



Fact Sheet

Toxic contaminants in seafood

Pollution from factories and power plants ends up in lakes, rivers, and the ocean. Almost all fish contain at least low levels of toxic pollutants. Many studies have shown that the contaminants found in seafood can be particularly harmful to children by increasing the risk of learning disorders¹, behavioral problems², and memory loss³.

Mercury: Mercury is an environmental toxin that causes a wide range of harmful health effects in humans. It can impact the central nervous system, kidneys, and immune system, and, in particular, brain development.

According to the American Academy of Pediatrics, “Mercury in all of its forms is toxic to the fetus and children, and efforts should be made to reduce exposure to the extent possible to pregnant women and children as well as the general population.”⁴

While naturally occurring in the environment, mercury is also released through industrial pollution, notably from coal-fired power plants. It falls from the air in rain and other forms of precipitation, getting into surface water and working its way into streams, lakes, and the ocean. Then bacteria cause chemical changes that transform mercury into its toxic form, methyl mercury. Fish absorb methyl mercury as they feed on aquatic organisms and other fish.

Although dangerous, mercury can be eliminated from our bodies over time. For a person with long-term regular exposure, it can take up to a year to fully eliminate methyl mercury from the body.⁵

In addition to a joint FDA/EPA fish advisory for mercury issued in 2004, 44 states have their own mercury advisories covering their lakes, rivers, and coastal areas.

¹ Patandin, S et al, 1999. Effects of environmental exposure to polychlorinated biphenyls and dioxins on cognitive abilities in Dutch children at 42 months of age. *Journal of Pediatrics* 134: 33-41. *See also* US EPA, 1999. Public health implications of exposure to polychlorinated biphenyls (PCBS). Downloaded from <http://epa.gov/waterscience/fish/pcb99.html>

² Physicians for Social Responsibility and the Association of Reproductive Health Professionals, 2004. Fish consumption to promote good health and minimize containments: A quick reference guide for clinicians. P. 7.

³ Schantz, S et al, 2001. Impairments of memory and learning in older adults exposed to polychlorinated biphenyls via consumption of great lakes fish. *Environmental Health Perspectives* 109: 605-611.

⁴ Goldman, L, Shannon, M, and the Committee on Environmental Health, 2001. Technical Report: Mercury in the Environment: Implications for Pediatricians. *Pediatrics* 108: 197-205, p. 203.

⁵ Clarkson, T, 2002. The three modern faces of mercury. *Environmental Health Perspectives* 110 (Suppl 1): 11-23, p. 13.

PCBs: Polychlorinated biphenyls (PCBs) are a group of chemicals that were produced as lubricants and insulators for electrical equipment. The EPA has classified them as probable human carcinogens⁶—that is, substances that can cause cancer. While their production was banned in the US in 1977, PCBs are persistent, meaning that they degrade only very slowly over time.

PCBs are also highly toxic. Early life exposure to PCBs can cause harmful neurological effects, leading to learning deficits, poor memory, and behavioral problems.⁷

Because they are fat soluble, PCBs accumulate in the fatty tissues of animals, with the highest levels typically found in those animals at the top of the food chain, including fatty fish, beef, dairy products, and, ultimately, the humans who eat them.⁸

Based on state and academic studies, the highest known levels of PCBs in fish sold in the US are found in bluefish, wild striped bass, and Atlantic salmon.⁹ Yet, as the FDA does not test seafood for PCBs, the levels in many types of seafood are unknown.

You can reduce (but not eliminate) the amount of PCBs in fish by properly trimming, skinning, and cooking it to remove fat. Cooking does not destroy PCBs, but heat allows some of the contaminated fat to melt off. In order to reduce the amount of PCB contaminants, you can broil, grill, or bake the trimmed, skinned fish on a rack so the fat drips away.¹⁰

Other contaminants of concern: Other contaminants are also found in fish: dioxins, antibiotics (primarily through fish farming), pesticides from agricultural runoff, and flame retardants (called PBDEs). KidSafe Seafood will not endorse any fish known to contain harmful levels of these substances, but much more testing and research is needed on the impact and extent of these contaminants in fish.

More information about mercury, PCBs and other toxic chemicals can be found in Physicians for Social Responsibility's report, *In Harms Way: Toxic Threats to Child Development* at <http://psr.igc.org/ihw-project.htm>.

Seafood health advisories create confusion for parents

State and federal health advisories for seafood are important, but their limitations create confusion, particularly for parents. In its October 2006 report, the Institute of Medicine, which is part of the National Academies, found that consumers need better guidance in order to sort through the risks and benefits of seafood.

