2020 Dietary Guidelines Advisory Committee: Beverages and Added Sugars Subcommittee

Subcommittee chair: Elizabeth Mayer-Davis
Heather Leidy
Richard Mattes (presenting)
Timothy Naimi
Rachel Novotny

Chair representative: Barbara Schneeman

DietaryGuidelines.gov
3 Topic Areas

1. Beverage patterns and non-alcoholic beverages

• What is the relationship between beverage consumption and
  • growth, size, body composition, and risk of overweight and obesity?*

• What is the relationship between beverage consumption during pregnancy and
  • birth weight standardized for gestational age and sex?*
  • gestational weight gain?*

• What is the relationship between beverage consumption during lactation and
  • post-partum weight loss?*
  • human milk composition and quantity?

* Protocols to be discussed today; available at DietaryGuidelines.gov

Beverages & Added Sugars Subcommittee
2020 Dietary Guidelines Advisory Committee: Meeting 2
2. Added Sugars

- What is the relationship between added sugars consumption and
  - growth, size, body composition, and risk of overweight and obesity?
  - risk of cardiovascular disease?
  - risk of type 2 diabetes mellitus?

- What is the relationship between added sugars consumption during pregnancy and
  - gestational weight gain?

- What is the relationship between added sugars consumption during lactation and
  - post-partum weight loss?
3. Alcohol

- What is the relationship between alcohol consumption and
  - growth, size, body composition, and risk of overweight, and obesity?
  - risk of cardiovascular disease?
  - risk of cancer?
  - neurocognitive health?
  - all-cause mortality?

- What is the relationship between alcohol consumption during lactation and
  - infant developmental milestones, including neurocognitive development?
  - post-partum weight loss?
  - human milk composition and quantity?
Covered today: 4 questions on non-alcoholic beverages

Questions:
What is the relationship between beverage consumption and
1) growth, size, body composition, and risk of overweight and obesity?
2) birth weight standardized for gestational age and sex? (pregnancy)
3) gestational weight gain? (pregnancy)
4) post-partum weight loss? (lactation)

Materials:
• Analytic Frameworks for each question
• Comparison of Inclusion/Exclusion Criteria

Approach to Answer Questions: NESR Systematic Reviews
Key Definitions

• **Beverage pattern** – the quantities, proportions, variety or combinations of different beverages in diets. Studies that examine a specific beverage or beverage group will also be considered

• **Gestational weight gain** – weight a woman gains during pregnancy (CDC)

• **Post-partum weight retention** – amount of weight that remains during the postpartum period minus the woman’s pre-pregnancy weight (IOM, 2009)
All non-alcoholic beverages will be included

- Categories will be used to help organize the data (subject to change)
- Included studies can assess beverage patterns, beverage categories, and/or individual beverages

<table>
<thead>
<tr>
<th>Milk</th>
<th>Nonalcoholic beverages</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>100% Juice</td>
<td>Plain water</td>
</tr>
<tr>
<td></td>
<td>Diet Beverages</td>
<td>Flavored or enhanced water</td>
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<tr>
<td></td>
<td>(Including high-intensity sweeteners)</td>
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<td></td>
<td>Sweetened Beverages</td>
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<td></td>
<td>Nutritional beverages</td>
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<td></td>
<td>Coffee and Tea</td>
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</tr>
<tr>
<td>Milk, whole</td>
<td>Fruit juice</td>
<td></td>
</tr>
<tr>
<td>Milk, reduced fat</td>
<td>Diet soft drinks</td>
<td></td>
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<tr>
<td>Milk, lowfat</td>
<td>Soft drinks</td>
<td></td>
</tr>
<tr>
<td>Milk, nonfat</td>
<td>Meal replacement beverages</td>
<td></td>
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<tr>
<td></td>
<td>Coffee -plain-sweetened</td>
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<tr>
<td></td>
<td>Including: Tap water Bottled water</td>
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<tr>
<td></td>
<td>Flavored or carbonated water</td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>Vegetable juice</td>
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<tr>
<td></td>
<td>Diet sport and energy drinks</td>
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<td></td>
<td>Fruit drinks</td>
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<td></td>
<td>Smoothies &amp; grain drinks</td>
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<tr>
<td></td>
<td>Tea -plain-sweetened</td>
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<tr>
<td></td>
<td>Enhanced or fortified water</td>
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<tr>
<td></td>
<td>Other diet drinks</td>
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<td></td>
<td>Sport and energy drinks</td>
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<td></td>
<td>Protein shakes</td>
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<tr>
<td></td>
<td>Juice diluted with water</td>
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<tr>
<td></td>
<td>May include smoothies &amp; mixed coffee drinks</td>
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<tr>
<td></td>
<td>Functional drinks: (e.g., kefir, kombucha)</td>
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</tr>
</tbody>
</table>
Analytic Framework: Growth, size, body composition, risk of overweight and obesity

