

2020 Dietary Guidelines Advisory Committee: Beverages and Added Sugars Subcommittee

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Subcommittee Status

	Completed	Underway	Up next
Non-alcoholic beverages	<u>Birth weight</u> standardized for gestational age and sex*	<u>Growth, size, body composition, and risk of overweight and obesity</u> <ul style="list-style-type: none">• Screening complete: 17,000 articles• 214 articles included• 70 articles under review for beverage subgroup: Milk	
Added sugars		Risk of <u>cardiovascular disease</u> <ul style="list-style-type: none">• Screening underway: 5,000 articles screened	Risk of <u>type 2 diabetes</u> <u>Growth, size, body composition, and risk of overweight and obesity</u>
Alcohol			<u>All-cause mortality*</u>

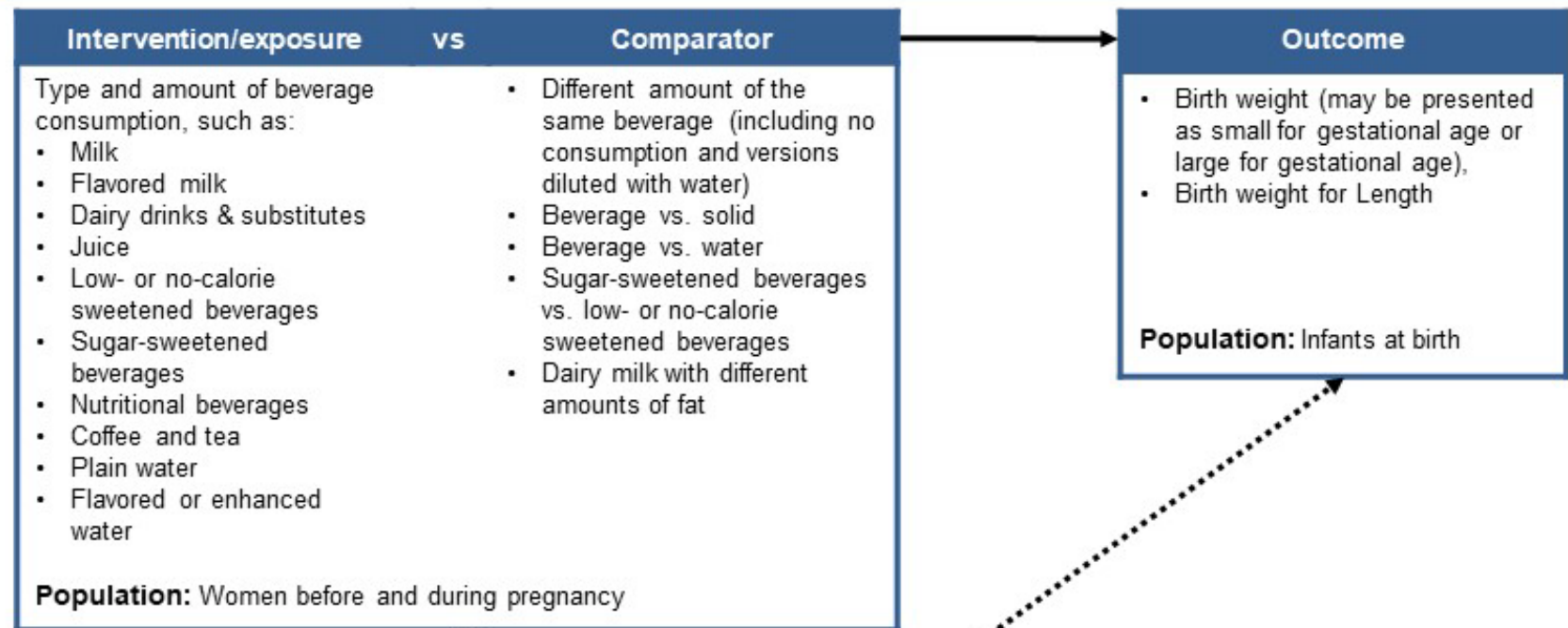
Question: Non-alcoholic beverage consumption

