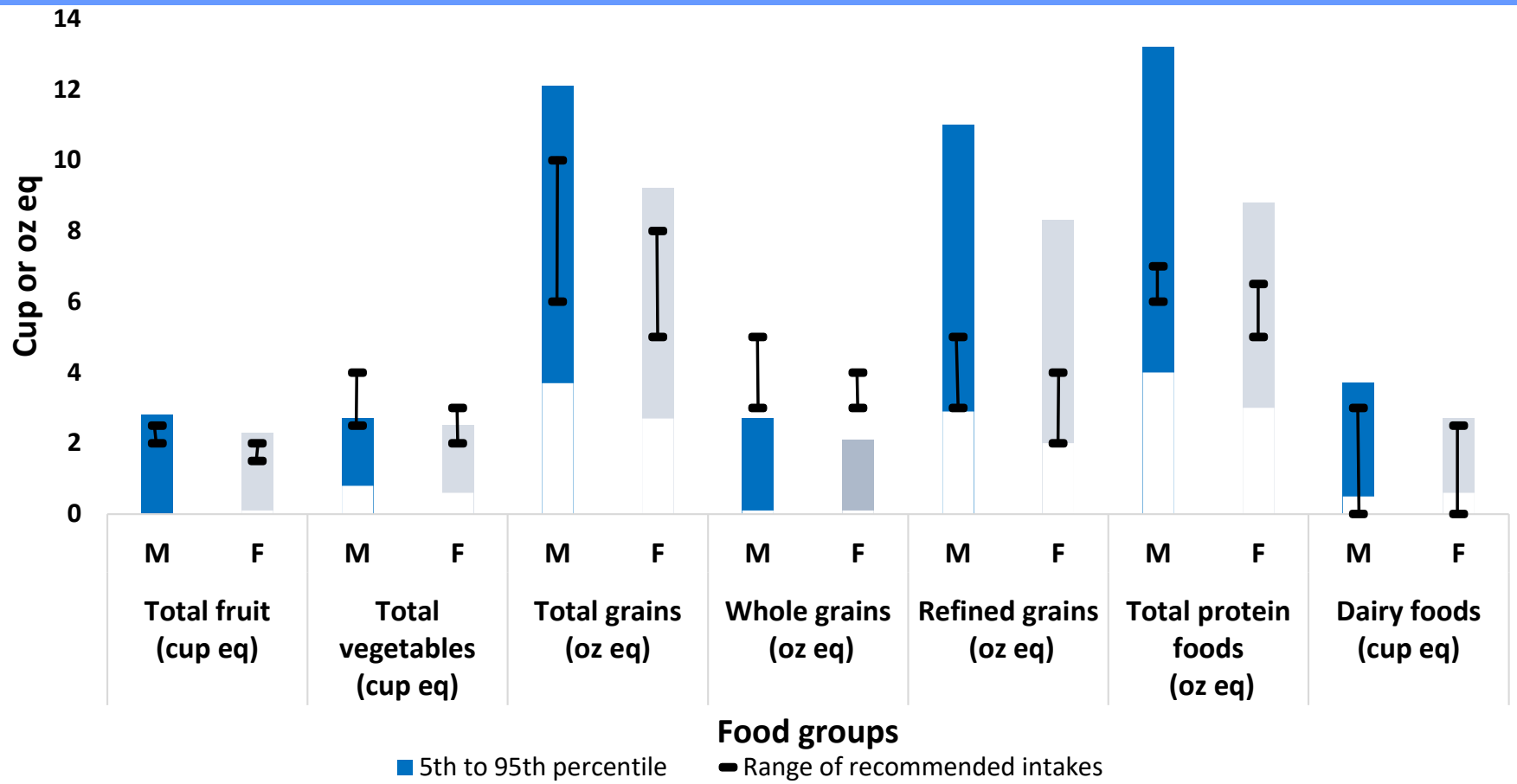
Source: Food Group Intake Distributions, WWEIA NHANES 2013-2016. Prepared by NCI, 2019

Range of Recommended Food Group Amounts in the Healthy U.S. Style Pattern Compared to the 5th to 95th Percentiles of Intake in the Population of Adolescents Ages 14 to 18 years



Source: Food Group Intake Distributions, WWEIA NHANES 2013-2016. Prepared by NCI, 2019

Range of Recommended Food Group Amounts in the Healthy U.S. Style Pattern Compared to the 5th to 95th Percentiles of Intake in the Population of Adults Ages 19+.