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

<table>
<thead>
<tr>
<th>Intervention/exposure</th>
<th>vs</th>
<th>Comparator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type and amount of beverage consumption, such as:</td>
<td></td>
<td>Different type or amount of beverage(s) consumed (including no consumption or plain water as a control when appropriate); Different volume, nutrient content, sensory property, or physical form</td>
</tr>
<tr>
<td>Milk</td>
<td></td>
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<tr>
<td>Flavored milk</td>
<td></td>
<td></td>
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<tr>
<td>Dairy drinks &amp; substitutes</td>
<td></td>
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<td>100% juice</td>
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<tr>
<td>Plain water</td>
<td></td>
<td></td>
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<tr>
<td>Flavored or enhanced water</td>
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<tr>
<td>Population: Age 2y+ (childhood through older adults)</td>
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<td></td>
</tr>
</tbody>
</table>

Outcomes:
- Weight, weight-for-age
- Height, length/stature-for-age
- BMI, BMI z-score, weight-for-length
- Body circumferences: head, arm, waist, thigh, neck
- Body composition and distribution (e.g., % fat mass, % fat free mass)
- Incidence and prevalence of:
  - Underweight, failure to thrive, stunting, wasting
  - Healthy weight
  - Overweight
  - Obesity

Population: Age 2y+ (childhood through older adults)

Key Confounders: Sex, age, race/ethnicity, socioeconomic status, total energy intake, anthropometry at baseline, smoking

Legend:
- The relationship of interest in the systematic review
- Factors that may impact the relationship of interest in the systematic review
Analytic Framework: Birth weight

**Systematic review question:** What is the relationship between beverage consumption during pregnancy and birth weight standardized for gestational age and sex?

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<td>Plain water</td>
<td>Flavored or enhanced water</td>
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</tr>
</tbody>
</table>

**Population:** Women before and during pregnancy

**Outcome:**
- Birth weight standardized for gestational age and sex (may be presented as small for gestational age or large for gestational age),
- Birth weight for Length for gestational age and sex

**Population:** Infants at birth

**Key Confounders:** Maternal age, race/ethnicity, socioeconomic status, pre-pregnancy beverage intake, pre-pregnancy BMI, smoking, diagnosis of gestational diabetes mellitus

**Legend**
- The relationship of interest in the systematic review
- Factors that may impact the relationship of interest in the systematic review
**Analytic Framework: Gestational weight gain**

**Systematic review question:** What is the relationship between beverage consumption during pregnancy and gestational weight gain?

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<td>Flavored or enhanced water</td>
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</tbody>
</table>

**Population:** Women during pregnancy; healthy and/or at risk for chronic disease

**Outcome**

- Gestational weight gain:
  - Gestational weight gain: Change in maternal body weight from baseline (before or during pregnancy) to a later time point during pregnancy and/or right before delivery
  - Weight gain in relationship to weight gain recommendations, based on pre-pregnancy BMI

**Population:** Women during pregnancy; healthy and/or at risk for chronic disease

**Key Confounders:** Maternal age, race/ethnicity, socioeconomic status, pre-pregnancy beverage intake, pre-pregnancy BMI, smoking

**Legend**

- The relationship of interest in the systematic review
- Factors that may impact the relationship of interest in the systematic review
## Analytic Framework: Postpartum weight loss

### Systematic review question: What is the relationship between beverage consumption during lactation and post-partum weight loss?

<table>
<thead>
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<tbody>
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<td></td>
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<td>Flavored or enhanced water</td>
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</tr>
</tbody>
</table>

**Population:** Women during lactation; healthy and/or at risk for chronic disease

**Key Confounders:** Maternal age, race/ethnicity, socioeconomic status, pre-pregnancy beverage intake, pre-pregnancy BMI, gestational weight gain, smoking, breastfeeding status

### Outcome

- Change in weight from baseline (postpartum) to a later time point during the postpartum period
- Postpartum weight retention if GWG is controlled for

**Population:** Women during lactation; healthy and/or at risk for chronic disease

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2020 Dietary Guidelines Advisory Committee: Meeting 2
Inclusion and Exclusion Criteria: Beverage pattern/non-alcohol questions

- **Standard criteria:**
  - Study design
  - Publication status
  - Language of publication
  - Country

- **Tailored to these 4 non-alcoholic beverage questions:**
  - Date of publication (January 2000 – June 2019)
  - Study duration

