Mercury Migration

Deadly Pathways to Developing and Indigenous Communities

Fish Warnings due to mercury contamination. Copyright J.C. Walls, Greenpeace

The Fish that Feeds Us is Killing Us

Mercury toxicity affects people through a variety of media and pathways, including atmospheric deposition, aquatic pollution, and unanticipated disasters, causing both immediate and chronic contamination. Still, the most acute form of mercury exposure comes from ingesting it directly through the food we eat.

According to both the World Health Organization (WHO) and the US Environmental Protection Agency (EPA), consumption of fish and marine mammals is the single most important source of human exposure to methylmercury. Methylmercury is formed when mercury mixes with organic matter in aquatic environments. Methylmercury is a potent neurotoxin that concentrates at increasingly poisonous levels in higher predatory fish and mammals. It can pass through the placental barrier during pregnancy, causing severe neurological damage in developing fetuses.

US EPA studies demonstrate that 90-100 percent of mercury found in fish is in fact in methylmercury form, and that for the purposes of analysis any mercury content in fish should be considered methylmercury. Fish-dependent populations are therefore not only exposed to mercury with greater frequency than other parts of the world population, but their exposure is to the most highly potent organic form of mercury that damages the central nervous system and can decimate fishing communities for generations.

According to the World Resources Institute, approximately one billion people rely on seafood as their primary source of protein. In 1996, the global harvest of fish rose to a record high of 121 million tons, making fish more popular than beef, veal, sheep, pig, and even poultry. In 1993, fish accounted for 16 percent of all animal protein consumption worldwide.

"Those living in developing countries, and indigenous communities that rely most heavily on traditional local fish as staples are at a disproportionately high risk"

But even though fish consumption includes billions of people from all parts of the world, rates of consumption are not the same everywhere. Mercury's propensity to bioaccumulate and bioconcentrate in aquatic pathways means that those living in developing countries, and indigenous communities that rely most heavily on traditional local fish as staples in subsistence economies are at a disproportionately high risk of mercury contamination.

Developing countries still account for the bulk of the world's fish consumption, particularly in China, South and Southeast Asia, and Africa. Moreover, the importance of fish as a source of protein is greater in these areas, climbing as high as 25 percent of all animal protein consumed in Asia, and 17 percent in Africa. For many indigenous communities, reliance on fish and wildlife forms the basis of subsistence economies practiced and preserved for centuries.

Mercury Migration Series

BAN Hg-WG

Mercury Migration Series

Once the fish and wildlife populations of a particular region are contaminated, entire communities are placed at risk. For instance, among the Wayana, an Amerindian tribe in French Guyana located in the vicinity of mercury-intensive artisanal gold mining operations, 14.5 percent of 242 fish samples taken from the Caroni River had mercury levels exceeding World Health Organization (WHO) limits. Not surprisingly, more than half the population was found to have levels of mercury in their hair exceeding threshold levels.

Minamata: Methylmercury's Wake-up Call

The extent of methylmercury's impact on the central nervous system was not fully recognized until 1956, several years after a chemical plant discharged between 70-150 metric tons of mercury in Minamata Bay, Japan. Hundreds of people died from eating large quantities of contaminated fish and shellfish from the ocean, while many others were crippled by nervous disorders, and children were born with congenital defects. To this day, the human health and economic consequences of this disaster are ongoing, and it was only in 1997 — more than 40 years after the initial spills — that it was declared safe for people to resume consumption of seafood from Minamata Bay. People there however continue to suffer the impact of this direct discharge.

But the impact of mercury on Minamata tells only a very small part of the story when it comes to the effect mercury contamination has on fish-dependent communities. While indisputably tragic, the release of mercury to Minamata Bay was relatively localized and could therefore be contained, monitored, and, over a long period of time, remediated. By and large, however, mercury enters aquatic ecosystems from a wide variety of sources, including long-range transboundary emissions, making the impact on marine fish and mammals globally pervasive and potentially epidemic. Moreover, international trade in fish products places communities all over the world at risk of methylmercury contamination, even if the source of the fish — much less the source of the mercury — is far from the point of consumption.

