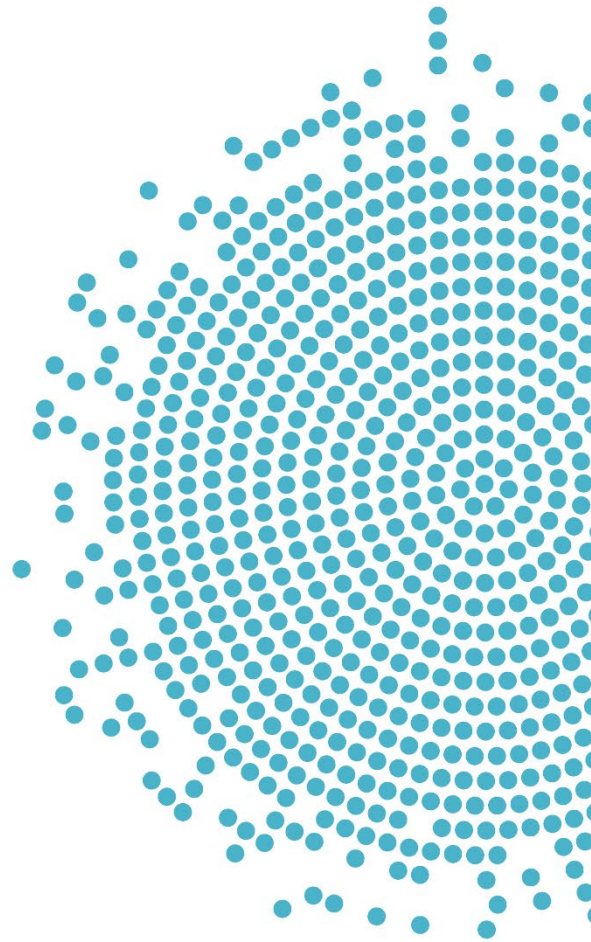




Parental and Caregiver Feeding Styles and Practices and Consuming a Dietary Pattern that is Aligned with the *Dietary Guidelines for Americans*: A Systematic Review Protocol

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Introduction

To prepare for the development of the *Dietary Guidelines for Americans, 2025-2030*, the U.S. Departments of Health and Human Services (HHS) and Agriculture (USDA) identified a proposed list of scientific questions based on relevance, importance, potential federal impact, and avoiding duplication, which were posted for public comment.* The Departments appointed the 2025 Dietary Guidelines Advisory Committee (Committee) in January 2023 to review evidence on the scientific questions. The proposed scientific questions were refined and prioritized by the Committee for consideration in their review of the evidence. Their review forms the basis of their independent, science-based advice and recommendations to HHS and USDA, which is considered as the Departments develop the next edition of the *Dietary Guidelines*. As part of that process, the following systematic review question has been identified: What is the relationship between parental and caregiver feeding styles and practices during childhood and adolescence and consuming a dietary pattern that is aligned with the Dietary Guidelines for Americans?

The Committee will conduct a systematic review to address this question, with support from USDA's Nutrition Evidence Systematic Review (NESR) team (**Table 1**).

Table 1. Review history

| Date | Description | Citation |
|---------------|---|--|
| May 2023 | Systematic review protocol for the 2025 Dietary Guidelines Advisory Committee published online | Fisher JO, Abrams SA, Andres A, Byrd-Bredbenner C, Deierlein A, Eicher-Miller HA, Odoms-Young A, Palacios C, Obbagy J, Kim JH, Momin S, Spahn J, Higgins M, Butera G, Terry N. Parental and Caregiver Feeding Styles and Practices and Consuming a Dietary Pattern that is Aligned with the Dietary Guidelines for Americans: A Systematic Review Protocol. May 2023. U.S. Department of Agriculture, Food and Nutrition Service, Center for Nutrition Policy and Promotion, Nutrition Evidence Systematic Review. Available at: https://nesr.usda.gov/protocols |
| February 2024 | Revisions to the systematic review protocol for the 2025 Dietary Guidelines Advisory Committee published online | Fisher JO, Abrams SA, Andres A, Byrd-Bredbenner C, Deierlein A, Eicher-Miller HA, Odoms-Young A, Palacios C, Obbagy J, Kim JH, Momin S, Spahn J, Higgins M, Butera G, Terry N. Parental and Caregiver Feeding Styles and Practices and Consuming a Dietary Pattern that is Aligned with the Dietary Guidelines for Americans: A Systematic Review Protocol. May 2023. U.S. Department of Agriculture, Food and Nutrition Service, Center for Nutrition Policy and Promotion, Nutrition Evidence Systematic Review. Available at: https://nesr.usda.gov/protocols |

