

Submission to Health Select Committee

Health (Fluoridation of Drinking Water) Amendment Bill

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I confirm that I wish to be heard in select committee.

I oppose this bill.

My submission is in three parts:

- PART I: DHBs should not decide if water is fluoridated
- PART II: The scope of the bill is too narrow
- PART III: Critique of government supplied information

PART I: DHBs should not decide if water is fluoridated

If DHBs make the decision, fluoridation would be a pre-determined outcome:

The stated purpose of this Bill¹ is to transfer power of decision-making regarding fluoridation to the DHBs. However, there is a pre-determined expectation of the government that fluoridation will go ahead if this is passed. DHBs after all, are expected to follow MoH guidelines. For example

- This bill states “This power replaces territorial local authorities’ decision-making responsibilities about fluoridation of drinking water. Transferring decision-making to DHBs is expected to enable extended fluoridation coverage, which would improve the status of oral health in New Zealand”²

¹ <http://www.legislation.govt.nz/bill/government/2016/0208/latest/whole.html - DLM7033750>

² ibid ref 1.

- The Minister of Health, Jonathan Coleman, stated “Putting water fluoridation in the hands of district health boards, rather than local councils, should lead to more water supplies being fluoridated”³
- The Ministry of Health (MoH) disclosure statement says “Transferring decision-making to DHBs is expected to enable extended fluoridation coverage, which would improve the status of oral health in New Zealand”⁴

As such it is only reasonable for citizens to assume it is a fait accompli - that if the bill is passed, we will all receive fluoridation in our water.

Effectively, the select committee is voting for compulsory fluoridation.

Debates in the House (as per Hansard)⁵ on this bill are dominated by members’ opinions on fluoride itself with little discussion on the merits of the actual democratic aspects of transferring this power to a more centralised body or what other more suitable options there may be.

The main reason for rejecting this bill is that the bill is only being proposed to fill a pre-determined outcome of the government, which believes it can force its stance on the population.

Transference of this decision to DHBs should not occur in order to make it is more likely that the government will achieve their pre-determined preferred outcome (as clearly alluded to in the intention of this bill).

If DHBs make the decision, the process is less democratic:

- The bill centralises the decision making process. This decision should be made in the most consultative and informed way possible. DHBs are not known for extensive hearings and consultation with the community. This is a step backwards for democracy.
- There is an obligation for DHBs to follow the guidelines of the MoH and they are under political pressure to do so. As such, it is not really an independent decision.

³ <http://www.stuff.co.nz/national/health/78830036/Water-fluoridation-DHBs-to-take-control-from-councils-under-Govt-proposal>

⁴ <http://disclosure.legislation.govt.nz/bill/government/2016/208>

⁵ https://www.parliament.nz/en/pb/hansard-debates/rhr/combined/HansD_20161206_20161206

The DHBs should not make the decision, because the issue is highly controversial:

- From reading the NZ 2014 Review⁶ I note the authors are acutely aware of the huge controversy surrounding the question of water fluoridation. The controversy and strong public opinion itself – either for or against – is exactly the reason why fluoride should be an *opt-in* only treatment for the population. (Fluoride tablets can be made available cheaply, whereas *opt-out* for individuals is expensive – filtration units are about \$500, it is cumbersome to collect and transport drinking and cooking water, and not all people are aware of the issues).
- Fluoride is known and proven to be toxic at the higher dose range, as extensively discussed by the government’s NZ 2014 review⁷, the World Health Organisation⁸, the National Research Council (NRC) Review⁹, and it is classified as toxic.¹⁰
- It is inconclusive that fluoride is safe at much lower doses¹¹ – Note, inconclusiveness does not constitute proof of safety
- The range between “toxic” levels and purportedly “safe” levels is very narrow
- Fluoride is used and sold¹² as a poison
- When fluoride is put in public water it is tantamount to forcing it on the population

I urge the committee to consider with an open mind the information from all opponents to the bill. I find it disturbing that people questioning the addition of a known toxin to the public drinking water (at any dose) justifies them being called a “tin foil hat wearing, UFO abducted, pseudoscientist” as Peter Dunne did in the House¹³.

⁶ <http://royalsociety.org.nz/media/2014/08/Health-effects-of-water-fluoridation-Aug-2014-corrected-Jan-2015.pdf>

⁷ *ibid.* ref 6.

⁸ <http://www.who.int/ipcs/features/fluoride.pdf?ua=1>

⁹ <https://www.nap.edu/read/11571/chapter/1>

¹⁰ <http://hazard.com/msds/mf/baker/baker/files/s3722.htm>

¹¹ *ibid.* ref 8.

