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To: HEALTH SELECT COMMITTEE

SUBMISSION BY NEW HEALTH NEW ZEALAND INC ON HEALTH (FLUORIDATION OF WATER) AMENDMENT BILL

Executive Summary

1. The Bill's claimed objective is to "enable extended fluoridation coverage, which would improve the status of oral health in New Zealand". The Bill would effectively mandate fluoridation and give legislative endorsement to a policy that is based on numerous materially flawed legal and factual assumptions. It is objectionable on several grounds.
 - a. Fluoridation is not capable of improving the oral health status of New Zealanders. The fluoride in fluoridation is too weak to have any significant effect on preventing tooth decay. It is consequently unsurprising that two high quality systematic reviews of fluoridation research (York 2000 and Cochrane 2015) could not find any high quality evidence to support the efficacy of fluoridation either in reducing decay in children or adults or reducing health inequalities. The state of the evidence is such that any benefit cannot be reliably estimated.
 - b. Fluoridation is unethical. It is the administration of medical treatment without consent under s 11 of the NZ Bill of Rights Act. It involves the use of a substance that is being used as a medicine that is delivered to the population in uncontrolled doses, contrary to pharmacological principles. Medical treatment without consent would only ever be justified to deal with an emergency situation involving a highly contagious outbreak of disease where no other measure would be effective. Tooth decay is non-contagious, easily prevented and easily treated.
 - c. The Bill fails to require a DHB to consider risks of harm. Fluoride is a recognised neurotoxin. It accumulates over time in bones, teeth and tissue and exposes any person consuming it to risks of harm (some are more at risk than others) including dental fluorosis, skeletal fluorosis, endocrine disorders and IQ reduction. In relation to IQ harm, the Gluckman/Skegg report acknowledges that the claimed shift of IQ from fluoride exposure was up to 7 IQ points (ie just less than half a standard deviation). The average IQ is 100. A shift (downwards) of up to 7 IQ points means more sub-intelligent people, fewer geniuses, and a general dumbing down of the population. That

risk is unacceptable and adopting the precautionary principle, justifies the immediate cessation of fluoridation

- d. It is not in dispute that the fluoridating chemicals (hydrofluosilicic acid (HFA) and sodium silicofluoride (SSF)) are highly toxic compounds that contain heavy metal contaminants such as arsenic, mercury and lead, all of which are added to the water supply together with the fluoride. There has been no safety testing of these products. It is incongruous that a public health authority such as a DHB would be empowered to direct a council to permit the water supply to be used to dispose of contaminated industrial waste.
 - e. It is deeply worrying that the Bill would give the power to DHBs to direct fluoridation without being required to consult the affected population. The proposed splitting of the identity of the decision-maker and implementer/funder, is unprincipled and unworkable. These two features of the Bill demonstrate how undemocratic and dictatorial the proposal is.
 - f. There is no requirement on DHBs to consider whether there are more cost-effective alternative measures to treat tooth decay. A cost-benefit analysis of a national tooth brushing programme prepared by economic advisory firm TDB Advisory, shows that such a programme could be implemented for a tiny cost (\$12m) and deliver significant benefits in terms of cost savings (between \$51 and \$61m annually) (Appendix B).
 - g. The Sapere Report which is being used to justify the Bill has grossly overstated the potential benefits of a nation-wide fluoridation programme. In particular most of the benefits under Sapere's calculations accrue to adults. As there is no reliable evidence of benefit to adults from water fluoridation, Sapere's calculations of huge prospective cost savings can be easily dismissed as fanciful.
2. This Bill is a classic example of confirmation bias. The basic hypothesis on which the Bill is based is unsound. The Bill seeks to ignore or deliberately distort the prevailing scientific evidence, suppress any public participation and debate, and override every individual's right to control what they put into their bodies. It is draconian. It should be immediately withdrawn, and substituted with a bill that prohibits adding fluoride in any form to any public water supply.

Introduction

3. This submission has been prepared on behalf of New Health New Zealand Inc. New Health is a consumer focused health organisation that aims to advance and protect the best interests and health freedoms of consumers.
4. New Health is opposed to fluoridation for reasons including: fluoridation constitutes medical treatment without consent; the evidence does not unambiguously establish either benefit or safety; the fluoridating chemicals are unprocessed industrial waste that contain arsenic, mercury and lead; there are alternative, less costly, more targeted, and effective ways of preventing dental decay.

5. As a public service and solely in the public interest, New Health has altruistically initiated litigation challenging the lawfulness of fluoridation. It argued:
 - a. that fluoridation is unauthorised;
 - b. that fluoridation is medical treatment without consent and contrary to s 11 of the New Zealand Bill of Rights Act;
 - c. that fluoridation is neither prescribed by law nor justified in a free and democratic society under s 5 of the NZBORA;
 - d. that the fluoridating chemicals are a medicine for the purposes of the Medicines Act
 - e. that the Medicines Amendment Regulations 2015 are invalid.
6. While this litigation did not succeed in the High Court and Court of Appeal,¹ New Health has sought leave to appeal from the Supreme Court. If leave is granted on all grounds, the Supreme Court will determine whether some of the key legal assumptions underpinning the Bill, eg that fluoridation is neither medical treatment nor the delivery of a medicine, are correct.
7. New Health opposes the Bill. Fluoridation is a deeply flawed policy. It is a relic from a past age that is anomalous and anachronistic. It has no place in a contemporary civilised and democratic society.
8. Society has changed significantly since fluoridation was introduced in 1954 in New Zealand. Today's citizens are very concerned with what they take into their bodies. Self-determination, autonomy, privacy and informed consent, are important contemporary values. It is not in dispute that those in fluoridated communities do not have any meaningful ability to refuse fluoridation. Nor that fluoride has been recognised in the last 20 years to work only topically – it is not necessary to ingest it. How much fluoride someone ingests through fluoridation will depend on how much water they drink or use, for example in making soup or boiling vegetables. This is uncontrolled. It is also relevant that the fluoridating chemicals do not just deliver fluoride into the water supply. The fluoridating chemicals are by-products of the superphosphate industry, and may contain arsenic, mercury and lead. These elements are also added to the water supply.
9. Fluoridation is mass medication which cannot be justified. Every individual has the right to determine for themselves what they do or not do to their own body. A person has the right to refuse to undergo medical treatment even though such treatment is considered beneficial, effective and necessary, and such a decision may be objectively considered to be contrary to the person's interests.
10. Tooth decay, while prevalent, is easily prevented through diet, education, and good oral hygiene practices and easily treated with a filling. It is non communicable. It can never be right that a person can be treated without their consent for a disease that poses no risk to anyone other than

¹ New Health NZ Inc v South Taranaki District Council and Attorney-General, [2016] NZCA 462

themselves. Any breach of a person's right to refuse medical treatment could only ever be justified to deal with an emergency situation where there has been an outbreak of disease and a person was posing a risk to others. That situation does not arise here.