Source: Food Group Intake Distributions, WWEIA NHANES 2013-2016. Prepared by NCI, 2019

Table 14.1 Healthy U.S.-Style Food Pattern: Comparison to Nutrient Goals for Select Energy Levels

Calorie Level	1,000	1,200	1,400	1,600	1,600	1,800	1,800	1,800	2,000	2,000	2,200	2,200	2,400
Age-sex group for comparison	M/F 1-3	F 4-8	M 4-8	F 9-13	F 51+	M 9-13	F 14-18	F 31-50	F 19-30	M 51+	M 14-18	M 31-50	M 19-30
Protein (%kcal)	17%	20%	19%	20%	21%	19%	19%	19%	18%	18%	18%	18%	18%
Carbohydrate (%kcal)	54%	53%	54%	51%	51%	53%	53%	53%	52%	52%	53%	53%	52%
Fiber, total dietary (14g/1000kcal)	99%	103%	105%	109%	109%	110%	110%	111%	106%	106%	110%	111%	108%
Total lipid (fat) (%kcal)	31%	30%	29%	30%	30%	30%	30%	30%	32%	32%	31%	31%	32%
Saturated fat (%kcal)	7%	7%	7%	7%	7%	7%	7%	7%	8%	8%	8%	7%	8%
Cholesterol (%DG)	28%	43%	54%	67%	65%	68%	68%	66%	73%	73%	81%	79%	87%
Minerals													
Calcium (%RDA)	111%	98%	102%	93%	101%	96%	96%	125%	127%	106%	102%	132%	136%
Iron (%RDA)	106%	89%	108%	154%	149%	176%	94%	76%	78%	176%	153%	203%	221%
Magnesium (%RDA)	214%	173%	201%	130%	102%	140%	93%	110%	118%	87%	95%	97%	108%
Potassium (%AI)	88%	95%	107%	128%	121%	130%	141%	132%	140%	107%	126%	117%	120%
Sodium (%CDRR)	65%	77%	88%	83%	55%	91%	71%	60%	63%	63%	80%	69%	74%
Vitamins													
Vitamin E (%RDA)	84%	83%	93%	74%	58%	82%	60%	64%	71%	71%	74%	78%	84%
Vitamin D (%RDA)	39%	41%	45%	55%	69%	56%	56%	69%	70%	70%	60%	72%	75%
Choline (%AI)	88%	91%	108%	88%	83%	92%	86%	87%	92%	71%	73%	77%	82%

Table 14.1 Healthy U.S.-Style Food Pattern: Comparison to Nutrient Goals for Select Energy Levels

Calorie Level	1,000	1,200	1,400	1,600	1,600	1,800	1,800	1,800	2,000	2,000	2,200	2,200	2,400
Age-sex group for comparison	M/F 1-3	F 4-8	M 4-8	F 9-13	F 51+	M 9-13	F 14-18	F 31-50	F 19-30	M 51+	M 14-18	M 31-50	M 19-30
Protein (%kcal)	17%	20%	19%	20%	21%	19%	19%	19%	18%	18%	18%	18%	18%
Carbohydrate (%kcal)	54%	53%	54%	51%	51%	53%	53%	53%	52%	52%	53%	53%	52%
Fiber, total dietary (14g/1000kcal)	99%	103%	105%	109%	109%	110%	110%	111%	106%	106%	110%	111%	108%
Total lipid (fat) (%kcal)	31%	30%	29%	30%	30%	30%	30%	30%	32%	32%	31%	31%	32%
Saturated fat (%kcal)	7%	7%	7%	7%	7%	7%	7%	7%	8%	8%	8%	7%	8%
Cholesterol (%DG)	28%	43%	54%	67%	65%	68%	68%	66%	73%	73%	81%	79%	87%
Minerals													
Calcium (%RDA)	111%	98%	102%	93%	101%	96%	96%	125%	127%	106%	102%	132%	136%
Iron (%RDA)	106%	89%	108%	154%	149%	176%	94%	76%	78%	176%	153%	203%	221%
Magnesium (%RDA)	214%	173%	201%	130%	102%	140%	93%	110%	118%	87%	95%	97%	108%
Potassium (%AI)	88%	95%	107%	128%	121%	130%	141%	132%	140%	107%	126%	117%	120%
Sodium (%CDRR)	65%	77%	88%	83%	55%	91%	71%	60%	63%	63%	80%	69%	74%
Vitamins													
Vitamin E (%RDA)	84%	83%	93%	74%	58%	82%	60%	64%	71%	71%	74%	78%	84%
Vitamin D (%RDA)	39%	41%	45%	55%	69%	56%	56%	69%	70%	70%	60%	72%	75%
Choline (%AI)	88%	91%	108%	88%	83%	92%	86%	87%	92%	71%	73%	77%	82%