¹² http://www.nofluoride.com/sodium_fluoride_uses.htm

¹³ https://www.parliament.nz/en/pb/hansard-debates/rhr/combined/HansD_20161206_20161206

Screen shot from one of many hazard websites¹⁴:

Ingestion:

Toxic! May cause salivation, nausea, vomiting, diarrhea, and abdominal pain. Symptoms of weakness, tremors, shallow respiration, cardopedal spasm, convulsions, and coma may follow. May cause brain and kidney damage. Affects heart and circulatory system. Death may occur from respiratory paralysis. Estimated lethal dose = 5-10 grams.

The issue is also controversial, because whether it is a poison or a medicine: all forms of fluoride act the same way in the body

To quote the NZ 2014 Review¹⁵, “There have been assertions that ‘artificial’ fluorosilicates differ from ‘natural’ fluorides in their dissolution in water and their bioavailability following ingestion in humans. Jackson et al.[27] addressed these issues, and determined that HFA¹⁶ used to fluoridate water is effectively 100% dissociated to form fluoride ion under water treatment conditions”. The review further states:



Figure 2 Sodium fluoride sold as poison

“In terms of chemistry and bioavailability there is no difference between added and “natural” fluoride. The laws of chemistry dictate that fluoride ions in solution in water are identical regardless of their source.”



Figure 1 Sodium fluoride tablets sold for cavity prevention

The World Health Organisation back this up by saying “The fluoride in final water is always present as fluoride ions, whether from natural sources or from artificial fluoridation.”¹⁷

Screen shot from World Health Organisation¹⁸

Adverse effects of excess fluoride

- The toxic effects of high fluoride intake are due to the fact that it is a direct cellular poison, which binds calcium and interferes with the activity of proteolytic and glycolytic enzymes.

Note that the World Health Organisation has extensive information documenting how to get fluoride out of drinking water if it is too high, due to health concerns¹⁹.

¹⁴ <http://hazard.com/msds/mf/baker/baker/files/s3722.htm>

¹⁵ Ibid. ref 6. Pg 23.

¹⁶ Hydro Fluorosilicic Acid

¹⁷ http://www.who.int/water_sanitation_health/dwq/GDW12rev1and2.pdf pg 376

¹⁸ Ibid. ref 8.

¹⁹ http://www.who.int/water_sanitation_health/publications/fluoride_drinking_water_full.pdf

Immoral controversy: #1

The very first thing we were taught in Medicine class during my 4th year of Veterinary School was *Primum non nocere* - “above all, do no harm”. We were also told this is the underlying Hippocratic oath for the medicine students. This is why, right now the burden of proof of safety sits entirely with the select committee.

Screen shot from the NZ 2014 review²⁰ (pg 5), states (...it is...)

important to note that the inherent nature of science is such that it is never possible to prove there is absolutely no risk of a very rare negative effect – science can only draw conclusions that are highly probable, but not absolute.

and pg 16 states

There is, however, considerable ongoing debate about the long-term safety of adding fluoride to drinking water, because it is difficult to determine cause and effect and to definitively rule out all potential risks. The nature of science is such that no conclusion can be absolute, and while something can be readily proved to be unsafe, conceptually it is never possible to say that something has absolutely no risk associated with it. In other words, epidemiological methods cannot prove beyond a shadow of a doubt that there is no negative effect – it can make a conclusion highly probable, but not 100% certain. Absolute certainty is therefore an impossible claim. Demanding it can lead to the inappropriate use of the precautionary principle, causing unnecessary public alarm when the weight of evidence indicates that significant harm is extremely unlikely. Most recently, the CWF

Screen shot from Wikipedia²¹

Precautionary principle

From Wikipedia, the free encyclopedia

The **precautionary principle** (or **precautionary approach**) to **risk management** states that if an action or policy has a suspected risk of causing harm to the **public**, or to the **environment**, in the absence of **scientific consensus** (that the action or policy is not harmful), the **burden of proof** that it is *not* harmful falls on those taking that action.

I refute that the public are making inappropriate use of the precautionary principle, or that we are causing unnecessary public alarm. The scientific consensus is that there is insufficient evidence to conclude that fluoride does not cause harm at lower doses. This does not constitute proof of safety. In fact, almost all papers call for more study to be done.

²⁰ Ibid. ref 5.