11. This submission has four parts:
 - a. Part 1 identifies some of the key factual assumptions underpinning the Bill which are materially flawed.
 - b. Part 2 contains a cost-benefit analysis prepared by TDB Advisory of a national tooth-brushing and education programme.
 - c. Part 3 sets out specific comments on the provisions of the Bill.
 - d. Part 4 contains recommendations.

PART 1: General Issues

12. The Bill is predicated on the scientifically unsound illusion that fluoridation is effective in reducing tooth decay, and is safe for all consumers at the current concentration.
13. Neither proposition has the backing of science, or can be objectively substantiated by high quality and reliable evidence. Taking a precautionary approach, there are sufficient doubts about fluoridation's safety and efficacy to justify the immediate cessation of all fluoridation in New Zealand.

Fluoridation is not effective at reducing tooth decay

14. It is axiomatic that public health measures must be evidence-based. Generally the Randomized Control Trial (RCT) is considered essential for clinical research. Tellingly, there have never been any RCTs conducted of fluoridation.
15. Another form of evidence that is an essential tool for policy makers is a systematic review. There have been two high quality systematic reviews of fluoridation in 2000 and 2015 respectively. Neither unequivocally validates the benefits of fluoridation. Both found that the evidence in support of fluoridation to be of low quality, and as a consequence the precise scale of any benefit cannot be confidently stated. Both recommended that more studies are required.

York Report

16. A systematic review of water fluoridation by the NHS Centre for Reviews and Dissemination at the University of York in 2000 was the first full systematic review on the subject (the York review, McDonagh et al 2000). It identified 5 objectives:
 - a. What are the effects of fluoridation of drinking water supplies on the incidence of dental caries?

- b. If water fluoridation is shown to have beneficial effects, what is the effect over and above that offered by the use of alternative interventions and strategies?
- c. Does water fluoridation result in a reduction of caries across social groups and between geographical locations, bringing equity?
- d. Does water fluoridation have negative effects?
- e. Are there differences in the effects of natural and artificial water fluoridation?

17. After nearly 50 years of study into water fluoridation it found that there was a surprising lack of high quality studies demonstrating benefits. In respect of objective 1 its conclusions were based on a limited number (26) of moderate quality studies, many of which lacked appropriate analysis. From these data the executive summary recorded that while there was evidence of benefit, the quality of the evidence was low and any estimates of effect could be biased. So in other words any actual benefit could not be reliably stated.

The best available evidence suggests that fluoridation of drinking water supplies does reduce caries prevalence, both as measured by the proportion of children who are caries free and by the mean change in dmft/DMFT score. The studies were of moderate quality (level B), but of limited quantity. The degree to which caries is reduced, however, is not clear from the data available. The range of the mean difference in the proportion (%) of caries-free children is -5.0 to 64% with a median of 14.6% (interquartile range 5.05, 22.1%). The range of mean change in dmft/DMFT score was from 0.5 to 4.4 median teeth (interquartile range 1.23, 3.63 teeth). It is estimated that a median of six people need to receive fluoridate water for one extra person to be caries-free (interquartile range of study NNTs 4,9). The best available evidence from studies following withdrawal of water fluoridation indicates that caries prevalence increases, approaching the level of the low fluoride group. Again, however, the studies were of moderate quality (level B), and limited quantity. The estimates of effect could be biased due to poor adjustment for the effects of potential confounding factors. (emphasis added)

18. In respect of objective 3 it found that there were no level A or B studies examining the effect of water fluoridation on the inequalities of dental health. Relying on level C (poor quality) studies:

[t]here appears to be some evidence that water fluoridation reduces the inequalities in dental health across social classes in 5 and 12 year-olds, using the dmft/DMFT measure. This effect was not seen in the proportion of caries-free children among 5 year-olds. The data for the effects in children of other ages did not show an effect. The small quantity of studies, differences between these studies, and their low quality rating, suggest *caution* interpreting these results.

19. In respect of objective 4 it found:

- a. That the prevalence of fluorosis at a level of 1 ppm was estimated to be 48% and for fluorosis of aesthetic concern predicted to be 12%.
- b. Studies into bone fracture and cancer were of low quality with a high risk of bias. No clear association was found between the incidence of hip fracture and cancer and water fluoridation.

20. The executive summary concluded:

This review presents a summary of the best available and most reliable evidence on the safety and 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. As such, this review should provide both researchers and commissioners of research with an overview of the methodological limitation of previous research conducted in this area.

The evidence of a benefit of a reduction in caries should be considered together with the increased prevalence of dental fluorosis. The research evidence is of insufficient quality to allow confident statements about other potential harms or whether there is an impact on social inequalities. This evidence on benefits and harms needs to be considered along with the ethical, environmental, ecological, costs and legal issues that surround any decisions about water fluoridation. All of these issues fell outside the scope of this review.

Any future research into the safety and efficacy of water fluoridation should be carried out with the appropriate methodology to improve the quality of the existing evidence base. (emphasis added)

21. This report is hardly an endorsement of the efficacy and safety of fluoridation. Despite the expressed lack of certitude about safety and efficacy, the report was used by those promoting fluoridation (eg the British Dental Association and British Medical Association) to support its claims that fluoridation was safe and effective. This prompted the York Reviewers to express concern about such misrepresentations in a statement dated 28 October 2003.

We are concerned about the continuing misinterpretations of the evidence and think it is important that decision makers are aware of what the review really found. As such, we urge interested parties to read the review conclusions in full.

We were unable to discover any reliable good-quality evidence in the fluoridation literature world-wide.

What evidence we found suggested that water fluoridation was likely to have a beneficial effect, but that the range could be anywhere from a substantial benefit to a slight disbenefit to children's teeth.

This beneficial effect comes at the expense of an increase in the prevalence of fluorosis (mottled teeth). The quality of this evidence was poor.

As association with water fluoride and other adverse effects such as cancer, bone fracture and Down's syndrome was not found. However, we felt that not enough was known because the quality of the evidence was poor.

The evidence about reducing inequalities in dental health was of poor quality, contradictory and unreliable.