Table 14.2B Healthy U.S.-Style Pattern Comparison to Goals for Women Who Are Pregnant or Lactating, Ages 19 to 30 years

Calorie Level	2,000	2,400	2,600	2,400	2,400
Life stage for comparison	pregnant (1st trimester)	pregnant (2nd trimester)	pregnant (3rd trimester)	lactating (0-6 mo post part)	lactating (7-12 mo post part)
Protein (%kcal)	18%	18%	17%	18%	18%
Carbohydrate (%kcal)	52%	52%	53%	52%	52%
Fiber, total dietary (14g/1000kcal)	106%	111%	119%	111%	108%
Total lipid (fat) (%kcal)	32%	32%	32%	32%	32%
Minerals					
Calcium (%RDA)	127%	136%	141%	136%	136%
Iron (%RDA)	52%	65%	73%	196%	196%
Magnesium (%RDA)	105%	123%	134%	139%	139%
Potassium (%AI)	125%	141%	152%	146%	146%
Sodium (%CDRR)	63%	74%	79%	74%	74%
Vitamins					
Vitamin A (%RDA)	123%	137%	149%	81%	81%
Vitamin E (%RDA)	71%	84%	92%	67%	67%
Vitamin D (%RDA)	70%	75%	75%	75%	75%
Choline (%AI)	87%	100%	104%	82%	82%
Folate, DFE (%RDA)	86%	108%	122%	130%	130%

Table 14.2B Healthy U.S.-Style Pattern Comparison to Goals for Women Who Are Pregnant or Lactating, Ages 19 to 30 years

Calorie Level	2,000	2,400	2,600	2,400	2,400
Life stage for comparison	pregnant (1st trimester)	pregnant (2nd trimester)	pregnant (3rd trimester)	lactating (0-6 mo post part)	lactating (7-12 mo post part)
Protein (%kcal)	18%	18%	17%	18%	18%
Carbohydrate (%kcal)	52%	52%	53%	52%	52%
Fiber, total dietary (14g/1000kcal)	106%	111%	119%	111%	108%
Total lipid (fat) (%kcal)	32%	32%	32%	32%	32%
Minerals					
Calcium (%RDA)	127%	136%	141%	136%	136%
Iron (%RDA)	52%	65%	73%	196%	196%
Magnesium (%RDA)	105%	123%	134%	139%	139%
Potassium (%AI)	125%	141%	152%	146%	146%
Sodium (%CDRR)	63%	74%	79%	74%	74%
Vitamins					
Vitamin A (%RDA)	123%	137%	149%	81%	81%
Vitamin E (%RDA)	71%	84%	92%	67%	67%
Vitamin D (%RDA)	70%	75%	75%	75%	75%
Choline (%AI)	87%	100%	104%	82%	82%
Folate, DFE (%RDA)	86%	108%	122%	130%	130%

Nutrient Goals not Met

Iron: The patterns provide < 90% of the RDA for females ages 4 to 8 years, 19 to 30 years, 31 to 50 years, and < 75% for women who are pregnant.

Vitamin D: The patterns achieve 30 to 45% of the RDA for children younger than age 8 years and approximately 55 to 70% the RDA for the rest of the population.

Vitamin E: The patterns generally provide < 80% of the RDA for Vitamin E, except for children younger than age 8 years, where 85 to 98% of the RDA is achieved.

Choline: The patterns generally provide less than 85% of the Adequate Intake for choline.

