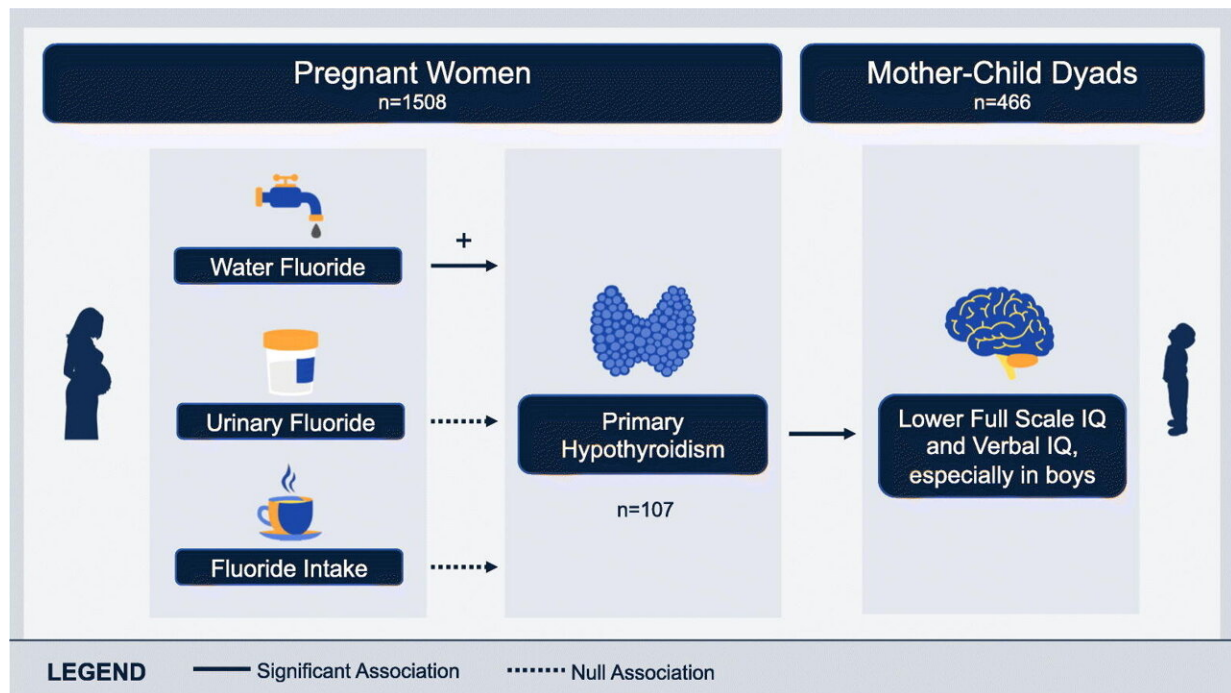


# Fluoride exposure associated with hypothyroidism in pregnancy, study finds

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Graphical abstract. Credit: *Science of The Total Environment* (2023). DOI: 10.1016/j.scitotenv.2022.161149

New research out of York University found that fluoride exposure via drinking water may increase the risk of hypothyroidism in pregnant women. In a smaller subset of participants, the researchers found lower IQ scores between boys whose mothers had been diagnosed with hypothyroidism compared to boys whose mothers had normal thyroid

levels.

Earlier research done by the same lab at York found an association between maternal fluoride exposure in pregnancy and lower IQ in boys, and this new research may explain these earlier findings, according to York neuropsychology Ph.D. student Meaghan Hall, lead author of this latest study.

"We know from the literature that there is a link between high levels of fluoride exposure and [thyroid](#) disruption and there's also an established connection between untreated hypothyroidism in pregnancy and adverse outcomes in children," says Hall. "Our latest study may provide a potential mechanism to explain links to lower IQs in boys born to mothers with higher fluoride exposure and is part of a growing body of evidence that suggests that prenatal fluoride exposure may be linked to worse cognitive outcomes for children."

The study, published today in *Science of the Total Environment*, followed more than 1,500 women enrolled in the Maternal Infant Research on Environmental Chemicals (MIREC) study, an ongoing, multi-year study led by Health Canada to investigate the impact of [environmental chemicals](#) on vulnerable populations, including pregnant people and infants. Women were recruited from 10 cities across Canada, seven of which have fluoridated drinking water.

The researchers only studied women who reported drinking tap water in pregnancy. The women were followed throughout pregnancy and their children were also followed after birth into early childhood.

In the study, a half-milligram-per liter increase in drinking-water fluoride levels, which may not sound like much, but is roughly the difference in exposure level between a fluoridated and non-fluoridated community, was associated with a 1.65 increase in odds of having a

diagnosis or meeting criteria for hypothyroidism in pregnancy.

"This translates into a 65 percent increase in risk," says Christine Till, Hall's supervising professor, senior author on the study and a clinical neuropsychologist who heads up the Faculty of Health's Till Lab, which studies how various environmental exposures affect children's health.

"The findings are concerning because hypothyroidism is a known cause of brain-based disorders in children," says Till.

Hall and Till say they hope that [policy makers](#) will consider this new research when evaluating the safety of community water fluoridation.

Previous research looking into the link between fluoride exposure and hypothyroidism has mostly been done with lab animals, and children and adults living in parts of the world where fluoride levels are naturally high. Fluoride's ability to suppress the thyroid has been known since the 1930s when it was used to treat overactive thyroid, also known as hyperthyroidism.

The mechanism by which fluoride may interfere with thyroid function is not entirely clear, says Hall, although she says that it may interfere with certain enzymes and iodine absorption, which is critical for thyroid hormone production.

Women in general are more at risk of developing hypothyroidism, a condition where the body does not synthesize enough thyroid hormones and can lead to symptoms such as fatigue, weight gain and depression. In pregnancy, the demands put on the thyroid system increase substantially, especially in the first trimester when the fetus is solely reliant on maternal thyroid hormones.

The researchers measured exposure to fluoride from tap water and other dietary sources such as black tea, which is naturally high in fluoride. The

researchers also measured urinary fluoride levels and found no link with hypothyroidism. The researchers say fluoride levels in tap water may be a more reliable indicator of long-term fluoride exposure than urinary levels, which might better correlate with short-term exposure, they say.

Approximately four in 10 Canadians and seven out of 10 Americans on public water supplies have fluoridated drinking water. Fluoride compounds are added to tap [water](#) as a way to reduce cavities at the population level and this is a major source of [fluoride](#) exposure.

**More information:** Meaghan Hall et al, Fluoride exposure and hypothyroidism in a Canadian pregnancy cohort, *Science of The Total Environment* (2023). [DOI: 10.1016/j.scitotenv.2022.161149](https://doi.org/10.1016/j.scitotenv.2022.161149)

Provided by York University

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