

In Confidence

Offices of:

Hon Dr Jonathan Coleman, Minister of Health
Hon Peter Dunne, Associate Minister of Health

Chair
Cabinet Social Policy Committee

DECISION-MAKING ON THE FLUORIDATION OF DRINKING-WATER SUPPLIES

Proposal

- 1 This paper proposes that decision-making on the fluoridation of drinking-water supplies is transferred from territorial local authorities to district health boards (DHBs).

Executive Summary

- 2 The significance of poor oral health is often under-estimated. There is a body of evidence which suggests that poor oral health affects general health and is related to a number of risk factors and determinants that are common to other chronic diseases, particularly cardiovascular diseases, cancer, chronic respiratory diseases and diabetes. Poor oral health also has significant downstream consequences: a study reported in the American Journal of Public Health, for example, found that children with poorer oral health status were more likely to experience dental pain, miss school and perform poorly in school.
- 3 Although New Zealand's oral health outcomes have improved dramatically over the last 30 to 40 years, we still have high rates of preventable tooth decay. In 2013, for example, more than 40 percent of all five year olds and more than 60 percent of Māori and Pacific five year olds already had tooth decay. These same children, and children in high deprivation areas, are also likely to have significantly lower levels of newborn enrolment with primary care services; contact with Well Child services; enrolment with child oral health services; and completion of the B4 School Check.
- 4 Water fluoridation has been endorsed by the World Health Organisation (WHO) and other international health authorities as the most effective public health measure for the prevention of dental decay. The US Centers for Disease Control and Prevention have recognised water fluoridation as one of the ten great public health achievements of the twentieth century. There is a large body of evidence about the safety, efficacy and cost-effectiveness of water fluoridation and this underpins the position of expert groups overseas and in New Zealand.
- 5 Fluoridation offers greater potential gains at lower cost than other interventions. The benefits of fluoridation are broadly spread, but would be proportionately greater for the groups least likely to use oral health services. Fluoridation has benefits for all age groups: reductions of tooth decay are reported to be around 20 percent among adults aged 18-44 years and 30 percent among adults aged 45 years and over. Among children and adolescents, there is a 40 percent lower lifetime incidence of tooth decay. The extended fluoridation coverage that would result from this proposal would lead to improvements in oral health status and would support the Government's Health Targets.

- 6 There are many cost-benefit studies which show that fluoridation is materially cost-saving for communities of over 1,000 people.
- 7 Currently, 27 out of 67 territorial local authorities fluoridate their drinking-water supply. This means that approximately 54 percent of the total population is receiving fluoridated water. The level of coverage has not increased over the last 15 years. A number of local authorities have decided not to fluoridate or have introduced fluoridation and then reversed their decision.
- 8 Fluoridation has become an increasingly contentious issue for local authorities because of active lobbying and court action against councils by anti-fluoridation groups and controversy at local body elections and referendums. The view of Local Government New Zealand (LGNZ) is that fluoridation decisions should be made in the health sector, rather than by local government which is simply the owner and operator of the water assets and does not have fluoridation expertise.
- 9 Ministers have considered a range of options for increasing access to fluoridated water supplies, from the status quo (local authority decision-making) to a legislative requirement to fluoridate drinking-water supplies. We recommend transferring decision-making on fluoridation to DHBs.
- 10 It is possible that fluoridated water supplies could be extended to cover an additional 1.45 million people. Net savings of more than \$600 million over 20 years would result, with most of the savings to consumers and a small amount to Vote Health.
- 11 A report by the Sapere Research Group commissioned by the Ministry¹ estimates the total capital and operating costs of extending fluoridation to populations not receiving fluoridated water to be \$144 million over a 20-year period, including a significant upfront capital investment and smaller annual operating costs.
- 12 This proposal entails local authorities continuing to meet the direct costs of fluoridation for both existing and new schemes. Any additional funding from the Crown for these costs would be subject to future budget discussions.
- 13 The proposal would require an amendment to the Drinking Water provisions in Part 2A of the Health Act 1956 and consequential amendments to the New Zealand Public Health and Disability Act 2000. We propose that these amendments be included in the 2016 legislative programme with Priority 5 – bill for introduction in 2016.