²¹ https://en.wikipedia.org/wiki/Precautionary_principle

Further:

- If there is considerable ongoing debate amongst the scientific community, it confirms the controversy is still alive and well, firm conclusions have not been formed, and the topic should be open for ongoing scientific debate.
- It confirms that the fluoride debate is inherently difficult with respect to many confounding factors, associated concomitant variables, variations in total fluoride intake from community fluoridated water (CWF) and other dietary sources, toothpaste and medicine or even drinking a lot of tea! Other factors include socio-economic status (SES), race, underlying health, or environmental pollution.
- We should be considering the scientific conclusions that give a statistical certainty within limits, which is a quantifiable outcome. Then we know the certainty we are working with. This is what science does for us, and it is not an “impossible claim”. There are standard techniques by using standard deviations and probability calculations that give us statistical certainty within limits. It is not an unobtainable or unreasonable expectation that these are given. Limits should be set, risks should be reported, and the precautionary principle should be upheld by the authorities using the results. Claiming that there are no certainties in science is no excuse for disregarding this precautionary principle. The question is only where do the limits lie?

“If there is any doubt, leave it out”

Immoral controversy: #2

A recent High Court ruling decided compulsory fluoride treatment does not breach Article 11 of the Bill of Rights – (that we have the right not to be medicated by force) - although that decision is being challenged. I do question: was the Judge aware of all the international reviews and meta-analysis about fluoride before he concluded that it was safe? Or was he relying on the NZ 2014 review? I do not understand the logic: fluoride is put in the water to have an effect on our bodies. This is what a medicine does.

However, this aside, as an opponent of forced fluoridation, and as a Veterinary Medicine graduate, my opinion is that if there is inconclusive evidence as to safety of fluoride – at any dose - by scientists, then fluoridation of our water supply should not be compulsory according to our own personal moral code as a society. Remember, fluoride is put in the water to treat the people, not the water.

Immoral controversy: #3

To ensure there were no repercussions resulting from the Court ruling above, the government passed a bill which specifically defined fluoride as **not** being a medicine. This is mincing words. The government is not fooling anyone. They're passing legislation to ensure a pre-determined outcome.

“Compulsory medication by any other name, is still compulsory medication”

Immoral controversy: #4

The United Nations (UNESCO) Universal Declaration on Bioethics and Human Rights (2005), Article 6, states that: “in no case should a collective agreement or the consent of a community leader or other authority substitute for an individual’s informed consent”²². I am unable to confirm whether NZ is a signatory to this declaration. However, I ask you to appreciate that the UN is a body to whom NZ has given great amount of respect, clout and kudos over the decades. Below is an excerpt from this article.

Universal Declaration on Bioethics and Human Rights (2005) Article 6:

Article 6 – Consent

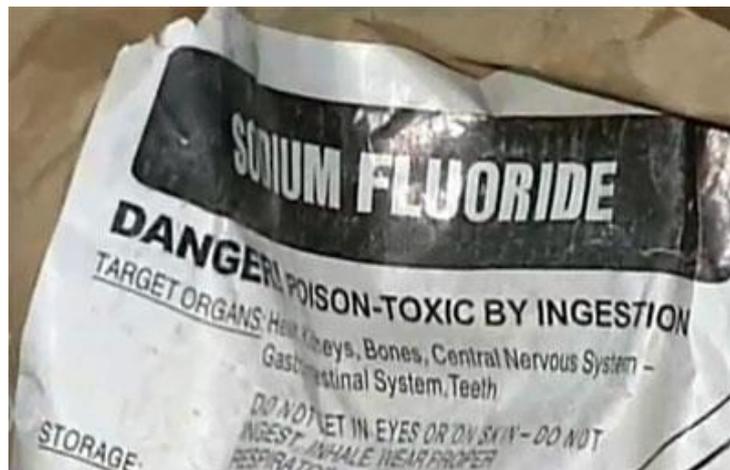
1. Any preventive, diagnostic and therapeutic medical intervention is only to be carried out with the prior, free and informed consent of the person concerned, based on adequate information. The consent should, where appropriate, be express and may be withdrawn by the person concerned at any time and for any reason without disadvantage or prejudice.
2. Scientific research should only be carried out with the prior, free, express and informed consent of the person concerned. The information should be adequate, provided in a comprehensible form and should include modalities for withdrawal of consent. Consent may be withdrawn by the person concerned at any time and for any reason without any disadvantage or prejudice. Exceptions to this principle should be made only in accordance with ethical and legal standards adopted by States, consistent with the principles and provisions set out in this Declaration, in particular in Article 27, and international human rights law.
3. In appropriate cases of research carried out on a group of persons or a community, additional agreement of the legal representatives of the group or community concerned may be sought. In no case should a collective community agreement or the consent of a community leader or other authority substitute for an individual’s informed consent.

Following on from the moral considerations and the extensive controversy over the issue of the safety of fluoride in our drinking water, I am dismayed to find that the Associate Minister for Health, Peter Dunne, intends to embark on a tax-payer funded campaign to “mitigate reaction”. I find this unethical. Below is an excerpt from a letter to cabinet by Peter Dunne²³.

