

# 2020 Dietary Guidelines Advisory Committee: Dietary Fats and Seafood Subcommittee

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# Topics and Questions Under Review

- Presented at previous meetings:
  - **Seafood** during pregnancy/lactation and **neurocognitive development**
  - **Seafood** during childhood/adolescence and **neurocognitive development/health**
  - **Seafood** during childhood/adolescence and **cardiovascular disease (CVD)**
- To be discussed today:
  - Revised conclusion statements for **seafood** and **neurocognitive development/health**
  - **Dietary fats** and **CVD**

# Follow-Up from Meeting 4: Revised Conclusion Statements (1 of 4)

What is the relationship between **seafood consumption** during pregnancy/lactation and **neurocognitive development** of the infant?

*CS as presented at the January meeting (Cognitive Development):*

**Moderate** evidence suggests that seafood intake during pregnancy is associated with **improvements** in cognitive development in the child.  
(Grade: Moderate)

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

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

# Follow-Up from Meeting 4: Revised Conclusion Statements (2 of 4)

What is the relationship between **seafood consumption** during pregnancy/lactation and **neurocognitive development** of the infant?

*CS as presented at the January meeting (Language/Communication Development):*

**Moderate** evidence suggests that seafood intake during pregnancy is associated **with improvements in** language and communication development in the child. **(Grade: Moderate)**

*Revised CS based on committee feedback (Language/Communication Development):*

**Limited** evidence suggests that seafood intake during pregnancy may be associated **favorably with measures of** language and communication development in the child. **(Grade: Limited)**

# Follow-Up from Meeting 4: Revised Conclusion Statements (3 of 4)

What is the relationship between **seafood consumption** during childhood and **neurocognitive development** of the infant?

## *CS as presented at the January meeting (Cognitive Development):*

- **Insufficient** evidence is available to determine whether seafood intake during childhood and adolescence is associated with improvements in cognitive development in children and adolescents. **Grade: Grade not assignable (improvements)**
- **Moderate** evidence suggests that seafood intake during childhood and adolescence does not have detrimental impacts on cognitive development in children and adolescents. **Grade: Moderate (no detrimental impact)**

## *Revised CS based on committee feedback (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)**

# Follow-Up from Meeting 4: Revised Conclusion Statements (4 of 4)

What is the relationship between **seafood consumption** during childhood and **neurocognitive development** of the infant?

## *CS as presented at the January meeting (Cognitive Development):*

- **Insufficient** evidence is available to determine whether seafood intake during childhood and adolescence is associated with **improvements in** cognitive development in children and adolescents. **Grade: Grade not assignable (improvements)**
- **Moderate** evidence suggests that seafood intake during childhood and adolescence **does not have detrimental impacts on** cognitive development in children and adolescents. **Grade: Moderate (no detrimental impact)**