Background

- 14 Appendix One comments on the impacts of poor oral health, the high rates of preventable tooth decay in New Zealand and the improvements that can be achieved through fluoridation of drinking-water supplies. It also comments on the naturally-occurring levels of fluoride in water supplies and outlines the scientific reviews of the evidence on the safety and effectiveness of fluoridation. For example, the report of the Prime Minister's Chief Science Advisor and the Royal Society of New Zealand concluded that:

There is compelling evidence that fluoridation of water at the established and recommended levels produces broad benefits for the dental health of New Zealanders. In this context it is worth noting that dental health remains a major issue for much of the New Zealand population and that, economically and from the equity perspective, fluoridation remains the safest and most appropriate approach for promoting dental public health.

¹ Moore D and Poynton M. 2015. *Review of the benefits and costs of water fluoridation in New Zealand*. Wellington: Sapere Research Group.

Fluoridation under current arrangements (local authority decision-making)

Roles

- 15 Local authorities fund drinking-water supplies from rates and they are responsible for decisions on fluoridation. The Ministry has no direct role in the decision-making process on water fluoridation.
- 16 Under the now-ceased fluoridation subsidy scheme, the Ministry provided financial assistance for the establishment of fluoridation systems. Priority was given to regions with populations of high need, areas with particular oral health problems and/or councils outside the main urban areas. The uptake of the subsidy was low, with only five district councils receiving subsidies since 2007. These subsidies ranged from \$49,000 to \$291,000. More recently the Ministry has funded councils undertaking fluoridation from underspends in the sanitary works subsidy scheme. The sanitary works scheme is now nearing its end, and no funding would be available to meet future demands.

Current level of coverage

- 17 As at December 2014, 27 out of 67 territorial authorities were fluoridating their local drinking-water supply. This means that approximately 54 percent of the total population is receiving fluoridated water². This level of coverage has not increased over the last 15 years. A number of major cities and towns do not fluoridate their water supplies, including Whangarei, Rotorua, Tauranga, Whanganui, New Plymouth (ceased in 2011), Napier, Nelson, Blenheim, Christchurch and Timaru. The map and table in Appendix Two show fluoridation status across the country. Appendix Three shows where local authorities have decided not to fluoridate or have introduced fluoridation and then reversed their decisions.

Fluoridation has become an increasingly contentious issue for local authorities

- 18 Fluoridation has become an increasingly contentious issue for local authorities, because of active lobbying and court action against councils by anti-fluoridation groups and controversy at local body elections and referendums.
- 19 A number of challenges in the High Court have been brought against local authorities that have adopted water fluoridation, notably:
 - *New Health New Zealand Inc v South Taranaki District Council* [2014] NZHC 395
 - *Safe Water Alternative New Zealand Inc v Hamilton City Council* [2014] NZHC 1463.
- 20 These cases challenged both the legality of fluoridation programmes and councils' decision-making processes where there had been a decision to start or recommence such programmes. The High Court found in favour of the local authorities in each of these cases and, as a result, they and the health agencies now have greater certainty about the scope of their powers and the requirements for valid decision-making.
- 21 Because none of the High Court's decisions finally rule on the substantive merits of fluoridation, the issue remains open to challenge by opponents of fluoridation. Councils find that they cannot make a decision "once and for all" but face the prospect of having to undertake further public consultations and to revisit decisions to fluoridate. At the 2014 conference of LGNZ, local authorities called for either the Director-General of Health or DHBs to take responsibility for decisions on fluoridation. The LGNZ view is that the decision should be made by health officials, rather than local government

2 Environmental Scan: The status of community water fluoridation in New Zealand March 2013-July 2014

which is simply the owner and operator of the water assets and does not have the expertise to make these decisions.

22 The National Fluoridation Information Service's *Environmental Scan* commented that:

Councils (particularly those with current fluoridation programmes) are increasingly advocating that either DHBs or central government should have responsibility for decision-making about fluoridation, rather than local authorities. Key reasons are frustration at the time taken up by the issue, the divisive nature of the issue, and the expense of legal challenges currently being borne by councils. For the same reasons, some councils in un-fluoridated areas are shying away from even opening the issue for discussion.