Since the report was published in October 2000 there has been no other scientifically defensible review that would alter the findings of the York review. As emphasised in the report, only high-quality studies can fill in the gaps in knowledge about these and other aspects of fluoridation. Recourse to other evidence of a similar or lower level than that included in the York review, no matter how copious, cannot do this. (emphasis added)

22. In 2001 Professor Trevor Sheldon who chaired the Advisory Group for the York review published the following open letter:

3/1/2001

In my capacity of chair of the Advisory Group for the systematic review on the effects of water fluoridation recently conducted by the NHS Centre for Reviews and Dissemination the University of York and as its founding director, I am concerned that the results of this review have been widely misrepresented. The review was exceptional in this field in that it was conducted by an independent group to the highest international scientific standards and a summary has been published in the British Medical Journal. It is particularly worrying then that statements which mislead the public about the review's findings have been made in press releases and briefings by the British Dental Association, British Medical Association, the National Alliance for Equity in Dental Health and the British Fluoridation Society. I should like to correct some of these errors:

1. Whilst there is evidence that water fluoridation is effective at reducing caries, the quality of the studies was generally moderate and the size of the estimated benefit, only of the order of 15%, is far from "massive".
2. The review found water fluoridation to be significantly associated with high levels of dental fluorosis which was not characterised as "just a cosmetic issue".
3. The review did not show water fluoridation to be safe. The quality of the research was too poor to establish with confidence whether or not there are potentially important adverse effects in addition to the high levels of fluorosis. The report recommended that more research was needed.
4. There was little evidence to show that water fluoridation has reduced social inequalities in dental health.
5. The review could come to no conclusion as to the cost-effectiveness of water fluoridation or whether there are different effects between natural or artificial fluoridation.
6. Probably because of the rigour with which this review was conducted, these findings are more cautious and less conclusive than in most previous reviews.
7. The review team was surprised that in spite of the large number of studies carried out over several decades there is a dearth of reliable evidence with which to inform policy. Until high quality studies are undertaken providing more definitive evidence, there will continue to be legitimate scientific controversy over the likely effects and costs of water fluoridation. (emphasis added)

SIGNED,
Professor Trevor Sheldon MSc DSc FMedSci

Cochrane Review

23. The Cochrane Review done in 2015 (*Water fluoridation for the prevention of dental caries*) also confirmed the lack of high quality research to support fluoridation's efficacy. It found:
 - a. That while there was evidence of benefit (they identified a 35% reduction in decayed, missing or filled baby teeth and a 26% reduction in decayed missing, or filled permanent teeth and an increased percentage of children with no decay by 15%) most of this evidence predated 1975 and the widespread use of toothpaste. Further 97% of the studies were at high risk of bias and so the confidence of the reviewers in the level of benefit was limited. In other words Cochrane found that what evidence there is of benefit is of low quality and at high risk of bias, and consequently the magnitude of any actual benefit cannot be confidently and reliably stated.

- b. There was insufficient information available to conclude that fluoridation changed existing differences in tooth decay across socio-economic populations.
 - c. No studies met the review's criteria (ie were of sufficient quality) to indicate effectiveness of water fluoridation in preventing tooth decay in adults.
 - d. That at a fluoride level of 0.7 ppm in the water approximately 12% of people had fluorosis that could cause concern about their appearance. Although the reviewers noted their confidence in this evidence was also limited due to the high risk of bias and variation in the studies' results.
24. The reviewers recommended that further studies be undertaken.
 25. It is remarkable that after more than 70 years of fluoridation there isn't any high quality convincing evidence of benefit, and that both York and Cochrane recommend further research.
 26. If the requisite evidence hasn't materialised by now, it doesn't exist. On the current state of the evidence, putting aside the ethical issues, fluoridation would never be approved as an intervention if considered for the first time today. The evidence simply doesn't support it.
 27. It is very important for this Committee and for the House as a whole to be properly informed about the state of the evidence, and to not simply accept the science of conformity and misrepresentation that is dished up by the Ministry of Health.
 28. It is plain from the York and Cochrane Reviews that the comments in the Gluckman/Skegg review below are wrong.

Analysis of the peer-reviewed scientific literature reveals a clear consensus on the effectiveness of CWF: a large number of epidemiological studies and thorough systematic reviews concur that CWF has a beneficial effect on oral health throughout the lifespan. This includes relatively recent studies in the context of the overall reduced burden of caries that has resulted from the widespread use of topical fluorides. Yet the effectiveness of CWF continues to be questioned by a small but vocal minority. The avenues used to present opposing views tend to be those most easily accessed by the public, giving the impression that there is an even debate among 'experts.' In reality, the weight of peer-reviewed evidence supporting the benefits of water fluoridation at the levels used in New Zealand is substantial, and is not considered (emphasis added)

29. There is no consensus on effectiveness other than that actual effectiveness cannot be reliably stated and that further research is required. There is no solid evidence that fluoridation benefits adults.

Why there is no convincing evidence of benefit

30. That there is no convincing and high-quality objective evidence of fluoridation's benefit should come as no surprise.
31. First, it is now widely accepted that fluoride works topically (ie on the tooth surface) and that any systemic effect is negligible or non-existent. This means that it does not work by swallowing. Previously it was thought that systemic application (ie swallowing) of fluoride was required to inhibit caries as a result of fluoride being incorporated into the tooth enamel during the

development of the tooth prior to eruption. On the basis that the effect was systemic, an “optimal” concentration at 0.7 to 1 ppm was identified as being one that would achieve the systemic effects of protecting the tooth enamel but at the same time minimise fluorosis. Since at least 1999 it has been known that fluoride does not work systemically but rather operates post eruptively and topically.

32. Any benefit from fluoride is from having continued elevated levels in the saliva and plaque caused by an initial application of high concentration fluoride such as in toothpaste. After brushing with toothpaste with 1000 ppm fluoride (brushing is needed to allow fluoride to have access to the tooth surface), fluoride levels in saliva are elevated to the levels required to achieve a cariostatic action and fall back to baseline levels over 2 to 6 hours. If a carious lesion has commenced, fluoride can operate to prevent the demineralisation process and enhance the remineralisation process.
33. Secondly, while the effect of fluoridated toothpaste in caries prevention is clear, an understanding of the mechanism of action shows that swallowing fluoridated water does not have the ability to provide meaningful caries protection.
34. For one thing its concentration is too low to have any significant topical effect as it washes over the teeth.
35. It is not in dispute that “fluoride is most effective in dental caries prevention when a low level of fluoride is constantly maintained in the oral cavity”.²
36. This is a key point because the “low level” is higher than the concentration of fluoride in fluoridated water which is between 0.7 and 1 ppm. The general consensus is that the concentration of fluoride in fluoridated water is inadequate to have substantial impact on caries prevention.³ SCHER in its 2011 Report said that topical application (ie fluoridated toothpaste or varnish) is most effective in preventing tooth decay because it sustains the fluoride levels in the oral cavity. However they say that the efficacy of population-based policies such as drinking

² Prevention of dental caries through the use of fluoride – the WHO approach, Poul Erik Petersen and Hiroshi Ogawa, *Community Dental Health* (2016) 33, 66 – 68 at 67

³ Damato, F.A. (1990). “Effect of fluoride concentration on remineralization of carious enamel.” *Caries Res.* 24(3):174-80

Cutress, T.W. (1995) “Effects of fluoride-supplemented sucrose on experimental dental caries.” *Advances in Dental Research* 9(1).

Arends, J, Christoffersen, J, Ruben, J & Jongebloed, WL (1989) “Remineralisation of bovine dentine in vitro. The influence of the F content in solution on mineral distribution.” *Caries Res.* 23. 309-14.

Pearce, E.I. (1992). Supplementation of domestic sugar (sucrose) with fluoride. *New Zealand Dent. J.* 88(393):84-8.