Methods

The NESR methodology manual[†] has a detailed description of the NESR methodology as it will be applied in the systematic reviews for the Dietary Guidelines for Americans, 2025-2030 Project. This section presents an overview of the specific methods that will be used to by the Committee to answer the systematic review

* Dietary Guidelines for Americans: Learn About the Process. 2022. Available at: <https://www.dietaryguidelines.gov/work-under-way/learn-about-process>

† USDA Nutrition Evidence Systematic Review Branch. USDA Nutrition Evidence Systematic Review: Methodology Manual. February 2023. U.S. Department of Agriculture, Food and Nutrition Service, Center for Nutrition Policy and Promotion, Nutrition Evidence Systematic Review. Available at: <https://nesr.usda.gov/methodology-overview>

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

Develop a protocol

A systematic review protocol is the plan for how NESR’s methodology will be used to conduct a specific systematic review and is established by the Committee, *a priori*, before any evidence is reviewed. The protocol is designed to capture the most appropriate and relevant body of evidence to answer the systematic review question. Development of the protocol involves discussion of the strengths and limitations of various methodological approaches relevant to the question, which then inform subsequent steps of the systematic review process. The protocol describes all of the methods that will be used throughout the systematic review process. Additionally, the protocol includes the following components, which are tailored to each systematic review question: the analytic framework, the inclusion and exclusion criteria, and the synthesis plan.

The protocol for this systematic review was posted online (<https://nesr.usda.gov/protocols>) in May 2023. Revisions to the systematic review protocol were made during the review process. These revisions are documented in **Table 2**.

Table 2. Protocol revisions

| Date | Protocol revision | Description |
|--------------|---|---|
| January 2024 | Inclusion and exclusion criteria for publication date were updated to document that the review will include studies published through January 2024. | This revision was made to document the final publication date range covered by the literature search. |

Develop an analytic framework

An analytic framework visually represents the overall scope of the systematic review question and depicts the contributing elements that will be examined and evaluated. **Figure 1** is the analytic framework for the systematic review and shows that the intervention or exposure of interest is parental and caregiver feeding styles and practices in toddlers (1 up to 2 years), young children (2 up to 6 years), school-aged children (6 up to 12 years), and adolescents (12 up to 19 years); the comparators are different degrees of parental or caregiver feeding styles or practices or different parental or caregiver feeding styles or practices; the outcomes are diet quality as measured by the Health Eating Index (HEI), including versions jointly released by USDA and HHS starting in 2008 (HEI-2005, HEI-2010, and HEI-2015) and dietary intake of fruits, vegetables, whole grains, and sugar-sweetened beverages in toddlers, young children, school-aged children, adolescents, adults, and older adults; the key confounders are socioeconomic position and/or parental or caregiver education, race and/or ethnicity, baseline dietary intake for food components assessed as outcomes, child’s anthropometry at baseline, child sex, and parental or caregiver BMI. The confounders may impact the relationships of interest.

Figure 1. Analytic framework for the systematic review question: What is the relationship between parental and caregiver feeding styles and practices during childhood and adolescence and consuming a dietary pattern that is aligned with the *Dietary Guidelines for Americans*?