Options for decision-making and increasing fluoridation coverage

23 Ministers have considered a range of options for managing fluoridation and increasing access to fluoridated water supplies. The options range from the status quo to a legislative requirement to fluoridate drinking-water supplies. The likelihood of increasing water fluoridation coverage increases along this continuum.

- status quo options
 - retain the status quo: local authorities are responsible for decision-making
 - status quo plus introduction of non-binding guidelines to support local authority decision-making
 - provide financial incentives for local authorities to fluoridate water supplies
- transfer decision-making responsibility to DHBs
- transfer decision-making responsibilities to the Director-General of Health
- require nationwide water fluoridation through legislation.

24 For each of the options officials considered:

- whether it would improve oral health and reduce disparities
- whether decisions would be informed by scientific evidence on the safety and efficacy of water fluoridation
- whether decisions would be informed by local health priorities and circumstances
- costs
- cost-effectiveness.

Comments

Status quo options

25 The status quo – local authority decision-making – is unlikely to increase water fluoridation coverage. There is likely to be no improvement in oral health status and no reduction in the disproportionate burden of ill health for those who do not have access to fluoridated water. Information on the scientific evidence is available to local authorities and their communities but they have had difficulty weighing and assessing conflicting advice about the usefulness and safety of fluoridation. Although local authorities have responsibility for some environmental health and public health issues, their current role in fluoridation is not linked to local (DHB) health priorities. Finally, the status quo is not cost-effective: it is achieving none of the very significant net savings that could result from fluoridation, through reduced treatment costs, or through any of the broader known benefits of fluoridation.

Transfer decision-making to district health boards

- 26 If DHBs had decision-making responsibility, it is proposed they would implement any decision to fluoridate by directing drinking-water suppliers to fluoridate water supplies, following an assessment of the oral health status of the affected communities and the circumstances related to any particular water-supply.
- 27 Transferring decision-making to DHBs would address most of the short-comings of the status quo options, that is:
- the scientific evidence for fluoridation would be a more prominent factor in decision-making than it is at present
 - decisions would be linked to other local health priorities
 - fluoridation coverage could be extended significantly
 - significant improvements in oral health status would result
 - this approach would be cost effective and should lead to substantial net savings.

Transfer decision-making to the Director-General of Health

- 28 Transferring decision-making to the Director-General of Health would address most of the short-comings of the status quo options, including:
- the scientific evidence for fluoridation would be a more prominent factor in decision-making than it is at present
 - fluoridation coverage could be extended significantly
 - significant improvements in oral health status would result
 - this approach would be cost effective and should lead to substantial net savings.
- 29 However, there would only be limited local input on fluoridation, and there would also be only limited links between fluoridation decisions and other local health priorities.

A legislative requirement to fluoridate

- 30 If a legislative requirement to fluoridate were to be established, this could require water suppliers to fluoridate drinking-water unless there was good reason not to do so. A legislative requirement to fluoridate would significantly increase water fluoridation coverage and would link decision-making more closely to the scientific evidence than under the status quo. A relatively rapid extension of fluoridation across the country could be expected, with consequently rapid generation of health benefits. However, there would be only limited local input on fluoridation – for example, where very small populations or water-supplies required alternatives to be considered. There would also be only limited links between fluoridation decisions and other local health priorities.

Discussion: DHB decision-making

- 31 If DHBs had decision-making responsibility, it is proposed that they would implement any decision to fluoridate by directing drinking-water suppliers to fluoridate water supplies, following an assessment of the circumstances related to any particular water-supply and the oral health status of the local community.

