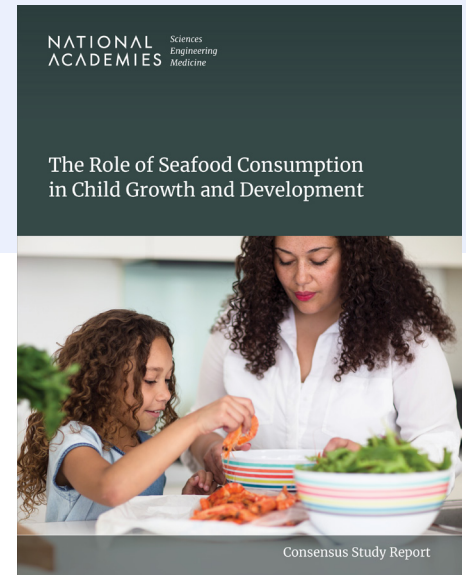


The Role of Seafood Consumption in Child Growth and Development

Seafood—including marine and freshwater fish, mollusks, and crustaceans—is a nutrient-rich food choice that can also contain contaminants. The 2020–2025 *Dietary Guidelines for Americans* (DGA) recommend that all adults, including pregnant and lactating women, consume at least 8 ounces of seafood per week—but it is unclear whether women of childbearing age in the United States adhere to this recommendation and if so, what impact seafood consumption has on children’s growth and development. The DGA also recommends that children consume two servings of seafood per week in amounts corresponding to their total caloric intake, but children’s adherence to this guideline and related impacts to growth and development are even more uncertain.

The U.S. Department of Health and Human Services, the U.S. Department of Agriculture (USDA), the U.S. Environmental Protection Agency (EPA), and the National Oceanic and Atmospheric Administration asked the National Academies of Sciences, Engineering, and Medicine (the National Academies) to convene an expert committee to examine associations between seafood intake for children, adolescents, and pregnant and lactating women and child growth and development, including systematic reviews of the literature along with evidence gathered by the committee and provided by the sponsors. The sponsors also requested an evaluation of when to conduct risk-benefit analyses (RBAs), considering contextual factors such as equity, diversity, inclusion, and access to health care and how these factors might impact such RBAs. The National Academies appointed a committee of experts in nutrition, toxicology, and evidence synthesis to address these complex questions, and the committee’s report, *The Role of Seafood Consumption in Child Growth and Development*, presents the committee’s findings, conclusions, recommendations, and critical research gaps.



The Role of Seafood Consumption in Child Growth and Development finds that seafood consumption patterns have not changed significantly since the National Academies last examined this issue in 2007 and that in the United States most children, adolescents, and women of childbearing age do not eat the DGA-recommended weekly amount of seafood. As a result, sufficient evidence does not exist to justify changes in DGA recommendations for seafood consumption or to evaluate the risks and benefits of complying with these recommendations to these groups. Additionally, the report finds that, because most U.S. women and children do not achieve the DGA recommendations for seafood intake, an accurate assessment of the health benefits and risks associated with meeting recommended levels of seafood intake is not possible. The report recommends that the Centers for Disease Control and Prevention identify strategies to enhance the collection of national data on dietary intake to better assess the types and amounts of seafood that these populations eat (see **Recommendation 1**).

SEAFOOD CONSUMPTION IN THE UNITED STATES

Levels of seafood consumption in the United States have increased since the 1920s, but generally fall short of DGA recommendations across most populations. Individuals in the United States consume shrimp, salmon, canned tuna, Alaska pollock, and tilapia most regularly, and most seafood is eaten at home. Notably, available data indicate that overall, school meals make a negligible contribution to seafood intake among most school-aged children.

The amount and type of U.S. seafood consumption are influenced by:

- **Cultural background:** Native and Indigenous Peoples, as well as subsistence or sport fishers, are more likely to eat seafood, and specific ethnic backgrounds influence what type of seafood an individual or family is most likely to eat.
- **Income:** Individuals with lower household incomes are less likely to eat seafood.
- **Geographic location:** Residence near the coast of an ocean or large lake increases the likelihood of seafood

consumption—although, notably, few women or children in these geographic regions appear to eat the DGA-recommended weekly amount of seafood.