Tanaka, M. (1993). “Effect of fluoride incorporation into human dental enamel on its demineralization in vitro.” *Arch Oral Biol.* 38(10):863-9.

water, milk or salt fluoridation in reducing oral health social disparities “remains insufficiently substantiated”.⁴

37. Additionally, the CDC has confirmed that the concentration of fluoride in saliva after drinking fluoridated water is too low to have any cariostatic effect.⁵
38. In other words the fluoride concentration in fluoridated water is too weak to meaningfully affect the balance of the demineralisation and remineralisation processes.
39. The logic of swallowing fluoridated water to prevent tooth decay is akin to swallowing sunscreen to prevent sunburn.
40. Thirdly, fluoridation was introduced in Grand Rapids in Michigan, USA in 1945. In 1950, before fluoridation trials were completed, and before any published data existed to establish its safety and efficacy, the US Public Health Service strongly endorsed the safety and efficacy of fluoridation. The American Medical Association and the American Dental Association quickly followed the US PHS's lead and endorsed fluoridation.⁶ And these endorsements have been back-filled by low quality and biased science ever since.
41. In short, the public was duped about fluoridation's efficacy and safety at the outset, the myth was manufactured and perpetuated by weak science, and further entrenched by the health establishment by the use of dubious tactics such as endorsements (you repeat something frequently enough it becomes an established “truth”), ridiculing and vilifying dissenters, and refusing to publish those who dare to question the orthodoxy.
42. That the propaganda machine is alive and well is evidenced by some of the comments made by MPs when the Bill had its first reading on 6 December 2016. For example Peter Dunne had this to say: “So I say for the benefit of the tin-foil hat-wearing, UFO-abducted anti-fluoride campaigners out there still peddling the same old pseudo-science myths, there is nothing left to debate on this issue. It is over. Science has won”.
43. Such comments are, with respect, unworthy of intelligent people. However, the Minister is right. Science has won. The hyperbolic claims of the pro-fluoridation health establishment can be exposed for what they are – not supported by quality science.

⁴Scientific Committee on Health and Environment Risks, *Critical review of any new evidence on the hazard profile, health effects, and human exposure to fluoride and the fluoridating agents of drinking water*, 2011 at pp 31 - 32

⁵ CDC MMWR Recommendation for using fluoride to prevent and control dental caries in the US, p 3.

⁶*The Case Against Fluoride: How Hazardous Waste Ended Up in Our Drinking Water and the Bad Science and Powerful Politics That Keep it There*, Paul Connett, James Beck and HS Micklem, Chelsea Green Publishing Company, 2010 pp 429 to 448

Fluoridation cannot be shown to be safe

Dental fluorosis

44. Generally the health establishment refuses to accept that fluoridation can lead to any health harms. However, it does accept that dental fluorosis is a proven adverse effect of water fluoridation at the current concentration of 0.7 to 1 ppm.
45. Fluorosis is the result of systemic (and excessive) ingestion of fluoride during tooth development and causes porosities in the enamel known as dental fluorosis, which manifest as chalky patches (classified as mild), white and dark brown discolourations (moderate), and pitting and malformation of the enamel (severe). It occurs because fluoride ions interfere with the normal function of the ameloblasts (enamel forming cells), generally during 10-20 months of age, when enamel formation is taking place.
46. Recently the US Department of Public Health and Human Sciences was so concerned about the prevalence of fluorosis that it recommended that the concentration of fluoride reduce to a maximum of 0.7 ppm to protect against the high levels of dental fluorosis that have been experienced in the US.
47. New Zealanders exposed to water fluoridation in childhood suffer very mild to moderate fluorosis. The prevalence of very mild or mild fluorosis in New Zealand children is estimated at 15% and approximately 2% have moderate forms. The York report figures would suggest a much higher prevalence of fluorosis – 48%. The Cochrane Review found approximately 12% of fluorosis that was of aesthetic concern and that this increased to 40% when considering fluorosis of any level (although the quality of the evidence was not high).
48. Because the risk of fluorosis is so great with fluoride interventions, the WHO now says that it is important that fluoride exposure be known before introducing any new fluoridation measures.⁷ This is significant, and will be discussed in detail in Part 3 of the submission, because the Bill fails to require a DHB to consider the risk of fluorosis or to identify the fluoride exposure of any community it might direct a local authority to fluoridate.

Other harms

49. The NRC review in 2006 which dealt with fluoride toxicology⁸ found that the EPA's current maximum contaminant level of 4 ppm was not sufficiently protective of human health and recommended that it should be lowered. Concerns raised by the review included dental fluorosis, skeletal fluorosis and increased risk of bone fractures.
50. It also identified other adverse health effects which are associated with fluoride exposure:
 - a. The potential of fluoride to initiate or promote cancers even though the overall evidence was mixed.

⁷ Prevention of dental caries through the use of fluoride – the WHO approach, Poul Erik Petersen and Hiroshi Ogawa, *Community Dental Health* (2016) 33, 66 – 68 at 67

⁸ Fluoride in Drinking Water: A Scientific Review of EPA's Standards (2006)

- b. Genotoxicity
- c. Endocrine effects including altered thyroid function
- d. Neurotoxicity, deleterious effects on cognitive development and performance.

51. All adverse effects other than fluorosis are dismissed by NZ health officials as not being likely at the current concentration of fluoride at 0.7 to 1 ppm. Indeed they claim that fluoridation is completely safe.
52. However, such an attitude overlooks that with fluoridated water it is impossible to control for dose. Dosage depends on the quantity consumed, normalised by weight. Individuals will drink different amounts of water and thus receive different doses. Formula-fed babies in particular, but also athletes and diabetics (and others who drink more than average) receive disproportionately higher doses of fluoride from fluoridated water given their weight to volume ratios.
53. It is noteworthy that fluoride in the form of a pharmacy-only fluoride tablet is not recommended for under 3s or pregnant woman, and a maximum safe dose is prescribed for young children and adults. Yet the government is content to allow all population groups to drink controlled quantities of industrial waste fluoride in fluoridated water. As a consequence many subpopulation groups will exceed the fluoride intake that is recommended for those taking fluoride tablets. This cannot be rationally justified.
54. A comparison of fluoride tablets and fluoridated water (fluoridated at 1 ppm) is set out below.

	Sodium fluoride tablets	HFA and SSF
Claimed Purpose	Prevent tooth decay	Prevent tooth decay
Status	Medicine: Pharmacy-only medicine subject to purity and other manufacturing standards set out in Medicines Act and Regulations	Hazardous substance: Toxic by-product of the superphosphate industry containing arsenic, mercury and lead
Dose unit or Concentration	Each tablet contains 0.5 mg of fluoride (dose unit)	A litre of water fluoridated at 1 ppm will deliver 1 mg of fluoride, ie the equivalent of two fluoride tablets. A litre of water fluoridated at 0.7 ppm will deliver 0.7 mg of fluoride, ie the equivalent of one and a half fluoride tablet.
Recommended Maximum Dose of Fluoride	Not to be taken by children under 3 or during pregnancy. 3 to 5 years: half a tablet daily 6 to 8 years: 1 tablet daily	Dose is uncontrolled and depends on how much water is drunk by each individual. Many children and adults will

	Adults: Two tablets daily.	exceed maximum daily recommended medicinal doses. Babies, toddlers, and pregnant women should not be drinking fluoridated water.
Informed consent	Yes	No

55. It is entirely feasible that a person with a high water intake will consume fluoride equivalent to the level deemed by the NRC to be non-protective of human health.

