

WHAT IS THE RELATIONSHIP BETWEEN BEVERAGE CONSUMPTION DURING PREGNANCY AND GESTATIONAL WEIGHT GAIN?: SYSTEMATIC REVIEW PROTOCOL

This document describes the protocol for a systematic review to answer the following question: What is the relationship between beverage consumption during pregnancy and gestational weight gain? This systematic review is being conducted by the 2020 Dietary Guidelines Advisory Committee, Beverages and Added Sugars Subcommittee and staff from USDA's Nutrition Evidence Systematic Review (NESR).

NESR methodology for answering a systematic review question involves:

- searching for and selecting articles,
- extracting data and assessing the risk of bias of results from each included article,
- synthesizing the evidence,
- developing a conclusion statement,
- grading the evidence underlying the conclusion statement, and
- recommending future research.

More information about NESR's systematic review methodology is available on the NESR website: <https://nesr.usda.gov/2020-dietary-guidelines-advisory-committee-systematic-reviews>.

This document describes the protocol, or plan, for how the systematic review will be conducted. The protocol provides:

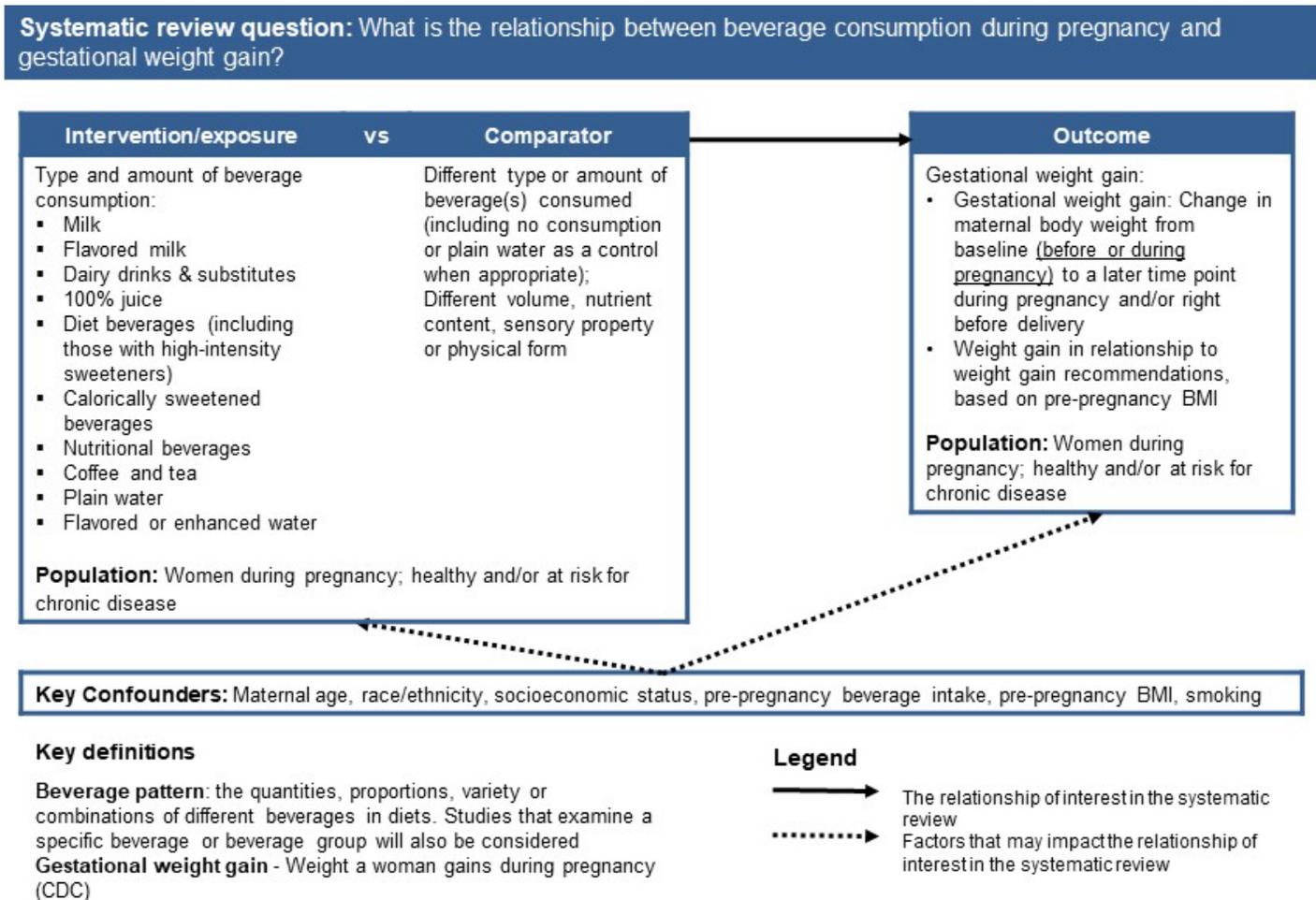
- The [analytic framework](#) (p. 2) illustrates the overall scope of the question, including the population, the interventions and/or exposures, comparators, and outcomes of interest.
- The [literature search and screening plan](#) (p. 2) details the electronic databases and [inclusion and exclusion criteria](#) (p. 3) that will be used to search for, screen, and select articles to be included in the systematic review.
- The [literature search and screening results](#) (p. 6) includes a list of included articles, and a list of excluded articles with the rationale for exclusion.

