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Mercury exposure linked to high rate of hospitalization for cerebral palsy

Males in Sarnia, Thunder Bay, Cornwall face five times more risk, researcher says

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Three Ontario communities that have had large industrial releases of mercury have hospitalization rates for cerebral palsy among boys and men that are up to five times higher than the average in the rest of the province, a new research paper shows.

Prenatal exposure to mercury compounds has been linked to the development of cerebral palsy in males, causing concern that environmental pollutants may be responsible for the high readings.

The areas with the high rates are along the St. Clair River around Sarnia, at five times the average, Thunder Bay on Lake Superior, at 3.3 times the average, and the St. Lawrence River near Cornwall, at 2.4 times the average.

The three areas have had large mercury discharges from chemical companies. Most of the plants were shut in the 1970s, but the one in Cornwall operated up to the mid-1990s.

The total amount of mercury that leaked into the environment around the three Ontario communities – at about 600 tonnes – is far larger than the 135 tonnes that caused the massive mercury-poisoning outbreak in Japan around Minimata Bay in the 1960s.

"We have an indication, based on this, that there are communities around the Great Lakes ..... that appear to have effects occurring as a result of these exposures," said Michael Gilbertson, author of the paper, which is to be published in the journal *Environmental Research.*

Cerebral palsy is a crippling birth defect that afflicts about one in 500 children, damaging areas of the brain and leading to impaired body movements. It is not known why male fetuses are more susceptible to mercury exposure.

The paper said two communities along Georgian Bay – Collingwood and Severn Sound, also had elevated rates of male hospitalizations of up to four times the average.

Although these areas did not have industrial mercury discharges, they lie in a region that has high naturally occurring levels of the element in rocks and soil.

Mr. Gilbertson, a biologist, compiled the paper based on research he conducted at the International Joint Commission, the U.S.-Canada body that monitors pollution levels on the Great Lakes.

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Michael Gilbertson, biologist, researcher

He retired from the IJC earlier this year, and the organization has not formally endorsed the paper.

The health data were taken from Health Canada statistics on disease rates around each of the 17 heavily polluted spots on the Canadian side of the Great Lakes. Health Canada compiled the statistics in a report it issued in 1999, but has not published more recent data.

If mercury exposure caused the elevated rates, it would be of great significance as an indication that the powerful metallic nerve poison has had a health effect on residents of the Great Lakes area.

Diet is viewed as the main human exposure route for mercury. Dozens of health advisories warn about eating fresh-water fish in Ontario because the mercury they contain is a hazard, particularly to women of child-bearing age.

Environmental causes of cerebral palsy have not received as much study as other risk factors, such as early-term births and prenatal bacterial infections.

Some experts caution that there are limitations to this new study because it is based on only hospitalization data.

Nigel Paneth, a professor of epidemiology and pediatrics at Michigan State University, said the majority of children with cerebral palsy are not put in hospital, and the Ontario figures could be skewed by a small number of patients receiving procedures. Cerebral palsy frequently leads to major leg operations.

He said the actual incidence of cerebral palsy by community is not well studied in North America. The hospitalization data showing the excesses among males in the three communities could be the result of other, unknown factors.

"If there was some excessive cerebral palsy in some areas, it's still a long way before I'd be convinced that it relates to mercury."

Mr. Gilbertson said there should be more research seeking to find out why the hospitalization figures he found among males are so different in the communities that have had high mercury discharges.

He said the rates of male and female hospitalization should be similar, and he could find no other explanations for the trend he observed.

NOTE: For the investigation described in the article reprinted above, in addition to limitation on the Answer imposed by the observational Plan, there are also significant limitations imposed by *measurement* error.