Risk to IQ

56. It will be apparent that fluoride's potential risks to health arises from systemic ingestion. Given that fluoride works topically and should not be swallowed, exposing populations to risks of these harms by requiring them to swallow fluoridated water is wrong.
57. Fluoride is a recognised neurotoxin. One point that New Health wishes to particularly emphasise is the growing evidence linking fluoride ingestion with a reduction in IQ.
58. This evidence has been comprehensively collated and a petition has been prepared by a range of organisations in the US calling on the US Environmental Protection Agency to ban the fluoridation of the public drinking water under the provisions in the Toxic Substances Control Act.
59. This petition is attached as Appendix A. It is a significant and important document which fully explains the substantial research demonstrating fluoride's neurotoxicity and the risks it poses to the US population at the current levels in fluoridation. Fluoride's neurotoxicity is supported by over 180 studies published since the 2006 NRC Review and fluoride is repeatedly linked to reduced IQ at so called "safe" water fluoride levels. All of the studies relied on are listed in the petition.
60. The petitioners conclude that "a large body of animal, cellular, and human research shows that fluoride is neurotoxic at doses within the range now seen in fluoridated communities". They say that fluoridation is "incompatible with a neurologically safe use of fluoride" and that because "fluoride's predominant role in caries prevention comes from *topical* contact and thus there is no reasonable justification to expose hundreds of millions of Americans to the neurotoxic risks of *systemic* fluoride via water".
61. Closer to home, the Gluckman/Skegg report⁹ in an erratum acknowledges that the research on neurotoxicity shows a claimed shift in IQ of less than a standard deviation. Previously they had noted that it showed a claimed shift in IQ of less than one point.

⁹ Health effects of water fluoridation: A review of the scientific evidence, August 2014

62. The significance of this amendment needs to be explained. A standard deviation is 15 points which is huge. The actual IQ drop based on the research reviewed in the Gluckman/Skegg report was up to 7 points which is still significant.
63. However, astonishingly, the Gluckman/Skegg report concludes that “the claimed shift of less than one standard deviation suggests that this is likely to be a measurement or statistical artefact of no functional significance”.¹⁰
64. That statement is scientifically incomprehensible. A shift to the left of IQ distribution in the population of up to seven points would have substantial impacts, especially among those in the high and low ranges of IQ distribution (the average IQ is 100, 70 to 79 is subnormal, over 140 is considered high intelligence). In other words there would be fewer people at the very high end and more people unable to function fully. But equally it indicates a general “dumbing-down” of children and the nation’s intelligence. It is untenable to say that a shift of 7 IQ points would be a measurement or statistical artefact of no functional significance.
65. The Gluckman/Skegg report appears to rely on a NZ study by Broadbent et al to justify this unscientific conclusion. The Broadbent study analysed the IQs of children in the Dunedin longitudinal study commenced in 1972 and claimed to find that the IQs of children and adults who spent their first 3 to 5 years of life in fluoridated vs unfluoridated Dunedin were the same.
66. This study is referred to in the petition to the EPA. The authors of the petition set out in detail why the Broadbent study does not establish the safety of fluoridation. Numerous limitations in the Broadbent study are identified which show that its conclusions are unsound. In particular a “glaring limitation” was that a substantial proportion of the “non-fluoridated” control population used 0.5mg/day fluoride tablets and fluoridated toothpaste resulting in only a marginal difference in average total fluoride exposure between the fluoridated and non-fluoridated populations. In other words there was no truly low exposure comparison group.
67. New Zealand is known to punch above its weight, but its stretching credibility to assert that one not very good New Zealand study can realistically counter 300 human and animal studies indicating fluoride’s neurotoxicity.
68. The evidence amassed by the petitioners to the EPA, together with the admission of an IQ shift of up to 7 points in the Gluckman/Skegg report provides more than enough information to establish that fluoridation poses an unacceptable risk to the developing brain.
69. Applying the precautionary principle to fluoridation, it is essential that it is stopped.

PART 2: A cost effective alternative to fluoridation

70. No one is disputing that tooth decay is a significant disease. What is disputed is that fluoridation is an appropriate way of addressing the issue.

¹⁰ Ibid at p7

71. It is important to understand that tooth decay is not caused by a lack of fluoride. Fluoride is not an essential nutrient. It is not required for any aspect of human growth, development, or reproduction.
72. Tooth decay is caused by excess sugars in the diet and poor oral hygiene. Consequently the emphasis should be on addressing these causes of tooth decay, eg tooth brushing programmes, education, reducing sugar in schools etc.
73. In the early 2000's Scotland decided that rather than fluoridate it would implement a tooth brushing programme in schools and pre-schools. This programme is called Childsmile and has had great success at reducing decay rates and improving dental health. For example the number of 5 year olds with "no obvious decay" rose from 44.6 percent in 2006 to 67 percent in 2012.
74. Such a programme could and should be easily implemented in New Zealand.
75. At significant cost to itself, New Health engaged economic advisory firm TDB Advisory to undertake a cost-benefit analysis of a national tooth-brushing and education programme for children. This is attached as Appendix B.
76. TDB found that the total cost to operate the programme would be approximately \$12m (less if there was sponsorship) and would deliver annual benefits of between \$51 m and \$61 m. They say at pp 5 - 6:

The total cost to operate the programme is estimated at \$12 million p.a. or around \$11 p.a per child in the programme. The cost of the programme would be incurred by the government via the Health budget. It is possible that this fiscal cost might be reduced to around \$7.3 million p.a. (\$7 p.a. per child) if sponsorship was available for the tooth-brushing supplies.

Against that background we provide estimates of the expected dental-health benefits from the reduced need for dental treatment using three scenarios. These scenarios are based on the measured impacts of programmes undertaken in Scotland and Denmark, and impact estimates based on shifting the current practices in New Zealand District Health Board (DHB) regions (the "reduced-disparities model"). The dental-health benefits measured are the avoided treatment costs for under 18-year olds whose dental care is currently subsidised by the government, and the life-long private costs of replacing dental fillings at regular intervals.

These scenarios show a potential range of expected benefits of between \$51 million p.a. and \$61 million p.a. with a central estimate of around \$57 million p.a. The Health budget benefits from the reduced need to treat dental caries in children and adolescents.