This protocol is up-to-date as of: 07/02/2019.

ANALYTIC FRAMEWORK

The analytic framework (**Figure 1**) illustrates the overall scope of the systematic review, including the population, the interventions and/or exposures, comparators, and outcomes of interest. It also includes definitions of key terms and identifies key confounders considered in the systematic review. The inclusion and exclusion criteria that follow provide additional information about how parts of the analytic framework will be defined and operationalized for the review.

Figure 1: Analytic framework



LITERATURE SEARCH AND SCREENING PLAN

Electronic databases

Listed below are the databases that will be searched to identify all potentially relevant articles that have been published to address the systematic review question. Additional details regarding the search strategy will be published upon completion of the review, and are available upon request prior to publication.

- Pubmed
- Cochrane
- Embase
- CINAHL

Inclusion and exclusion criteria

This table provides the inclusion and exclusion criteria for the systematic review. The inclusion and exclusion criteria are a set of characteristics used to determine which articles identified in the literature search will be included or excluded in the systematic review.

Table 1. Inclusion and exclusion criteria

Category	Inclusion Criteria	Exclusion Criteria
Study design	<ul style="list-style-type: none"> • Randomized controlled trials • Non-randomized controlled trials including quasi-experimental and controlled before-and-after studies • Prospective cohort studies • Retrospective cohort studies • Nested case-control studies 	<ul style="list-style-type: none"> • Uncontrolled trials • Case-control studies • Cross-sectional studies • Uncontrolled before-and-after studies • Narrative reviews • Systematic reviews • Meta-analyses
Study Duration	<ul style="list-style-type: none"> • Minimum duration for experimental studies: 8 weeks 	<ul style="list-style-type: none"> • Experimental studies shorter than 8 weeks
Intervention/exposure	<p>Type and amount of beverage consumption—all beverage types will be considered</p> <p>Example beverage categories include:</p> <ul style="list-style-type: none"> • Milk • Flavored milk • Dairy drinks & substitutes • 100% juice • Diet beverages (including those with high-intensity sweeteners [also known as artificial sweeteners], and juice diluted with water) • Calorically sweetened beverages (including sweetened juice) • Nutritional beverages (including meal replacements and protein shakes) • Coffee and tea • Plain water • Flavored or enhanced water 	<ul style="list-style-type: none"> • Not a beverage • Alcohol (addressed in separate questions)