| Population | Intervention/ exposure | Comparator | Outcome | Key confounders |
|---|---|---|--|---|
| Toddlers (1 up to 2 years) | Parental and caregiver feeding styles and practices | <ul style="list-style-type: none"> • Different degrees of parental or caregiver feeding styles or practices • Different parental or caregiver feeding styles or practices | In toddlers, young children, school-aged children, adolescents, adults, older adults <ul style="list-style-type: none"> • Diet quality as measured by the Healthy Eating Index (HEI), including versions jointly released by USDA and HHS starting in 2008 (HEI-2005, HEI-2010, and HEI-2015) • Dietary intake of <ul style="list-style-type: none"> ○ Fruit and vegetables <ul style="list-style-type: none"> ▪ Fruit ▪ Vegetables ○ Whole grains ○ Sugar-sweetened beverages (SSBs) | <ul style="list-style-type: none"> • Socioeconomic position and/or parental or caregiver education • Race and/or ethnicity • Baseline dietary intake for food components assessed as outcomes • Child's anthropometry at baseline • Child sex • Parental or caregiver BMI |
| Young children (2 up to 6 years) | | | | |
| School-aged children (6 up to 12 years) | | | | |
| Adolescents (12 up to 19 years) | | | | |

Synthesis organization:

- I. **Population:** Toddlers; young children; school-aged children; adolescents
 - a. **Intervention/exposure:** Parental and caregiver feeding styles and practices
 - i. **Outcome:** Diet quality as measured by the Healthy Eating Index (HEI); Dietary intake of fruits, vegetables, whole grains, sugar-sweetened beverages

Key definitions:

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

Feeding practices in infants and toddlers

Feeding practices: the strategies or behaviors parents or caregivers use to direct child eating.

Responsive feeding: is characterized by caregiver guidance and recognition of the child's cues of hunger and satiety.

Non-responsive feeding: is dominated by a lack of reciprocity between the parent and child, with the caregiver taking excessive control of the feeding situation (forcing/pressuring or restricting food intake), the child completely controlling the feeding situation (indulgent feeding), or the caregiver being completely uninvolved during meals (uninvolved feeding/ laissez-faire), using feeding as a default first response to infant distress (feeding to soothe).

Feeding styles and practices across developmental stages

Parental feeding styles: reflect the overall attitude and emotional climate which characterize child eating occasions and reflect differences in parental demandingness and responsiveness^{*†}:

- Authoritative feeding style characterized by high demand and high response is defined as reasonable nutritional demands in conjunction with sensitivity toward the child.
- Authoritarian feeding style characterized by high demand and low response is defined as high control with little sensitivity during feeding.
- Indulgent feeding style characterized by low demand and high response is defined as high responsivity with little structure around feeding.
- Uninvolved feeding style characterized by low demand and low response is defined as a lack of involvement during feeding.

Food parenting practices/feeding practices: goal-oriented food-specific behaviors or actions carried out by parents (intentional or unintentional) that affect their child's attitudes, behaviors, or beliefs.[‡] Three overarching, high-order food parenting constructs include:

- Coercive control: "parent's pressure, intrusiveness, and dominance in relation to children's feelings and thoughts, as well as their behaviors". Coercive control includes restriction, pressure to eat, threats and bribes (instrumental feeding, food and non-food threats or rewards), and using food to control negative emotions (emotional feeding).
- Autonomy support: "psychological autonomy and encouragement of independence" and may include responsiveness to feeding cues, nutrition education, child involvement, encouragement, praise, reasoning, and negotiation.
- Structure: "parent's organization of children's environment to facilitate children's competence" and may encompass rules, limits or boundaries, limited/guided choices, portion size, monitoring, meal- and snack time routines (atmosphere of meals, distractions [e.g., screens], family presence, and meal and snack schedule), modeling, food availability and accessibility, and food preparation, and unstructured (indulgent feeding practices).

Sugar sweetened beverages (SSB): are liquids that are sweetened with various forms of added sugars. These beverages include, but are not limited to, soda (regular, not sugar-free), fruitades, sports drinks, energy drinks, sweetened waters, and coffee and tea beverages with added sugars. Also called calorically sweetened beverages.[§]

* Arlinghaus KR, Vollrath K, Hernandez DC, Momin SR, O'Connor TM, Power TG, Hughes SO. Authoritative parent feeding style is associated with better child dietary quality at dinner among low-income minority families. *Am J Clin Nutr*. 2018 Oct 1;108(4):730-736. doi: 10.1093/ajcn/nqy142. PMID: 30169719; PMCID: PMC6186208.