- **Modified and tailored to the specific non-alcoholic beverage questions:**
  - Study participants
  - Health status
## Inclusion and Exclusion Criteria: Study duration

<table>
<thead>
<tr>
<th>Category</th>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study duration</td>
<td>Minimum duration for experimental studies: 8 weeks</td>
<td>Experimental studies shorter than 8 weeks</td>
</tr>
</tbody>
</table>

Beverage pattern/non-alcohol questions
2020 Dietary Guidelines Advisory Committee: Meeting 2
<table>
<thead>
<tr>
<th>Category</th>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
</table>
| **Growth, size, body composition, overweight, obesity** | Age at intervention/exposure/outcome:  
  • Child (2-5 years)  
  • Child (6-12 years)  
  • Adolescents (13-18 years)  
  • Adults (19 and older)  
  • Older adults (65+ years) | Age at intervention/exposure/outcome:  
  • Infants and toddlers (<2 years) |
| **Birth weight**                 | • Human subjects  
  • Females who are pregnant  
  • Females capable of becoming pregnant  
  • Neonates (outcome) | Animal and in vitro models  
  • Hospitalized patients, when hospitalization is not related to pregnancy, birth and immediate postpartum  
  • Pregnancies conceived ONLY using Assisted Reproductive Technologies  
  • Studies that exclusively enroll multiple gestation pregnancies  
  • Studies that enroll both singleton and multiple pregnancies and do not account for singleton and multiple gestation in the design or analyses and only present aggregate findings |
| **Gestation weight gain**        | • Human subjects  
  • Post-partum women who are lactating | Animal and in vitro models  
  • Hospitalized patients, when hospitalization is not related to pregnancy, birth and immediate postpartum  
  • Studies that enroll lactating and non-lactating mothers and ONLY present combined data for lactating and non-lactating mothers |
| **Postpartum weight loss**       | • Human subjects  
  • Post-partum women who are lactating | Animal and in vitro models  
  • Hospitalized patients, when hospitalization is not related to pregnancy, birth and immediate postpartum  
  • Studies that enroll lactating and non-lactating mothers and ONLY present combined data for lactating and non-lactating mothers |
## Inclusion and Exclusion Criteria: Health status of study participants

<table>
<thead>
<tr>
<th>Category</th>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
</table>
| Growth, size, body composition, overweight, obesity | • Studies that enroll participants who are healthy and/or at risk for chronic disease  
• Studies that enroll *some* participants diagnosed with a disease  
• Studies that enroll *some* participants who are classified as underweight, stunted, wasted, or obese | • Studies that *exclusively* enroll participants diagnosed with a disease, or hospitalized with an illness or injury  
• **Studies that *exclusively* enroll participants classified as obese** (i.e., studies that aim to treat participants who have already been classified as obese) |
| Birth weight; Gestation weight gain; Postpartum weight loss | • Studies that enroll mothers who are healthy and/or at risk for chronic disease, including those with obesity  
• Studies that enroll *some* participants who are classified as underweight, stunted, wasted, or obese  
• Studies that enroll *some* mothers diagnosed with a disease  
• Studies that enroll mothers with infants born full-term (≥37 and 0/7 weeks gestational age)  
• Studies that enroll *some* mothers with infants who are born preterm (gestational age <37 and 0/7 weeks), with low birth weight (2500g), and/or small for gestational age | • Studies that *exclusively* enroll preterm infants (gestational age <37 and 0/7 weeks) (Birth weight only)  
• Studies that exclusively enroll mothers diagnosed with a disease, or hospitalized with an illness or injury (For this criterion, *studies that exclusively enroll mothers with obesity will not be excluded*) |
Next Steps: Proposed order of remaining questions

1. What is the relationship between beverage consumption during lactation and human milk composition and quantity?

2. What is the relationship between added sugars consumption and
   - growth, size, body composition, and risk of overweight and obesity?
   - risk of cardiovascular disease?
   - risk of type 2 diabetes mellitus?
   - gestational weight gain? (lactation)
   - post-partum weight loss? (lactation)

3. What is the relationship between alcohol consumption and
   - growth, size, body composition, and risk of overweight, and obesity?
   - risk of cardiovascular disease?
   - risk of cancer?
   - neurocognitive health?
   - all-cause mortality?
   - infant developmental milestones, including neurocognitive development? (lactation)
   - post-partum weight loss? (lactation)
   - human milk composition and quantity? (lactation)
2020 Dietary Guidelines Advisory Committee: Beverages and Added Sugars Subcommittee

**Members:**
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Marisol Hernandez
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Richard Olson (DFO rep)