

# The interwoven history of mercury poisoning in Ontario and Japan

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Ball Lake Lodge. The Ball Lake Lodge, built in 1947, was owned and operated by Barney and Marion Lamm. The Lamms employed residents of the Grassy Narrows community as fishing guides. Used with permission.

**T**he history of mercury poisoning among indigenous people in Canada is entangled with a mid-20th-century industrial incident in Minamata, Japan. There, in the mid-1950s, sightings of ataxic cats heralded signs of a bizarre neurologic condition. In 1956, the first affected human entered Japan's Chisso factory hospital. By 1958, Doctors Shukuro Araki and Douglas McAlpine established a link between methylmercury contaminated fish and human neurologic symptoms.<sup>1</sup> As investigations proceeded in Japan, a similar story began to unfold in Northern Canada. However, in the Canadian case, problems would persist for more than 50 years. The Asubpeechee-wagong/Grassy Narrows First Nation

still grapples with the ravages of mercury contamination. In the words of Chief Simon Fobister Sr.,

The story of my people, the Grassy Narrows First Nation, weighs heavily on the collective conscience of Canada. For over half a century, mercury poison has contaminated the river that is our lifeblood.<sup>2</sup>

Methylmercury is a lipid-soluble compound formed when mercury enters aquatic ecosystems and is consumed by small animals. When larger fish eat these animals, mercury undergoes biomagnification, reaching toxic levels. Human consumption of mercury-laden fish provokes nervous system damage.<sup>3</sup> Before the disaster in Minamata, the scientific community

was unaware of the effects of methylmercury on humans.

As the environmental catastrophe devolved in Japan, another emerged in Dryden, Ontario. The Dryden Chemical Company's pulp and paper mill generated mercury waste from bleaching paper. Daily, between 1962 to 1970, the mill dumped 2–4.5 kg of mercury effluent, totaling more than 10 tonnes, into the English–Wabigoon river system. George Kerr, the Ontario Minister of Energy and Natural Resource Management, ordered the company to cease mercury dumping by March 1970.<sup>4</sup> He estimated it would take 12 weeks before the mercury levels lowered in local fish; however, scientific reports estimated between 50 and 70 years for recovery. On multiple

occasions between 1970 and 1975, when the Dryden Chemical Company claimed it had stopped releasing mercury, Ontario officials found levels 30 times above normal and absence of fish for 64 km downstream. Residents noticed strange behaviour in animals; cats stumbling in circles and salivating, and turkey vultures flying in disordered patterns.<sup>5</sup>

Marion and Barney Lamm owned the multimillion-dollar Ball Lake fishing lodge at the confluence of the English and Wabigoon rivers, 150 km downstream of the factory. They employed more than 75 indigenous Ojibwa people, including as fishing guides for wealthy tourists. A lodge highlight was the “shore lunch,” where guides prepared freshly caught fish. For his support, Barney was made an honorary chief by leaders of the White Dog and Grassy Narrows reserves.<sup>5</sup>

In May 1970, the Ontario government

Ms. Smith to Grassy Narrows. During that visit, Smith noticed that the nearby residents displayed symptoms resembling what she had witnessed in Japan. She contacted Dr. Masazumi Harada, neurologist and world expert on Minamata Disease at Kumamoto University, who agreed to analyze Canadian hair samples. With “safe” levels of 100 ppb at the time, 87 Grassy Narrows residents were over the limit, 61 in the 100–199 ppb range and 26 exceeding 200 ppb.<sup>5,7</sup>

Mercury contamination also attracted Ontario health officials who formed the Task Force on Organic Mercury in the Environment in 1972. In 1974, the task force published a 19-page final report.<sup>8</sup> A list of acknowledgements mentioned no Japanese contributions, despite the involvement of Harada and colleagues. The report found that despite elevated mercury levels, the clinical tests performed in six locals showed no acute or chronic effects of

Alliance arranged for Barney Lamm and a few Grassy Narrows residents to visit Minamata Bay to witness the damage from mercury poisoning. At the request of band councils, a Japanese research team led by Harada travelled to Ontario. His investigations revealed that Minamata disease was already evident, although symptoms were mild: glove-and-stocking-type sensory disturbance, balance problems, tremor and tunnel vision.<sup>7</sup> Mirroring the governmental response seen a decade earlier in Japan, Ontario officials refused to recognize this outbreak.

In 1976, acting Editor-in-Chief of the *CMAJ*, Dr. David A. E. Shephard, published “Methyl Mercury Poisoning in Canada.”<sup>10</sup> He focused on its health consequences in general because concrete evidence of Canadian effects was still lacking. He described the “fragmented and quasipolitical” stalemate and differences in interpretation between Canadian and Japanese neurologists. The only Canadian group to have published studies on exposure in indigenous Canadian communities came from the Environmental Contaminants branch of Health Canada. Between 1970 and 1992, Dr. Brian Wheatley and colleagues conducted testing in 514 indigenous communities across Canada, beginning in Grassy Narrows and White Dog. They focused on elevated mercury levels in hair and blood but did not detect clinical abnormalities.<sup>11</sup>