## *Revised CS based on committee feedback (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)**

# Question

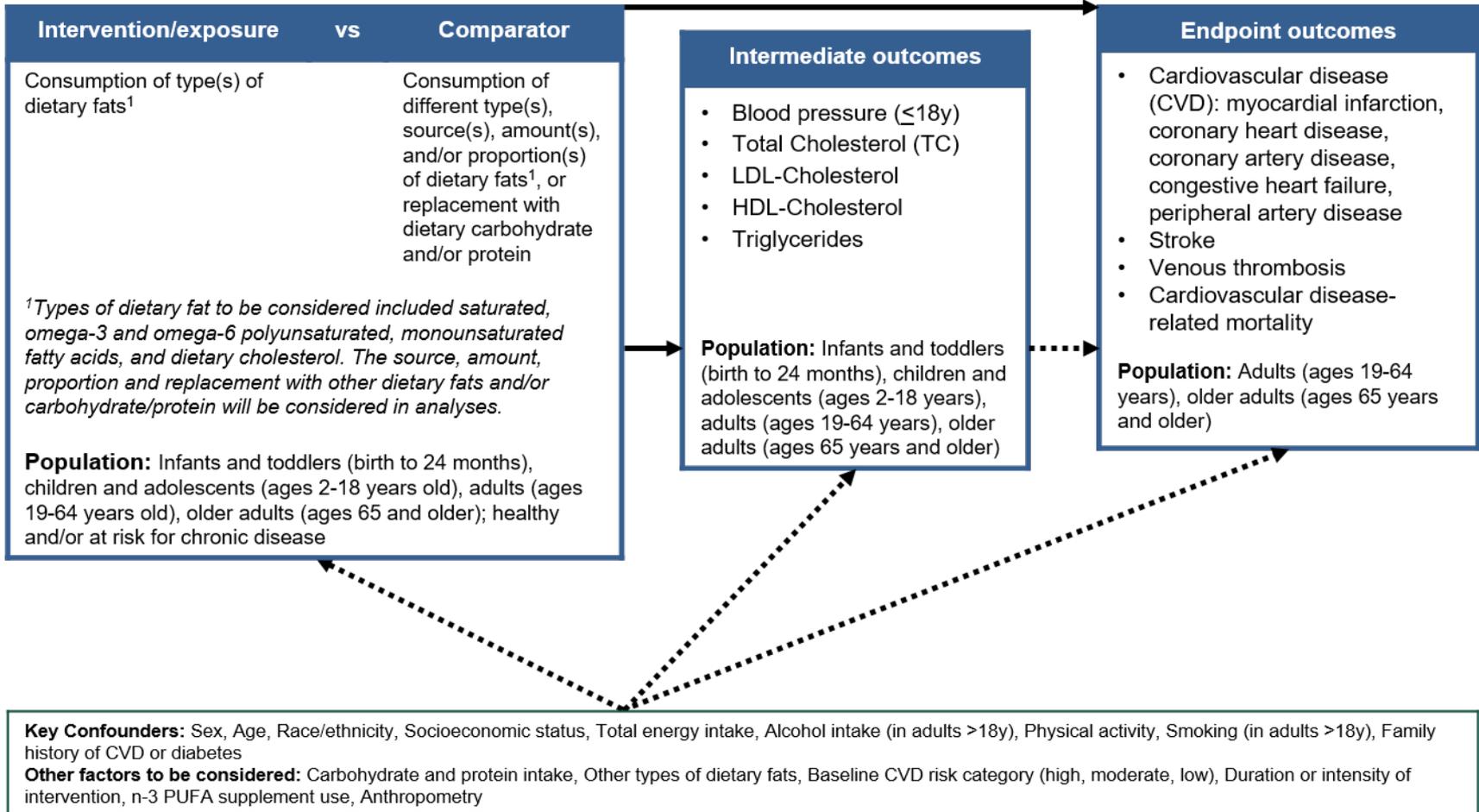
What is the relationship between **types of dietary fat** consumed and **risk of cardiovascular disease**?

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Approach to Answer Question: NESR Systematic Review

# Analytic Framework

**Systematic review question:** What is the relationship between types of dietary fat consumed and risk of cardiovascular disease?



