

Investigating the Health Effects of Low-Level Exposure to Methyl Mercury



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André Lachance

[Jean Lebel](#) will long remember that long sleepless night in the summer of 1996, searching computer databases. At exactly 2:44 a.m. — eureka! Before his tired eyes, a sinusoidal curve suddenly appeared on his computer screen. There was no doubt that a link existed between the seasons and methyl mercury levels found in a village population in the Brazilian Amazon.

When Dr Lebel finally left his office at the [Université du Québec à Montréal](#) (UQAM) that morning, a light fog covered the sleeping city. "I was literally floating on air," he recalls. "We had just proven that contamination levels in the Amazon were highest during the rainy season, when large carnivorous fish grew in number."

Vital interest

Until then, this correlation had never been suggested. Yet it is of vital interest to the 500 inhabitants of Brasília Legal — a village nestled between the tropical forest and the loamy waters of Tapajós, an Amazonian tributary — who rely heavily on fish as part of their diet. For several years, they worked in partnership with Quebec and Brazilian researchers studying environmental levels of methyl mercury, a highly toxic form of mercury created when the metal is released into streams and modified by bacteria. Funded by the International Development Research Centre (IDRC), the research sheds new light on the health effects of methyl mercury.

After determining the degree of methyl mercury contamination in several species of fish, the researchers compared the results with exposure levels observed in the village population. The average level was 15.9 micrograms per gram in hair — well below the [World Health Organization](#)'s proposed exposure guidelines for mercury, which are based on the lowest levels (between 50 and 125 micrograms/gram) at which scientists in previous studies have reported the first clinical signs of mercury poisoning in adults. An investigation of nearly half the residents of Brasília Legal, however, revealed a decline in their manual dexterity and certain visual functions — such as the ability to distinguish contrasting lines.

Coordination problems

"Many villagers were experiencing difficulty with coordination," adds [Donna Mergler](#), a research scientist at UQAM. "A very simple coordination test, developed by a local doctor (Fernando Branches from Santarém) has helped us a lot. [It] showed us that motor problems existed even at very low levels of exposure." She believes this discovery will help the World Health Organization to identify areas where methyl mercury is a potential health risk.

It is not known yet whether Brasilia Legal residents will eventually develop any of the advanced neurological symptoms associated with methyl mercury poisoning (such as loss of peripheral vision, and speech problems). To reduce the likelihood, "instead of simply telling the people to no longer eat fish, we have advised them to choose mostly herbivorous species, which contain less mercury," says Dr Lebel, who now works for IDRC. "This mitigation measure was developed with the people, who understood perfectly the situation." A new IDRC-funded study is now evaluating the effectiveness of this measure.

Looking back, both scientists are proud of the work they accomplished, including the exchange of knowledge resulting from the IDRC-funded project. "At least 12 Brazilian working-class students have participated in all stages of this study. "Some are even in James Bay studying the effects of methyl mercury on the [Canadian] environment. We have demonstrated that you do not always need high technology to perform good work," Dr Mergler concludes.

André Lachance is a freelance writer based in Montréal. [Photo: J. Lebel]

Sidebar:

[How Mercury Enters the Amazon Food Chain](#)

Resource Persons:

Jean Lebel, Senior Program Officer, Ecosystem Health, IDRC, PO Box 8500, Ottawa, Ontario, K1G 3H9, Canada; Tel: (613) 236-6163, ext. 2539; Fax: (613) 567-7748; E-mail: jlebel@idrc.ca

Donna Mergler, Institut des sciences de l'environnement, Université du Québec à Montréal, CP 8888, succursale Centre-Ville, Montréal, Québec, H3C 3P8; Tel: (514) 987-3000, ext. 3355; Fax: (514) 987-6183; E-mail: mergler.donna@uqam.ca

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Ecosystem Health: Human Health Impacts & Interventions in Priority Ecosystems

Lebel, J., D. Mergler, M. Lucotte, M. Amorim, J. Dolbec, D. Miranda, G. Arantès, I. Rheault, and P. Pichet. 1995. *Evidence of Early Nervous System Dysfunction in Amazonian Populations Exposed to Low-Levels of Methylmercury*. *NeuroToxicology*. 16 (4) Annex 1.