

Study documents heavy air pollution in Canadian area with cancer spikes

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The Industrial Heartland of Alberta, Canada, is home to more than 40 companies, including oil refineries, natural gas liquids facilities and chemical plants. Credit: Isobel Simpson / UC Irvine

Levels of contaminants higher than in some of the world's most polluted cities have been found downwind of Canada's largest oil, gas and tar sands processing zone, in a rural area where men suffer elevated rates of cancers linked to such chemicals.

The findings by UC Irvine and University of Michigan scientists, published online this week, reveal high levels of the carcinogens 1,3-butadiene and benzene and other airborne pollutants. The researchers also obtained health records spanning more than a decade that showed the number of men with leukemia and non-Hodgkin's lymphoma was greater in communities closest to the pollution plumes than in neighboring counties. The work is a dramatic illustration of a new World Health Organization report that outdoor [air pollution](#) is a leading cause of cancer.

While the scientists stopped short of saying that the pollutants they documented were definitely causing the male cancers, they strongly recommended that the industrial emissions be decreased to protect both workers and nearby residents.

"Our study was designed to test what kinds of concentrations could be encountered on the ground during a random visit downwind of various facilities. We're seeing elevated levels of carcinogens and other gases in the same area where we're seeing excess cancers known to be caused by these chemicals," said UC Irvine chemist Isobel Simpson, lead author of the paper in *Atmospheric Environment*. "Our main point is that it would be good to proactively lower these emissions of known carcinogens. You can study it and study it, but at some point you just have to say, 'Let's reduce it.' "

Co-author Stuart Batterman, a University of Michigan professor of environmental health sciences, agreed: "These levels, found over a broad area, are clearly associated with industrial emissions. They also are evidence of major regulatory gaps in monitoring and controlling such emissions and in public health surveillance."

The researchers captured emissions in the rural Fort Saskatchewan area downwind of major refineries, chemical manufacturers and [tar sands](#)

processors owned by BP, Dow, Shell and other companies in the so-called "Industrial Heartland" of Alberta. They took one-minute samples at random times in 2008, 2010 and 2012. All showed similar results. Amounts of some dangerous volatile organic compounds were 6,000 times higher than normal.

The team compared the Alberta plumes to heavily polluted megacities. To their surprise, the scientists saw that levels of some chemicals were higher than in Mexico City during the 1990s or in the still polluted Houston-Galveston area.

Simpson is part of UC Irvine's Blake-Rowland Group, which has measured air pollution around the world for decades. She and Batterman said the findings were important for other residential areas downwind of refineries and chemical manufacturers, including parts of Los Angeles.

"For any community downwind of heavy industrial activity, I would say it's certainly prudent to conduct surveys of both air quality – especially carcinogens – and human health," Simpson said.

"For decades, we've known that exposure to outdoor air pollutants can cause respiratory and cardiovascular disease," Batterman said. "The World Health Organization has now also formally recognized that outdoor air pollution is a leading environmental cause of cancer deaths."

Longtime residents near industrial Alberta have struggled to bring attention to bad odors, health threats and related concerns. The peer-reviewed study is one of few in the region and more investigation of the large and complex facilities is needed.

For example, Simpson said, it appeared in some cases that the companies were not reporting all of the tons of chemicals they release. She and her colleagues documented high levels of 1,3-butadiene that could only have

come from one facility, but she said the company had not reported any such [emissions](#).

Provided by University of California, Irvine

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