

Rebuttal of Stuff’s “The Whole Truth: Water fluoridation - at recommended levels - is safe and beneficial”

On the 28th of March 2023, New Zealand mainstream media outlet Stuff, published an article titled “[The Whole Truth: Water fluoridation - at recommended levels - is safe and beneficial.](#)”

Stuff’s article was in response to the release of the US Government’s National Toxicology Program’s Monograph titled “[NTP Monograph on the State of the Science Concerning Fluoride Exposure and Neurodevelopmental and Cognitive Health Effects: A Systematic Review](#)”.

This post rebuts all the points made in Stuff’s article. Text from Stuff’s article has grey background, our rebuttals have white background.

Stuff

This reporting is part of Stuff’s fact-checking project, The Whole Truth – at recommended levels - is safe and beneficial

What’s the issue? Misinformation about fluoride isn’t new. Community water fluoridation isn’t new, either. Since the 1960s, about half of Aotearoa New Zealand’s population has had access to it. Fluoride is known for its role in helping protect our teeth by making them stronger and by reducing tooth decay.

Rebuttal

There is no strong evidence that fluoridation reduces tooth decay. The Cochrane Review, considered the gold standard in providing factual evidence on health topics, [published a review in 2015](#). They said:

- Studies on dental decay and fluoridation were of low quality.

- The only studies worthy at all of review were published at least 40 years ago i.e. pre 1970.
- An estimate that 40% of people will have dental fluorosis when water is fluoridated at 0.7ppm
- An estimate that 12% of people will have dental fluorosis that could cause concern over appearance when water is fluoridated at 0.7ppm
- No evidence that cessation of fluoridation led to an increase in dental decay rates
- No evidence that fluoridation reduced inequalities between rich and poor
- No evidence that fluoridation benefited adults
- 97% of the studies they examined were biased

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The mineral is actually present in all water sources but usually at levels too low to have beneficial effects on dental health. Water fluoridation is the process of increasing levels to between 0.7 parts per million and 1.0 ppm – in line with World Health Organisation recommendations and kept in check by national standards.

Rebuttal

Fluoride is not like calcium or magnesium, it's like lead or arsenic. There is no requirement for fluoride in the body, so it can never be too low for anything.

We have one of the highest levels for fluoridation. The NZ MoH recommend a range of 0.7ppm to 1.00ppm with a target of 0.85ppm. The US has lowered their recommended maximum level to 0.7ppm.

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But concerns about links between childhood fluoride exposure and reduced IQ have reemerged in the backlash against compulsory fluoridation orders for local authorities in New Zealand, using controversial data published by the National Toxicology Program (NTP) in the United States.

Rebuttal

The NTP report does not provide data but provides scientific reviews of studies. This information has not been anything to do with a backlash against the NZ Government decision to mandate fluoridation, but as a result of the NTP report of 2016 where it found fluoride may be causing neurotoxic effects on animals but there was not enough information to determine what effect it was having on humans.

The Monograph and Meta analysis are not controversial according to all National Academies of Sciences, Engineering, and Medicine (NASSEM) reviewers who praised the NTP for its high quality.

Stuff

What we found The misinformation we've seen suggests current exposure to fluoride via drinking water prenatally and during childhood results in measurable IQ loss. This simply isn't true. So why's it doing the rounds?

Rebuttal

Two of the highest quality studies, [Green](#) and [Till](#), found measurable IQ loss in children exposed either prenatally or via bottle feeding respectively, in areas of Canada that are fluoridated. In Canada they fluoridate at a lower level than New Zealand – 0.7ppm compared to the MoH target of 0.85ppm.

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The National Toxicology Program in the United States has been reviewing studies on fluoride exposure and potential neurodevelopmental and cognitive health effects. On March 15, the site published a draft report of its systematic review from September, 2022, saying there is “a large body of evidence on IQ effects in children” and more limited evidence suggesting “other neurodevelopmental and cognitive effects in children”.

But the report also highlights issues with the quality of the literature and notes the strongest associations between fluoride and cognitive effects were seen at levels in excess of the current recommendations.

Rebuttal

This is patently not true. “The results from 18 of the 19 high-quality studies that evaluated IQ in children provide consistent evidence that higher fluoride exposure is associated with lower IQ.”

The Green and Till studies are two that were done in fluoridated Canada. The [Bashash](#) study is from Mexico where actual fluoride exposure to each of the study participants was measured and found to be comparable with fluoridated areas. Referring to these three studies, the NTP state “together the three studies provided consistent evidence that increasing maternal fluoride levels were associated with lower IQ scores in the children.”