RDA = Recommended Dietary Allowance

Comparison of Food Groups between 3 Styles: 2,000 kcal

FOOD GROUP (units)	Healthy US	Vegetarian	Mediterranean
FRUITS (cup eq/day)	**2**	**2**	**2.5**
VEGETABLES (cup eq/day)	**2.5**	**2.5**	**2.5**
GRAINS (oz eq/day)	**6**	**6.5**	**6**
Whole grains (oz eq/ day)	*3*	*3.5*	*3*
Refined grains (oz eq/ day)	*3*	*3*	*3*
PROTEIN FOODS (oz eq/day)	**5.5**	**3.5**	**6.5**
Subgroups	Protein Foods Subgroup Amounts in Oz Eq per Week		
Meats, Poultry and Eggs	*25*		*26*
Eggs only (Vegetarian)		*3*	
Seafood	*8*		*15*
Legumes as protein (Vegetarian)		*6*	
Nuts, Seeds and Soy	*5.5*	*15*	*4.5*
DAIRY (cup eq/day)	**3**	**3**	**2**
OILS (grams/day)	**27**	**27**	**27**
Remaining Calories for Other Uses (kcal)	**230**	**252**	**155**

Comparison of Food Groups between 3 Styles: 2,000 kcal

FOOD GROUP (units)	Healthy US	Vegetarian	Mediterranean
FRUITS (cup eq/day)	**2**	**2**	**2.5**
VEGETABLES (cup eq/day)	**2.5**	**2.5**	**2.5**
GRAINS (oz eq/day)	**6**	**6.5**	**6**
Whole grains (oz eq/ day)	*3*	*3.5*	*3*
Refined grains (oz eq/ day)	*3*	*3*	*3*
PROTEIN FOODS (oz eq/day)	**5.5**	**3.5**	**6.5**
Subgroups	Protein Foods Subgroup Amounts in Oz Eq per Week		
Meats, Poultry and Eggs	*25*		*26*
Eggs only (Vegetarian)		*3*	
Seafood	*8*		*15*
Legumes as protein (Vegetarian)		*6*	
Nuts, Seeds and Soy	*5.5*	*15*	*4.5*
DAIRY (cup eq/day)	**3**	**3**	**2**
OILS (grams/day)	**27**	**27**	**27**
Remaining Calories for Other Uses (kcal)	**230**	**252**	**155**

Table D14.4. Comparison to Goals between the 3 USDA Food Patterns at the 2,000-Calorie level

	Healthy US	Vegetarian	Mediterranean-Style
Age-sex group for comparison	Female 19 to 30 y	Female 19 to 30 y	Female 19 to 30 y
Protein (%kcal)	18%	16%	19%
Carbohydrate (%kcal)	52%	56%	53%
Fiber (14g/1000kcal)	108%	125%	110%
Total lipid (fat) (%kcal)	32%	31%	31%
Saturated fat (%kcal)	8%	8%	7%
Cholesterol (%DG)	75%	39%	75%
Calcium (%RDA)	128%	134%	99%
Iron (%RDA)	79%	91% (51%*)	80%
Vitamin E (%RDA)	70%	73%	70%
Vitamin D (%RDA)	52%	37%	50%
Vitamin B-12 (%RDA)	260%	164%	266%
Choline (%AI)	86%	71%	83%

RESULTS OF FOOD PATTERN MODELING EXERCISES: Draft Conclusion Statement Part 3

If Nutrient Needs Are Not Met, Is There Evidence to Support Supplementation and/or Consumption of Fortified Foods to Meet Nutrient Adequacy?

- Evidence supports supplementation and fortification for:
  - Iron for females during adolescence and pregnancy
  - Vitamin D for all age-sex groups
  - Folic acid (periconception and first trimester)

DISCUSSION

- Most Americans would benefit from shifting current food choices to healthy, nutrient-dense choices across and within all food groups
  - How to change food intake behaviors
  - Cost and access to nutrient-dense foods

- Energy balance must be a consideration given the high prevalence of overweight and obesity in our nation

DISCUSSION

Continue to build on FPM life stage approach

- Identify life stage transition points when the potential for changes are likely to be detrimental or lead to higher risk dietary patterns
- Allows proactive public health strategies to anticipate "at risk" periods
- Support maintenance of healthy intakes that start early in life but decline over time
- Foods that individuals should eat over the lifespan are remarkably consistent
- Adapt to include other factors