²² http://portal.unesco.org/en/ev.php-URL_ID=31058&URL_DO=DO_TOPIC&URL_SECTION=201.html

²³ <http://www.health.govt.nz/system/files/documents/pages/cabinet-paper-decision-making-fluoridation-drinking-water-supplies.pdf>

54 The successful implementation of this decision relies on public support for the policy. Given that water fluoridation appears to be a low-risk, high-controversy issue, the Ministry would work with DHBs and local authorities to mitigate the level of public reaction, in order to win acceptance for the extension of water fluoridation. Practical measures to be considered when fluoridation is being extended include: providing access to a source of unfluoridated water; using well-designed surveys to seek a public response; and regularly publishing the monitoring reports of fluoride levels in the drinking water and the quality analysis of the sodium fluoride used in the treatment of water.



PART II: The scope of the bill is too narrow

This bill does not allow DHBs to assess or consider any of the reviews or literature studying the risks of fluoride on the body as a whole. Nor does it allow for them to periodically review updated literature regarding new findings of overall health risks. I consider this a serious and negligent oversight.

In the media snippet below, Health Minister Jonathan Coleman assures us that the DHBs have got the resources to gather the scientific information to make the right decision. He omits to mention that this bill will only allow them to do this with reference to teeth and cost. This statement sounds reassuring but is completely misleading.

Screenshot from Media snippet²⁴

"They [DHBs] know health and they're very focused on the health needs of their communities, and they've also got the resources to gather the scientific information and make the right decision."

²⁴ <http://www.stuff.co.nz/national/health/78830036/Water-fluoridation-DHBs-to-take-control-from-councils-under-Govt-proposal>

The disclosure statement demonstrates this²⁵:

In deciding whether to make a direction, DHBs will be required to consider scientific evidence and whether the benefits of adding fluoride to drinking water outweigh the financial costs, taking into account local oral health status, population numbers, and financial cost and savings.

The DHB mandate will be²⁶:

- (2) In deciding whether to make a direction, the district health board must consider—
 - (a) scientific evidence on the effectiveness of adding fluoride to drinking water in reducing the prevalence and severity of dental decay; and
 - (b) whether the benefits of adding fluoride to the drinking water outweigh the financial costs, taking into account—
 - (i) the state of the oral health of its resident population; and
 - (ii) the number of its resident population to whom the local government drinking-water supplier supplies drinking water; and
 - (iii) the likely financial cost and savings of adding fluoride to the drinking-water supply, including any additional financial costs of ongoing management and monitoring.

If the DHBs are to decide on fluoridation, then at the very least, the following clause should be inserted in to the bill:

In deciding whether to make a direction, the district health board must consider--

- 2c) scientific evidence of all detrimental effects of fluoride on overall health—
 - i) taking in to account all organ systems of the human body
 - ii) ensuring confidence of safety and recognition that lack of evidence does not constitute proof of safety
 - iii) reviewing new and updated information periodically
 - iv) taking in to account all possible fluoride exposures including, but not limited to, water, food, dental products, medicines, air and environmental toxins.
 - v) taking in to account various sub-population variances including body weight and consumption, diseased body systems, babies and the vulnerable.
 - v) ensuring there is very low risk of possible harm for all groups
 - vi) giving full disclosure of all sources and references to justify decisions
 - vii) allowing public submissions and hearings and consider all evidence before any direction is made, or any change of direction in future

²⁵ *ibid.* ref 4.

²⁶ *ibid.* ref 1.

PART III: Critique of government supplied information

With respect to statements made in this section, I have commented specifically on the NRC review 2006²⁷, the NZ 2014 Review²⁸, as well as some other significant papers. The NRC review was cited in the NZ 2014 review many times, but mostly to explain why the MoH do not conclude that their results apply to the NZ situation. This section shall explain why I disagree.

The NRC produced one of the most extensive and thorough reviews on the overall health aspects of fluoride as requested by the Environmental Protection Agency (EPA). This study was a meta-analysis, took years to complete, involved an extensive panel of experts and had a large budget (see Review comparison on pg 17 of this submission)

The NZ 2014 review analysed and commented on parts of the NRC review, but was, in itself not a meta-analysis and reviewed the work already done by the NRC.

Ministry of Health Disclosure statements:

Screenshot from MoH disclosure statement²⁹

The World Health Organization and other international health authorities have endorsed water fluoridation as the most effective public health measure for the prevention of tooth decay.

However, as previously discussed, the WHO is also cognitive of the fact that fluoride is a direct cellular poison³⁰

²⁷ Ibid. ref 9.

²⁸ Ibid. ref 6.

