

## CEHN Article of the Month, September 2015 Issue

### Title

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Relation of Prenatal Methylmercury Exposure from Environmental Sources to Childhood IQ

### Author(s)

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Joseph L. Jacobsen, Gina Muckle, Pierre Ayotte, Éric Dewailly, and Sandra W. Jacobson

### Abstract

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#### *Background*

Mercury is a naturally occurring metallic element that is released into the environment by natural sources, but also increasingly, by human activity and resultant pollution such as the operation of coal-burning power plants. The mercury released into the air as pollution is emitted as inorganic mercury vapor. This mercury eventually settles into streams and oceans where it is converted by bacteria into an organic form of mercury called methylmercury. Methylmercury increases in concentration as it moves up the food chain, with higher levels accumulating in large, long-lived fish, and it can build up in the human blood stream over time. Methylmercury that has been absorbed by the mother can be passed to the fetus during pregnancy, and to newborns through breast milk. Several studies have linked prenatal methylmercury exposure to cognitive deficits. However, two major studies produced contradictory results on the link between prenatal methylmercury exposure and intelligence quotient (IQ) scores, suggesting that co-exposure to other contaminants may have obscured or protected against some adverse effects of mercury.

#### *Objective*

To determine the degree to which co-exposure to polychlorinated biphenyls (PCBs) may account for the adverse effects of methylmercury, and the degree to which co-exposure from docosahexaenoic acid (DHA) may obscure these effects.

#### *Methods*

IQ was estimated in 282 school age Inuit children in Arctic Quebec from whom umbilical cord blood samples had been obtained and analyzed for mercury and other environmental exposures.

#### *Results*

Prenatal mercury exposure was related to poorer estimated IQ after adjustment for potential confounding variables. Children with cord mercury greater or equal to 7.5 micrograms per liter were four times as likely to have an IQ score lower than 80, the clinical cut-off for borderline intellectual disability. The entry of DHA into the model supported the hypothesis that the beneficial effects from DHA intake can obscure adverse effects of mercury exposure. Co-exposure to PCBs did not alter the association of IQ and mercury.

#### *Conclusion*

This is one of the first, if not the first study to document an association of prenatal mercury exposure with poorer performance on a school-age IQ assessment. School-age IQ scores are relevant for occupational success in adulthood. This study also provides evidence that prenatal DHA exposure can partially obscure the association of prenatal mercury with lower IQ.

### Policy Implications

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Regulations limiting mercury emissions from power plants can help to decrease the amount of mercury/methylmercury in the environment. The Supreme Court of the United States (SCOTUS) recently overturned the U.S. Environmental Protection Agency's (EPA) [Mercury Air Toxics Standards](#) rule, which places limits on mercury pollution from power plants. SCOTUS ruled that EPA did not properly consider the costs to industry of the Mercury Air Toxics Standards rule. Because the rule was issued over three years ago, most power plants have already invested in technology necessary to meet these standards and are well on their way to compliance with the rule. However, SCOTUS' decision represents a setback in public health protection.

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### Policy Implications continued

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The U.S. Food and Drug Administration's (FDA) regulatory limit on methylmercury in seafood is set at 1 part per million (ppm). In 2013 the Agency declined a citizen petition requesting that: the limit be lowered to 0.5 ppm; FDA revise FDA/EPA's joint fish consumption advice accordingly; and FDA require posting of that advice at the point-of-sale. In lieu of point-of-sale advice on seafood, sufficient funding is essential for robust public health campaigns to educate pregnant women, mothers, and women who may become pregnant, about methylmercury exposure and sources.

### Reference

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Article found in [Environmental Health Perspectives](#).

### Keyword(s)

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[Mercury/Methylmercury](#), [PCBs](#), DHA, Childhood IQ