† Hughes SO, Shewchuk RM, Baskin ML, Nicklas TA, Qu H. Indulgent feeding style and children's weight status in preschool. *J Dev Behav Pediatr*. 2008 Oct;29(5):403-10. doi: 10.1097/DBP.0b013e318182a976. PMID: 18714209; PMCID: PMC2769986.

‡ Vaughn AE, Ward DS, Fisher JO, Faith MS, Hughes SO, Kremers SP, Musher-Eizenman DR, O'Connor TM, Patrick H, Power TG. Fundamental constructs in food parenting practices: a content map to guide future research. *Nutr Rev*. 2016 Feb;74(2):98-117.

§ Dietary Guidelines Advisory Committee. 2020. Scientific Report of the 2020 Dietary Guidelines Advisory Committee: Advisory Report to the Secretary of Agriculture and the Secretary of Health and Human Services. U.S. Department of Agriculture, Agricultural Research Service, Washington, DC. Available at: <https://doi.org/10.52570/DGAC2020>

Develop inclusion and exclusion criteria

The inclusion and exclusion criteria provide an objective, consistent, and transparent framework for determining which articles to include in the systematic review (see **Table 2**). These criteria ensure that the most relevant and appropriate body of evidence is identified for the systematic review question, and that the evidence reviewed is:

- Applicable to the U.S. population of interest
- Relevant to Federal public health nutrition policies and programs
- Rigorous from a scientific perspective

Table 3. Inclusion and exclusion criteria

| Category | Inclusion Criteria | Exclusion Criteria |
|--------------------------------|---|---|
| Study design | <ul style="list-style-type: none"> • Randomized controlled trials • Non-randomized controlled trials* • Prospective cohort studies • Retrospective cohort studies • Nested case-control studies | <ul style="list-style-type: none"> • Uncontrolled trials† • Case-control studies • Cross-sectional studies • Ecological studies • Narrative reviews • Systematic reviews • Meta-analyses • Modeling and simulation studies |
| Publication date | <ul style="list-style-type: none"> • January 2000 – January 2024 | <ul style="list-style-type: none"> • Before January 2000, after January 2024 |
| Population: Study participants | <ul style="list-style-type: none"> • Human | <ul style="list-style-type: none"> • Non-human |
| Population: Life stage | <ul style="list-style-type: none"> • At intervention or exposure: <ul style="list-style-type: none"> ○ Toddlers (12 up to 24 months) ○ Children and adolescents (2 up to 19 years) • At outcome: <ul style="list-style-type: none"> ○ Toddlers (12 up to 24 months) ○ Children and adolescents (2 up to 19 years) ○ Adults and older adults (19 years and older) | <ul style="list-style-type: none"> • At intervention or exposure: <ul style="list-style-type: none"> ○ Infants (birth up to 12 months) ○ Adults and older adults (19 years and older) • At outcome: <ul style="list-style-type: none"> ○ Infants (birth up to 12 months) |