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

Approach to Answer Question: NESR Systematic Review

Analytic Framework: Beverages during pregnancy and birth weight

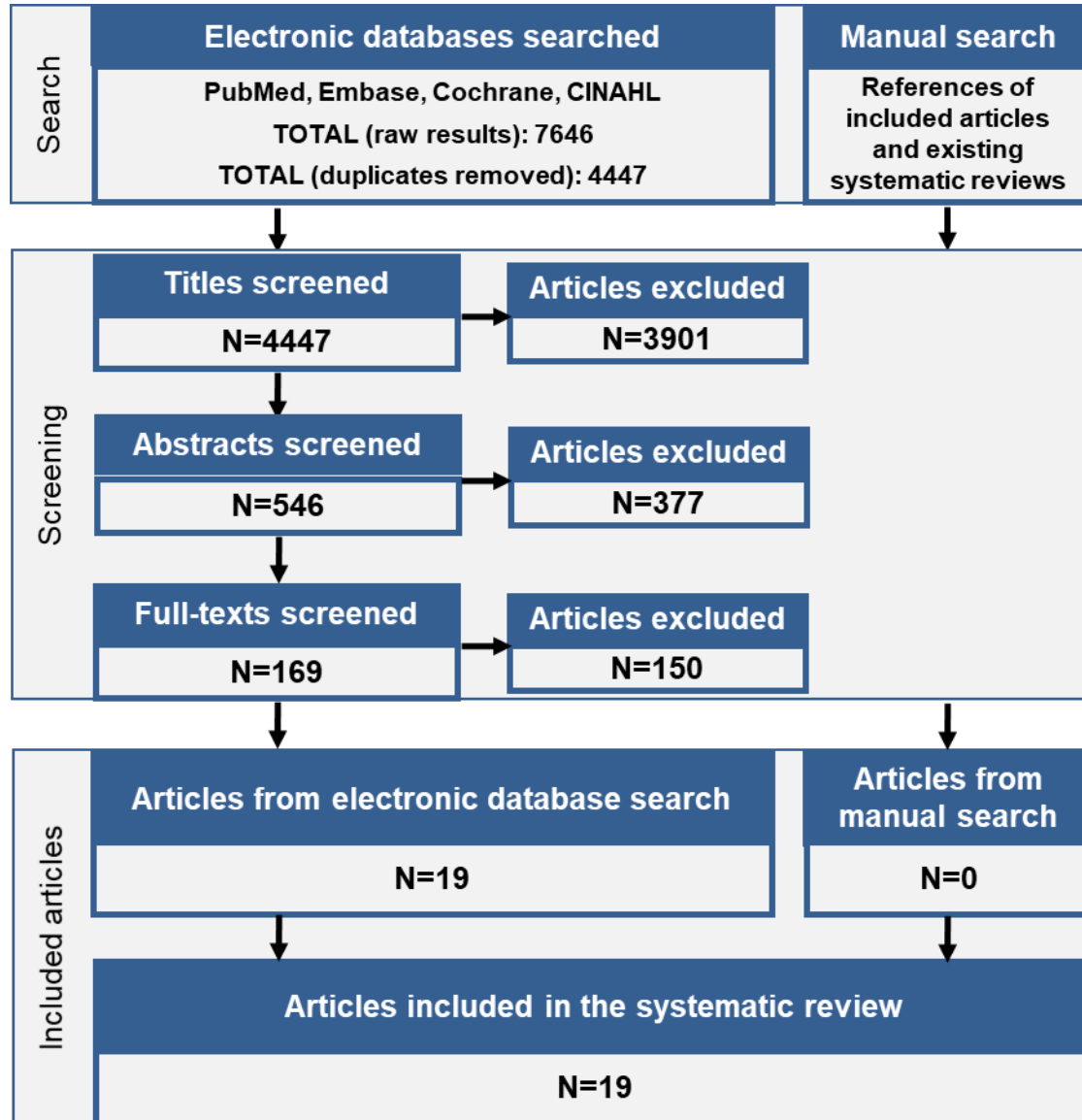
Systematic review question: What is the relationship between beverage consumption during pregnancy and birth weight standardized for gestational age and sex?



