Detailed consumption advisories would better serve women across US

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A school of sardines in Italy. Credit: Wikimedia / Alessandro Duci

Among women of childbearing age in the U.S., fish consumption has increased in recent years while blood mercury concentrations have decreased, suggesting improved health for women and their babies, a new study shows.

The research at Oregon State University also indicates fish consumption advisories tailored to specific regions and ethnic groups would help women of childbearing age to eat in even more healthy ways, including better monitoring of mercury intake.

Food from the ocean has a unique and valuable nutritional profile. Among seafood's many benefits are the omega-3 fatty acids that promote neurodevelopment, and the nutrients in seafood are especially important for pregnant women to pass on to developing fetuses.

But the main way people are exposed to toxic methylmercury—a mercury atom with a methyl group, CH3, attached to it—is through eating seafood. Thus the need for precise, nuanced fish consumption advisories, said Leanne Cusack of Oregon State University, the corresponding author on the study.

Comparatively less-toxic elemental mercury enters the ocean from natural sources such as volcanic eruptions and also from human activities like the burning of fossil fuels, which accounts for about two-thirds of the mercury that goes into the water.

Once in the ocean, the mercury is methylated, diffuses into phytoplankton and passes up the food chain, accumulating along the way.

A scallop or a shrimp, for example, can have a mercury concentration of less than 0.003 parts per million. A large predator like a tuna, on the other hand, can contain roughly 10 million times as much methylmercury as the water that surrounds it and have a concentration of many parts per million.

Exactly how the mercury in the ocean becomes methylated, scientists don't know.

Fish advisories are usually aimed at women of childbearing age because a developing fetus has greater sensitivity to the neurotoxic effects of methylmercury. Jointly, the U.S. Environmental Protection Agency and the Food and Drug Administration recommend women in that group eat two meals of low-mercury fish per week.

Using data from the ongoing National Health and Nutrition Examination Survey, Cusack's research group looked at fish consumption patterns with regard to blood mercury levels in U.S. women of childbearing age from 1999 to 2010.

Findings were recently published in the journal *Environmental Health*.

Women in the coastal regions, particularly the Northeast, were found to have the highest blood mercury concentrations; women living away from the sea, especially in the inland Midwest, had the lowest.

Coastal residents also ate fish the most frequently, with the species consumed varying by region. The type of fish most often consumed was shellfish in every part of the U.S. except for the inland West and inland Midwest.

As women's age and household income increased, so did their fish consumption frequency and blood mercury concentrations. Among ethnic groups, Asian Americans, Pacific Islanders, Alaska Natives and Native Americans ate fish the most often and showed the most mercury, and Mexican Americans consumed fish the least often and showed the smallest concentration of mercury.

"We also found total monthly fish consumption by women of reproductive age was higher than it had been in recent years, with women consuming more marine fish and shellfish but with no appreciable difference in the mean consumption of freshwater fish, tuna,

swordfish and shark," said Cusack, a postdoctoral scholar in OSU's College of Public Health and Human Sciences.

"That's encouraging because marine and shellfish are associated with smaller increases in blood mercury. And also encouragingly, an average women who'd eaten fish nine or more times in the previous month had lower blood mercury levels than women who'd had fish at the same rate in 1999-2000."

The differences in consumption and mercury levels by race and region illustrate the need for tailored fish advisories, she said.

"They need to have information about fish types and quantities you can safely eat," Cusack said. "The more detailed they can be, the better.

"The main thing is we do need to increase fish consumption in this demographic," Cusack added. "It has been increasing since 1999, but it's still not at the level where we want to see it. People need to start consuming fish, and advisories need to focus on the benefits of consumption and not just the risks by providing a broad range of fish that are low in methylmercury and high in omega-3's."

More information: Leanne K. Cusack et al, Regional and temporal trends in blood mercury concentrations and fish consumption in women of child bearing Age in the united states using NHANES data from 1999–2010, *Environmental Health* (2017). DOI: 10.1186/s12940-017-0218-4

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