2020 Dietary Guidelines Advisory Committee: Dietary Fats and Seafood Subcommittee

Linda Snetselaar (Chair)
Regan Bailey
Joan Sabaté
Linda Van Horn

Advisory Chair Rep: Barbara Schneeman

DietaryGuidelines.gov

Status of Questions

Draft Conclusion:

- **Seafood** during pregnancy/lactation and neurocognitive development (ADD/ADHD; ASD)
  - Developmental domains portion is still being synthesized

Implementing the plan:

- **Seafood** during childhood/adolescence and neurocognitive development
- **Seafood** during childhood/adolescence and cardiovascular disease
- **Dietary fats** and all-cause mortality

Developing the plan:

- **Dietary fats** and cardiovascular disease
- **Dietary fats** and neurocognitive development/health
- **Dietary fats** and cancer

All protocols discussed in this presentation are available at DietaryGuidelines.gov

Updates to Protocols Presented in July

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

Will build upon the 2015 Dietary Guideline Advisory Committee review, which considered:

- Studies only in adults
- Evidence dating back to 1960s
- Evidence on saturated fat and macronutrient replacement

2020 NESR Systematic Review date range:

- Children and adolescents: **1990** to present
- Adults: **2010** to present

Question

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

Approach to Answer Question: NESR Systematic Review

Cross-cutting Discussion

- Joint meeting with Pregnancy and Lactation and Birth to 24 Months subcommittees
  - Feedback on protocols
  - Discussion of evidence
- External neurocognitive experts
  - Feedback on assessment tools

Key Definitions

- **Seafood** – Marine animals that live in the sea and in freshwater lakes and rivers. Seafood includes fish (e.g., salmon, tuna, trout, tilapia) and shellfish (e.g., shrimp, crabs, oysters) (Source: 2015-2020 DGA)

Analytic Framework

Systematic review question: What is the relationship between seafood consumption during pregnancy and lactation and neurocognitive development in infants?

Intervention/exposure	vs	Comparator
Seafood consumption (type, source, amounts, frequency, and/or timing of exposure)		Different types, sources, and/or amounts of seafood consumed; Different frequency of and/or timing of seafood consumption
Population: Women during pregnancy and/or lactation; healthy and/or at risk for chronic disease		

Endpoint outcomes

- Developmental domains, examined via milestone achievement and/or scales/indices, including Cognitive, Language/communication, Movement/physical, Social-emotional
- Academic performance
- Attention deficit disorder (ADD) or attention-deficit/hyperactivity disorder (ADHD)
- Anxiety
- Depression
- Autism spectrum disorder (ASD)

Population: Infants and toddlers (birth to 24 months), children and adolescents (ages 2-18 years)

Key Confounders: Child sex, Child age, Maternal age, Race/ethnicity, Socioeconomic status, Alcohol intake, Non-fish dietary exposure to n-3 polyunsaturated fatty acids (PUFAs), Smoking, Maternal anthropometrics, Child's birth weight, Gestational age, Parental education, Parity
Outcome Specific Key Confounders: ADD, ADHD, Anxiety, ASD, Depression: Family history of neurocognitive disorders.

Other factors to be considered: Key nutrients in seafood (e.g., n-3 PUFAs, iodine, selenium, iron, fish protein, vitamin D); Environmental chemicals (e.g,. mercury, persistent organic pollutants, and polychlorinated biphenyls); Blood and human milk biomarkers of seafood intake (e.g., n-3 PUFA, and environmental pollutants), mother (e.g., venous/umbilical cord, placenta, red blood cell) and child (e.g., arterial/umbilical cord) EPA, DHA, iron, iodine, selenium, protein, vitamin D; infant feeding mode

Inclusion and Exclusion Criteria

- **Standard criteria used for:**
  - Study Design
  - Publication Status
  - Date of Publication (January 2000 – present)
  - Language of Publication
  - Country
  - Health status of participants