NTP - “We have no basis on which to state that our findings are not relevant to some children or pregnant people in the United States.”

NTP - “Several of the highest quality studies showing lower IQs in children were done in optimally fluoridated (0.7 mg/L) areas...many urinary fluoride measurements exceed those that would be expected from consuming water that contains fluoride at 1.5 mg/L.” (page 346 of the NTP Meta analysis).

New Zealand fluoridates at 0.85 mg/L (range between 0.7 – 1 mg/L).

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A Ministry of Health spokesperson told Stuff: “Much of the evidence presented in the NTP report comes from studies that involve relatively high fluoride concentrations and is not applicable to the fluoridation of water in municipal water sources.”

Rebuttal

In response to a similar comment from a peer reviewer, the NTP said “We do not agree with this comment...our assessment considers fluoride exposures from all sources, not just water...because fluoride is also found in certain foods, dental products, some pharmaceuticals, and other sources... Even in the optimally fluoridated cities...individual exposure levels...suggest widely varying total exposures from water combined with fluoride from other sources.”

NTP found that the Green and Till studies from Canada, with lower fluoride levels than NZ, were of high quality.

New Zealand has a high tea drinking population. Tea contains high levels of fluoride. A [study published in 2017](#) provides data on how much fluoride many New Zealanders are being exposed to through their tea consumption.

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Misinformation about fluoride isn't new. Community water fluoridation isn't new, either.

Some people have incorrectly claimed the report had been suppressed. It's online. It just has not been formally published because it's under review. Peer review – where fellow scientists look for errors – is an important part of the scientific process.

Rebuttal

The Report was withheld from the public even though it had been peer reviewed twice. Normally NTP reviews only go through one peer review process, In May 2022, the US Associate Secretary Health, prevented the Report from being released claiming the review needed even more peer review. However, because of the current court case in the US the judge ordered the Report had to be released. The judge ordered that the NTP had to also release all the reviewer comments and the NTP responses so the court was provided with a full understanding of everything that had been considered.

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“Research on fluoride can influence exposure guidelines or regulations, so it is important for it to be able to withstand scientific scrutiny,” the ministry spokesperson said. It's known excessive consumption of fluoride can present

health risks, the most common being dental fluorosis – a tooth enamel defect resulting in white marks on the teeth. Progressively higher levels can increase risks of bone disease, skeletal fluorosis.

Rebuttal

According to the last research done in NZ (2009) to ascertain levels of dental fluorosis, [Kanagarathnam](#) et al found 30% of children have some form of dental fluorosis. The study also found children who lived continuously in fluoridated areas were over four times more likely to have dental fluorosis than children who lived continuously in non-fluoridated areas.

The Cochrane Review (Gold standard in research) found that 40% of adolescents had dental fluorosis and 12% was of cosmetic concern in areas that fluoridated. It's known excessive consumption of fluoride can present health risks, the most common being dental fluorosis – a tooth enamel defect resulting in white marks on the teeth. Progressively higher levels can increase risks of bone disease, skeletal fluorosis.

Dental fluorosis is the first outward sign of overexposure to fluoride i.e. fluoride poisoning.

Stuff

While there's some research to suggest very high levels and chronic exposure can potentially have negative neurodevelopmental and cognitive impacts, experts say this isn't a concern at the levels we're exposed to in New Zealand.

Rebuttal

Quotes from unnamed "experts" are meaningless. They should be named and the studies on which they base their view need to be cited to have any credibility.

The NTP Report states "We have no basis on which to state that our findings are not relevant to some children or pregnant people in the United States."

"Several of the highest quality studies showing lower IQs in children were done in optimally fluoridated (0.7 mg/L) areas.... Many urinary fluoride measurements exceed those that would be consuming water than contains fluoride at 1.5 mg/L."

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Using data from the Dunedin Multidisciplinary Health and Development Study, researchers have studied the relationship between community water fluoridation and lower IQ in childhood and adulthood. The study, published in 2015,

concluded: “These findings do not support the assertion that fluoride in the context of [community water fluoridation] programs is neurotoxic.”

Rebuttal

The study using data from the Dunedin Multidisciplinary study was carried out by dentist, Jonathan Broadbent. That study was excluded from the NTP Report as it was considered of low quality and at risk of bias. Providing their reasoning for excluding the Broadbent study, the NTP said “In one case, multiple sources of fluoride exposure were assessed separately without properly controlling for the other sources of exposure, which could bias the results (Broadbent et al. 2015). Broadbent et al. (2015) assessed fluoride exposure in three ways: use of community water in a fluoridated area versus a non-fluoridated area, use of fluoride toothpaste (never, sometimes, always), or use of fluoride tablets prior to age 5 (ever, never). The same children were used for each analysis without accounting for fluoride exposure through other sources.