In finding that few women of childbearing age and children and adolescents in the general population adhere to the DGA seafood-related recommendations, the committee concluded that strategies are needed to support increasing seafood consumption toward meeting DGA recommendations and overcoming barriers to seafood consumption. Related to this, the committee recommends that USDA re-evaluate its federal nutrition programs, particularly school meals, to support greater inclusion of seafood in meal patterns (see **Recommendation 2**).

HEALTH IMPACTS OF SEAFOOD CONSUMPTION

Women who eat higher amounts of seafood generally have a lower risk of poor health outcomes or see neither positive nor negative health outcomes related to this consumption. Pregnant women who eat seafood may also see quantifiable health benefits, including improved birth outcomes. However, there is not enough evidence to draw any conclusions about the relationship between seafood consumption and child health and development. But it is important to note that the evidence does not suggest harm from seafood consumption among children in the studied populations.

Seafood, despite being a nutrient-rich protein choice, may contain contaminants including heavy metals, per- and polyfluoroalkyl substances, dioxins, polychlorinated biphenyls, and microbiological hazards that could be detrimental to the growth and development of children and adolescents. These toxins vary widely by:

- species;
- geographic region;
- size and age of the individual fish, mollusk, or crustacean; and
- whether the organism is wild-caught, or cultivated.

The sponsors requested that the committee also develop and implement an approach to mapping nutrient, contaminant,

and micro-organism exposures to health outcomes. In response, the committee outlined a conceptual framework (see Figure 1) that helped guide its deliberations.

RISK-BENEFIT ANALYSES TO UNDERSTAND THE IMPACTS OF SEAFOOD CONSUMPTION

Formal RBAs can be used to inform policy decisions and develop guidelines for public health practitioners, and these analyses can vary in their scope, depth, and anticipated outcomes. The committee concluded that RBAs can be applied at the population and individual levels, and their scope can extend beyond health concerns by including data about costs, environmental sustainability, and ethics. Figure 2 illustrates the committee’s proposed steps when evaluating if a formal RBA should be undertaken.

The committee found that the following factors have a direct impact on food choice behaviors and therefore should be considered in the context of an individual-level RBA:

- social environments (family and peer influence),
- physical environments (schools and restaurants), and
- economic factors (income and socioeconomic status).

The committee concluded that formal RBAs of seafood consumption are rarely conducted due to the lack of a comprehensive source of data on consumption, contextualization factors, and contamination. Building on this conclusion, the report recommends that FDA consider conducting an RBA of maternal and child seafood intake and child growth and development, supported by a review of existing evidence and additional new research (see **Recommendations 3 and 4**).