The Minamata–Ontario connection was strengthened when Japanese physicians returned to Grassy Narrows and White Dog for follow-up studies; the team has returned 6 times since 2004.<sup>11</sup> Harada himself returned 27 years after his initial visit, and his follow-up represents the only longitudinal investigation of mercury poisoning in a single cohort, including Minamata, Japan. The work of Harada and colleagues is important not only to the local people and medical community, but also to other countries affected by mercury poisoning, including Iraq, Pakistan and Mexico.<sup>5</sup> The 2002 Ontario study prompted revisions of the diagnostic criteria: now, severe digital sensory impairment is sufficient to make a diagnosis of Minamata disease. This symptom was present in Ontario in 1975. More recently, in 2014, the Japanese research team found high rates of Minamata disease symptoms attributable to mercury

## Canada has yet to make an official diagnosis of Minamata disease in Ontario.

banned commercial fishing in Ball Lake and the English–Wabigoon rivers, and posted “Fish For Fun” signs throughout the region to discourage consumption. Fearing economic losses, some lodge owners issued bounties for confiscating signs. The Lamms, however, decided to close their profitable business.<sup>4</sup>

Barney Lamm then asked Norvald Fimreite, a Norwegian graduate student at the University of Western Ontario, to study mercury levels in local flora and fauna. Fimreite’s tests revealed mercury levels far exceeding international standards, among the highest recorded in the Western hemisphere.<sup>6</sup> In 1971, Lamm sued Dryden Chemical Company for \$3.75 million in damages for the social and economic impacts on him and the indigenous people. In preparing for the lawsuit, Marion collected correspondence, newspaper clippings, radio transcripts, photographs and legal claims.

In this process, Marion encountered the work of photojournalists Aileen and Eugene Smith, who were writing a book on Minamata. In December 1973, she invited

methylmercury poisoning. However, it concluded that the free flow of information and data on mercury in the environment within Ontario was impeded for reasons that were not clearly understood and recommended that unrestricted flow of information be encouraged.<sup>8</sup> The suggestion went unheeded. Provincial cabinet discussions are confidential, but as recently as July 2016, investigative journalists obtained cabinet memos dating back to 1984 that showed friction between the Premier and Environment Minister and cabinet members over a plan to remediate sedimentary mercury that threatened a perpetual nidus of fish contamination.<sup>9</sup> The report recognized that inhabitants of the river system would continue to consume contaminated fish due to “misinterpretation, hearsay and distortion,” and mentioned potential health risks. The primary impact of mercury contamination was deemed to be economic, social and cultural as a result of lost employment, food sources and traditional way of life.

In 1975, the Minamata Disease Patients

poisoning in young residents of Grassy Narrows.<sup>11</sup>

Nearly 50 years since the ministerial order to cease mercury dumping in the English–Wabigoon rivers, much work has been left unfinished. Negotiations for settlements between Dryden Chemical Company and the Ojibwa people were never successful, and Canada, unlike Japan, has yet to make an official diagnosis of Minamata disease in Ontario. For many generations, the Asubpeechoseewagong people relied on the river as a source of drinking water and consumed a diet high in protein-rich, locally caught fish. Overt environmental injustice led to the destruction of the local food chain, and loss of employment in the guiding and commercial fishing businesses led to increasing prevalence of manufactured foods of dubious quality (i.e., low protein and carbohydrate rich).

This story is no longer historical. Recent protests in Toronto demand action to

address mercury contamination, which continues to make a deleterious impact on the health of the Asubpeechoseewagong/Grassy Narrows First Nation. In the words of Chief Simon Fobister,<sup>2</sup> “we must not deny another generation of our children a bright future by refusing to clean our river.”

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## References

1. McAlpine D, Araki S. Minamata disease: an unusual neurological disorder caused by contaminated fish. *Lancet* 1958;2:629-31.
2. Fobister S. Grassy Narrows must be cleaned up now: Chief Fobister. *The Star* [Toronto];2016 June 6.
3. Pirkle CM, Muckle G, Lemire M. Managing mercury exposure in northern Canadian communities. *CMAJ* 2016;188:1015-23.
4. Marion Lamm mercury collection, Environmental Science and Public Policy Archives. Cambridge (MA): Harvard College; 2000.
5. Shkilnyk A. *A poison stronger than love: the destruction of an Ojibwa community*. New Haven (CT): Yale University Press; 1985.
6. Fimreite N, Reynolds LM. Mercury contamination of fish in northwestern Ontario. *J Wildl Manage* 1973;37:62-8.
7. Harada M, Fujino T, Oorui T, et al. Follow-up study of mercury pollution in indigenous tribe reservations in the Province of Ontario, Canada, 1975–2002. *Bull Environ Contam Toxicol* 2005;74: 689-97.
8. Bernstein A. *Final report: task force on organic mercury in the environment, Grassy Narrows and White Dog communities*. Ottawa: Health and Welfare Canada; 1977.
9. Shephard DA. Methyl mercury poisoning in Canada. *Can Med Assoc J* 1976;114:463-72.
10. Poisson J, Brusser D. Province ignored minister’s 1984 recommendation to clean up mercury in river near Grassy Narrows: *Star* investigation. *The Star* [Toronto]; 2016 July 4.
11. Wheatley B, Paradis S, Lassonde M, et al. Exposure patterns and long-term sequelae on adults and children in two Canadian indigenous communities exposed to methylmercury. *Water Air Soil Pollution* 1997;1:63-73.

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