

Mercury in Fish: Countering Industry Misinformation

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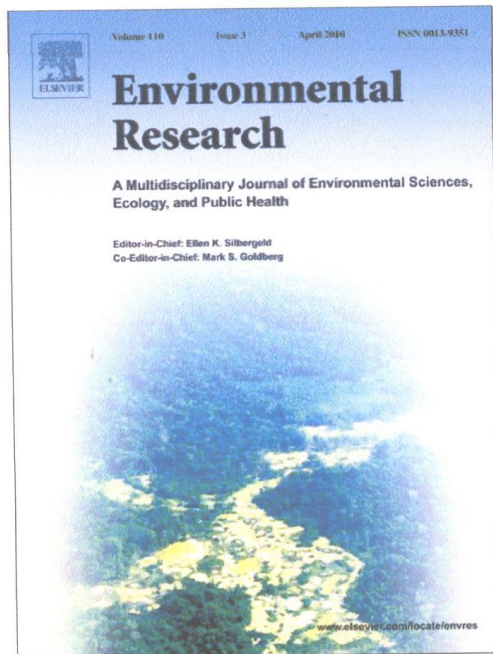
Topics:

- Improving consumer information about mercury in fish and shellfish
- Countering industry (and other) misinformation

Background:

- Fish provides nutrients that benefit cardiovascular health. Fish eaten during pregnancy promotes fetal brain development.
- Ample evidence documents adverse effects of mercury in fish on babies' developing brains, and on the nervous system in adults who eat a lot of high-mercury fish.
- Recent studies show that both beneficial effects and damage from mercury occur at ordinary levels of fish consumption (two fish meals per week or less).

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Ranking the contributions of commercial fish and shellfish varieties to mercury exposure in the United States: Implications for risk communication[☆]

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ABSTRACT

Fish and shellfish have important nutritional benefits, and US per capita seafood consumption has increased substantially since 2002. Recent research has reinforced concerns about adverse effects of methylmercury exposure, suggesting that methylmercury doses associated with typical US rates of fish consumption may pose measurable risks, with no threshold. These converging trends create a need to improve risk communication about fish consumption and mercury. The analysis performed here identifies the relative importance of different fish and shellfish as sources of mercury in the US seafood supply and proposes improved consumer advice, so that the public can benefit from fish consumption while minimizing mercury exposure. I have quantified contributions to total mercury in the US seafood supply by 51 different varieties of fish and shellfish, then ranked and sorted the 51 varieties in terms of relative impact. Except for swordfish, most fish with the highest mercury levels are relatively minor contributors to total inputs. Tuna (canned light, canned albacore and fresh/frozen varieties) accounts for 37.4 percent of total mercury inputs, while two-thirds of the seafood supply and nine of the 11 most heavily consumed fish and shellfish are low or very low in mercury. Substantial improvement in risk communication about mercury in fish and seafood is needed; in particular, several population subsets need better guidance to base their seafood choices more explicitly on mercury content. I have sorted the 51 seafood varieties into six categories based on mercury levels, as a framework for improving risk communication in this regard.

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1. Introduction

Methylmercury exposure from consuming fish and shellfish is a significant public health concern in the United States (Institute of Medicine (IOM), 2006; Mahaffey et al., 2009). Fish and shellfish

[☆] *Funding sources:* The work on this paper was done on my own time, without salary, grants or any other form of reimbursement. I have been retired since January 2004. Prior to that, I worked for 25 years at Consumers Union of US, Inc., the publisher of Consumer Reports magazine, where my responsibilities included risk analysis and risk communication on a wide variety of environmental and food safety issues, including mercury in fish. Since my retirement, I have consulted occasionally with non-governmental organizations engaged in risk communication about mercury issues. In January 2009 I submitted comments on behalf of the Mercury Policy Project to the US Food and Drug Administration, on a draft risk/benefit analysis on mercury in seafood. Those comments included a preliminary version of the analysis presented in this paper, and MPP paid me a modest fee for the time I spent drafting them. This paper expands my analysis and the discussion of risk communication implications flowing from it. It reflects my personal commitment to share this work with the larger scientific community by publishing it in a peer-reviewed journal, and the work was done, as noted, without compensation.

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in the diet account for almost all methylmercury exposure (National Research Council, 2000). Seafood also has substantial nutritional benefits (IOM, 2006; Mozaffarian and Rimm, 2006); populations with high-fish diets have reduced risks of mortality from cardiovascular disease and stroke (Bouzan et al., 2005; König et al., 2005; Kris-Etherton et al., 2002), and the omega-3 polyunsaturated fatty acids supplied by some fish and shellfish are essential for prenatal development of the brain and visual system (Daniels et al., 2004). Fish consumption may also reduce the risk of Alzheimer's disease (Morris et al., 2003).