SUMMARY: Draft Evidence-Based Advice to USDA and HHS

- Continue to recommend established USDA Food Patterns: Healthy U.S.-Style, Healthy Vegetarian, and Healthy Mediterranean-Style
- Core components of all 3 USDA Food Patterns:
  - Fruits, vegetables, legumes, whole grains, nuts and seeds
  - Protein and fats from nutrient-rich food sources
  - Limited amounts of added sugars, solid fats, and sodium
  - Discretionary calories: A small amount of energy remains for additional saturated fats, added sugars, alcohol or other sources of energy
- Help the public continue to shift dietary intakes in healthy directions including strategies for maintaining energy balance

DRAFT - Part D. Chapter 14: USDA Food Patterns For Individuals Ages 2 Years and Older
USDA/HHS Staff Who Supported this Chapter

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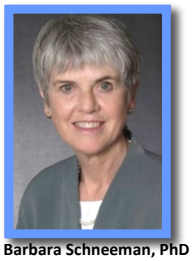
2020 Dietary Guidelines Advisory Committee:
DRAFT - Part D. Chapter 14: USDA Food Patterns For Individuals Ages 2 Years and Older



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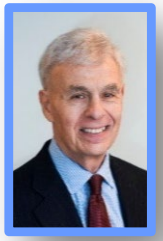

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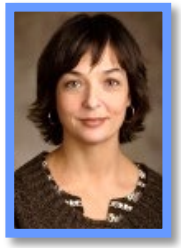

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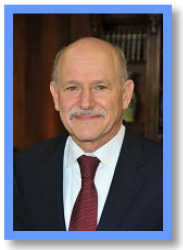

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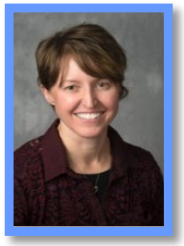

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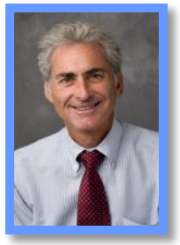

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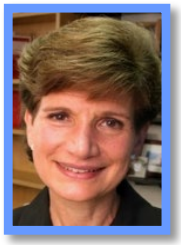

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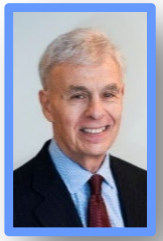
2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee

Barbara Schneeman, PhD
University of California-Davis
Chair



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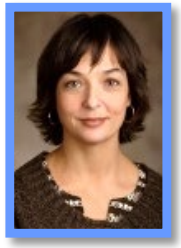

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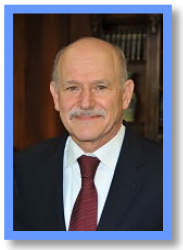

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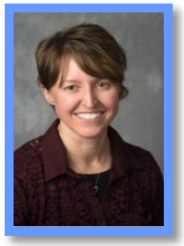

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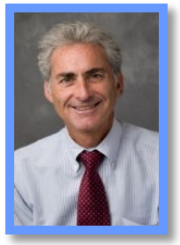

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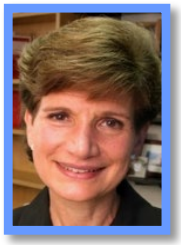

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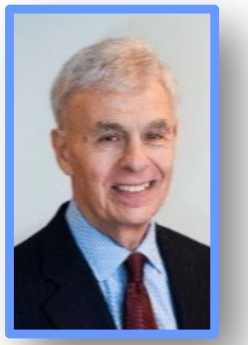
2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

2020 Dietary Guidelines Advisory Committee



Integrating the Evidence and Future Directions

Barbara Schneeman, PhD

Ronald Kleinman, MD

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Scientific Report of the 2020 Dietary Guidelines Advisory Committee

PART A: EXECUTIVE SUMMARY

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PART E: FUTURE DIRECTIONS

PART F: APPENDICES

PART B: INTEGRATION CHAPTER

- Purpose:
  - Describes the major themes from the Committee's review of the evidence
  - Provides an overview of our advice to the Departments for the upcoming edition of the *Dietary Guidelines for Americans*
- Process:
  - A working group worked with the chair and vice-chair to draft the chapter
    - Working group members: Jamy Ard, Teresa Davis, Richard Mattes, Jamie Stang, Elsie Taveras, Linda Van Horn
  - Draft discussed within subcommittees and shared for full member review

Major Themes

Presented at Meeting 5 and remain the same:

- Public health challenges
- Life stages
- Dietary patterns

A healthy dietary pattern is important at each life stage and can affect health and wellness during the current and future life stages.