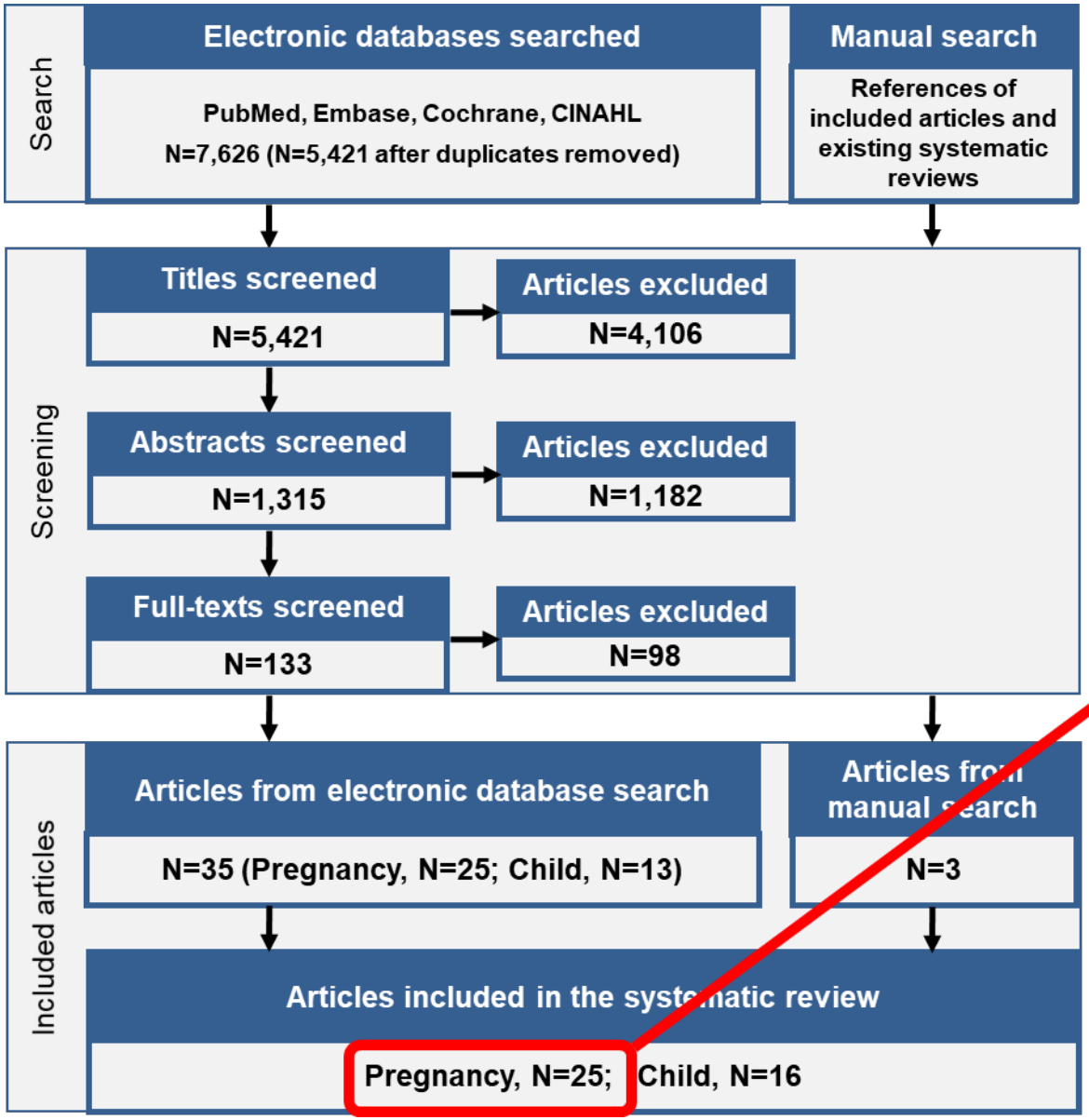
Inclusion and Exclusion Criteria (Continued)

Category	Inclusion Criteria	Exclusion Criteria

Intervention/ exposure	• Seafood consumption measured prior to outcome assessment
	  ○ Type (e.g., salmon, tuna bass)
	  ○ Source (e.g., sea fresh water, farmed, wild)
	  ○ Amount/frequency of intake
	  ○ Timing of exposure (e.g., age at intake)
	• Dietary intake (e.g., from food frequency questionnaires, dietary recall, fish/seafood screeners) may be validated with biomarkers for PUFA or MeHg, but not substituted.
		• No measure of seafood consumption (i.e., studies that only examined biomarkers for consumption)
		• Omega-3 supplement studies which do not evaluate seafood consumption
		• Studies evaluating infant formula with added DHA and/or EPA

Comparator	• Different types, sources, amounts, frequency, and/or timing of exposure of seafood consumption	• No comparator

Literature Search and Screening Results



This search addressed <u>two</u> systematic review questions related to seafood consumption and neurocognitive outcome.

- ADD/ADHD: 4 studies
- ASD: 3 studies

DRAFT Conclusion Statement and Grade: Academic performance, Anxiety, Depression

No evidence is available to draw a conclusion about the relationship between **maternal seafood intake** during pregnancy and lactation and **academic performance, anxiety, and depression** in children.

Grade not assignable: Academic performance, anxiety, depression

DRAFT Conclusion Statement and Grade: Seafood intake during lactation

No evidence is available to draw a conclusion about the relationship between **maternal seafood intake** during lactation and **neurocognitive development** in children.