Expert authorities have therefore advised Americans to eat more fish (e.g., see American Heart Association (AHA), 2009; IOM, 2006; US Department of Health and Human Services (US DHHS), 2005). Per capita fish consumption in the US has increased in recent decades. It grew from 12.5 pounds per year in 1980 to 15.0 pounds per year in 1990, then held steady at around 15 pounds per year until 2002. But from 2003 through 2008, per capita consumption averaged 16.4 pounds per year (National Marine Fisheries Service (NMFS), 2009). Several factors may account for this increase, including changing consumer preferences, the proliferation of sushi restaurants, more widespread availability

Risk Communication:

- Mercury exposure must be managed via consumer choices; it can't be regulated.
- Benefits and risks are both associated with eating fish, so communication on this topic is a challenge.
- Stakeholders (nutritionists, public health scientists, the seafood industry, environmental activists, and others) offer conflicting advice on the issue.
- Some sources (the seafood industry and “contrarian” activists) actively promote misinformation.
- Consumers are poorly informed and confused.

Consumer Info Needs:

- Most consumers are unaware of mercury risks.
- Those who have heard that mercury is a concern are generally unable to name specific types of fish that are either high or low in mercury.
- This can lead to counterproductive decisions: Eating fish without discriminating by mercury content (i.e., taking needless risks), or avoiding fish altogether (i.e., foregoing benefits).
- Pregnant women and people who eat fish often (twice a week or more) need to be made aware of mercury risks, and guided to choose low-mercury fish.

Critical Information:

- Different fish and shellfish varieties differ by more than 120-fold in average mercury levels. The mercury level in the fish varieties you choose to eat is the most important driver of your mercury exposure.
- The information that could most directly support better informed, sounder consumer choices is more extensive, detailed and accurate data on the mercury content of different types of fish.
- Messages also need to be better targeted to the groups that most need this advice.

The ideal message
(conveyed in “one voice”):

“Eat lots of *low-mercury* fish”

Guide to mercury levels in different varieties of fish and shellfish

LOW-MERCURY FISH AND SHELLFISH

VERY LOW	BELOW AVERAGE
Shrimp Sardines Tilapia Oysters & Mussels Clams Scallops Salmon Crayfish Freshwater Trout Ocean Perch & Mullet	Pollock Atlantic Mackerel Anchovies, Herring & Shad Flounder, Sole & Plaice Crabs Pike Butterfish Catfish Squid Atlantic Croaker Whitefish

MODERATE-MERCURY FISH AND SHELLFISH

ABOVE AVERAGE	MODERATELY HIGH
Pacific Mackerel (Chub) Smelt Atlantic Tilefish Cod Canned Light Tuna Spiny Lobster Snapper, Porgy, Sheepshead Skate Freshwater Perch Haddock, Hake, Monkfish	Carp & Buffalofish Halibut Sea Trout Sablefish Lingcod & Scorpionfish Sea Bass Pacific Croaker American Lobster Freshwater Bass Bluefish

HIGH-MERCURY FISH

HIGH	VERY HIGH
Canned Albacore Tuna Spanish Mackerel Fresh/Frozen Tuna Grouper Marlin Orange Roughy	King Mackerel Swordfish Shark Gulf Tilefish Tuna Sushi/Bluefin Tuna

Some Key Facts:

- Two-thirds of the US seafood supply is low or very low in mercury.
- Nine of the eleven top-selling seafood items are low in mercury; i.e., low-mercury choices are easy to find, familiar and popular.
- The very high-mercury category accounts for just 6 percent of overall mercury exposure.
- Tuna fish accounts for 37 percent of all the mercury in the food supply.
- Canned light tuna is the largest single source.

Countering Misinformation:

- Those of us who are trying to inform consumers about mercury in fish have to contend with an aggressive public relations campaign from “the other side.”
- This PR effort is mounted by the seafood industry and some professional “contrarians.”
- It began when the government first advised pregnant women to avoid high-mercury fish.
- It has continued and intensified as scientific research has heightened concerns about mercury exposure.