Part B: Integration Chapter

2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report*

Considerations for Updating the Guidelines

The Guidelines

1. **Follow a healthy eating pattern across the lifespan.** All food and beverage choices matter. Choose a healthy eating pattern at an appropriate calorie level to help achieve and maintain a healthy body weight, support nutrient adequacy, and reduce the risk of chronic disease.
2. **Focus on variety, nutrient density, and amount.** To meet nutrient needs within calorie limits, choose a variety of nutrient-dense foods across and within all food groups in recommended amounts.
3. **Limit calories from added sugars and saturated fats and reduce sodium intake.** Consume an eating pattern low in added sugars, saturated fats, and sodium. Cut back on foods and beverages higher in these components to amounts that fit within healthy eating patterns.
4. **Shift to healthier food and beverage choices.** Choose nutrient-dense foods and beverages across and within all food groups in place of less healthy choices. Consider cultural and personal preferences to make these shifts easier to accomplish and maintain.
5. **Support healthy eating patterns for all.** Everyone has a role in helping to create and support healthy eating patterns in multiple settings nationwide, from home to school to work to communities.

1. Follow a healthy eating pattern across the lifespan.

- Suggested Update: Concepts that the Committee recommend be included in the overarching guidelines:
  - Initiate a healthful dietary pattern early in life for infants and young children.
  - Follow a healthful dietary pattern appropriate for the nutritional needs of each life stage.
  - Modify the dietary pattern over the lifespan to meet the nutritional needs of each life stage.

2. Focus on variety, nutrient density, and amount.

- Suggested Update: Concepts that the Committee recommend be included in the overarching guidelines:
  - Focus on nutritional quality of food choices, portion size and frequency of eating.
  - For the earliest life stage, focus on breastfeeding and human milk for optimal nutrition and gradual introduction of a variety of nutrient-rich complementary foods during the second half of infancy.

3. Limit calories from added sugars and saturated fats and reduce sodium intake.

- Suggested Update: Concepts that the committee recommend be included in the overarching guidelines:
  - Limit food and beverage choices that are sources of added sugars, saturated fats, alcohol, and salt to reduce intake of excess energy, solid fats, and sodium.
  - Replace foods and beverages that are sources of added sugars, saturated fats, alcohol, and salt with more healthful choices.
  - In the first 2 years, foods such as sugar-sweetened beverages should be avoided.

4. Shift to healthier food and beverage choices.

- Suggested Update: Concepts that the Committee recommend be included in the overarching guidelines:
  - Shift eating patterns to food and beverage choices that have a higher nutrient to energy ratio
  - Shift to higher quality food and beverage choices at every age to achieve a more healthful dietary pattern

5. Support healthy eating patterns for all.

- Suggested Update: Concepts that the Committee recommend be included in the overarching guidelines:
  - Support healthful eating patterns in all food environments for all Americans at all ages.
  - Promote and support breastfeeding.
  - Support healthful eating patterns for all ages where people live, learn, work, play, and gather.

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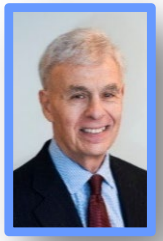

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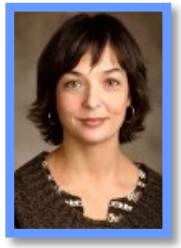

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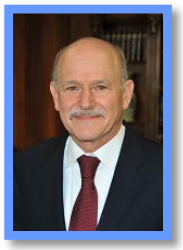

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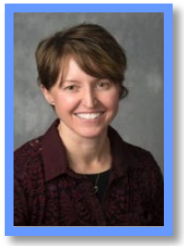

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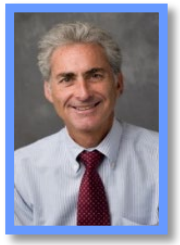

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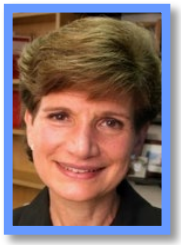

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PART E: FUTURE DIRECTIONS

- Purpose:
  - Highlight research recommendations, work needed to complement the Dietary Guidelines, topics to be considered in future Dietary Guidelines processes, data needs, and more
- Process:
  - Developed within subcommittees
  - Compiled and collated by staff
  - To be reviewed by the full Committee as we finalize our report
- The Committee hopes this is a useful resource to continue to advance nutrition research and support activities to improve public health.