- 32 There are some risks with this option:
- the boards of DHBs would face the same scrutiny that territorial local authorities have experienced at election time over fluoridation. The election of anti-fluoride advocates could lead to a stalemate or a reversal of fluoridation, as has happened with some local authorities
 - DHB decision-making would not rule out a series of locally-fought campaigns over fluoridation. The great majority of DHBs would need to consider introducing or extending fluoridation in their areas
 - DHBs would have to respond to the opponents of fluoridation and face legal challenges to their decisions (High Court rulings in recent cases have, however, reduced the grounds available for future challenges.)
- 33 In order to help manage these risks, the Ministry would develop a regulatory framework to support DHBs to take a structured and nationally consistent approach. This would require the use of standard tools to undertake:
- health status and needs assessment
 - evaluation of water quality
 - evaluation and application of scientific evidence
 - cost benefit analysis taking account of local conditions
 - decision-making criteria, including consultation requirements.
- 34 The role of the DHB would be to collect local data; apply the national tools to generate information about identified water supplies and the affected population groups and communities; and make directions on the basis of this analysis. This approach would both provide strong national supports for DHBs and limit judicial review to a DHB's analysis of local data and its application within a regulated set of tools and decision-making criteria. Subject to the Cabinet's agreement to the proposal, officials would consult DHBs and local authority representatives as the proposal is further developed.
- 35 The DHB option would represent a significant advance on the current arrangements through territorial local authorities. We note, from soundings the Ministry has taken, the DHB view is that fluoridation is closely related to their statutory role and that they should take on the decision-making role. The regulatory framework outlined would support DHBs and would ensure that the process is more robust than it is at present. We note that the risk of legal challenge would remain but this is also a feature of the status quo.
- 36 This option would require an amendment to the Health Act 1956, through the Drinking Water provisions at Part 2A, and consequential amendments to the New Zealand Public Health and Disability Act 2000.

Costs

- 37 The Sapere report estimates the total capital and operating costs of extending fluoridation to populations not receiving fluoridated water to be \$144 million over a 20 year period. Sapere also shows costs by water treatment plant size, which indicate the range of costs for projects on varying scales. See Table 1 below.

Table 1, Estimated cost of water fluoridation, by plant size

Size of water treatment plant	Population	Total capital set-up costs	Annual operating costs	Annual fluoride supply costs (m ³ /day)
Neighbourhood	<100	\$112,500	\$6,700	\$3.57
Small	101-500	\$117,500	\$7,100	\$3.46
Minor	501-5,000	\$170,000	\$8,200	\$3.41
Medium	5,001-10,000	\$202,500	\$8,900	\$1.25
Large	10,000+	\$347,004	\$8,900	\$1.25

From Sapere report, Table 5, page 27

Fluoride supply costs are related to water flow. For example, a medium-sized plant in Table 1 with a water flow of 3,450 cubic metres per day would generate fluoride supply costs of about \$4,300 per year. The annual cost to the local authority for a medium-sized plant would be in the region of \$13,000.

Savings for Health and consumers, costs for local authorities

- 38 The Sapere report indicates that the savings associated with fluoridation would be, primarily, private savings in the form of reduced dental care costs for consumers. Some savings to Vote Health may also be expected, although this would be a much smaller amount. The costs associated with extending fluoridation coverage would be incurred by local government. Estimates of the costs and savings over a 20 year time horizon, as calculated by Sapere, are shown in Table 2.

Table 2, Net costs by provider: 20-year time horizon

Stakeholder	Cost*	Saving*	Net cost (a negative is a net saving)
Health budget		-\$149m	-\$149m
Local government	\$177m		\$177m
Private		-\$1,428m	-\$1,428m
Total	\$177m	-\$1,578m	-\$1,401m

* Over 20 years, discounted at a rate of 3.5 percent p.a.

Financial implications

- 39 At the moment the direct operating and capital costs of fluoridating water are met by local authorities. This will continue to be the case if decision making shifts to DHBs.
- 40 After assuming responsibility, DHBs are likely to incur some additional costs, related to consultation and accessing technical expertise. In the event of judicial review, significant costs could result – for both the DHBs involved and for the Ministry. Based on the recent South Taranaki District Council case in the High Court, legal costs could range from \$100,000 - \$200,000 (excl GST) per challenge, potentially a substantial burden on smaller DHBs. In this case the Ministry may need to provide additional financial support to DHBs.

- 41 Areas which become fluoridated in the future will incur the additional direct costs of installing fluoridation infrastructure and fluoridating the water. The timing of costs will depend on the passage of legislation and on the nature and timing of DHB decisions.
- 42 This proposal entails local authorities continuing to meet the direct costs of fluoridation for both existing and new schemes. Based on cost information provided to Sapere by local authorities, extending fluoridation to the whole country might cost in total \$144 million over 20 years, an average of \$7.2 million per year (discounted at 3.5 per cent per year). Any additional funding from the Crown for these costs would be subject to future budget discussions.

