

When the wind blows

Wildly abnormal birth rates in a native Canadian tribe surrounded by petrochemical plants have caused researchers to question the threat of emissions – and warn that Scotland may be next. By Stephen Naysmith

The Aamjiwnaang people were already anxious about their health when they contacted public health researchers in the Canadian province of Ontario. Hemmed in by petrochemical and plastics plants, they feared pollution was causing health problems such as breathing difficulties, increased rates of miscarriage and learning disabilities among their children.

But the results of a subsequent wide-ranging study in collaboration with the local population were more striking. It showed that children being born on their reservation, on the shores of Lake Huron, were mainly girls.

Now the researchers, who trained in Scotland, and their Stirling University mentor, claim people living next to Scotland's largest concentration of petroleum industries at Grangemouth, should be questioning the impact of pollution there.

The Aamjiwnaang study showed that rate of birth of boys has been dropping steadily since about 1993. From a rate similar to the Canadian norm (and that of most western countries), which saw about 105 boys born to every 100 girls, it dropped steadily until today only one in three births is a boy. It is a difference that isn't just sta-

tistically significant, it's extreme.

It may be one of the clearest replications yet in a human population of a phenomenon much recorded in environmental studies – the apparent influence of hormone-mimicking compounds. Already implicated in affecting the fish and animal reproduction, could such substances also be affecting our own?

The Aamjiwnaang are a sub-community of a native American Indian tribe called the Chippewa, known in Canada as a First Nation people. They live on a reservation adjacent to Ontario's Chemical Valley, in the industrial town of Sarnia. Concerned about a host of problems, they approached occupational health experts who were already involved in assessing the links between asbestos-related disease and local industries.

The gender imbalance was only revealed when residents mentioned in passing their unusual softball teams. There were enough young girls in the area for three teams, and only enough boys for one.

Their story has set alarm bells ringing across the globe, as it may help explain much slower declines in the number of babies born as boys across many industrialised countries, including Britain.

But it began, in no small part, at the

University of Stirling. Two of the researchers involved, Jim Brophy and Margaret Keith, are members of the university's Public Health Research Group, having achieved PhDs in occupational and environmental health there.

"We were holding occupational health sessions relating to asbestos – Ontario has some of the highest rates of asbestos-related illness in the country," Brophy explains. "But the First Nation people came to us concerned about the health of their children."

Brophy and colleagues at OCHOW (occupational health clinics for Ontario workers) detailed the falling birth rate in the journal *Environmental Health Perspectives*. They also tried to establish whether other populations were being affected.

A control group of Chippewa Indians, living elsewhere in the region, were also studied. Genetically very similar to the Aamjiwnaang, they showed no trace of the change in birth rate. Sample statistics relating to births in other more mixed communities nearby appeared to suggest a link too, according to Brophy. "Those to the south,

in the path of the prevailing wind from the petrochemical plants, had a predominance of girls in the 0-4 age group, according to a 2001 census. To the north, there was no such predominance."

However, better quality data is needed for these latter communities, Brophy says. Meanwhile, he admits that all they have actually demonstrated in Sarnia's First Nation population is the decline in the number of boys born. "We've not been able to establish a cause. We can't say this exposure caused it, or that plant. It's not conclusive. But we think there is tremendous circumstantial evidence," he says.

The OCHOW study has led to a surge of interest in further study of the Aamjiwnaang. A review of the research in medical publication *The Lancet* in February acknowledged the case for further examination of the gender-skewing effect.

Now there are warnings from both sides of the Atlantic over Scotland's chemical industries. Professor Andrew Watterson, director of the Public Health Research Group at Stirling, says Keith and Brophy's research is an example of the need to pick up on "sentinel" events - warning signs about what could be happening elsewhere.

Because the Chippewa population is relatively limited on a reservation and the neighbouring petrochemical complexes are some of the most varied and extensive in the world, what is observed there could be happening less obviously, somewhere like Grangemouth, Watterson says.

"We are interested in looking at this in the context of Scotland," he adds. "Their study does after all relate to a large petrochemical works close to a relatively confined population."

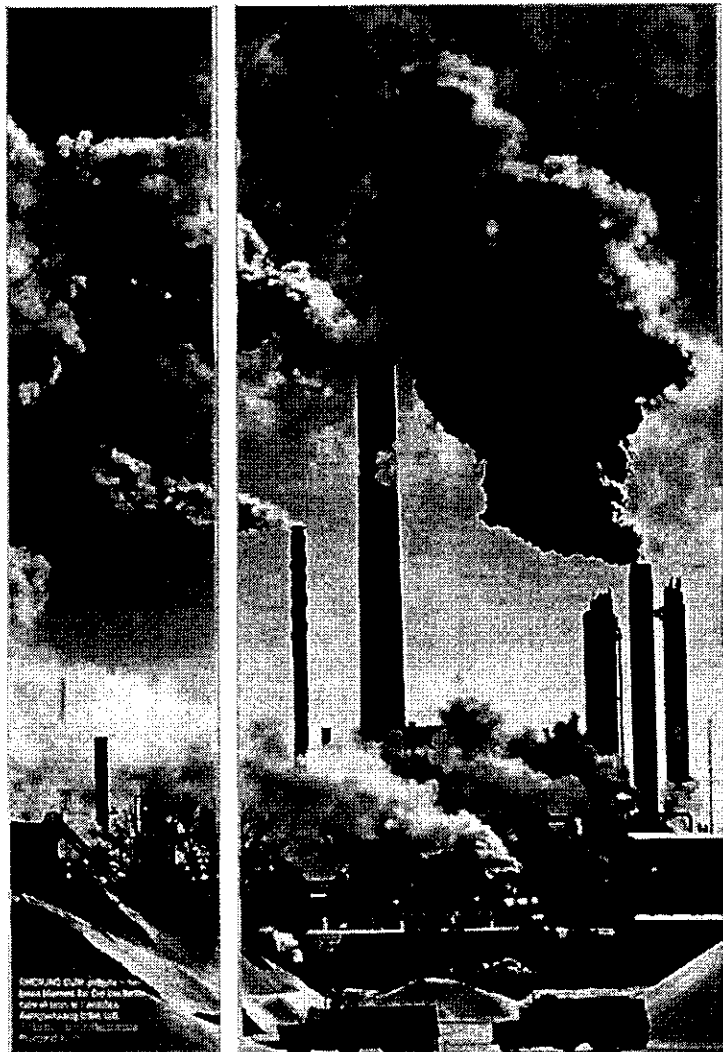
"Sarnia has a much bigger and more var-

ied concentration of petrochemical works than almost anywhere," he said. "Grangemouth is smaller by comparison. But there is a need for more epidemiological studies."

Brophy adds: "We know that the pollutants that come out of chemical plants, refineries, the incineration process and coal-fired generators, are hazardous. The question is at what level of exposure does it begin to have an effect on communities."

There is enough scientific information to be concerned, and there are parallels with asbestos-related illnesses such as the cancer mesothelioma, Brophy argues.

"If the government in Scotland and Canada had taken seriously the concerns of workers in shipbuilding in Glasgow, for instance, we wouldn't have thousands of people each year suffering from these totally preventable diseases."



INDUSTRIAL SMOKE
Sarnia, Ontario, Canada
Photo by [unreadable]