> ***"Developing countries still account for the bulk of the world's fish consumption"***

Reports from all parts of the world are beginning to show mercury levels in aquatic environments exceeding daily, weekly, monthly, and annual, recommended consumption levels. In Sweden, 50 percent of the country's 100,000 lakes contain fish with mercury levels exceeding the WHO's limits of 0.5 mg mercury/kg; in 10 percent of the lakes, levels are twice the recognized limits. Alarmingly, mercury deposition in Sweden would have to decrease 80 percent from 1980s levels to reduce mercury in fish below WHO limits.

In the US, the EPA calculates that as many as 7-8 percent of women between the reproductive ages of 15-44, may exceed exposure of reference doses as a result of diets including at least 100 grams of fish and shellfish per day. According to the National Academy of Sciences, approximately 60,000 newborns each year are at risk in the US alone because of mercury absorbed during pregnancy. Environmentalists claim the number may be as high as 400,000. Already, the Food & Drug Administration (FDA), which

Minimata child born deformed from parents eating methylmercury contaminated fish. Copyright W. Eugene Smith

as an agency has been reluctant to issue any fish-warnings whatsoever, advises pregnant women, or women who wish to become pregnant, not to eat shark, swordfish, king mackerel, or tilefish. Meanwhile, 10 US states have issued advisories for women of reproductive age to limit consumption of canned tuna fish, while in July an independent commission recommended that the FDA follow and issue a similar nationwide advisory.

Mercury on Top of The World

Despite living far from most local mercury sources, the impact of methylmercury on fish and marine mammal-dependent communities is nowhere more severe than in Arctic regions. Atmospheric mercury pollution accumulates through global distillation processes at dangerously high levels in the fragile Arctic food chain. Indeed, the highest levels of gaseous mercury ever observed were reported recently from the US National Oceanic & Atmospheric Administration's Point Barrow Observatory in Alaska.

The Arctic is a focus for major atmospheric, riverine, marine pathways, and terrestrial routes, which result in the long-range transport of contaminants into and within the Arctic. At least 50 percent of all mercury contamination in the Arctic comes from long-range emissions transport. The Arctic acts like a contaminant storage reservoir — or sink — not just for mercury but for other heavy metal pollutants, as well as radioactive discharges and many persistent organic pollutants. Contaminants from the atmosphere, oceans, and rivers, are passed through the long aquatic food web — which includes three levels of predators at the top — and contributes to increased magnification of methylmercury when it is finally consumed by humans. Polar bears in the high Arctic have levels of mercury in their livers 10 times higher than the level found in populations of bears farther south.

Sudden bursts of sunlight after long polar winters drive chemicals in sea salt to react with normally inert mercury vapor in the air, causing the mercury to be deposited in the snow. As the snow melts at the end of winter, mercury is released into the Arctic ecosystem — dubbed the "Mercury Sunrise"— at the precise moment when most animals and plants are growing fastest and the ecosystem is most vulnerable to contamination. According to one study published in the journal *Nature,*

Arctic Inuit peoples are severely impacted by mercury as it distills in Arctic regions. Are they doomed to import their food or face mercury poisoning?

the poles are currently redirecting about 150 tonnes of mercury from the atmosphere into the environment each year.

As a result, methylmercury levels in Arctic fish and mammals have the potential to become the highest anywhere in the world. Levels of mercury in Arctic ringed seals and beluga whales have increased by 200-400 percent over the last 25 years in some areas of the Canadian Arctic and Greenland. In North Greenland, where marine mammals such as seals are a primary part of the diet, more than 80 percent of the population exceeds the WHO's acceptable blood mercury concentration for pregnant women. In parts of northern Canada, 40 percent of fish, 32 percent of marine mammal meat, and 64 percent of terrestrial mammal meat exceed Canadian consumption guideline levels. Studies of 28 indigenous communities in Canada show the greatest mercury exposure among communities with the highest consumption of marine mammals. In another study, 57 percent of Inuit tested had blood levels exceeding Canadian "no risk" levels of 20 parts per billion in blood. In one Inuit community, over 50 percent of the residents had dietary intake exceeding tolerable daily intake. Within the community, those who consumed more traditional foods had even

"In one Inuit community, over 50 percent of the residents had dietary intake exceeding tolerable daily intake"

Mercury Migration Series

Mercury Migration Series

higher mercury levels — as much as six-times recommended risk levels.