Legislative implications

- 43 Changing the decision-making process for water fluoridation would require an amendment to Part 2A (Drinking-Water) of the Health Act 1956 and consequential amendments to the New Zealand Public Health and Disability Act 2000. Appendix Four outlines the provisions that would need to be included in amended legislation to give effect to Cabinet's decision.

Next steps

- 44 Subject to Cabinet's agreement to our recommendations, Ministers propose that officials consult DHB and local authority representatives on the details of the regulatory framework to support DHB decision-making. Wider consultation on this issue would occur through the Select Committee process. There would be a significant level of interest in the issue, from local communities and anti-fluoridation groups as well as local authorities and DHBs.
- 45 Officials estimate that, if Cabinet agrees to this proposal, legislation could be introduced by the end of 2016 and passed before the end of the Parliamentary term in 2017. Legislation could come into force from mid-2018. Given the planning and consultation that would be required before new fluoridation schemes were implemented, there would be only minimal new expenditure before 2019/20.

Regulatory impact analysis

- 46 A regulatory impact statement (RIS) has been provided with this paper. The Ministry's review of the RIS concluded that the information and analysis summarised in the RIS meets the criteria set out in the quality assurance guidance.

Human rights

- 47 The proposals are consistent with the New Zealand Bill of Rights Act 1990 and the Human Rights Act 1993.
- 48 The High Court has recently considered New Zealand Bill of Rights Act issues related to fluoridation in the case involving the South Taranaki District Council. In that case, the High Court found that fluoridation of the community water supply is not a medical treatment for the purposes of section 11 of the Bill of Rights Act; that a breach of section 11 requires a "direct interference with the body or state of mind of the individual"; and that section 11 does not cover public health interventions delivered to the population at large or inhabitants of a particular locality. It also found that, even if water fluoridation did engage section 11 of the Bill of Rights Act, councils' power to fluoridate water is a justified restriction of the right to refuse medical treatment – because the benefits of fluoridation far outweigh its risks.

Gender implications

- 49 The proposal does not raise any gender issues.

Disability perspective

- 50 The proposal has the general benefit of supporting better oral health for people with disabilities.

Consultation

- 51 The following agencies were consulted on this paper: Ministry for Business, Innovation and Employment, Office for Disability Issues, Department of Internal Affairs, Ministry of Justice, Te Puni Kokiri, Ministry for Pacific Peoples, Ministry of Social Development, Ministry for Women and The Treasury. The Department of Prime Minister and Cabinet was informed. The Department of Internal Affairs commented that it supports the progression of work to review decision-making on community water fluoridation programmes but considered that the option of a legislative requirement to fluoridate (with a limited exemptions regime) had not been effectively discounted.
- 52 The Ministry has canvassed DHB views through the Chair of the DHB chief executives' group. DHBs support the proposal for the transfer of responsibility from local authorities and DHBs taking on the decision-making role. Subject to Cabinet's agreement to our recommendations, we propose that officials consult DHBs and local authorities on the details of the proposals.

Publicity

- 53 The four referendums on water fluoridation held by local authorities in 2013 attracted a lot of media attention and it is likely that any change to roles in decision-making for water fluoridation would attract a similar level of interest. Key stakeholders will be alerted and a media release will outline the background to the change in decision-making roles. This announcement may also convey the Government's intentions over the timing for the introduction of an amendment bill. It is proposed that this Cabinet paper and minuted decisions also be proactively released at an appropriate time, subject to material being redacted consistent with the Official Information Act 1982. Note also that the Ministry intends to release the report of the Sapere Research Group, *Review of the benefits and costs of water fluoridation in New Zealand*, at the appropriate time.
- 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.

