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## Canadian Men An Endangered Species

The Aamjiwnaang First Nation community near Sarnia in Ontario, Canada has seen an enormous decline in male births over the last decade. The community lives on reserve land in the St. Clair River Area of Concern, immediately adjacent to several large petrochemical, polymer, and chemical industrial plants. The research into the community's gender ratios was led by Constanze A. Mackenzie of the University of Ottawa, and the resulting study will appear in the journal *Environmental Health Perspectives*. The research began when the community expressed concerns about an apparent decrease in male births. The researchers analyzed live birth records from 1984 to 2003 and discovered that until 1993, the community's sex ratio was within expected parameters. But starting in 1994, the percentage of male births began to decline sharply, and the significant drop-off continued through 2003.



The sex ratio - the proportions of male and female births within a population - is a key indicator of the reproductive health of a population and of great interest to researchers. Globally, between 50.4 percent and 51.9 percent of births are males, and this percentage is usually stable. Canadian figures fall within these parameters, with 51.2 percent of births male. But in the Aamjiwnaang community, from 1999 to 2003, males represented only 34.8 percent of births.

The researchers say the proportions are clearly outside of what could be considered a normal range. "Although normal variation in sex ratio can be expected in any population, especially with a small sample size, the extent of the sex ratio deviation appears to be outside the range of normal," they wrote.

In addition to skewed human statistics, studies of the St. Clair River Area of Concern have found changes in the sex ratios and reproductive ability of fish, bird, and turtle populations. It is thought that this may be due to exposure to endocrine-disrupting chemicals (EDCs) from neighboring industrial plants. The present study did not seek to determine the presence of chemicals such as EDCs and the extent to which those factors may have contributed to the suddenly shifting sex ratios but a 1996 soil assessment of the land found "high concentrations of several contaminants."

The authors believe further studies are warranted. "Although there are several potential factors that could be contributing to the observed decrease in sex ratio of the Aamjiwnaang First Nation, the close proximity of this group to a large aggregation of industries and potential exposures to compounds that may influence sex ratios warrants further assessment into the types of chemical exposures for this population," the researchers concluded.

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## Industry blamed for massive dive in male birth rate (published on 26-Aug-2005)

Chippewas living in the shadow of industrial plants in Ontario have reported a worrying drop in the number of male births within the community.



Male birth rates have dropped in a Chippewa community

An in depth scientific investigation was carried out confirming the fears of members of the Aamjiwnaang First Nation community near Sarnia, Ontario.

Globally slightly more male children are born than female, the balance is, as might be expected, roughly half and half with the ratio usually somewhere around 51% to 49%.

While regional variations do exist around the world, Canada follows the trend, with the national male birth rate at 51.2%.

The Chippewas community near Sarnia, however, shows a startling divergence from the national average, with only one in three babies born male in recent years.

Research into the discrepancy was led by Constanze Mackenzie from the University of Ottawa, who concluded that the most likely explanation for the plummeting rate of baby boy births was the proximity of the settlement to a host of heavy industry plants.

The report was published in *Environmental Health* magazine.

"The trend in the proportion of male live births of the Aamjiwnaang First Nation has been declining continuously from the early 1990's to 2003, from an apparently stable sex ratio prior to this time," the researchers wrote in their study.

"This community is situated immediately adjacent to several large petrochemical, polymer, and chemical industrial plants.

"Although there are several potential factors that could be contributing to the observed decrease in sex ratio of the Aamjiwnaang First Nation, the close proximity of this community to a large aggregation of industries, and potential exposures to compounds that may influence sex ratios warrants further assessment into the types of chemical exposures for this population."

The effects of endocrine disruptors, or 'gender bender' chemicals, have been well recorded in the animal kingdom, but their direct impact on human development is less understood.

The Sarnia case is likely to shed some light on the matter but the effects of individual substances could be a difficult to unravel, as the population is likely being exposed to a cocktail of chemicals rather than a single compound.

Meanwhile, the problem persists for the Chippewas and appears to be getting worse.

20 years ago, the gender balance seemed normal in Sarnia.

Over the past 15 years, the imbalance has grown and is now at its greatest level since concerns were raised, with just 34.8% of births resulting in male children between 1999 and 2003.

A community health survey is currently underway to gather more information about the health of the Aamjiwnaang community and to provide additional information about the factors that could be contributing to the problem. By Sam Bond

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## Doctors fear pollution is skewing birth rates

Two girls for every boy born near chemical plants: U of O student

**Tom Spears**

The Ottawa Citizen

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Doctors were investigating the effects of pollution on an Ontario Chippewa community when some band members raised an odd point: Their community had enough girls for three softball teams, but only one boys' team.

They were worried about the lack of baby boys.

From that unexpected observation, health researchers from Ottawa and Sarnia tracked down a shocking fact: Today, nearly two baby girls are born for every baby boy at Aamjiwnaang First Nation, near Sarnia.

Pollution from the petrochemical factories of nearby Chemical Valley is the likely -- though still unproven -- cause, the team argues. It's been known for more than a decade that many industrial pollutants mimic the action of the female sex hormone estrogen, and these can upset the reproductive systems of wildlife and humans alike.

"You can't be anywhere on their land and not see a score of these things (chemical plants)," says Jim Brophy, director of the Occupational Health Clinic for Ontario Workers, a Sarnia clinic that focuses on health effects of industrial chemicals and asbestos.

A University of Ottawa medical student, Constanze Mackenzie, started counting baby boys and baby girls born on the reserve since 1984.

Until the early 1990s, an average of 54 per cent of the babies were male -- very close to the Canadian average of 51.2 per cent, she found.

"But over the past 10 years that dropped to 41-per-cent male, and in the past five years it averaged 35-per-cent male," she said.

The final years of the study, from 1999 and 2003, saw 86 baby girls and only 46 boys born.

"We see, holy smokes, in the past 10 years we've got this huge drop" in male births, Mr. Brophy said. He noted it hasn't shown signs of levelling out. "We don't know what all the implications are for human health."

The study appears in a science journal, Environmental Health Perspectives.

There's no evidence that these babies have any unusual health problems. But the researchers know that in wildlife, upsetting the reproductive system with pollutants can cause long-term health problems in the next generation, such as behavioural problems, infertility and cancer.

The reserve's soil is full of toxic metals such as arsenic, lead, chromium, and especially mercury, says Mr. Brophy, who has a PhD in occupational and environmental health. It's also close to factories that have air emissions such as benzene and its compounds.

Mr. Brophy said other communities downwind of Chemical Valley -- places south and east such as Corunna and Chatham -- appear on the basis of preliminary analysis of Statistics Canada data to have more baby girls than boys as well. It's "nothing as significant as the First Nations, but it's in every single one of them," he said.

To the north, away from prevailing winds, there are more boys born, Mr. Brophy said. "These are all puzzle pieces. We have no causal connection," he added. "But these are all parts of a larger picture."

"It's difficult to prove cause and effect in science," adds Ms. Mackenzie, "but we feel there's enough evidence here that there should be some concern."

No one has done blood tests in search of pollutants in Aamjiwnaang yet. Ms. Mackenzie said she hopes her work will be the first stage of a longer investigation.

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