In addition to the benefits of reducing the number of cavities and the need for dental treatment, the Government would reduce expenditures in the Health budget with a central value of \$45 million p.a. These reductions in expenditures arise from the cost savings from not having to treat dental caries minus the cost of the running the programme. That saving could be passed on to other health priorities. There is also a continuing benefit of sound teeth in the form of avoided replacements that would have a value of around \$13 million p.a. This is a private benefit to people 18 years and over who would not need to have replacement treatment on fillings first installed on their permanent teeth as an adolescent. (emphasis added)

77. This report shows that for a tiny cost - \$12m is small change – that an effective and targeted measure that demonstrably reduces tooth decay and saves significant money – can be implemented. Ditching fluoridation and implementing a tooth brushing and education

programme would be seen as an enlightened initiative by a sensible government. It's a no-brainer.

PART 3: Comments on the content of the Bill

Summary of key provisions

78. The Bill purports to transfer the decision-making in relation to fluoridation from local authorities to DHB's. The Bill would empower a district health board to direct a local authority to add fluoride to its water supply. In deciding whether to make a direction a district health board must consider:
- a. Scientific evidence of 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
79. The local authority is responsible for implementing and funding the decision. If the local authority doesn't obey a direction to add fluoride, it can be fined up to a maximum of \$200,000 and a further fine of up to \$10,000 for every day that the offence continues.
80. The Bill is deeply worrying. It is designed to bring about mandatory fluoridation by stealth by a health agency that is bound to implement government policy, ie slavish adherence to fluoridation. Essentially the real decision-maker will be the Minister of Health. There is no requirement for public consultation and no consideration of important matters such as potential harms of fluoridation, and alternative means of preventing tooth decay. The draconian nature of the Bill is also evident by the severe fines a local authority faces if it refuses to implement such a direction. The fines are totally disproportionate.
81. The world is moving away from centralised control but this Bill represents a reversal of that trend that is redolent of Nazi Germany or Stalinist Russia.

Ministry of Health's disclosure statement is misleading

82. Unfortunately, when it comes to water fluoridation, the Ministry of Health suffers from institutional myopia. It has been parroting the "safe and effective" mantra for decades that it is unable to objectively consider the evidence.

83. In more modern parlance, the Ministry (and the health establishment generally) appears worryingly prone to confirmation bias. “Confirmation bias” results from policy-makers and decision-makers having a tendency to confirm an initial hypothesis in the face of later acquired disconfirming evidence, even though the hypothesis may not have been based on substantial or reliable evidence. In other words this bias manifests itself in the policy maker or decision maker being prone to confirm what was originally thought, without paying heed to evidence suggesting the opposite.
84. This bias is particularly apparent in section 2.1 of the Disclosure Statement. This section requests any publicly available inquiry, review or evaluation reports that have informed or are relevant to the policy to be given effect to by the Bill. This requires the Ministry to provide a balanced account of the available material, but it did not.
85. They said:
- The World Health Organisation and other international health authorities have endorsed water fluoridation as the most effective public health measure for the prevention of tooth decay (emphasis added).
86. This is plainly hyperbole because it cannot be seriously argued that fluoridation is more effective than tooth-brushing programmes or dental varnishes or regular dental check-ups for children.
87. More importantly, the Ministry omits to inform the Select Committee important details such as:
- a. Most of Europe doesn’t fluoridate its water and many countries such as Sweden abandoned the practice on the basis that it is unethical, with unproven benefits, and real risks of harm.
 - b. That only a small proportion of the world’s population drink artificially fluoridated water.
 - c. That SCHER in 2011 said that fluoridation is unproven at reducing health inequalities.
 - d. That the CDC said fluoride in saliva is too weak to provide benefit.
 - e. That there is no significant difference in decay rates between fluoridated and non-fluoridated countries.
88. The Ministry then says:
- 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.
89. This is untrue in relation to harmful effects, and grossly overstates the position in relation to benefits.
90. As already discussed the Cochrane Review hardly found that water fluoridation was effective at preventing tooth decay. It said there was some evidence of benefit (largely predating 1975 and the widespread use of toothpaste) but that this evidence was at high risk of bias and therefore

they could have limited confidence in it. They said there was no good contemporary evidence of benefit and more research was required.

91. The Cochrane Review did not consider harmful effects other than fluorosis. To the extent the York review considered harms other than fluorosis and it said that it couldn't conclude one way or the other because of the quality of the evidence.
92. There is no systematic review that has found that fluoridation does not cause harmful effects. The Gluckman/Skegg report is not a systematic review and cannot be relied on to support a claim of lack of harm. The Ministry's statement that "In 2014 the Prime Minister's Chief Science Advisor and the Royal Society of New Zealand, assisted by a panel of experts, conducted a systematic analysis of the local and international scientific evidence for and against fluoridation of water supplies", is not an accurate statement of the nature of that report.
93. It is critical to the health and wellbeing of New Zealanders that the Select Committee has the benefit of independent and objective advice on fluoridation that is separate from the NZ health establishment and its confirmation bias handicap. New Health engaged a number of experts to provide evidence in its litigation. These experts are unbiased and do not have vested interests. New Health offers to make these experts available to the Health Select committee to assist it properly and critically evaluate all of the available evidence.

Specific comments on the Bill

94. New Health raises the following specific objections on the content of the Bill. For the avoidance of doubt New Health's comments should not be regarded as in any way endorsing or supporting any Bill specifically amended to address its objections. The Bill should be immediately withdrawn and fluoridation banned.

No requirement to consult with the community

95. In its litigation against the South Taranaki District Council New Health argued that councils have no legal authority to add fluoride. Although this argument did not succeed, New Health has sought leave to appeal to the Supreme Court.
96. Whether or not councils have a legal power to add fluoride, decisions on fluoridation made by councils are done after a comprehensive consultation process with their communities.
97. The Bill does not require the DHB to consult with anybody, not even the local authority.
98. This is fundamentally objectionable. There must be a public consultation process.
99. Fluoridation involves the addition of a highly toxic industrial waste product to the public water supply, a product that is disguised as a medicine and intended for a therapeutic purpose. Regardless of whether it works or not, or exposes a consumer to risks of harm, the manner by which this substance is intended to be imposed on an unsuspecting public by behind closed door decision-making has all the hallmarks of forced medication and medical experimentation. This is exactly the sort of intervention that the Nuremburg trials were about and that our own NZBORA were supposed to protect us from.

100. It is critical that the community that might be forced to both fund and consume fluoride has a say in whether they want it. It is frightening that any enlightened society could contemplate imposing such a measure without consultation.
101. Summary: The Bill should have been drafted to require a public consultation and hearing process. Further if the DHB makes a decision there should be an opportunity for the community to meaningfully oppose this decision, eg by calling for a binding referendum.