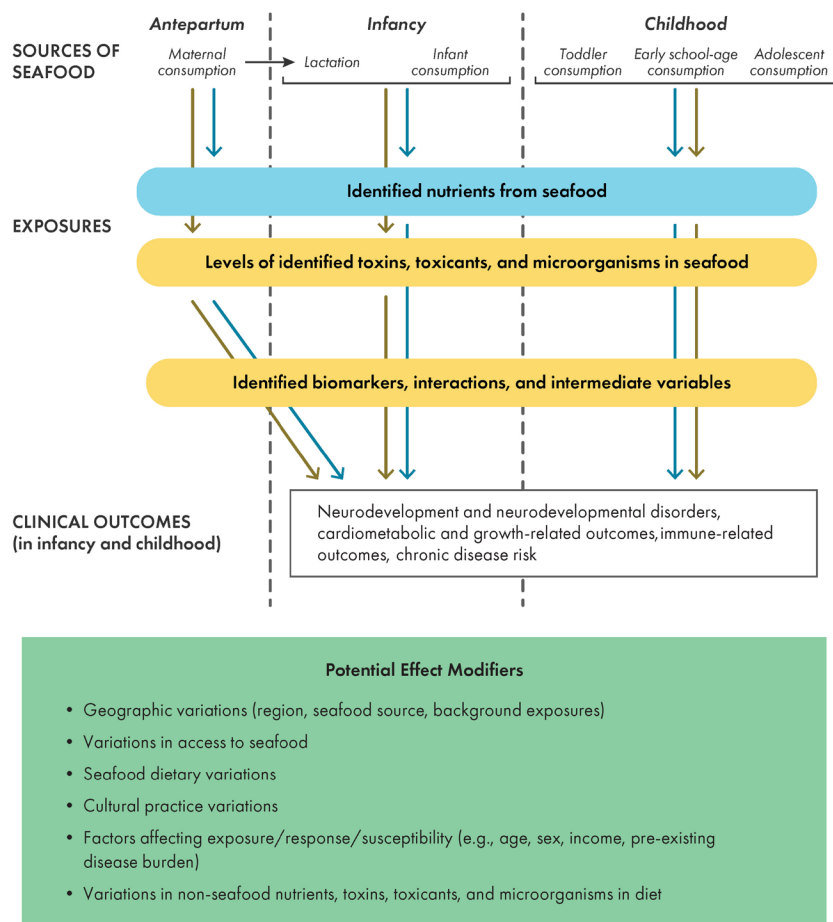


FIGURE 1 Conceptual framework for mapping nutrient, contaminant, and micro-organism exposures to health outcomes.

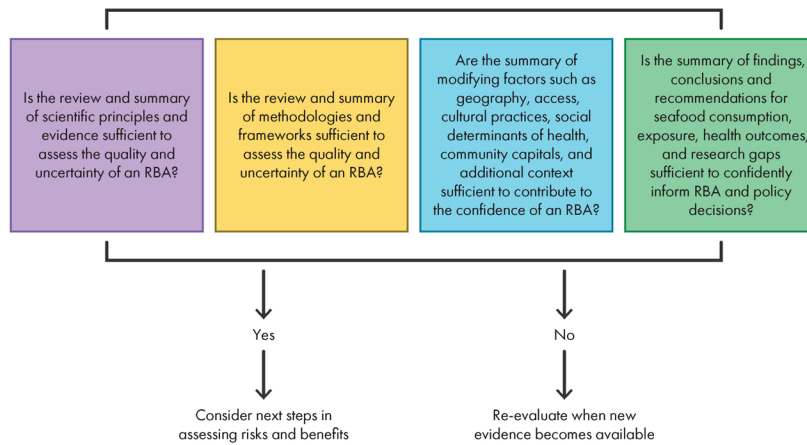


FIGURE 2 Steps in evaluating when to conduct a formal risk-benefit analysis.

RESEARCH GAPS

As the report's key findings include that most women of childbearing age and children and adolescents do not meet DGA recommendations for seafood consumption and, therefore, evaluations of the risks and benefits of consuming recommended amounts of seafood are challenging, the committee identified many critical research gaps. A representative list is presented below, but readers should review the entire report for the full scope of research and data necessary to understand how seafood consumption impacts individual health outcomes, and specifically, child growth and development.

More research is needed to:

- Determine the extent to which women of childbearing age are aware of and respond to DGA recommendations about seafood consumption;

- Identify the barriers to providing seafood as a component of meals served in schools;
- Quantify the risk of chronic exposure to less studied contaminants in seafood and track levels of these contaminants geographically and over time, with a special focus on populations at high risk of exposure, such as Indigenous and Native Peoples and subsistence and sport fishers; and
- Determine how emerging technologies could support a comprehensive data framework used to scaffold future RBAs.

To learn more about this report, visit www.nationalacademies.org/seafood-child-development.

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FOR MORE INFORMATION

This Consensus Study Report Highlights was prepared by National Academies staff based on the Consensus Study Report *The Role of Seafood Consumption in Child Growth and Development* (2024).

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Health and Medicine Division

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