Key confounders: Child sex, maternal age, gestational age, race/ethnicity, socioeconomic status, anthropometry (pre-pregnancy BMI), pre-pregnancy beverage intake, smoking, Diagnosis of diabetes (gestational, type 1, type 2);

Other factors to be considered: Parity, total energy intake, timing, temporal use, sugar, protein, fiber, energy density, medications, supplements

Literature Search and Screening Results: Beverages during pregnancy and birth weight



Description of the Evidence: Beverages during pregnancy and birth weight

**Sugar-sweetened beverages (SSBs) &
Low- or no-calorie sweetened beverages (LNCSBs)**

Summary of the Description of the Evidence: Beverages during pregnancy and birth weight: **SSBs/LNCSBs**

7 studies included: All prospective cohort studies

Exposure:

- 3 studies examined **Sugar-sweetened beverages (SSBs) independently**
- 2 studies examined **Low- or no-calorie sweetened beverages (LNCSBs) independently**
- 2 studies examined **combined SSB+LNCSB intake**

Outcomes:

- Continuous birth weight
- Categorical birth weight: (e.g., Small-for-gestational age (SGA))

Description of the Evidence: Beverages during pregnancy and birth weight: **SSBs only**

SSBs: Study descriptions

Study, country	Exposure/Comparator	Outcome(s) (adjusted for gestational age and/or sex)	Adjust for TEI	Participant characteristics
Azad, 2016 Canada (n = 2,413)	<u>SSB</u> intake (servings/wk) <u>Assessed</u> : 2 nd or 3 rd trimester by validated FFQ <u>Represents</u> : current intake	BW (neither)	No	<u>Age</u> : 32.5y <u>Education</u> : ≥13y: 78% <u>Pre-preg BMI</u> : 24.8 kg/m ²
Grundt, 2017 Norway (n = 50,712)	<u>Carbonated SSB</u> intake (per 100 mL/d) <u>Assessed</u> : 15wk, 22wk (FFQ), 30wk <u>Represents</u> : current & 0-22wk intake	BW (neither) SGA/LGA (GA & sex) LBW/HBW (neither)	No	<u>Age</u> : 30y <u>Education</u> : >12y: 71% <u>Pre-preg BMI</u> : 24 kg/m ²
Phelan, 2011 US, (n = 285)	<u>SSB</u> intake (kcal/d) <u>Assessed</u> : 10-16wk & 30wk by validated FFQ <u>Reflects</u> : previous month's intake	Birth weight-for-age z-score (GA & sex) LGA (GA & sex) Macrosomia (GA & sex)	No (stepwise removed)	<u>Age</u> : 28.5y <u>Education</u> : ≥13y: 86% <u>Pre-preg BMI</u> : healthy: 46% overwt/ob: 54%

Evidence Synthesis: Beverages during pregnancy and birth weight: **SSBs only**

Study, country	Exposure/Comparator	Adjust for TEI	Continuous BW (adjustments)	Categorical BW (adjustments) (SGA/LGA/LBW/IUGR)
Azad, 2016 Canada (n=2,413) BW mean: 3447g	<u>SSB</u> intake: 28% = 2-6 servings/wk <u>Assessed</u> : 2 nd or 3 rd trimester by validated FFQ <u>Represents</u> : current intake	No	<u>BW (neither)</u> <1 serving/mo: Mean=3439 g, SD=462 ≤1 serving/wk: Mean=3449 g, SD=472 2-6 servings/wk: Mean=3479 g, SD=499 ≥1 serving/d: Mean=3460 g, SD=487 P=0.49	N/A
Grundt, 2017 Norway (n=50,712) BW mean: 3629g	<u>Carbonated SSB</u> intake (per 100 mL/d) 76% = <100mL/d <u>Assessed</u> : 15wk, 22wk (FFQ), 30wk <u>Represents</u> : current intake	No	<u>BW (neither)</u> Non-GDM pregnancies (n = 50,280): B= -7.8 g, 95% CI: -10.3, -5.3 (Additional adj. for gestational age, B: -6.6 g) Pre-pregnancy BMI Category <18.5: B: -3.9 g, 95% CI: -16.9, 9.1 18.5-25: B: -5.3 g, 95% CI: -8.5, -2.1 >25: B: -10.1 g, 95% CI: -14.0, -6.1 Smoking Category Nonsmokers: B: -5.5 g, 95% CI: -8.6, -2.3 Smokers: B: -11.0 g, 95% CI: -15.1, -6.9 GDM pregnancies (n = 432): B: 25.1 g, 95% CI: -2.0, 52.2	<u>LBW</u> (<2500 g), Non-GDM: OR: 1.05, 95% CI: 0.99, 1.10 Pre-pregnancy BMI Category <18.5: OR: 1.10, 95% CI: 0.95, 1.27 18.5-25: OR: 1.02, 95% CI: 0.95, 1.09 >25: OR: 1.08, 95% CI: 1.00, 1.17 Smoking Category, Nonsmokers: OR: 1.02, 95% CI: 0.95, 1.11 Smokers: OR: 1.07, 95% CI: 1.01, 1.13 <u>HBW</u> (>4500g), Logistic regression Non-GDM: OR 0.94, 95% CI: 0.90, 0.97 Pre-pregnancy BMI Category <18.5: OR: 1.13, 95% CI: 0.86, 1.49 18.5-25: OR: 0.96, 95% CI: 0.91, 1.01 >25: OR: 0.93, 95% CI: 0.88, 0.97 Smoking Category Nonsmokers: OR: 0.94, 95% CI: 0.90, 0.98 Smokers: OR: 0.93, 95% CI: 0.87, 1.00 GDM pregnancies: OR 1.18, 95% CI: 1.00 1.39
Phelan, 2011 US (n=153) WFA z-score mean: ~0.31	<u>SSB</u> intake (kcal/d); Intake NR <u>Assessed</u> : 10-16wk & 30wk by validated FFQ <u>Reflects</u> : previous month's intake	No (stepwise removed)	<u>Birth weight-for-age (WFA) z-score (GA & sex)</u> B: 0.002, 95% CI: 0.0001, 0.004, Beta: 0.16, P (without adj. for GWG)=0.04, P(with adj. for GWG)=0.10	<u>LGA (>90th %) & Macrosomia (>4000g)</u> Normal weight (n = 153) Omnibus test of model coefficients were non-significant (Data NR) <u>LGA (>90th %) & Macrosomia (>4000g)</u> Overweight/Obese (n = 132) Omnibus test of model coefficients were non-significant (Data NR)

