



Fish consumption:

Bridging together fisheries, food safety and nutrition sectors

Rich in nutrients for health benefits

Fish plays a significant role in fighting hunger and malnutrition. Fish is not only a source of animal protein and healthy fats, but it also provides essential micro-nutrients such as iodine, selenium, vitamin D and calcium, and even iron, zinc, and vitamin A when eaten whole. These micronutrients can often be absent in many local diets, especially in low- and middle-income countries (LMICs).

Dietary patterns are also shifting in many countries, and fish is gaining a spotlight from those who have not regularly consumed fish before for overall health benefits. These benefits can be appreciated at all life stages from youths, adults, pregnant women to elderlies.

Fish provide more than 3.2 billion people with almost 20 percent of their average per capita intake of animal protein (it can be more than 50 percent in many LMICs). Often underrated parts of the fish (head, viscera and back-bones) make up 30 – 70 percent of fish, and they can be particularly high in micronutrients.



Joint FAO/WHO Expert Consultation on the Risks and Benefits of Fish Consumption: Meeting report

Importance of food safety to ensure benefits

It is an unfortunate truth that any food, including meat, milk, fruits and vegetables, bread or any other products, can become unsafe at any points of the agrifood systems from the primary production to consumers.

Fish and other aquatic foods are no exception and the presence of contaminants such as methylmercury, cadmium, polychlorinated biphenyls (PCBs), dioxins, radioactive substances as well as waterborne microorganisms could be a concern.

It is important to **weigh the nutritional and health benefits** of fish consumption against the potential health risks from the hazards.

An ad hoc Expert Consultation on the risks and benefits of fish consumption was jointly held by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) in October 2023 to discuss the current scientific knowledge on both potential benefits of fish consumption and risks. It was the follow-up of the previous Joint FAO/WHO Expert Consultation on the same topic held in 2010.

The full report of the 2023 Expert Consultation is available with a short [executive summary report](#)



Summary report of the Joint FAO/WHO Expert Consultation on Risks and Benefits of Fish Consumption

Expert consultation process

First, five systematic literature reviews were conducted and focused on 1) health benefits of fish consumption, 2) toxic effects of dioxins and dl-PCBs, 3) toxic effects of methylmercury, 4) the role of selenium (Se) in mitigating methylmercury's health effects, and 5) occurrence data for methylmercury, dioxins, and dl-PCBs in fisheries and aquaculture products. Upon completion these reviews served as the basis for the Expert Consultation to initiate the discussion.

A total of 21 global experts with diverse expertise in nutrition, food safety, toxicology, epidemiology and many other relevant areas examined the benefits and effects of fish consumption on various health issues, including chronic diseases such as cancer, cardiovascular disease, and neurodevelopmental trouble among other outcomes.

The consultation also delved into the effects of dioxins and methylmercury exposure, focusing on neurological, cardiovascular, and reproductive issues among others.

The role of selenium in mitigating the effects of methylmercury was also scrutinized across health domains, like cardiovascular, oxidative stress, and neurodevelopment.



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Risks versus benefits – key conclusions:

- 1** Consuming fish provides a range of nutrients important for health and is part of the cultural traditions of many peoples and a major source of food in some populations.
- 2** Strong evidence exists for the benefits of total fish consumption during all life stages: pregnancy, childhood, and adulthood. For example, resulting in improved birth outcomes and reduced risks for cardiovascular and neurological diseases. This evidence for health benefits of total fish consumption reflects the overall effects of nutrients and contaminants in fish.
- 3** Dietary exposure to dioxins comes from multiple different foods of animal origin, including fish. Studies are lacking regarding the effects of dioxins from fish consumption on human health in general populations.
- 4** There is limited evidence of adverse health effects from methylmercury exposure in relation to cardiovascular, neurological and other health outcomes in adulthood.
- 5** Consumption of ocean fish rich in Se protects against methylmercury toxicity by preventing methylmercury from inducing a conditioned Se deficiency, alleviating risks of methylmercury toxicity.
- 6** High Hg exposures among subsistence freshwater-fish consumers will be accentuated in regions where environmental Se availability is low, resulting in a low Se:Hg/MeHg molar ratio. Findings of human and animal studies indicate the health effects of MeHg exposures from fish consumption will vary according to Se status and intake.
- 7** Maternal fish consumption during pregnancy is associated with improved offspring neurological development, despite evidence from some populations showing that methylmercury exposure from fish consumption in early life has been associated with less neurodevelopmental benefit.



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Future research directions

Fish consumption has beneficial effects on human health, but more evidence is needed to elucidate the following 8 aspects.



1. A comprehensive estimate of the relationship between fish intake and the specific health outcome of interest, accounting for confounding and effect modification factors.



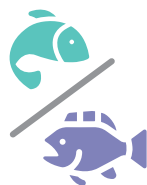
2. The concentrations of nutrients and contaminants in fish, and their interactions and synergies, especially for selenium and methylmercury.



3. The health implications of dioxins and other contaminants from fish consumption for general populations, beyond highly contaminated regions where adverse effects have been observed.



4. The effects of food processing and preparation methods on the nutrient and contaminant concentrations and bioavailability (or bio-accessibility) in fish, and the consequent impacts on human health.



5. The differentiation of the type of fish consumed, including species, source (i.e., freshwater versus marine, capture vs. aquaculture), fatty versus lean, and geographic location of catch, and how these factors influence the health outcomes of fish consumption.



6. Dose-response studies/meta-regression analyses with probable benefits, to help refine public health guidance about optimal fish consumption amounts and frequencies.



7. Factors that explain observed heterogeneity in health effects of fish consumption across the life course, such as genetic variations, epigenetic mechanisms, and co-exposures.

Possible next steps for authorities

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- Establish standardized data collection procedures for monitoring fish contaminants and nutrients as well as dietary fish intake, including quantity, variety, and sources, at regional, national, or subnational levels.
- Develop, maintain and enhance databases tracking levels and trends of contaminants like methylmercury, dioxins as well as nutrient content such as selenium and long-chain omega-3 fatty acids, specific to regional fish consumption.
- Develop and assess risk analysis strategies encompassing risk assessment, management, and communication to optimize the advantages and mitigate the risks associated with fish consumption.

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CD5493EN/1/05.25