Category	Inclusion Criteria	Exclusion Criteria
Comparator	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • No comparator
Outcomes	<ul style="list-style-type: none"> • Change in 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 	
Temporality	<ul style="list-style-type: none"> • Studies when the exposure was assessed prior to the outcome 	<ul style="list-style-type: none"> • Studies when the outcome was assessed prior to the exposure
Date of publication	<ul style="list-style-type: none"> • January 2000 – June 2019 	<ul style="list-style-type: none"> • Articles published prior to 2000
Publication status	<ul style="list-style-type: none"> • Articles published in peer-reviewed journals 	<ul style="list-style-type: none"> • Articles not published in peer-reviewed journals, including unpublished data, manuscripts, reports, abstracts, and conference proceedings
Language of publication	<ul style="list-style-type: none"> • Articles published in English 	<ul style="list-style-type: none"> • Articles published in languages other than English
Countryⁱ	<ul style="list-style-type: none"> • Studies conducted in Very High or High Human Development Countries 	<ul style="list-style-type: none"> • Studies conducted in Medium or lower Human Development Countries

Category	Inclusion Criteria	Exclusion Criteria
Study participants	<ul style="list-style-type: none"> • Human subjects • Females who are pregnant • Females capable of becoming pregnant 	<ul style="list-style-type: none"> • Animal and in vitro models • Hospitalized patients, when hospitalization is not related to pregnancy, birth and immediate postpartum • Studies that exclusively enroll based on pregnancies conceived 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
Health status of study participants	<ul style="list-style-type: none"> • Studies that enroll mothers who are healthy and/or at risk for chronic disease, including those with obesity • Studies that enroll <i>some</i> mothers diagnosed with a disease • Studies that enroll <i>some</i> mothers classified as underweight, wasted, or obese prior to pregnancy 	<ul style="list-style-type: none"> • Studies that exclusively enroll mothers diagnosed with a disease, including severe undernutrition, or hospitalized with an illness or injury (For this criterion, studies that exclusively enroll mothers with obesity will not be excluded)

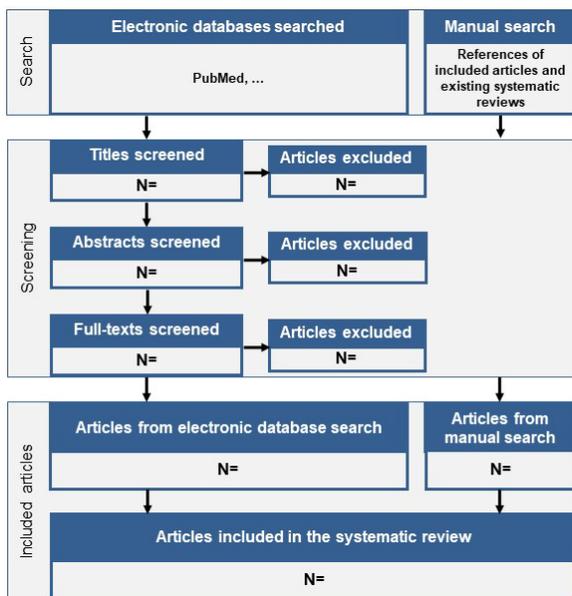
ⁱ The Human Development classification was based on the Human Development Index (HDI) ranking from the year the study intervention occurred or data was collected. If the study did not report the year in which the intervention occurred or data were collected, the HDI classification for the year of publication was applied. HDI values are available from 1980, and then from 1990 to present. If a study was conducted in 2018 or 2019, the most current HDI classification was applied. If a study was conducted prior to 1990, the HDI classification from 1990 was applied. When a country was not included in the HDI ranking, the current country classification from the World Bank is used instead.

LITERATURE SEARCH AND SCREENING RESULTS

This protocol will be updated with the literature search and screening results after the search and screening plan has been finalized and implemented.

The flow chart (**Figure 2**) below illustrates the literature search and screening results for articles examining the systematic review question. The results of the electronic database searches, after removal of duplicates, were screened independently by two NESR analysts using a step-wise process by reviewing titles, abstracts, and full-texts to determine which articles met the inclusion criteria. A manual search was done to find articles that were not identified when searching the electronic databases; all manually identified articles are also screened to determine whether they meet criteria for inclusion.

Figure 2: Flow chart of literature search and screening results (To be added)



Included Articles (To be added)

1. Ref

Excluded Articles (To be added)

The table below lists the articles excluded after full-text screening. At least one reason for exclusion is provided for each article, which may not reflect all possible reasons. Information about articles excluded after title and abstract screening is available upon request.

Table 2. Excluded articles

Citation	Rationale
1	