Summary of the Evidence Synthesis: Beverages during pregnancy and birth weight: **SSBs only**

Findings

- Mixed findings for relationship with birth weight
 - 1 study: greater SSB intake related to higher birth weight
 - 1 study: greater SSB intake related to lower birth weight
 - 1 study: relationship was not significant
- No studies assessed the same categorical outcome

Risk of Bias: Beverages during pregnancy and birth weight: **SSBs only**

	Confounding	Selection of participants	Classification of exposures	Deviations from intended exposures	Missing data	Outcome measurement	Selection of the reported result
Azad, 2016	Critical	Low	Low	Low	Low	Low	Moderate
Grundt, 2017	Serious	Low	Moderate	Low	Moderate	Low	Moderate
Phelan, 2011	Moderate	Low	Moderate	Moderate	Moderate	Low	Moderate

Low		Serious	
Moderate		Critical	

Common causes for risk of bias:

- Inadequate adjustment for key confounders
- Inadequate description/definition of exposure

Summary of the Evidence Synthesis: Beverages during pregnancy and birth weight: **LNCSBs & SSB+LNCSB**

2 studies examined LNCSBs, independently

Findings:

- 1 study: greater intake related to lower birth weight
- 1 study: relationship not significant
- Neither study examined categorical birth weight outcomes

2 studies examined SSB+LNCSB intake, combined

Findings:

- 1 study: greater combined intake related to lower birth weight
- 1 study: greater intake related to higher risk of SGA
- 1 study: relationship between combined intake and SGA not significant

DRAFT Conclusion Statement and Grade: SSBs/LNCSBs

Conclusion statement

Insufficient evidence is available to determine the relationship between consumption of SSBs or LNCSBs during pregnancy and birth weight outcomes.

Grade: Grade not assignable

Summary Description of the Evidence: Beverages during pregnancy and birth weight: **Dairy milk**

6 studies assessed dairy milk intake: 1 RCT, 5 prospective cohort studies

Exposure: commercially available dairy milk of varying fat and sweetener content

Outcomes:

- 5 studies assessed continuous birth weight
- 3 studies assessed categorical birth weight outcomes

Findings:

- 4 studies found greater milk intake related to higher birth weight
- 1 study found lower milk intake related to higher birth weight
- SGA: 1 study found greater dairy milk intake related to lower risk of SGA; 1 study found the relationship was not significant
- LGA: 1 study: relationship not significant
- Low birth weight (LBW): 1 study: greater milk intake related to lower risk

DRAFT Conclusion Statement and Grade: Beverages during pregnancy and birth weight

Conclusion statement

Insufficient evidence is available to determine the relationship between consumption of **dairy milk** during pregnancy and birth weight outcomes.