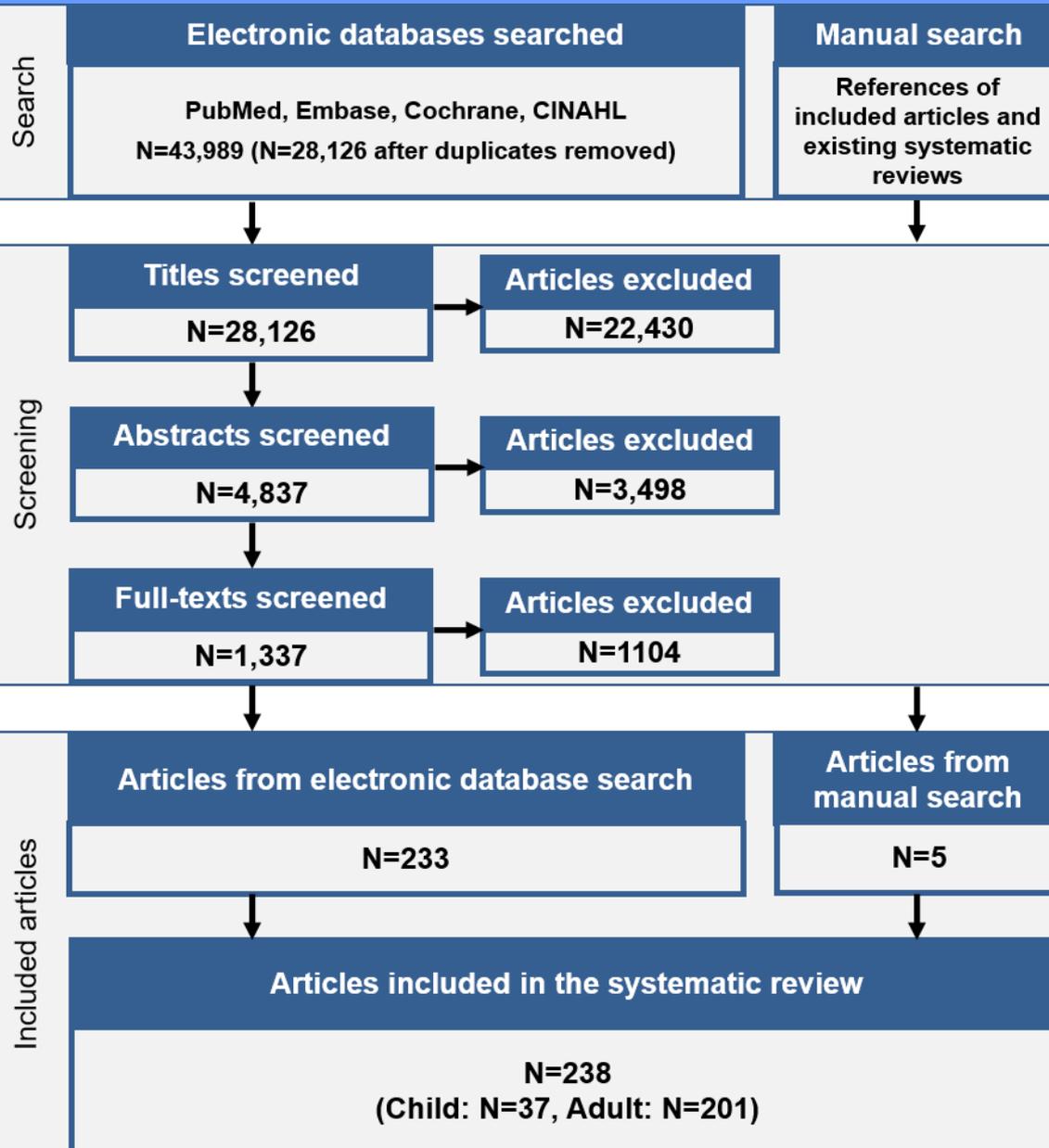
**Dietary Fats & CVD**

**2020 Dietary Guidelines Advisory Committee: Meeting 5**

# Exclusion Criteria: Updates

Category	Exclusion Criteria
Outcomes	<ul style="list-style-type: none"><li>• Serum lipid ratios (i.e., TC:HDL, LDL:HDL)</li><li>• Blood pressure in adults (&gt;18y)</li><li>• Intermediate outcomes in <b>observational studies</b> conducted in adults (&gt;18y)</li></ul>
Study duration	<ul style="list-style-type: none"><li>• &lt; 4 weeks (only RCTs)</li></ul>
Intervention/exposure	<ul style="list-style-type: none"><li>• Human milk and/or infant formula as the <b>only</b> source of dietary fat</li></ul>

# Literature Search and Screening Results



## Search Date Ranges

- Children: Jan. **1990** – Oct. 2019
- Adults: Jan. **2010** – Oct. 2019
  - *Builds upon 2015 DGAC report on saturated fats and CVD, which considered evidence in adults preceding Jan. 2010*

## Children

- Endpoint outcomes: 1
- Intermediate outcomes: 36

## Adults

- Endpoint outcomes: 94
- Intermediate outcomes: 107

# Dietary Fat and CVD, Children: Description of the Evidence

Thirty-seven articles: 22 articles from 7 RCTs, 16 articles from 14 PCS (*Note: one RCT also analyzed as PCS*)

## Population characteristics

- Conducted predominantly in US and Northern Europe (Finland, Netherlands, UK)
- Majority of RCTs and PCS conducted during ~4-13y of age, with 1-5y of follow-up
  - One RCT (STRIP) initiated at early age (7mo of age) and continued for >19y.
  - Some PCS had longer-term follow-ups (~15-20y)

## Interventions/Exposures

- Most articles from RCTs came from two trials: STRIP and DISC
  - Provided dietary counseling to reduce or limit SFA and dietary cholesterol intake
  - Increased PUFA intake also encouraged, but not the focus of interventions
- Remaining RCTs modulated dietary fat intake by providing different food products
- Among the PCS, most focused on SFA and PUFA with fewer studies on MUFA or cholesterol
- Few studies (RCT or PCS) directly addressed replacement or dietary source of fat
- Variety of diet assessment methods, including FFQs, diet records, 24h recall (~half validated)