⁶ US EPA. Downloaded from <http://www.epa.gov/pcb/pubs/effects.html>

⁷ Physicians for Social Responsibility and the Association of Reproductive Health Professionals, p. 7.

⁸ US EPA. 1999. Downloaded from [Http://epa.gov/waterscience/fish/pcb99.html](http://epa.gov/waterscience/fish/pcb99.html).

⁹ Environmental Defense, 2006. Downloaded from <http://www.oceansalive.org/eat.cfm?subnav=healthalerts>

¹⁰ Armbruster, G, Gerow, KG, Gutenmann, WH, Littman CB, and Lisk, DJ, 1987. The effect of several methods of fish preparation on residues of polychlorinated biphenyls and sensory characteristics of striped bass. *Journal of Food Safety* 8: 235-243.

Some of the sources of confusion include:

- *The advisories don't provide clear information for parents:* The federal FDA/EPA seafood advisory is based on an estimated body weight of an average-sized American woman, but does not explain how to scale the recommendations to a child's body weight—leaving parents to make guesses. (Body weight is a critical variable for calculating safe consumption levels.) For example, the federal advisory currently states that children can eat up to 6 ounces of albacore tuna a week, the same guidance for women. However, based on the EPA's guidelines for fish advisories¹¹, a child weighing 67 pounds could consume more than double the federal mercury limit by following that guidance.¹²
- *Most fish are not tested for contaminants:* The U.S. Food and Drug Administration is responsible for the safety of the million of pounds of seafood sold each year in the United States, yet it does not have a comprehensive testing program. Some species of fish that the FDA designates as having “lower levels of mercury”—including scallops, herring, and Atlantic mackerel—have not been tested since 1978. Haddock's designation as a “lower mercury” seafood is based on just four haddocks being tested between 1990 and 2002.¹³ The FDA does not test for PCBs or other contaminants affecting fish (flame retardants, dioxins, etc.), and it rarely tests both farmed and wild versions of a species¹⁴—which can have markedly different levels of contamination—adding to the fragmented information.
- *Conflicts between federal and state agencies:* Adding to the confusion for consumers is the fact that while the FDA has no advisory for PCBs in fish, 39 states do.

How the KidSafe Seafood List was developed

KidSafe Seafood takes a cautionary approach where children's health is concerned. It is based on the U.S. Environmental Protection Agency's (EPA) risk-assessment methodology for two major seafood contaminants—mercury and PCBs—and the most comprehensive scientific data currently available. For parents who want to feed their children fish and limit their exposure to toxic contaminants, KidSafe Seafood highlights some of the best options available.

Following EPA guidelines¹⁵, all KidSafe Seafood options can be eaten at least once a week (4.35 times per month) by young children (age 3 and up). These calculations are based on an average body weight of 38 lbs (17.4 kg) and a portion size of 3 ounces. For mercury, the health limit is 0.14 ppm (parts per million). For PCBs, the health limit is .007 ppm.

¹¹ U.S. Environmental Protection Agency. Downloaded 9/5/06 from <http://www.epa.gov/waterscience/fish/guidance.html>

¹² Environmental Defense. Downloaded 10/16/06 from <http://www.oceansalive.org/eat.cfm?subnav=healthalerts>

¹³ Center for Food Safety and Nutrition, US Food and Drug Administration. Downloaded 8/24/06 from <http://www.cfsan.fda.gov/~frf/sea-mehg.html>

¹⁴ Center for Food Safety and Nutrition, US Food and Drug Administration. Downloaded 9/5/06 from <http://www.cfsan.fda.gov/~frf/sea-mehg.html>

¹⁵ U.S. EPA. [Http://www.epa.gov/waterscience/fish/guidance.html](http://www.epa.gov/waterscience/fish/guidance.html)

Under the guidance of the KidSafe Seafood scientific advisory panel, we assessed government and peer-reviewed scientific data from a wide variety of sources: the U.S. Food & Drug Administration, the EPA, the National Marine Fisheries Service, various state agencies, and academic studies.

KidSafe Seafood’s “best choices” are sustainable, as determined by the leading environmental organizations monitoring the world’s fisheries: Environmental Defense, Monterey Bay Aquarium, and Blue Ocean Institute. We are also providing consumers with complete information about other seafood choices—even if they are not sustainable—so that they can make their own informed decisions about what to feed their families.

The limitations of KidSafe Seafood

KidSafe Seafood was designed to provide clearer guidance based on the best information available.

The biggest limitation to this effort is the lack of comprehensive federal seafood safety testing. Some seafood not on the KidSafe Seafood list might actually qualify, but their contaminant levels are unknown. In other cases, we have had to base our recommendations on very few data points. Whenever available, however, we have been able to collect additional sources of peer-reviewed data to supplement the FDA’s.