Grade: Grade not assignable

Summary Description of the Evidence: Beverages during pregnancy and birth weight: **Tea**

- **8 studies assessed tea intake:** All prospective cohort studies
- **Exposure:**
 - Most studies combined all tea intake as a single exposure variable
 - Some examined intake for specific tea types (e.g., oolong, black, green)
 - 3 studies examined caffeinated tea specifically
- **Outcome:**
 - 6 studies assessed continuous birth weight
 - 8 studies assessed categorical birth weight outcomes
- **Findings**
 - 3 studies: greater intake related to lower birth weight
 - 3 studies: relationship with birth weight was not significant
 - SGA: 3 studies: relationship not significant;
2 studies: greater tea intake related to higher risk of SGA
 - LBW: 3 studies: relationship not significant
 - LGA: 1 study: highest intake level related to higher risk

DRAFT Conclusion Statement and Grade: Beverages during pregnancy and birth weight: **Tea**

Conclusion statement

Insufficient evidence is available to determine the relationship between consumption of **tea** during pregnancy and birth weight outcomes.

Grade: Grade not assignable (all beverage types)

Summary Description of the Evidence: Beverages during pregnancy and birth weight: **Coffee**

- **7 studies assessed coffee intake:** All prospective cohort studies
- **Exposure:**
 - Average coffee intake
 - 3 studies examined caffeinated coffee, specifically
- **Outcomes:**
 - 5 studies assessed continuous birth weight
 - 6 studies assessed categorical birth weight outcomes
- **Findings**
 - 3 studies: greater coffee intake related to lower birth weight
 - 2 studies: relationship with birth weight was not significant
 - SGA: 2 studies: greater coffee intake was associated with higher risk; 2 studies: relationship not significant
 - LBW: 2 studies: relationship not significant; 1 study: greater coffee intake was associated with higher risk

DRAFT Conclusion Statement and Grade: Beverages during pregnancy and birth weight: **Coffee**

Conclusion statement

Insufficient evidence is available to determine the relationship between consumption of **coffee** during pregnancy and birth weight outcomes.

Grade: Grade not assignable (all beverage types)

Summary Description of the Evidence: Beverages during pregnancy and birth weight: **Plain water**

2 studies assessed plain water intake: Both prospective cohort studies

Exposure: Plain water

- Tap and bottled water
- Does not included flavored, carbonated, or fortified water

Outcome:

- 2 studies assessed continuous birth weight
- 2 studies assessed categorical birth weight outcomes

Findings:

- 2 studies: relationship with birth weight was not significant
- 2 studies: found the relationship was not significant (SGA & LBW)

DRAFT Conclusion Statement and Grade: Beverages during pregnancy and birth weight: **Plain Water**

Conclusion statement

Insufficient evidence is available to determine the relationship between consumption of **plain water** during pregnancy and birth weight outcomes

Grade: Grade not assignable

Beverage consumption during pregnancy and birth weight: Considerations & Limitations

Study design

- Multiple studies with attrition >25%
- Total energy intake adjusted for in some studies but not all
- Samples with poor generalizability to lower SES and minority populations

Exposure

- Variation in fat or sweetener levels not examined
- Half of tea and coffee evidence examined only caffeinated versions
- Exposure definitions & assessment timing inconsistent

Outcome

- Birth weight inconsistently adjusted for gestational age and sex: many studies adjusted only for one or for neither
- Inconsistency in outcomes assessed and definitions used
- Statistically significant but small effect size—practical significance unclear