## Outcomes (# of articles)

- Intermediate outcomes, predominantly blood lipids (33); fewer blood pressure (16)
- 11 CVD endpoint outcomes: only 1 study (limited by use of indirect measure of exposure)

# Dietary Fat and CVD, Children: Summary of the Evidence Synthesis

## SFA and total blood cholesterol & LDL-cholesterol

- Evidence from RCTs: consuming less SFA and dietary cholesterol resulted in lower blood total and LDL cholesterol throughout childhood, particularly in boys
- Evidence from PCS: consistent with RCTs

## PUFA and total blood cholesterol

- Evidence from RCTs: higher PUFA intake resulted in decreased total blood cholesterol, particularly in boys
- Primary focus of trials was SFA; PUFA was secondary
- Evidence from PCS: fewer, but broadly consistent with RCTs

## MUFA and total blood cholesterol & LDL-cholesterol

- Few studies, RCTs or PCS, focused on MUFA intake and results were predominantly null

## Effects of types of fat on blood pressure were difficult to discern

- RCT which provided counseling on dietary fat also gave advice to reduce sodium consumption
- Fewer PCS on this topic with predominantly null association

# Dietary Fat and CVD, Children: Draft Conclusion Statements (1 of 6)

**Insufficient evidence** is available to determine the relationship between intake of **types of dietary fat** during childhood and **CVD health outcomes** during adulthood.

- **Grade not assignable**

# Dietary Fat and CVD, Children: Draft Conclusion Statements (2 of 6)

**Insufficient evidence** is available to determine the relationship between intake of **types of dietary fat** during childhood and **blood pressure** throughout childhood.

- **Grade not assignable**

# Dietary Fat and CVD, Children: Draft Conclusion Statements (3-5 of 6)

**Strong** evidence demonstrates that **diets lower in SFA and cholesterol** during childhood result in **lower levels of total blood and LDL cholesterol** throughout childhood, particularly in **boys**.

- **Grade: Strong**

**Moderate** evidence suggests that **diets higher in PUFA** during childhood result in **lower levels of total blood cholesterol** throughout childhood, particularly in **boys**.

- **Grade: Moderate**

**Insufficient evidence** is available to determine the relationship between **MUFA intake** during childhood and **total blood and LDL cholesterol** throughout childhood.

- **Grade not assignable**

**Dietary Fats & CVD**

**2020 Dietary Guidelines Advisory Committee: Meeting 5**

# Dietary Fat and CVD, Children: Draft Conclusion Statements (6 of 6)

**Insufficient evidence** is available to determine the relationship between **replacement of SFA with PUFA, MUFA or other macronutrients** during childhood and **total blood, LDL, or HDL cholesterol or triglycerides** throughout childhood and adulthood.

- **Grade not assignable**

# Dietary Fat and CVD, Adults (Health Outcomes): Building upon 2015 Review/CS

- Current review builds upon 2015 DGAC review of saturated fat and CVD outcomes
  - Considered evidence prior to January 2010; studies dating back to 1960s
- 2015 Conclusion Statements
  - **Strong** and consistent evidence from RCTs and statistical modeling in prospective cohort studies shows that replacing SFA with PUFA reduces the risk of CVD events and coronary mortality. For every 1 percent of energy intake from SFA replaced with PUFA, incidence of CHD is reduced by 2 to 3 percent. However, reducing total fat (replacing total fat with overall carbohydrates) does not lower CVD risk. Consistent evidence from prospective cohort studies shows that higher SFA intake as compared to total carbohydrates is not associated with CVD risk. (**Grade: Strong**)
  - Evidence is **limited** regarding whether replacing SFA with MUFA confers overall CVD (or CVD endpoint) benefits. One reason is that the main sources of MUFA in a typical American diet are animal fat, and because of the co-occurrence of SFA and MUFA in foods makes it difficult to tease out the independent association of MUFA with CVD. However, evidence from RCTs and prospective studies has demonstrated benefits of plant sources of monounsaturated fats, such as olive oil and nuts on CVD risk. (**Grade: Limited**)