Grade not assignable: Seafood during lactation

Description of the Evidence for ADD/ADHD: 4 Prospective Cohort Studies

Sample Characteristics

- Country: 3 UK, 1 USA
- Sample size: N=217-6580
- Predominantly maternal age >20y, white, middle-high SES

Exposure

- Total seafood; 1 study also assessed oily fish intake
- Timing of intake:
  - 1st trimester only, 3rd trimester only, throughout pregnancy
  - No studies assessed maternal seafood intake during lactation

Outcome

- 4 studies assessed ADD/ADHD-like traits or behaviors (ages 4-13y)
- No studies looked at clinical diagnosis of ADD or ADHD

Summary of the Evidence Synthesis: ADD/ADHD-like behaviors or traits

- Four prospective cohort studies examined the relationship between **maternal seafood intake** during pregnancy and **ADD and ADHD-like traits or behaviors** in children ages 4 to 13 years.
  - Two studies provide evidence of a protective association between maternal seafood intake (total or oily fish intake) during pregnancy and ADD and ADHD-like traits or behaviors in 8 and 9 years of age.
  - Two larger studies from a single cohort used a more rigorous dietary assessment method and found no association between maternal seafood intake during pregnancy and hyperactivity in children 4 to 13 years of age.

DRAFT Conclusion Statement: ADD/ADHD-like traits or behaviors

Insufficient evidence is available to draw a conclusion about the relationship between **seafood consumption** during pregnancy and attention deficit disorder (**ADD**)-like or attention-deficit/hyperactivity disorder (**ADHD**)-like **traits or behaviors**.

Grade not assignable: ADD/ADHD-like traits or behaviors

Summary of the Evidence Synthesis: Clinical diagnosis of ADD or ADHD

- No studies reported clinical diagnosis of ADD or ADHD.

DRAFT Conclusion Statement: Clinical diagnosis of ADD/ADHD

No evidence is available to draw a conclusion about the relationship between **seafood consumption** during pregnancy and clinical diagnosis of attention deficit disorder (**ADD**) or attention-deficit/hyperactivity disorder (**ADHD**).

Grade not assignable: Clinical diagnosis of ADD/ADHD

Description of the Evidence for ASD: 3 Prospective Cohort Studies

Sample Characteristics

- Country: 1 Netherlands, 1 Spain, 1 UK
- Sample size: N=1200-8000
- Maternal age ~31y, Predominantly white, middle-high SES

Exposure

- Seafood or fish
  - 2 studies examined: Oily fish, white fish, large fatty fish, small fatty fish, lean fish, and/or shellfish separately
- Timing of intake:
  - 1st trimester only, early or late pregnancy, throughout pregnancy
  - No studies assessed maternal seafood intake during lactation

Outcome

- Three studies assessed ASD-like traits or behaviors (ages 3-9 years)
- One study assessed clinical diagnosis of ASD by 11 years

Summary of the Evidence Synthesis: ASD diagnosis

- One prospective cohort study examined the relationship between **maternal seafood intake** during pregnancy and clinical diagnosis of **ASD** by 11 years and found no association with either oily fish, white fish, or shellfish.

Summary of the Evidence Synthesis: ASD-like traits or behaviors

- Three prospective cohort studies examined the relationship between **maternal seafood intake** during pregnancy and **ASD-like traits or behaviors** in children ages 3 to 9 years.
  - One study, conducted in a population with high seafood intake (~18 oz/wk) in Spain, found a protective association between total seafood and fatty fish intake during pregnancy and ASD-like traits or behaviors at 5 years of age.
  - Two other studies, conducted in European populations with a more moderate seafood intake during pregnancy, found no association between seafood intake during pregnancy and ASD-like traits or behaviors in children ages 3 to 9 years.

DRAFT Conclusion Statement and Grade: ASD-like traits or behaviors or ASD diagnosis

Insufficient evidence is available to draw a conclusion about the relationship between **seafood consumption** during pregnancy and autism spectrum disorder (**ASD**)-like traits or behaviors or clinical diagnosis of **ASD**.

Grade not assignable: ASD

Next Steps

1. **Complete Evidence Portfolios & Conclusion Statements**
   - **Seafood** during pregnancy and neurocognitive development (Developmental Domains)
   - **Seafood** during childhood/adolescence and neurocognitive development
2. **Complete Screening & Extract Data**
   - **Seafood** during childhood/adolescence and cardiovascular disease
   - **Dietary fats** and all-cause mortality
3. **Begin Screening**
   - **Dietary fats** and cardiovascular disease
   - **Dietary fats** and cancer
   - **Dietary fats** and neurocognitive development/health

2020 Dietary Guidelines Advisory Committee: Dietary Fats and Seafood

Members:	Joan Sabaté
Linda Snetselaar	Linda Van Horn
Regan Bailey	Barbara Schneeman
Support Staff:	Joanne Spahn
Rebecca MacIsaac	Julia Kim
Julia Quam	Charlotte Bahnfleth
Julie Obbagy	Gisela Butera
Eve Stoody (DFO)	Janet de Jesus (DFO rep)

DietaryGuidelines.gov