Question: Alcohol

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

Approach to Answer Question: NESR Systematic Review

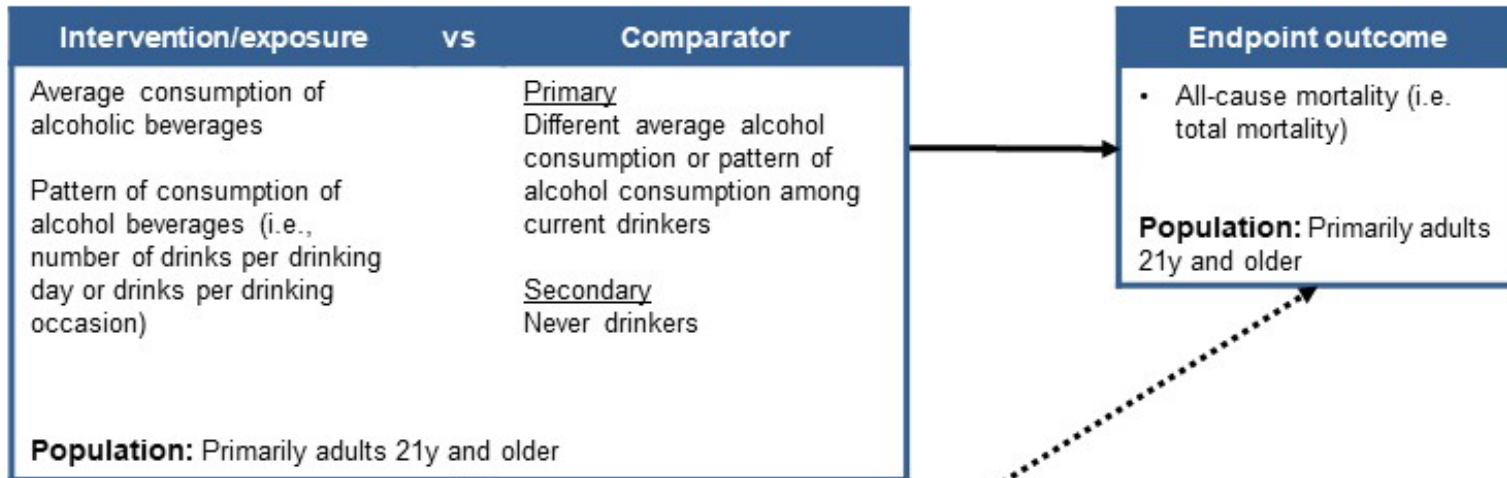
NEW protocol posted at [DietaryGuidelines.gov](https://www.dietaryguidelines.gov)

Key Definitions: Alcohol and All-Cause Mortality

- **All-cause mortality:** the total number of deaths from any/all causes during a specific time period. This does not include cause-specific mortality (i.e., total number of deaths from a specific disease, such as CVD or cancer).

Analytic Framework: All-cause mortality

Systematic review question: What is the relationship between alcohol consumption and all-cause mortality?



Key confounders: Sex, age, race/ethnicity, SES (income, education, health insurance, preventive health care access), eating pattern or diet quality, physical activity, smoking

Exposure-specific key confounders:

Key confounder for average consumption exposure: Pattern of consumption

Key confounder for pattern of consumption exposure: Average consumption

Other factors to be considered: Total energy intake (ideally without alcohol), age distribution of the study sample, anthropometry, hypertension, blood pressure, diabetes, glucose, lipids, medications, family history of chronic disease, beverage type (e.g., beer, wine, spirits)

Alcohol and All-Cause Mortality

2020 Dietary Guidelines Advisory Committee: Meeting 4

Inclusion and Exclusion Criteria: All-cause mortality

- Propose standard criteria be used for:
 - Study design
 - Publication Status
 - Language of Publication
 - Country
 - Health Status of Participants

Inclusion and Exclusion Criteria: All-cause mortality

Category	Inclusion Criteria	Exclusion Criteria
Intervention/ exposure	<p>Average consumption of alcoholic beverages</p> <p>Pattern of consumption of alcohol beverages (i.e., number of drinks per drinking day or drinks per drinking occasion)</p> <ul style="list-style-type: none"> Information on type of beverage (e.g., beer, wine, spirits) will be collected if available 	<ul style="list-style-type: none"> Data on 'non-drinker' groups where never and former drinkers are combined (in observational studies)
Comparator	<p><u>Primary</u></p> <p>Comparisons across different average alcohol consumption or pattern of alcohol consumption among current drinkers</p> <p><u>Secondary</u></p> <p>Comparisons between never drinkers and current drinkers</p>	<ul style="list-style-type: none"> No comparator Comparisons with never and former drinkers as a combined 'non-drinker' group (in observational studies)

Inclusion and Exclusion Criteria: All-cause mortality, continued

Category	Inclusion Criteria	Exclusion Criteria
Date of publication	January 2000 – January 2020	Articles published prior to January 2000
Age of participants	Primarily adults 21y and older Studies that enroll <i>some</i> participants under 21 years old	Studies that <i>exclusively</i> enroll participants under 21 years old

Refining and Prioritizing Remaining Work

- Added sugars and health outcomes
 - Cardiovascular disease: Building on 2015 NESR systematic review
 - Type 2 diabetes: Building on 2015 Advisory Committee report
 - Growth, size, body composition, and risk of overweight and obesity: Building on 2015 Advisory Committee report
- Alcohol and health outcomes
 - Prioritizing all-cause mortality as first outcome to be examined
 - As time allows, will address CVD, cancer, neurocognitive health, and growth, size, and body composition

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