2020 Dietary Guidelines Advisory Committee

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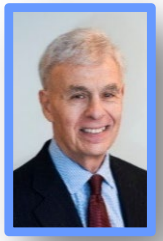
University of California-Davis
Chair



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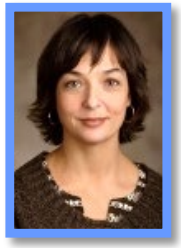

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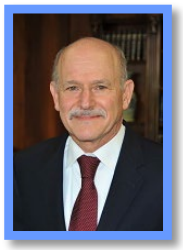

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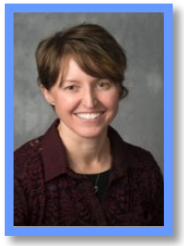

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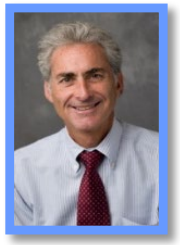

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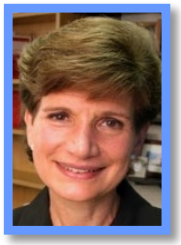

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Next Steps and Closing Remarks

Eve Stoody, PhD

Designated Federal Officer

2020 Dietary Guidelines Advisory Committee

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Meetings of the 2020 Committee

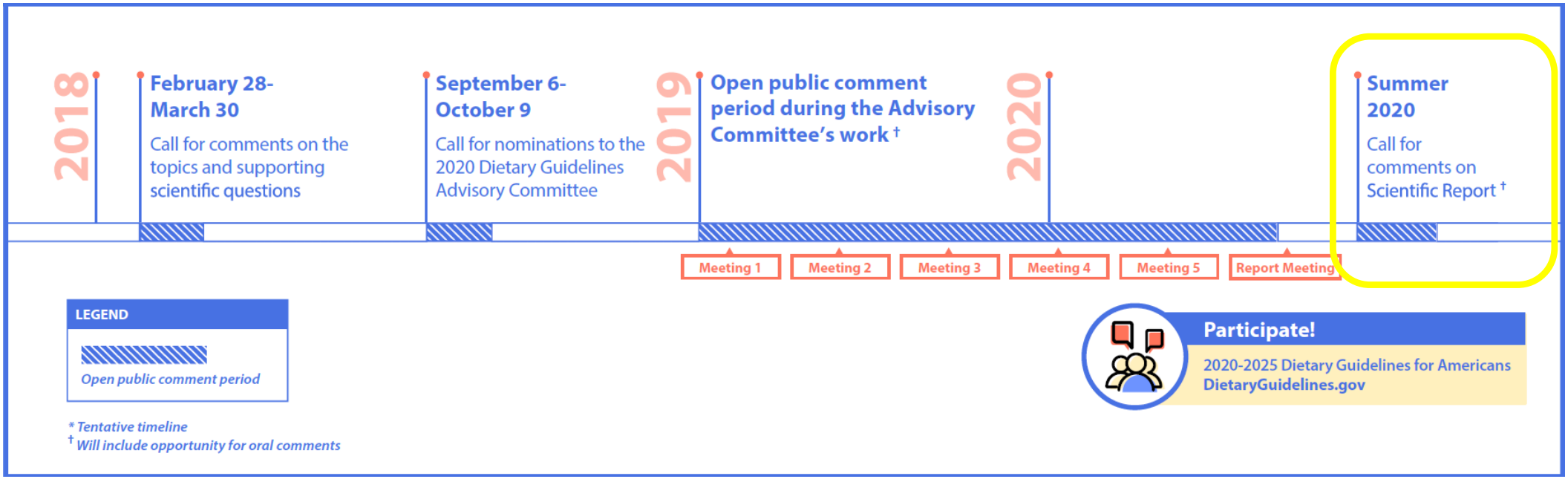
All meetings of the full Committee are open to the public.

