

Nitrate in drinking water could cause up to 100 cases of bowel cancer per year in NZ

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Nitrate contamination of drinking water could cause up to 100 cases of bowel cancer in New Zealand every year, leading to 40 deaths, New Zealand research has estimated.

The [collaborative research](#) by the Universities of Otago, Loughborough, Auckland and Victoria found 800,000 people in New Zealand are

exposed to [nitrate levels](#) in water above those found to be a risk in the international studies.

The estimate is based on international studies linking nitrate in drinking water and [bowel cancer](#) combined with assessment of the levels of nitrate in drinking water in New Zealand.

Dr. Tim Chambers, a senior research fellow in the Department of Public Health at the University of Otago, Wellington, says the study—the first study to assess the levels of nitrate exposure in New Zealand and collate a national dataset of drinking [water quality](#)—found that a substantial number of New Zealanders are on water supplies with nitrate that could increase their risk of [bowel](#) cancer.

"This research highlights the potential health burden of [nitrate contamination](#), particularly if further evidence on the link between nitrate and bowel cancer reinforces existing studies. The results support the need to take a precautionary approach towards nitrate contamination in New Zealand," he says.

"However, the study did not directly assess the link between nitrate exposure and bowel cancer as some overseas epidemiological studies have done," he says.

The research is published in the international journal *Environmental Research*. It is a preliminary step of future research to assess the potential public health impact of water quality in New Zealand following the 2016 Havelock North campylobacter outbreak which caused an estimated 8,320 people to get sick, 42 hospitalisations and four deaths.

"The results also highlight the need for the Three Waters Reform in New Zealand. Our recent Official Information Act requests to district councils found that some councils have not tested for key contaminants

in drinking water for years as the current legislation does not require them to do so," Dr. Chambers says.

The researchers collated data from all 67 district and regional councils plus a sample of private water supplies to generate a national nitrate exposure dataset. They then applied the bowel cancer risk estimate from a meta-analysis of eight studies investigating the link between nitrate in drinking water and bowel cancer.

"This work on bowel cancer also sits alongside a wider set of evidence linking nitrate in drinking water to preterm births, low birthweight and congenital abnormalities which are a growing concern. Other [environmental research](#) also shows the negative impact of nitrate contamination on freshwater ecosystems and the wider environment.

"While more research is required in this area, particularly around the biological mechanism and additional epidemiological studies, the potential health and environmental impacts of nitrate contamination provide a compelling case for intervention," Dr. Chambers says.

Nitrate contamination in New Zealand is mainly driven by pastoral farming, specifically from intensive dairy farming. Nitrate leaching from urine patches is the largest source of nitrate contamination from pastoral farming. Nitrate leaching has increased substantially since 1990 and many groundwater sites continue to degrade.

The likely biological mechanism for nitrate increasing the risk of bowel cancer is complicated and is influenced by dietary factors, especially the balance of red meat, fruit and vegetables, and gut microflora. The interplay of these factors determines the amount of N-nitroso compounds, a class of cancer-causing chemicals, that are formed in the gut—a process known as endogenous nitrosation. The International Agency for Research on Cancer concluded "ingested [nitrate](#) or nitrite

under conditions that result in endogenous nitrosation is probably carcinogenic to humans (group 2A)".

New Zealand experiences one of the highest rates of bowel cancer in the world (35.3 age-standardized cases per 100,000), with an average of 3,000 cases per year. It is our second biggest cancer killer, causing an average of 1,200 death per year. Established risk factors for bowel cancer include obesity, alcohol consumption, physical inactivity, smoking, and consumption of red and processed meat.

The research paper, "Nitrate contamination in drinking [water](#) and colorectal [cancer](#): Exposure assessment and estimated health burden in New Zealand," is published in the international journal *Environmental Research*.

More information: Jayne Richards et al, Nitrate contamination in drinking water and colorectal cancer: Exposure assessment and estimated health burden in New Zealand, *Environmental Research* (2021). [DOI: 10.1016/j.envres.2021.112322](https://doi.org/10.1016/j.envres.2021.112322)

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