²⁹ Ibid. ref 4.

³⁰ Ibid. ref 8.

The safety and efficacy of water fluoridation has been evaluated many times, and systematic reviews consistently find that it prevents and reduces dental decay and does not cause harmful health effects. This includes a study recently published by the Cochrane Collaboration:

Iheozor-Ejiofor Z, Worthington HV, Walsh T, O'Malley L, Clarkson JE, Macey R, Alam R,

Tugwell P, Welch V, and Glenny AM. 2015. Water fluoridation for the prevention of dental caries. Cochrane Database of Systematic Reviews: Issue 6. Access:

<http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD010856.pub2/full>

The statement made is that this Cochrane report is an example of a study showing that “fluoride does not cause harmful health effects”. However, this was not part of the scope of the Cochrane review which did not even address this issue of overall health at all.

The Cochrane report was also incorrectly represented by the MoH because, in the Cochrane report there was considered to be a high risk of bias in the data used, and as such the authors’ conclusion was that there was little evidence as to the benefit of fluoridation. This was also reported as such in the media³². A screenshot of the Cochrane report conclusion is below³³.

Authors' conclusions

There is very little contemporary evidence, meeting the review's inclusion criteria, that has evaluated the effectiveness of water fluoridation for the prevention of caries.

The available data come predominantly from studies conducted prior to 1975, and indicate that water fluoridation is effective at reducing caries levels in both deciduous and permanent dentition in children. Our confidence in the size of the effect estimates is limited by the observational nature of the study designs, the high risk of bias within the studies and, importantly, the applicability of the evidence to current lifestyles. The decision to implement a water fluoridation programme relies upon an understanding of the population's oral health behaviour (e.g. use of fluoride toothpaste), the availability and uptake of other caries prevention strategies, their diet and consumption of tap water and the movement/migration of the population. There is insufficient evidence to determine whether water fluoridation results in a change in disparities in caries levels across SES. We did not identify any evidence, meeting the review's inclusion criteria, to determine the effectiveness of water fluoridation for preventing caries in adults.

There is insufficient information to determine the effect on caries levels of stopping water fluoridation programmes.

There is a significant association between dental fluorosis (of aesthetic concern or all levels of dental fluorosis) and fluoride level. The evidence is limited due to high risk of bias within the studies and substantial between-study variation.

³¹ Ibid. ref 8.

³² <http://europe.newsweek.com/fluoridation-may-not-prevent-cavities-huge-study-shows-329505?rm=eu>

³³ <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD010856.pub2/full>

Incidentally to this Cochrane report, another paper³⁴ published in Researchgate last month, (Jan 2017), used all the MoH data for Auckland obtained under the Official Information Act (OIA) and once all the data was re-analysed, found there was no significant difference in caries for those children receiving fluoridated water. I note that even the WHO phrase one comment as “...there is *evidence* of fluoride being a beneficial element with regard to the prevention of dental caries”³⁵ I thought this was telling, coming from an organisation ultimately endorsing water fluoridation, that they justify their endorsement on “evidence” rather than “established proof”.

There is plenty more information questioning the effectiveness of fluoride on caries but that is not the scope of this submission. I raise this only as it relates to the conclusions drawn by the Cochrane report.

Overall health implications:

There are many overall health concerns regarding fluoride. However, skeletal fluorosis and bone fractures are two main areas of main concern as fluoride interacts most in places of calcification such as in teeth and bones. So, I have addressed these. The other area I have chosen to address is that of neurotoxicity due to the serious nature of this.

Skeletal Fluorosis

The World Health Organisation recognises that one of the main effects of fluoride is fluorosis³⁶. Tens of millions of people are likely to suffer skeletal fluorosis due to high fluoride levels³⁷. Fluoride causes an elevated risk of skeletal fluorosis at high levels of 6mg/day upwards according to the WHO information below³⁸, however in a separate document they say fluorosis (with adverse changes in bone structure) may be observed when drinking water contains 3–6 mg of fluoride per litre³⁹.

³⁴https://www.researchgate.net/publication/312946717_The_effect_of_community_water_fluoridation_on_the_incidence_and_severity_of_tooth_decay_in_31720_Auckland_children_working_paper?sg=lZkThEWb7wLG-3ZbK2pAOrfOSC4P2d7B90yBfFYoNj7FKzCsXNB9cwKws7XOyQ

³⁵ Ibid. 17 pg 377

³⁶ Ibid. Ref. 8.

³⁷ Ibid. Ref.8.

³⁸ Ibid. Ref. 8.