Scientific evidence of effectiveness – the best evidence is that there is no benefit

102. Ironically, if the DHB were to objectively look at the best evidence as analysed by York and Cochrane it would come to the firm conclusion that there is no reliable and sound evidence of fluoridation's effectiveness in reducing caries in children. Further and significantly both York and Cochrane confirm that there is no convincing evidence that fluoridation reduces social health inequalities, and Cochrane says there is no conclusive evidence fluoridation benefits adults. The reason for these results have already been discussed. The concentration of fluoride in fluoridation is simply too weak to be able to meaningfully prevent tooth decay.
103. On that basis a DHB could not direct fluoridation.
104. However, New Health has no confidence that a DHB would consider any evidence of effectiveness unbiasedly. DHBs are subject to the direction of the Minister who will require DHB's to direct fluoridation regardless of the parlous state of the evidence of benefit.

Range of mandatory considerations inadequate

105. Fluoridation involves the administration of uncontrolled doses of fluoride. It accumulates over time in the bones and the teeth and tissues. There is no dispute that dental fluorosis is an adverse effect that arises from excess fluoride ingestion.
106. This effect should not be accepted. Why should children unnecessarily suffer teeth blemishes and brittle teeth brought about by fluoride poisoning?
107. It seems accepted by the health establishment that some degree of fluorosis is an inevitable outcome of fluoridation. The WHO now says that health administrator must be made aware of fluoride exposure before the introduction of any fluoridation or supplementation programmes.¹¹
108. The Bill is deficient in that the DHB is not presently required to identify fluoride exposure of the population in terms of identifying a total daily intake of fluoride from all sources, such as beverages (including fizzy drinks made with fluoridated water) and food, and toothpaste.
109. The Bill is deficient in omitting a requirement for a DHB to know in advance the oral health behaviours of the populations. The DHB should know the extent of the use of toothpaste, the

¹¹ Prevention of dental caries through the use of fluoride – the WHO approach, Poul Erik Petersen and Hiroshi Ogawa, *Community Dental Health* (2016) 33, 66 – 68

availability and uptake of other caries-preventing strategies, the consumption of fluoridated water and the movement and migration of the population.

110. The Bill is also deficient in that it does not require consideration of the scientific evidence of the safety of adding fluoride to drinking water.
111. The health establishment cling to the naïve belief that fluoridation at a concentration of 0.7 to 1 ppm is incapable of causing harm other than dental fluorosis. As already noted, dental fluorosis is a symptom of fluoride poisoning and is caused at a concentration as low as 0.7 to 1 ppm. If excess fluoride at this concentration can damage the developing ameloblasts to cause mottling of the enamel, what else is it doing to cells and bones and tissue? Further, there is never any consideration about the costs to the individual to remedy these effects. Techniques to cosmetically cover up and treat dental fluorosis include applying veneers, enamel microabrasion, bonding, and crowns. These costs incurred to fix this particular harm caused by fluoridation have never been acknowledged or taken into account by those promoting fluoridation.
112. The evidence presented to the EPA about the risks to IQ from fluoride proves that there should not be any complacency about other risks of harm from fluoridation.
113. Summary: the Bill should have been drafted to require the DHB to:
 - a. identify the fluoride exposure of the population;
 - b. to understand the oral health behaviours of the population;
 - c. identify the initial and ongoing costs of treating dental fluorosis;
 - d. consider all evidence of potential risks of harm arising out of water fluoridation, and to identify publicly what evidence it has considered, and to give the public a genuine opportunity to review and challenge this information.

The Bill has no place in the Health Act

114. The proposed provisions are intended to be inserted into Part 2A of the Health Act. This part deals with the provision of “safe” drinking water.
115. Fluoridation has nothing to do with making water safe, it is for the purpose of providing medicated water.
116. The irony is that an industrial waste product is being used to medicate the water.
117. It is not in dispute that the fluoridating chemicals (HFA and SSF) are byproducts of the superphosphate and aluminium industry and may contain heavy metal contaminants including arsenic, mercury, and lead.
118. It is incongruous that a public health agency such as a DHB would be authorising such a product to be used in fluoridation and would permit arsenic, mercury and lead to be added. There is no known safe level for arsenic.

119. Effectively what is being added is a contaminant and this is contrary to s 69ZZO of the Health Act which provides that every person commits an offence who contaminates or pollutes drinking water.
120. What is additionally concerning is that the chemistry and toxicology of HFA and SSF have not been adequately studied.
121. Summary: The Bill ought to have been drafted to permit only the use of pharmaceutical grade sodium fluoride and to punish any breach of this provision by substantial fines (ie \$200,000 and daily fine of \$10,000). Additionally the Bill should have been drafted to insert the power into the NZPHDA as it is this Act that establishes DHBs and confers them with their powers and functions.

DHB's are not independent and would be subject to direction by the Minister

122. The reality is that while nominally the DHBs have been given decision-making responsibilities, the real decision maker will be the Minister on the basis that a DHB is required to follow government policy and can be subject to direction if it doesn't (refer s33B of the New Zealand Public Health and Disability Act 2000 (NZPHDA)).
123. The DHBs are just the middleman.
124. In any event, DHBs are not the appropriate decision-maker. It is noteworthy that in Britain in 2013, responsibility for fluoridation decisions reverted to local authorities. Local authorities made the decision on fluoridation up to 1974, and from 1974 to 2013 the statutory responsibility transferred to the NHS. However, Britain eventually realised that local authorities were the more appropriate repository of the power and the power went back to local authorities in 2013.

The split between decision-making and funding is unworkable, and the level of proposed fines are unconscionable

125. The split in the decision-making and the funding and implementation of the decision is highly unusual and unprincipled. The local authority has no say in the decision, and is expected to fund it and implement it, and will be fined heavily if it disobeys. That is an extraordinary power that has been given to the DHB and is unfair and unworkable.
126. Whoever makes the decision should be required to fund it.
127. The level of fines proposed to be imposed on a disobedient local authority are repugnant. Those fines are presently applied to water providers who fail in their duty to provide safe water. Such a fine is appropriate as providing unsafe water may result in significant risk of health harms to the population (as demonstrated by the recent Hawkes Bay fiasco).
128. However, a local authority poses no risk of harm to any person if it fails to comply with a direction to fluoridate, and in fact the opposite is true. A fine of up \$200,000 is grossly disproportionate and cannot be justified and serves to the dictatorial and undemocratic nature of this Bill.

129. Summary: The Bill should not have been drafted to include fine provisions. The Bill should have been drafted to require the decision-maker to fund the implement the decision.

Requirement for population monitoring

130. The Bill should have included a requirement for population monitoring of total fluoride accumulation in the bones, blood and urine of citizens and for this evidence to be reviewed annually and reported on to Parliament and for appropriate remedial action to be taken.