* Including quasi-experimental and controlled before-and-after studies

† Including uncontrolled before-and-after studies

| Category | Inclusion Criteria | Exclusion Criteria |
|------------------------------|--|--|
| Population: Health status | <ul style="list-style-type: none"> Studies that enroll <u>some</u> caregivers with a disease or disorder that affects feeding or eating (e.g., eating disorders, depression, or anxiety disorders) Studies that <u>exclusively</u> enroll toddlers, children and adolescents not diagnosed with a disease or disorder that affects feeding or eating* Studies that enroll <u>some</u> participants: <ul style="list-style-type: none"> diagnosed with a disease; diagnosed with a disorder that affects feeding/eating or growth (e.g., autism spectrum disorder, attention-deficit/hyperactivity disorder, eating disorders); with severe undernutrition, failure to thrive/underweight, stunting, or wasting; born preterm,[†] with low birth weight,[‡] and/or small for gestational age and/or hospitalized for an illness, injury or surgery | <ul style="list-style-type: none"> Studies that <u>exclusively</u> enroll caregivers with a disease or disorder that affects feeding or eating (e.g., eating disorders, depression, or anxiety disorders) Studies that <u>exclusively</u> enroll participants: <ul style="list-style-type: none"> diagnosed with a disease;[§] diagnosed with a disorder that affects feeding/eating or growth (e.g., autism spectrum disorder, attention-deficit/hyperactivity disorder, eating disorders); with severe undernutrition, failure to thrive/underweight, stunting, or wasting; born preterm,[†] with low birth weight,[‡] and/or small for gestational age; and/or hospitalized for an illness, injury, or surgery** |
| Intervention/ exposure | <ul style="list-style-type: none"> Measured parental or caregiver feeding styles or practices that include responsive and non-responsive feeding practices (in toddlers) assessed using objective (observations) or subjective (self-reported questionnaire) or ecological momentary assessment methods Multi-component intervention in which the isolated effect of the parental or caregiver feeding styles and practices on dietary intake and dietary quality or effect or association can be determined despite multiple components | <ul style="list-style-type: none"> Childcare and school-based interventions/exposures Multi-component intervention in which the isolated effect of the caregiver feeding styles and practices on dietary intake and dietary quality is not provided or cannot be determined due to multiple components |
| Comparators | <ul style="list-style-type: none"> Different degrees of parental or caregiver feeding styles or practices Different parental or caregiver feeding styles or practices | <ul style="list-style-type: none"> No comparator |

* Studies that enroll participants who are at risk for chronic disease will be included; disorder that affects feeding or eating include condition such as autism spectrum disorder, attention-deficit/hyperactivity disorder, eating disorders, depression or anxiety disorders.

[†] Gestational age <37 weeks and 0/7 days

[‡] Birth weight <2500g

[§] Studies that exclusively enroll participants with obesity will be included

** Studies that exclusively enroll participants post-cesarean section will be included

| Category | Inclusion Criteria | Exclusion Criteria |
|--------------------|---|---|
| Outcomes | <ul style="list-style-type: none"> Diet quality as measured by the Healthy Eating Index (HEI), including versions jointly released by USDA and HHS starting in 2008 (HEI-2005, HEI-2010, and HEI-2015) Dietary intake of <ul style="list-style-type: none"> Fruit and vegetables <ul style="list-style-type: none"> Fruit Vegetables Whole grains Sugar-sweetened beverages (SSBs) | <ul style="list-style-type: none"> Other scales or indices of diet quality, including those based on or adapted from the HEI that are not released jointly by USDA and HHS. Intake of other food groups and beverages not described in the inclusion criteria |
| Publication status | <ul style="list-style-type: none"> Peer-reviewed articles published in research journals | <ul style="list-style-type: none"> Non-peer-reviewed articles, unpublished data or manuscripts, pre-prints, reports, editorials, retracted articles, and conference abstracts or proceedings |
| Language | <ul style="list-style-type: none"> Published in English | <ul style="list-style-type: none"> Not published in English |
| Country* | <ul style="list-style-type: none"> Studies conducted in countries classified as high or very high on the Human Development Index the year(s) the intervention/exposure data were collected | <ul style="list-style-type: none"> Studies conducted in countries classified as medium or low on the Human Development Index the year(s) the intervention/exposure data were collected |

Search for and screen studies

NESR librarians, in collaboration with NESR analysts and the Committee, will use the analytic framework and inclusion and exclusion criteria to develop a comprehensive literature search strategy. The literature search strategy will include selecting and searching the appropriate bibliographic databases, translating search using syntax appropriate for the databases being searched, and employing search refinements, such as search filters. The full literature search will be available upon request, and will be fully documented in the final review.

The results of all electronic database searches, after removal of duplicates, will be screened independently by two NESR analysts using a step-wise process by reviewing titles, abstracts, and full-texts to determine which articles meet the inclusion criteria. Manual searching will be conducted to find peer-reviewed published articles not identified through the electronic database search. These articles will also be screened independently by two NESR analysts at the abstract and full-text levels.