³⁹ Ibid. Ref. 17. Pg 377

- In *skeletal fluorosis*, fluoride accumulates progressively in the bone over many years. Early symptoms include stiffness and pain in the joints. Crippling skeletal fluorosis is associated with osteosclerosis, calcification of tendons and ligaments, and bone deformities. There is an elevated risk of skeletal effects at fluoride intakes above 6 mg/day. These intake levels occur in many areas of the world because of naturally high fluoride levels in the groundwater, notably in the Rift Valley of East Africa and in China.
- While the global prevalence of dental and skeletal fluorosis is not entirely clear, it is estimated that excessive fluoride concentrations in drinking-water have caused tens of millions of cases of dental and skeletal fluorosis worldwide over a range of years.¹¹

If we estimate the adult daily intake of water is 2L a day, with our CWF levels of 0.7 mg/L, that would be 1.4 mg a day just from water. According to the WHO, this nearly 50% of the lowest 3mg dose needed to reach the WHO risk of developing clinical symptoms of skeletal fluorosis. This is too close for comfort because (as previously discussed under “precautionary principle”) we are exposed to fluoride from many other sources.

This problem of studying the pathophysiology of fluoride exposure is often commented on in journals. There are many confounding factors. These include that fluoride is not just in water, but in food, in toothpaste, in dental products and in medicines. There are a multitude of confounding variables that include socio-economic status (SES), race and environmental exposure.

As such, the NRC modelled the outcome of fluoride on skeletal fluorosis⁴⁰ and concluded “Thus, more research is needed to clarify the relationship between fluoride ingestion, fluoride concentrations in bone, and stage of skeletal fluorosis before any conclusions can be drawn.”

While this was not conclusive they did say “The models estimated that bone fluoride concentrations resulting from lifetime exposure to fluoride in drinking water at 2 mg/L (4,000 to 5,000 mg/kg ash) or 4 mg/L (10,000 to 12,000 mg/kg ash) fall within or exceed the ranges historically associated with stage II and stage III skeletal fluorosis (4,300 to 9,200 mg/kg ash and 4,200 to 12,700 mg/kg ash, respectively).”

If adults receiving only three times (2mg/L) the tap water concentration we do (0.7g/L) fall within or exceed ranges historically associated with clinical symptoms of skeletal fluorosis, there is sufficient doubt as to its safety.

⁴⁰ <https://www.nap.edu/read/11571/chapter/2-5>

The gap between what is being given in water and the lowest point at which fluoride is *said* to be toxic is a very narrow range. This is significant because, as discussed above there are so many other confounding variables.

Worse, this only takes in to account the point when overt clinical symptoms begin, and the NRC study does not even account for stage I skeletal fluorosis – where subclinical pathology occurs. Subclinical pathology is not yet able to be diagnosed. There is no data or information on the extent of subclinical skeletal fluorosis.

Fluoride is cumulative in bone

The WHO confirms⁴¹ that fluoride exposure in bone is progressively accumulative and this is also confirmed in by the NRC Review⁴². The WHO also said 99 per cent of the body burden of fluoride is retained in calcium rich areas such as bone and teeth (dentine and enamel). Infants retain about 80 to 90 per cent of the absorbed fluoride whereas adults retain about 60 per cent of absorbed fluoride⁴³.

The NZ 2014 Review⁴⁴ said fluoride *can* be released back into blood as bone is remodelled. It did not mention that fluoride in teeth and bone are mobilized *after external exposure has ceased* or been reduced⁴⁵. Instead, the NZ 2014 review said blood levels are determined by intake and exchange with fluoride accumulated in remodelling bone. Their reference⁴⁶ was a study from the 1980s which showed that an increase in blood fluoride (from bone releasing fluoride) occurred in only six patients with pathologic, chronic bone resorption conditions. This is insufficient evidence to conclude that fluoride is not cumulative in normal healthy bone or to conclude that the calcium in the bone releases the fluoride readily in a healthy individual.

The NZ 2014 Review did say the body has no direct homeostatic control over fluoride, which is of further concern.

⁴¹ Ibid. Ref 8.

⁴² Ibid. Ref 33.

⁴³ http://apps.who.int/iris/bitstream/10665/43514/1/9241563192_eng.pdf?ua=1 pg 30

⁴⁴ Ibid. Ref 6. (pg 30)

⁴⁵ Ibid. Ref 17. Pg 377

⁴⁶ [https://www.ncbi.nlm.nih.gov/pubmed/?term=Clin+Sci+\(Lond\),+1980.+58\(2\)%3A+p.+145-52+Serum+inorganic+fluoride](https://www.ncbi.nlm.nih.gov/pubmed/?term=Clin+Sci+(Lond),+1980.+58(2)%3A+p.+145-52+Serum+inorganic+fluoride)

No study has established what dose, over what time, or how many people have subclinical skeletal fluorosis. The NZ 2014 review states skeletal fluorosis has not been known to occur in NZ. However, the question remains as to whether this has been studied or looked for, or whether there is subclinical pathology or whether generalised musculoskeletal disease (skeletal fluorosis) causing joint pain of the elderly may be correlated with a life-time of fluoride exposure.