For example, there were 99 children included in the non-fluoridated area for the community water evaluation, but there is no indication that these 99 children were not some of the 139 children that had ever used supplemental fluoride tablets or the 634 children that had always used fluoride toothpaste. Therefore, comparing fluoridated areas to non-fluoridated areas without accounting for other sources of exposure that might occur in these non-fluoridated areas would bias the results toward the null”. (page 722 of the meta- analysis).

For comparison, it was found the the exposure to lead through paint and car fumes amounted to a reduction in four IQ points. This was enough to cause serious widespread concern throughout the world and lead was removed from these products. See study on Lead by the [Dunedin Multidisciplinary Health and Development Study](#) published in JAMA in 2017.

Stuff

In 2014 review by the Royal Society of New Zealand and the office of the Prime Minister’s chief science adviser of scientific evidence for and against the safety of fluoridation of public water supplies found “on the available evidence there is is no appreciable effect on cognition arising from [community water fluoridation]”.

Rebuttal

The [2014 NZ Report](#) on fluoridation is completely outdated. The NTP say half of the high-quality studies have been carried out since 2015. The NZ Report originally stated in its summary findings on IQ “Further, the claimed shift of less than one IQ point suggests that this is likely to be a measurement or statistical artefact of no functional significance”. The authors of the NZ Report were made to change this as they had mistakenly said “less than one IQ point” when in fact it was “less than one standard deviation”. The Report was amended to say standard deviation but the conclusion that it “is likely to be a measurement or

statistical artefact of no functional significance“, was not changed, even though one standard deviation is 15 IQ points and drop being discussed was 7 IQ points.

The NTP review highlights that a loss of 5 IQ points across a society is serious. “Although the estimated decreases in IQ may seem small, research on other neurotoxicants has shown that subtle shifts in IQ at the population level can have a profound impact on the number of people who fall within the high and low ranges of the population’s IQ distribution. For example, a 5-point decrease in a population’s IQ would nearly double the number of people classified as intellectually disabled.” (page 476 of the meta-analysis).

Stuff

The authors said: “[We] conclude that the efficacy and safety of fluoridation of public water supplies, within the range of concentrations currently recommended by the Ministry of Health, is assured.” Fluoridation remains the safest and most appropriate approach for promoting dental public health, they said.

Rebuttal

In non-fluoridated Scotland they have a [Childsmile programme](#) that involved school and nursery school tooth brushing. This has been hugely successful reducing dental decay rates in children significantly and halved the number of children needed general anaesthetics.

Stuff

In 2021, the office examined new evidence on water fluoridation and found the conclusions of the 2014 report “remain appropriate”. Jonathan Broadbent, a professor at Otago University’s Department of Oral Sciences and the lead author of the 2015 paper, told Stuff, “there are measurable benefits to oral health” with community water fluoridation.

Rebuttal

Studies by New Zealand researchers Schluter, Kanagaratham and others have found no major difference in decay rates between fluoridated and non-fluoridated areas.

The NZ School Dental Statistics that provides data for all 5 year old children and all Year 8 children, who attend the school dental service (most children), finds virtually no difference in dental decay rates when comparing the combined average in nonfluoridated areas and fluoridated areas. In some years, and always in some areas, children in nonfluoridated areas do better than children in the fluoridated areas. As mentioned above, Cochrane, the Gold Standard in medical science review found there was no modern evidence that fluoridation is effective in reducing dental decay.

Stuff

He added “there is a need for ongoing research” on potential risks, particularly in understudied areas such as this.

Rebuttal

If there is a need for ongoing research, it means promoters do not actually know that fluoridation is not causing harm. Therefore, fluoridation needs to be stopped immediately. The Government does not have a right to carry out medical experiments on the population without informed consent.

Stuff

New Zealand dentist and Dental Association spokesperson Dr Rob Beaglehole also emphasised the need for ongoing research. However, the levels of fluoride added to drinking water are “almost homeopathic”. To reach an acute toxic dose, an adult would need to drink between 1200 and 1500 glasses of water a day.