# Dietary Fat and CVD, Adults (Health Outcomes): Description of the Evidence

## Ninety-four articles:

- PCS - 90 articles from 48 cohorts; Nested case control - 4 articles from 3 cohorts

## Population Characteristics

- Most studies conducted in the US, Scandinavia, Southern Europe, and Japan
- Majority were middle-aged or elderly adults with overweight

## Exposures

- Predominantly measured with validated FFQs
- Studies focused primarily on SFA, n-3 PUFAs, total PUFA, or MUFA; Fewer studies focused on n-6 PUFA or dietary cholesterol
- Few studies directly assessed dietary source of types of fat

## Outcomes

- Many studies examined incident CVD, inclusive of multiple fatal/nonfatal events such as MI, CHD, and stroke; others examined a specific subset of CVD outcomes

## Common Limitations

- Majority did not control for all key confounders
- CVD was not always the primary outcome of study

# Dietary Fat and CVD, Adults (Health Outcomes): Summary of the Evidence

## **Saturated Fat (SFA) – 35 articles**

- Replacement of SFA with PUFA was primarily significantly associated with lower risk of CHD and CVD mortality
  - Consistent with conclusions made from the 2015 DGAC report, which considered systematic reviews including RCTs and PCS studies dating back to 1960
  - Fewer, more current, studies examined other specific CVD outcomes such as heart failure or stroke alone
- Replacement of SFA with total carbohydrates tended to be inconsistent, with mostly null associations with CVD outcomes
  - Most studies did not specify or differentiate between the type of carbohydrate (e.g., complex, simple) replacing SFA

# Dietary Fat and CVD, Adults (Health Outcomes): Draft Conclusion Statements

**Strong** evidence demonstrates that **replacing SFA with PUFA** in adults **reduces the risk of CHD events and CVD mortality**.

**Grade: Strong**

**Insufficient** evidence is available to determine if **replacing SFA with PUFA** in adults **affects the risk of stroke or heart failure**, due to inconclusive results.

**Grade Not Assignable**

**Insufficient** evidence is available to determine if **replacing SFA with different types of carbohydrates (e.g., complex, simple)** in adults **affects the risk of CVD**.

**Grade Not Assignable**

# Dietary Fat and CVD, Adults (Health Outcomes): Summary of the Evidence – MUFA

## **MUFA (26 articles)**

- Predominantly null associations were observed between total MUFA intake and risk of CVD
  - Broadly consistent with conclusions from the 2015 DGAC report
- Predominantly null associations were observed for replacement of SFA with total MUFA
  - Among the few studies that examined food sources, MUFAs from plant sources were generally associated with lower risk of CVD compared to MUFAs from animal sources

# Dietary Fat and CVD, Adults (Health Outcomes): Draft Conclusion Statement

Concur with and will carry forward the 2015 DGAC report conclusion statement:

Evidence is **limited** regarding whether replacing SFA with MUFA confers overall CVD (or CVD endpoint) benefits. One reason is that the main sources of MUFA in a typical American diet are animal fat, and because of the co-occurrence of SFA and MUFA in foods makes it difficult to tease out the independent association of MUFA with CVD. However, evidence from RCTs and prospective studies has demonstrated benefits of plant sources of monounsaturated fats, such as olive oil and nuts on CVD risk.

**Grade:** Limited

# Dietary Fat and CVD, Adults (Health Outcomes): Summary of the Evidence – n-3 PUFA

## **n-3 PUFA** (*47 articles*)

- Predominantly beneficial or null associations between intake of n-3 PUFAs and CVD risk
- In particular, total intake of EPA and DHA from food sources were most consistently associated with lower risk of CVD

# Dietary Fat and CVD - Adults (Health Outcomes): Draft Conclusion Statement

**Moderate** evidence suggests that total intake of **n-3 PUFA, particularly EPA and DHA from food sources**, in adults is associated with **lower risk of CVD**.

**Grade: Moderate**

# Dietary Fat and CVD, Adults: Work in Progress

## Topics still under review by SC

- n-6 PUFA and CVD health outcomes
- Dietary cholesterol and CVD health outcomes
- Dietary fat, with a focus on food source, and CVD intermediate outcomes

# Next Steps

- Complete topics still under review
- Peer review of dietary fats and CVD
- Draft report

# 2020 Dietary Guidelines Advisory Committee: Dietary Fats and Seafood

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