The NRC finally concludes that “more research is needed to clarify the relationship between fluoride ingestion, fluoride concentrations in bone, and stage of skeletal fluorosis before any conclusions can be drawn” That is, they could not discount that NZ community water fluoridation (CWF) levels or lower posed no risk.

Bone Fractures

The NRC report⁴⁷ concluded overall, consensus among the committee that there is scientific evidence that under certain conditions fluoride can weaken bone and increase the risk of fractures.

The NRC report stated that the committee found support for a continuous exposure-effect gradient down to 1mg/L (our water is 0.7mg/L). The committee also found that they had insufficient data available for drawing conclusions about the risk or safety of lower concentrations eg. at 2mg/L of CWF.

The NZ 2014 review⁴⁸ claimed the NRC report was irrelevant, citing our community water fluoridation levels being lower than those studied.

That the NRC study did not include our level of water fluoridation in its scope does not constitute scientific proof of safety! The continuous exposure-effect gradient may well continue past 1mg/L but it has not been studied!

The NZ 2014 Review is wrong to state that NZ CFW levels pose no risk for bone fractures.

⁴⁷ Ibid. Ref 9. Pg 7

⁴⁸ Ibid. Ref 6. Pg 48

Dental fluorosis

I want this submission to steer away from teeth per se, because I feel it is irrelevant to the question of overall human health. I accept that dental fluorosis is a cosmetic concern although prevalent. I'd like to plant the question of the possibility that the prevalence of dental fluorosis could be reflective of the degree of skeletal fluorosis. Teeth and bones both attract fluorine due to the nature of their calcification.

Neurotoxicity

I read the NZ 2014 review with some dismay as to its brevity of this important aspect.

In 2006, the NRC's chapter⁴⁹ on the topic acknowledged there was a possible important link between fluoride and IQ but that more studies needed to be done.

In 2012 there came such a study⁵⁰. A meta-analysis of 27 studies published over 22 years suggested an inverse association between high fluoride exposure and children's intelligence. Children who lived in areas with high fluoride exposure had lower IQ scores than those who lived in areas of low-exposure to fluoride. This was a landmark paper.

The paper was significant enough for the world's oldest and most prestigious medical journal, Lancet,⁵¹ to cite the conclusion that exposure to raised fluoride concentrations suggests an average decrement of IQ of seven points. It felt the quality of this study justified the listing of fluoride as a developmental neurotoxin.

The NZ 2014 review, however, claimed that this was "likely to have no functional significance"⁵² and is "not considered relevant to the situation in NZ"⁵³ citing that fluoride in the studies was higher than that of community water fluoridation in New Zealand. It also claimed confounding variables were likely.

The Lancet clearly said that confounding variables seemed unlikely. And while our fluoride water concentration is lower, it is not correct to conclude, as the review did, that there is

⁴⁹ <https://www.nap.edu/read/11571/chapter/9>

⁵⁰ <https://ehp.niehs.nih.gov/1104912/>

⁵¹ [http://www.thelancet.com/journals/lanneur/article/PIIS1474-4422\(13\)70278-3/fulltext - article_upsell](http://www.thelancet.com/journals/lanneur/article/PIIS1474-4422(13)70278-3/fulltext - article_upsell)

⁵² Ibid. Ref 6. Pg 7.

⁵³ Ibid. Ref 6. Pg 49

no effect on IQ. What has been strongly suggested is that there is a strong inverse causal link between fluoride dose and IQ, which in all probability, applies at any dose.

There was also another significant study published linking fluoride to lower IQ, but the 2014 NZ review did not review it: (Cheng H, Lynn R. The adverse effect of fluoride on children's intelligence: a systematic review. *Mankind Quarterly*. 2013;53(3/4):306–47)(This study was done long after the 2006 NRC review).

A poignant summary of the omissions of the 2014 review with respect to IQ can be found by Wellington Barrister Lisa Hansen⁵⁴. It is worth the read.

The NZ 2014 review went on to quote a paper⁵⁵ in which data from the large longitudinal Dunedin study was used. It was reported that the effects of fluoride on IQ were imperceptibly small. However, the *New Zealand Medical Journal (NZMJ)*, published by the New Zealand Medical Association (NZMA) published a response⁵⁶, critiquing the use of that data. They claimed there was not enough control of confounders - especially the use of fluoride tablets in non-fluoridated suburbs. (I was one of these children who grew up in Dunedin and took fluoride tablets). In general, they said the 2014 NZ review appears to have overstated the evidence.