Campaign Elements

The industry/contrarian PR campaign:

- *Denies* that mercury poses any risk
- *Exaggerates* so-called “safety margins”
- *Promotes* the benefits of fish consumption
- “*Shoots* the messenger:”
 - Criticizes scientists whose work shows risk
 - Harasses journalists whose reports reflect scientific understanding of mercury risks
 - Asserts that mercury warnings harm public health

PR Tools:

- Web sites (e.g., Mercuryfacts.com, Fishscam.com)
- Blogs (National Fisheries Institute)
- Professional PR staff who are talented, alert, ready to pounce on threats, and relentless
- Letters, e-mails, press releases, blog postings
- Modern media (e.g., YouTube)
- Aggression and chutzpah in haranguing reporters, editors and others
- No apparent shortage of resources

Who Are They?

- National Fisheries Institute: The trade association of the US seafood industry
- Some academics who agree with and often consult for the industry
- Center for Consumer Freedom: A PR shop dedicated to the propositions: (1) No risk is real, (2) It is not the job of government to protect us from risks in tobacco smoke, alcoholic beverages, obesity-generating diets, foods that contain toxic contaminants, and similar hazards.

The Truth?

- This PR campaign is based on a lattice of frankly false statements, distortions, misleading information, facts out of context, and *ad hominem* arguments.
- Since PR is about what you can get people to believe – not about what’s true – the campaign tells whopper after whopper, and tells them again and again.
- The Mercury Policy Project has grown tired of seeing this industry/contrarian PR nonsense used to harass reporters and confuse consumers.
- So we’re doing something about it.

A New Resource:

MPP has created a new web site:

<http://mercuryfactsandfish.org>

- Provides the facts on mercury issues
- Recounts seafood lobby PR “Fables”
- Shows how and why each is wrong

Some Favorite Fables:

- Mercury in fish doesn't pose any risk
- Fish are fish (as in, "Eat more fish!")
- The safe level of mercury in blood is 58 $\mu\text{g}/\text{l}$
- Mercury is a natural contaminant (and thus OK)

- I'll explain briefly why each fable is wrong.

“Mercury Not a Risk:”

This fable takes various forms:

- There is no risk at all; it’s “environmentalist hype”
- The benefits of eating fish “vastly outweigh the minuscule risks” from mercury.
- The risks are just “theoretical.”
- There has “never been a single documented case” of harm from the mercury in commercially-caught fish.

The Risk Is Real:

Whether a flat denial or more nuanced risk/benefit statement, this fable is wrong:

- Epidemiological studies show clear-cut harm to the developing brain, even at everyday exposure levels.
- Adverse effects are as large as or larger than beneficial effects from eating fish.
- There are documented cases of adults who ate too much high-mercury fish and got mercury poisoning.
- You can have all the benefits and avoid the risk ***by choosing low-mercury fish.***

“Fish Are Fish:”

The Facts:

- All fish are definitely *not* alike.
- Fish and shellfish varieties differ in their content of beneficial nutrients, such as omega-3 fatty acids.
- They also differ by *more than 120-fold* in average mercury levels.
- The types of fish you choose to eat therefore make a huge difference in terms of your mercury exposure.

Safe Doses:

This fable also takes several forms:

- The EPA's reference dose (the official definition of safe exposure) is 58 $\mu\text{g}/\text{l}$ of mercury in blood (or once, 580 $\mu\text{g}/\text{l}$!)
- The safe level is 5.8 μg per *deciliter*.
- The safe dose is for lifetime exposure
- The safe dose includes a 10-fold “safety margin”

The Facts:

- The actual EPA Reference Dose is 0.1 $\mu\text{g}/\text{kg}/\text{day}$ of dietary intake.
- The blood level that corresponds to the Reference Dose is 5.8 $\mu\text{g}/\text{liter}$.
- The PR spinners are trying to make the “safe” exposure level seem 10-fold (or briefly, 100-fold) higher than it actually is.
- The critical period is a pregnancy, not a lifetime.
- An uncertainty factor is ***not*** a “safety margin.”
- Recent evidence shows adverse effects at or below the Reference Dose, which is 11 years old & needs review.

“Mercury is Natural:”

- This PR claim plays on people’s mistaken but common belief that something “natural” is less harmful.

The Facts:

- Mercury in the oceans comes from both pollution and natural sources.
- Methylmercury, the form in fish, is formed by bacteria through a natural process.
- The sources are irrelevant. Methylmercury is toxic and too much of it poses a hazard, regardless of its origin.

For More Info:

- Please see our web site.
- Many more PR fables about mercury and fish are dissected there.
- The facts about the issues are presented in varying degrees of detail, written as a resource for consumers, journalists, students and others.
- <http://mercuryfactsandfish.org>