- ✓ Meeting 1: March 28-29, 2019 (Washington, DC)
- ✓ Meeting 2: July 10-11, 2019 (Washington, DC)*
- ✓ Meeting 3: October 24-25, 2019 (Washington, DC)
- ✓ Meeting 4: January 23-24, 2020 (Houston, TX)*
- ✓ Meeting 5: March 12-13, 2020 (Webcast only)
- ✓ Draft Advisory Report Meeting: June 17, 2020 (Webcast only)

* Oral comments to the Committee from the public

Presentations, transcripts, and recordings available at DietaryGuidelines.gov

2020 Dietary Guidelines Advisory Committee Timeline*



- Committee will finalize report based on today's meeting.
- Committee will submit report to Secretaries of USDA and HHS at the end of June.
- USDA and HHS will post the final report online on or around July 15, 2020 for public comment.
- The public will also be invited to present oral comments to USDA and HHS on the Committee's report on August 11, 2020.
- Sign up for updates at DietaryGuidelines.gov.

2020-2025 Dietary Guidelines for Americans

USDA and HHS will then write and publish the Dietary Guidelines for Americans. Our goal is to publish the 2020-2025 edition by the end of 2020.

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THANK YOU

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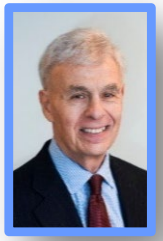

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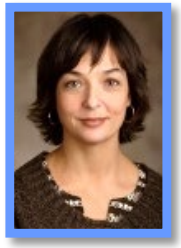

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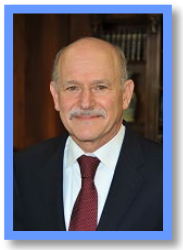

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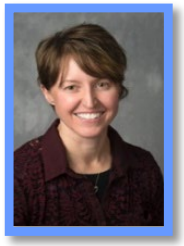

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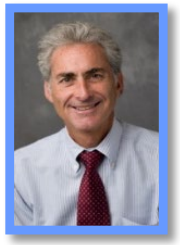

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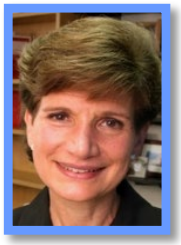

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- Don Wright
- Richard Olson
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- Elizabeth Rahavi
- Stephenie Fu
- Jessica Larson
- Meghan Adler
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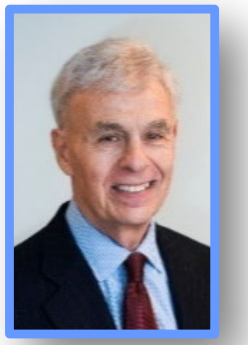
- Dave Herring
- Corey Holland
- Janie Fleming
- Hannah Mitchell
- Erica Gavey
- Mary Herrup
- Susan Cole
- Betty Harvey
- Barb Jirka
- Garth Clark
- UrbanEmu
- Mansy Pullen
- Laurie Wheeler
- NESR systematic review peer reviewers
- Previous support: Colette Rihane, Amy Frady, Jenna Fahle
- *And more!*

THANK YOU
Members and Support Staff

- Draft report: Over 500 pages, plus online supplements
- For the NESR systematic reviews, over 270,000 citations screened and nearly 1,500 included articles
- Over 150 analyses of Federal data sets
- Food pattern modeling analyses representing, for the first time, 6-24 month life stage

2020 Dietary Guidelines Advisory Committee



Closing Remarks

Barbara Schneeman, PhD
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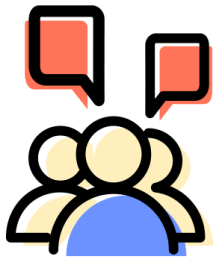
Public Comments to the Committee

- The Committee received approximately 62,350 written public comments from March 12, 2019 to June 10, 2020.
  - Public comments available at Regulations.gov
  - A summary will be included in our Report
- Thank you to public for being part of this process and to the staff for summarizing the comments for the Committee.



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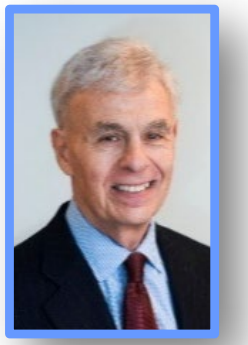

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