Dependence on fish and wildlife is at the core of Arctic societies, cultures, and economies. But this dependence on marine fish and mammals now puts Arctic communities at a disproportionate global risk of methylmercury poisoning. Not only does this affect their basic sustenance but it threatens important dimensions of cultural identity. Indigenous groups who have managed to survive for centuries by cultivating highly advanced knowledge of how to live off fish and mammals, are now being forced to seek alternative, and often imported, food sources. This requires drastic changes in economic patterns in order to locate ways of purchasing outside products. Among indigenous groups, fear of contaminants in traditional food is now reported to be a primary reason for declines in fish and mammal consumption. In some cases, this decline in traditional diets has led to obesity, diabetes, and cardiovascular disease.

The Ban Mercury Working Group

The Ban Mercury Working Group (Ban Hg-Wg) is an international network of activists working to end pollution from the toxic metal — mercury. The Mission of the Ban Hg-Wg is to participate collectively to ensure that:

- ***Use of mercury is phased out in both the South and the North and all new mining must cease;***
- ***Mercury releases from all sources are subject to continuing minimization, and ultimate elimination as feasible;***
- ***Commodity transactions and global trade in mercury must be reduced and then eliminated;***
- ***Long-term storage facilities must be created to assure environmentally sound storage of existing quantities of mercury; and***
- ***In the interim, the South must not become a dumping ground for mercury-based technologies, products and/or wastes.***

Web: www.ban.org/Ban-Hg-Wg

Global Action Now

As evidence of methylmercury contamination in the Arctic has mounted, the eight-nation Arctic Council Monitoring & Assessment Program has called on the United Nations Environment Program to take seriously the impact of mercury on Arctic communities. Article 13 of the Barrow Declaration — the Arctic Council's framework for sustainable development — comments that "releases of mercury have harmful effects on human health and may damage ecosystems of environmental and economic importance, including in the Arctic," and calls on UNEP "to initiate a global assessment of mercury that could form the basis for appropriate international action in which the Arctic states would participate actively."

Anecdotal and scientific evidence from Arctic communities, as well as from indigenous and fish-dependent populations around the world, make clear the need to act with precaution as an international community. The basis for this decision lies in the basic principle of human dignity and the precepts of human rights, that no person or group of people should be expected to bear such disproportionate burdens of the negative impact of modern industrial activity as the communities adversely affected by long-range mercury pollution.

While many countries and even municipalities have taken individual actions against mercury, its global, transboundary threat to the entire planet makes it impossible to resolve the problem of mercury contamination as individual nations. Indeed, The Nordic Council of Ministers concludes in its 2001 report that mercury as an issue can only be solved by "broad international consensus."

It is ironic that but for the fact that mercury is chemically considered inorganic, and thus falls into the wrong chemical family, it would easily have qualified to be phased-out of production, and use under the Stockholm Convention regulating persistent organic pollutants (POPs). It is arguably more or as dangerous than the 12 POPs targeted for control. And its potential impact on the survival of the species and basic food security places it at the top of chemical contaminants of global concern. Thus, while our understanding of mercury's impacts on the environment and human health may never be complete, evidence of mercury's adverse impacts on the primary source of protein for over one billion people is more than sufficient cause to warrant swift, comprehensive, legally binding action.

> ***"but for the fact that mercury falls into the wrong chemical family, it would easily have qualified to be phased-out of production, and use under the Stockholm Convention."***

BAN HG-WG

The Ban Mercury Working Group Secretariat

c/o BAN
1305 4th Ave., Suite 606, Seattle, WA., USA. 98101
Tel: 1.206.652.5751
Fax: 1.206.652.5750
E-mail: info@ban.org
Web: www.ban.org/Ban-Hg-Wg

Printed with non-toxic soy-bean based inks on 100% post-consumer recycled paper.