Extract data and assess the risk of bias

NESR analysts will extract all essential data from each included article to describe key characteristics of the available evidence, such as the author, publication year, cohort/trial name, study design, population life stage at intervention/exposure and outcome, intervention/exposure and outcome assessment methods, and outcomes. One NESR analyst will extract the data and a second NESR analyst will review the extracted data for accuracy. Each article included in the systematic review will undergo a formal risk of bias assessment, with

* The classification of countries on the Human Development Index (HDI) is based on the UN Development Program Human Development Report Office (<http://hdr.undp.org/en/data>) for the year the study intervention occurred or data were collected. If the study does not report the year(s) in which the intervention/exposure data were collected, the HDI classification for the year of publication is applied. Studies conducted prior to 1990 are classified based on 1990 HDI classifications. If the year is more recent than the available HDI values, then the most recent HDI classifications are used. If a country is not listed in the HDI, then the current country classification from the World Bank is used (The World Bank Country and Lending Groups, available from: <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-country-and-lending-groups>)

two NESR analysts independently completing the risk of bias assessment using the tool that is appropriate for the study design.*†‡

Synthesize the evidence

The Committee will describe, compare, and combine the evidence from all included studies to answer the systematic review question. Synthesis of the body of evidence will involve identifying overarching themes or key concepts from the findings, identifying and explaining similarities and differences between studies, and determining whether certain factors impact the relationships being examined. The first level of synthesis organization will be by population. Then, within each of the population groups, the evidence will be organized by similar caregiver feeding styles and practices based on the available evidence. Depending on the available evidence, the next level of organization will be according to similar outcome.

Develop conclusion statements and grade the evidence

After the Committee synthesizes the body of evidence, they will draft a conclusion statement or conclusion statements. A conclusion statement is one or more summary statements carefully constructed to answer the systematic review question. It reflects the evidence reviewed, as outlined in the analytic framework (e.g., PICO elements) and synthesis plan, and does not take evidence from other sources into consideration. The Committee will review, discuss, and revise the conclusion statement until they reach agreement on wording that accurately reflect the body of evidence.

The Committee will then assign a grade to each conclusion statement (i.e., strong, moderate, limited, or grade not assignable). The grade communicates the strength of the evidence supporting a specific conclusion statement to decision makers and stakeholders. NESR has predefined criteria, based on five grading elements that the Committee will use to evaluate and grade the strength of the evidence supporting each conclusion statement. The five grading elements are: consistency, precision, risk of bias, directness and generalizability of the evidence. Study design will also be considered during the grading process.

Recommend future research

The Committee will identify and document research gaps and methodological limitations throughout the systematic review process. These gaps and limitations will be used to develop research recommendations that describe the research, data, and methodological advances that are needed to strengthen the body of evidence on a particular topic. Rationales for the necessity of additional or stronger research may also be provided with the research recommendations.

Acknowledgments and funding

The Committee members are involved in: establishing all aspects of the protocol, which presents the plan for how they are planning to examine the scientific evidence, including the inclusion and exclusion criteria; reviewing all studies that meet the criteria the Committee sets; deliberating on the body of evidence for each question; and writing and grading the conclusion statements. The NESR team, with assistance from Federal

* Sterne JAC, Savovic J, Page MJ, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. *BMJ*. Aug 28 2019;366:I4898.doi:10.1136/bmj.I4898

† Sterne JA, Hernan MA, Reeves BC, et al. ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. *BMJ*. Oct 12 2016;355:i4919.doi:10.1136/bmj.i4919

‡ ROBINS-E Development Group., Higgins J, Morgan R, et al. Bias In Non-randomized Studies - of Exposure (ROBINS-E). 2022. <https://www.riskofbias.info/welcome/robins-e-tool>

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staff from HHS and USDA (Dennis Anderson-Villaluz, MBA, RD, LDN, FAND; Hazel Hiza, PhD; Tessa Lasswell, MPH, RDN; TusaRebecca Pannucci, PhD, MPH, RD; Elizabeth Rahavi, RD; Kelley Scanlon, PhD, RD; Colleen Sideck, MPH, RDN) and Project Leadership (HHS: Janet de Jesus, MS, RD; USDA: Eve Stoodly, PhD), supports the Committee by facilitating, executing, and documenting the work necessary to ensure the reviews are completed in accordance with NESR methodology. Contractor support was also provided by Panum Telecom (Emily Madan, PhD).

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