Rebuttal

If levels added to drinking water are “almost homeopathic” then what is the mechanism for it to provide dental benefit? How is it that at least 30% of children in New Zealand have some form of dental fluorosis and children in fluoridated areas are four times as likely to be adversely affected? In 1999 the US Government’s Centers for Disease Control advised that the primary benefit from fluoride is topical rather than systemic i.e. it works on the outside of the teeth, not from swallowing.

In 2013 at the Hamilton City Council Tribunal, Dr Robin Whyman (former Principal Dental Officer for the MoH) [gave testimony to the Council](#) explaining how fluoridation is supposed to prevent dental decay. He stated that when fluoride is swallowed, it is stored in the bones and soft tissue. Around 50% of it is then released during the day into the blood stream and eventually secreted by the salivary glands, providing a topical benefit to the tooth surface. But simple math shows this new theory does not hold water any more than the older disproven theory as the amount of fluoride required for topical benefit is much higher than what is secreted from the salivary glands. The Ministry of Health advises that children should brush their teeth with adult strength toothpaste containing fluoride of 1,000 parts per million (ppm) rather than the child strength toothpaste, which only has 400ppm. They say that 400ppm is not strong enough to provide a benefit. Yet fluoridated water only contains 0.85ppm and the amount secreted into the salivary glands is only 0.016ppm.

This doesn’t add up. If 400ppm child strength is not strong enough to provide a benefit, how can the 0.016ppm that is secreted from the salivary glands provide a benefit? 0.016ppm is approximately 62,500 times less fluoride than 1,000ppm in adult strength toothpaste.

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Numerous studies have shown children and adults living in areas with community water fluoridation have significantly less tooth decay. (In children, up to 40% less decay.) And tooth decay is one of the leading causes of preventable hospitalisations for children in New Zealand. Beaglehole says fluoride isn't the only answer: "The number one reason we get decay is dietary sugar".

Rebuttal

We assume Dr Beaglehole is referring to the [2009 Oral Health survey](#) which states in its own report should not be used as a fluoridation study. As stated above, the Cochrane review found that there were no modern (post 1970) studies on tooth decay that could be relied on.

The MoH and fluoridation promoters such as Drs Broadbent and Beaglehole are ignoring the highly successful Scotland Childsmile Programme that has seen outstanding results such as a halving of the number of general anaesthetic operations needed for severe tooth decay.

Stuff

In summary Numerous studies have shown the oral health benefits of community water fluoridation. Namely, the prevention of tooth decay among children. The levels of fluoride in fluoridated water in Aotearoa New Zealand are in line with those recommended by key public health agencies around the world including the World Health Organisation. There has been no serious suggestion current levels pose any neurodevelopmental or cognitive risks to children (or adults).

Rebuttal

In the closing discussion in the US Government's National Toxicology Program's Monograph they state:

"This review finds, with moderate confidence, that fluoride exposure is associated with lower IQ in children. The association between higher fluoride exposure and lower IQ in children was consistent across different study populations, study locations, study quality/risk-of-bias determinations, study designs, exposure measures, and types of exposure data (group-level and individual-level). There were 19 low risk-of-bias studies that were conducted in 15 study populations, across 5 countries, and evaluating more than 7,000 children. Of these 19 studies, 18 reported an association between higher fluoride exposure [e.g., represented by populations whose total fluoride exposure approximated or exceeded the WHO Guidelines for Drinking-water Quality of 1.5 mg/L of fluoride (WHO 2017)] and lower IQ." (page 82 of the Monograph)

Note: WHO guidelines assume 1.5 mg/L constitutes total exposure of 1.5 mg per day.

The NTP also comment:

“We have no basis on which to state that our findings are not relevant to some children or pregnant people in the United States.” “Several of the highest quality studies showing lower IQs in children were done in optimally fluoridated (0.7 mg/L) areas...many urinary fluoride measurements exceed those that would be expected from consuming water that contains fluoride at 1.5 mg/L.” (page 352 of the Meta Analysis)

New Zealand fluoridates at a higher level than the US so this comment is even more pertinent to NZ. It is not truthful for Stuff’s “Whole Truth” to say that findings from NTP are not credible.

Stuff

Reporting disclosure statement: This post was written with expert advice from Jonathan Broadbent, a professor of dental public health, Dr Rob Beaglehole, New Zealand Dental Association spokesperson, and the Ministry of Health.

Rebuttal

The “Whole Truth” did not seek comment from opponents of fluoridation and can therefore not be considered “the whole truth” as it is only providing one side of a very contentious debate. The current court case in the US provides [affidavits from world renown scientists](#) who are far more qualified to speak to this issue than two New Zealand dentists or anyone in the New Zealand Ministry of Health.