Other limitations include the variability of contamination levels from one geographic location to another, and the lack of government data on other types of contaminants, such as other dioxins and PBDEs. The only solution to these limitations is more comprehensive seafood testing.

To compensate for these limitations, we also evaluated each fish based on life history and other characteristics, as fish are more or less likely to be contaminated depending on what they eat, how long they live, and how much body fat they have.

Expanding the KidSafe Seafood list

There may be many other seafood options that would be best choices for kids, but they have simply not been adequately tested for contaminants. As more PCB and mercury data become available, KidSafe Seafood will continually reassess and update the list.

One of the goals of KidSafe Seafood is to get more fish on the KidSafe list. By shining a spotlight on low contaminant options, the campaign aims to encourage more monitoring and testing of the seafood supply.

Why sustainability matters

Why does it matter if the fish we eat are ocean-friendly? For two important reasons: First, many of the most seriously contaminated fish, like shark and Atlantic (farmed) salmon, are also the ones that are the most over-fished or are raised on fish farms that pollute. Second, if we want to have enough safe, nutritious seafood for the future, we all need to eat fish are caught or harvested responsibly. As the demand for seafood grows worldwide, two-thirds of all commercial seafood

is being fished to the maximum limit. There is also tremendous waste in the fish business: for some fisheries, nearly 25% of fish caught are discarded as unusable or undesirable.

Fish farming—known as aquaculture—is widely viewed as the long-term solution. Yet, many problems within the industry need to be resolved. Environmental and health standards vary widely from country to country, and from fish farm to fish farm. In some cases, they are nonexistent. Many aquaculture operations are damaging coastal environments and harming natural fish populations. Others are producing fish that contain harmful contaminants.¹⁶

Health benefits of seafood and omega-3s for kids

The majority of American children's diets are high in processed and fried foods, total and saturated fats, and red meats, while lacking in fruits, vegetables, and whole grains.¹⁷ When combined with too little exercise, the result is that there is a rise in childhood obesity¹⁸ and diabetes, as well as developmental, learning, and behavioral disabilities.¹⁹

Increasingly nutritionists are turning to seafood as a solution. Low in saturated fat, seafood provides vitamins and minerals, including iron, zinc, vitamins A, B, and D; and protein. The omega-3 fatty acids found in fish are considered beneficial for cardiovascular health and preliminary research suggests they can enhance brain development and improve learning, behavior, and vision.

Fish have varying levels of omega-3s; fatty fish contain the highest amount of omega-3s. Seaweed and fortified eggs—from chickens fed flaxseed, algae, and fresh green grass—have high omega-3 content. Flaxseed, walnuts, and some leafy greens also provide omega-3s.

Exactly how much fish children should be eating is currently the topic of much debate. The USDA's food pyramid advises that children obtain protein from a variety of sources—lean meat, poultry, fish, beans, nuts, peas, and seeds; and essential oils from fish, nuts, and corn, soybean, and canola oil. The American Heart Association is more specific, recommending two servings of fish a week for children as an early prevention of cardiovascular disease.

Physicians for Social Responsibility and the Association for Reproductive Health Professionals stresses the importance of eating a variety of fish in its joint report to medical community: "To reduced the risk of high exposure to pollutants from over-consumption of any one fish, parents should be advised to teach children from an early age to enjoy a variety of low mercury, low PCB fish and shellfish."

¹⁶ Naylor, R.L., Goldberg, R.J., Primavera, J.H., Kautsky, N., Beveridge, M.C., Clay, J., Folk, C., Lubchenco, J., Mooney, H. and Troell, M. (2000) Effect of aquaculture on world fish supplies. *Nature*, 405, 1017–1024.

¹⁷ USDA (2003) Food Guide Pyramid for Young Children and US Dept of Agriculture & HHS (2000) Dietary Guidelines for Americans as cited in ADA Position Paper: Dietary Guidance for Healthy Children Ages 2 -11 Years (2004) *J. of the ADA*. 104:660-677

¹⁸ Allison A. Hedley, PhD; Cynthia L. Ogden, PhD; Clifford L. Johnson, MSPH; Margaret D. Carroll, MSPH; Lester R. Curtin, PhD; Katherine M. Flegal, PhD. 2004. Prevalence of Overweight and Obesity Among US Children, Adolescents, and Adults, 1999-2002 *JAMA*. 2004;291:2847-2850

¹⁹ Goldman. L.R. and Koduru, S. 2000. Chemicals in the Environment and Developmental Toxicity to Children: A Public Health and Policy Perspective. *Environmental Health Perspectives* 108(S#): 443-448