Requirement for research on harms

131. As the petition in Appendix A shows there have been many studies published that have found an association between low and moderate and high fluoride exposure and lowered IQ in children.
132. Further studies are required and the Bill should have been drafted to include a requirement to investigate the possible relationships between fluoridation and IQ loss, as well as conditions including the following:¹²
- a. Alzheimer's disease in adults: one study showed that rats given water containing 1 ppm of fluoride for one year had a greater uptake of aluminium into their brains and the formation of beta-amyloid deposits, which are associated with Alzheimer's disease.¹³
 - b. Lowered thyroid function: doctors used to give fluoride to lower thyroid activity and today many New Zealanders suffer from hypothyroidism. A paper by Stephen Peckham from the University of Kent found a relationship between fluoridation status and lowered thyroid function in the UK.¹⁴
 - c. Increased arthritis rates in adults: arthritis is a leading cause of disability in New Zealand and the first symptoms of poisoning of the bones by fluoride are identical to the first symptoms of arthritis.
 - d. ADHD: a paper published in the journal of *Environment Health* found an association in the US between fluoridation status by US state and the prevalence of ADHD using data on ADHD prevalence among 4-7 year olds collected in 2003, 2007 and 2011.¹⁵

¹² The Case Against Fluoride: How Hazardous Waste Ended Up in Our Drinking Water and the Bad Science and Powerful Politics That Keep it There, Paul Connett, James Beck and HS Micklem, Chelsea Green Publishing Company, 2010 at 218

¹³ JA Varner, KF Jensen, W Horvath and RL Isaacson, "Chronic Administration of Aluminium-Fluoride and Sodium-Fluoride to Rats in drinking Water: Alterations in Neuronal and Cerebrovascular Integrity", *Brain Research* 784 no.1-2 (1998): 284-298

¹⁴ S Peckham, D Lowery, S Spencer Are Fluoride levels in drinking water associated with hypothyroidism prevalence in England? A large observational study of GP practice data and fluoride levels in drinking water, *Epidemiol Community Health* 2015; 70: 1-6

¹⁵ Ashley J Mailin, Christin Till, Exposure to fluoridated water and attention deficit hyperactivity disorder prevalence among children and adolescents in the United States: an ecological association *Environment Health* (2015) 14:17

- e. Bone fractures in children and the elderly. Falls including those giving rise to fractures are a leading cause of hospitalisation for children and those aged 80 and over.

The flaws in the Sapere Report

133. One apparent driver of the Bill was a report done by the Sapere Research Group in 2015 that was commissioned by the Ministry of Health. This report is recorded in the Departmental Disclosure Report as estimating the costs of extending fluoridation to population not receiving fluoridation to be \$144 m over a 20-year period and estimating net savings of over \$600 million over twenty years with most of the saving to consumers and a small amount to Vote Health.
134. The TDB economic report at Appendix B includes an Appendix that compares the Sapere costs with the costs of tooth brushing programme.
135. Two issues in particular arise. First Sapere used a 3.5 percent real discount rate whereas a rate of 7 percent is in line with Treasury recommendations for cost-benefit analysis. Secondly, under Sapere's analysis most of the predicted benefits would accrue to adults. If the discount rate was adjusted and the benefit to adults deducted, TDB showed that the actual net benefit of fluoridation would reduce by \$2,022 million to \$24 million.
136. Taking Sapere's figures at face value, TDB concluded at pp 47-48:

The Sapere study sets out with the same goal as the [TDB] study of tooth-brushing and education to measure the economic costs and benefits attributable to a health intervention. Sapere measured the net economic benefits of community water fluoridation over 20 years (at a 3.5 percent real discount rate) as follows:

- a net saving from water fluoridation of \$1,401 million, made up of a present value cost of fluoridation of \$177 million and offsetting benefits of \$1,578 million from reduced dental decay treatment costs; and
- extending water fluoridation to communities with over 500 residents costs an extra \$144 million with offsetting benefits of an extra \$789 million, and a NPV of net benefits of \$645 million over 20 years (the extension would cover an additional 1.1 million individuals, 3.2 million individuals in total with 1.3 million without access to fluoridated water supplies).

To compare these estimates to those presented in the tooth-brushing and education study some adjustments are considered:

- in the tooth-brushing study a higher discount rate was used in line with the Treasury's recommendations for cost-benefit analysis in the public sector;
- there may be no evidentiary basis to justify the claim in the Sapere report that adults in adulthood get benefits from water fluoridation. Therefore the additional benefits attributed to fluoridation for the adult segment of the population should be treated with caution; and
- using the observed levels of tooth decay in children in fluoridated and un-fluoridated areas, instead of the levels of effect attributable to water fluoridation from studies carried out mostly before 1975.

If these adjustments are made, the cumulative effect on the estimates in the Sapere report is as follows:

- the net benefit from water fluoridation of \$1,401 million reduces by \$1,372 million to \$29 million (benefit-cost ratio of 1.2x);
- the net benefit from extending water fluoridation reduces by \$650 million to -\$5 million (benefit-cost ratio of <1.0x); and
- the overall net benefits of water fluoridation reduce by \$2,022 million to \$24 million (benefit-cost ratio of 1.1x).

These adjusted estimates are on a comparable basis to the estimates present in section 7.2 of the start-up scenario for tooth brushing and education.

Finally, and no less importantly, is the size of the effect attributed to fluoridation. In contrast to tooth brushing, where there is reliable means of attributing causality to the effect on oral health, possible other explanations for observations of better oral health (among children) receiving fluoridated water have not been eliminated in the scientific studies. Identifying effective policy interventions rests critically on the ability to reliably attribute causality.

137. The TDB report clearly and conclusively demonstrates that a tooth-brushing programme is a highly viable and cost-effective intervention (\$12m annual cost and between \$51 and \$61m annual benefits), and that the actual benefits of extending fluoridation will be significantly less than the highly inflated estimates contained in the Sapere report.

PART 4: The Science is settled, fluoridation needs to be banned

138. New Health's primary submission is that the Bill is fundamentally flawed and should be withdrawn, and a new Bill prohibiting the addition of fluoride to any public water supply should be enacted.
139. For years the pro-fluoridation health establishment has claimed extravagant benefits of fluoridation. Those claims do not have the backing of science and it clear why: the fluoride in fluoridation is too weak to have any significant effect on preventing dental decay.
140. Further the risks of harm from swallowing uncontrolled doses of fluoride in fluoridated water are real and present.
141. Let's get into the 21st century and join civilised Europe where most countries have resoundingly rejected this outdated and scientifically flawed policy. Let's stop this Cold War-era practice of putting a highly toxic industrial waste product into our water under the pretence that it protects our teeth.
142. There are numerous practices that were imposed on citizens during that era that claimed to be supported by reputable science, but have since been discredited, eg smoking, thalidomide, DDT etc, and fluoridation needs to join them. More contemporary examples include Vioxx, and other claimed-to-be-safe-but-ultimately-proven-to-be-deadly pharmaceutical drugs.
143. Let's stop mass medicating and start funding programmes such as tooth brushing and education programmes that are appropriately targeted to address the real cause of tooth decay. As the TDB economic report shows such a programme can be implemented for a fraction of the cost of fluoridation and will deliver significant benefits in terms of reduced tooth decay and cost savings.

Request to be heard orally

144. New Health wishes to be heard in support of its submission.

Yours sincerely

A handwritten signature in black ink, reading "Lisa Hansen", followed by a horizontal line.

Lisa Hansen