As such, and as per the precautionary principle, we cannot be sure beyond reasonable doubt that the fluoride in our community water has no affect on IQ.

Overall critique of the NZ 2014 Review.

Overall, the reassurances of the NZ 2014 Review are tenuous.

Please refer to the table below which compares characteristics of each of the major historic reviews with that of the NZ 2014 paper. (Note the York Review was not quoted in this submission to the select committee). This table is courtesy of Lisa Hansen, Barrister⁵⁷.

⁵⁴ <https://openparachute.files.wordpress.com/2015/02/open-letter-from-new-health-nz-inc-to-sir-peter-gluckman-and-sir-david-skegg.pdf>

⁵⁵ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4265943/>

⁵⁶ <https://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2014/vol-127-no-1407/6394>

⁵⁷ Ibid. Ref 45

Review Comparison

Review	York	US National Research Council	NZ
Timeframe	1 year (1999-2000)	3 years (2003 – 2006)	3 months (April - July 2014)
Budget	£ 1 million	\$US 6 million	\$ NZ 50 thousand
Chair	Advisory panel: neutral; Review panel: pro-fluoridation	Pro-fluoridation	Two co-chairs, publicly committed to fluoridation
Panel makeup	There were two panels – a fully pro-fluoridation review panel and a mixed advisory panel: pro-, anti- and neutral.	13. Balanced: pro-, anti-, and neutral	5. All pro-fluoridation. Some panellists declined/resigned due to procedural concerns.
Methodology	Systematic review of original published research (approx 3,300). This was established by the UK Health Department "to prove once and for all the safety and effectiveness of fluoridation", as it was intended to launch a renewed push for expanding fluoridation. Excluded animal studies on toxicity, and medical case histories. Parameters were deliberately narrowed to exclude 100 case histories of fluoride-poisoned children received by the review Board.	Systematic review of original published research on adverse health effects of fluoride, from 1ppm upwards. 512 page report. Included animal studies on toxicity, and medical case histories. Focus was solely on health risks from fluoride; not claimed benefits.	Some original research purportedly reviewed. No record of what was rejected. No record of "anti-fluoridation" studies not cited. Pro-fluoridation panel members wrote their own summaries, gave these to the writer to consolidate, and peer-reviewed their own work. Co-chair Skegg admits that the research on toxicity is so 'vast and complex' that they could not possibly review it – second hand pro-fluoridation reviews were adopted instead, contrary to the statements in the public report. Excluded most studies on toxicity, just like York.
Transparency	Review was publicized before being conducted. Information provided openly to the public during the review. Pre-publication peer review included those opposed to fluoridation.	Open, transparent process. The existence and membership of the committee (including a short summary of the project) were all online. Parts of the first meetings were open to the	Conducted in secret, with no external input. Peer reviewers appear to have been selected for pro-fluoridation views. No attempt to have a balanced panel, and evasive when

Review	York	US National Research Council	NZ
		public and some public submissions were heard. Wide canvassing of external community for relevant research. Members of the public also submitted studies/papers for the NRC committee to include, and at least some of those were used.	asked what experts with views against fluoridation were approached.
Outcome	In spite of the bias with which it was established, this review presents a summary of the best available and most reliable evidence on the alleged efficacy of water fluoridation. "Given the level of interest surrounding the issue of public water fluoridation, it is surprising to find that little high quality research has been undertaken." No conclusive evidence on safety, or benefit to the poor. Evidence for general benefit in reducing tooth decay was based on few studies, of mediocre quality, with wide-ranging conclusions (including fluoride <u>increasing</u> tooth decay). "Legitimate scientific controversy will remain until better quality research is done."	The level (of natural fluoride only) allowed in the US of 4ppm is not safe. A promised but disallowed minority report would have recommended a maximum level of 0.4ppm until a truly safe level could be scientifically determined. The Chair stated in an interview for Scientific American "What the committee found is that we've gone with the status quo regarding fluoride for many years—for too long really—and now we need to take a fresh look . . . In the scientific community people tend to think this is settled. But when we looked at the studies that have been done, we found that many of these questions are unsettled and we have much less information than we should, considering how long this [fluoridation] has been going on."	Concluded that there was general consensus that fluoridation is 'safe and effective', as the two co-chairs had publicly proclaimed before the review. This was shortly after the Deputy Director of the National Poisons Centre, Michael Beasley, stated publicly that the "I think the jury is still out regarding the safety of Fluoride." Claimed there was an adequate margin of safety in spite of repeated statements throughout the report identifying there was not.

If in doubt, leave it out