

Trace metal exposure among pregnant women living near fracking wells in Canada

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The *Journal of Exposure Science and Environmental Epidemiology* last week revealed the findings of a 2016 pilot study that measured pregnant women's exposure to environmental contaminants in northeastern British

Columbia, an area of intensive natural-gas production through hydraulic fracturing (fracking). The study, directed by Marc-André Verner, a professor at the School of Public Health (ESPUM) of Université de Montréal (UdeM), showed that the women had higher concentrations of some metals, especially barium, aluminum, strontium and manganese, in their hair and urine compared to the general population.

"These results are of concern because a previous study showed that relatively high concentrations of barium, aluminium, strontium and manganese are found in rock samples from B.C.'s Montney Formation, where natural gas is extracted via fracking," said Élyse Caron-Beaudoin, a post-doctoral researcher at EPSUM and the study's lead author. "In addition, recent studies analyzing wastewater from fracking generally have shown higher concentrations of the same metals."

"It's impossible to say with certainty whether fracking caused the women's [exposure](#) to these metals," she added, "but our study does provide further evidence that this could be the case."

Community-initiated studies

Initially requested by people living near the natural-gas production areas, the study was jointly launched by UdeM researchers and the region's First Nations and public-[health](#) authorities. These communities wanted clear answers about how living near natural-gas developments was affecting their health.

"We used data from the Canadian Health Measures Survey (CHMS) to compare trace metal concentrations in the urine and hair of the 29 [pregnant women](#) we studied versus the general population," said Caron-Beaudoin. "However, for some metals we had to use exposure data collected in France, because similar data has never been collected in sufficient quantity in Canada."

The researchers found that concentrations of manganese in the women's urine were 10 times higher than in the reference populations. As well, the women's hair had greater concentrations of aluminum (16 times higher), barium (three times higher) and strontium (six times higher) than in the reference populations in France. Furthermore, barium and strontium concentrations were higher in hair samples from indigenous participants than in those from non-indigenous participants.

Is there a health risk?

At this stage of their investigations, researchers cannot comment on the presence or absence of a risk to human health. Many essential data for this type of toxicological evaluation are still lacking, including [epidemiological studies](#) assessing the association between exposure of pregnant women to these trace metals and the adverse effects on children's health: "We are aware that people would like to have answers right away, but we are only at the beginning of a long process of scientific inquiry," said Caron-Beaudoin. "Other studies are already underway or being planned to clarify this legitimate issue."

Pending questions

Data on [water quality](#) in the study areas's Peace River Valley remains scarce and the data that has been collected to date is highly variable. In addition, there's no systematic water-monitoring program in the region.

A previous study on exposure to volatile organic compounds such as benzene in the same group of pregnant women was published in 2018 in *Environment International*. Its findings suggested benzene exposure is also potentially higher among study participants, especially indigenous women, than in the general Canadian population.

To learn more, Caron-Beaudoin has returned to the Peace River Valley to recruit a second group of pregnant women so the researchers can measure their exposure to different contaminants. She and her team will also measure concentrations of these contaminants in water and indoor air. In addition, years as part of an epidemiological study, they are assessing the overall health of babies born in the region over the last 10 years.

More information: Élyse Caron-Beaudoin et al. Urinary and hair concentrations of trace metals in pregnant women from Northeastern British Columbia, Canada: a pilot study, *Journal of Exposure Science & Environmental Epidemiology* (2019). [DOI: 10.1038/s41370-019-0144-3](https://doi.org/10.1038/s41370-019-0144-3)

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