Recommendations

- 55 It is recommended that Cabinet Social Policy Committee:
- 1) **Note** that, in spite of significant improvements in oral health status, New Zealand still has high levels of dental decay;
 - 2) **Note** that there is strong evidence for the effectiveness of fluoridation as a means of improving dental health status;
 - 3) **Note** that around 2.3 million New Zealanders have access to fluoridated drinking water; that this number has not increased over the last 15 years; and that there is potential to extend coverage to an additional 1.45 million people;
 - 4) **Agree** to transfer responsibility for decision-making on fluoridation from territorial local authorities to DHBs;
 - 5) **Note** that net savings of more than \$600 million over a 20-year period are likely to result from extending fluoridation, with most savings accruing to consumers;
 - 6) **Note** that the total direct costs of extending fluoridation to populations not receiving fluoridated water are estimated to be \$144 million over a 20-year period;
 - 7) **Agree in principle** that
 - a. business-as-usual costs should be met from baseline funding of DHBs and the Ministry of Health
 - b. the direct costs of fluoridation should be met by local authorities.
 - 8) **Note** that should local government seek funding from the Crown to meet costs associated with the proposal, this would be subject to future budget discussions;
 - 9) **Agree** to amend the Health Act 1956, through the Drinking Water provisions at Part 2A, and the New Zealand Public Health and Disability Act 2000, and any consequential amendments required to give effect to this decision;
 - 10) **Agree** to the inclusion of a bid in the 2016 legislative programme for these amendments, with Priority 5 – bill for introduction in 2016;
 - 11) **Approve** the submission of drafting instructions to Parliamentary Counsel Office to implement the recommendations set out in this paper;
 - 12) **Agree** that this Cabinet paper and minuted decisions be proactively released in due course, subject to any material being withheld as necessary if a request for release had been made under the Official Information Act 1982;
 - 13) **Note** that Ministers intend to release the report of the Sapere Research Group, *Review of the benefits and costs of water fluoridation in New Zealand*, at the appropriate time.

Hon Dr Jonathan Coleman
Minister of Health

_____/_____/_____

Hon Peter Dunne
Associate Minister of Health

_____/_____/_____

Background: impacts of poor oral health, evidence for the benefits of fluoridation

Impacts of poor oral health

The significance of poor oral health is often under-estimated. An emerging body of evidence suggests that poor oral health affects general health and is related to a number of risk factors and determinants that are common to other chronic diseases, particularly cardiovascular diseases, cancer, chronic respiratory diseases and diabetes. Poor oral health also has significant downstream consequences: for example, a study reported in the American Journal of Public Health found that children with poorer oral health status were more likely to experience dental pain, miss school and perform poorly in school. The extended fluoridation coverage that would result from this proposal would lead to improvements in oral health status and would support the Government's Health Targets and other initiatives aimed at improving participation in education and employment.

High rates of preventable tooth decay in New Zealand

Although New Zealand's oral health outcomes have improved dramatically over the last 30 to 40 years, we still have high rates of preventable tooth decay. The burden of poor oral health remains inequitable and is costly to individuals, the health system and society. In 2013, more than 40 percent of all five year olds, and more than 60 percent of Māori and Pacific five year olds, had already experienced tooth decay. The 2013/14 New Zealand Health Survey found that 35,000 children aged between 1 and 4 years had had a tooth extracted in the last 12 months due to decay, and that Māori children were 1.6 times more likely to have had a tooth extracted than non-Māori children. The Well Child / Tamariki Ora Quality Improvement Framework reports that these same children, and children in high deprivation areas, are also likely to have significantly lower levels of newborn enrolment with primary care services; contact with Well Child services; enrolment with child oral health services; and completion of the B4 School Check.

Tooth decay is also one of the leading causes of potentially avoidable hospitalisations among children. In 2011/12, around 6200 children aged between 0 and 9 years were admitted to hospital for the treatment of tooth decay. The cost of such treatment under general anaesthetic is estimated to be between \$2,200 and \$4,000 per case.

Fluoridation offers the greatest potential gains

Fluoride levels in drinking-water

Natural fluoride levels in New Zealand water supplies vary but are generally low compared with other countries, at less than 0.2 parts per million (ppm). The World Health Organisation (WHO) reports naturally-occurring fluoride in drinking-water at less than 0.2ppm in water-supplies in the Netherlands and Canada, 2ppm in some American water supplies and as high as 8-9ppm in groundwater supplies at some localities in a number of countries. Seawater typically contains around 1.3 ppm of fluoride. The Ministry recommends adjusting fluoride levels to between 0.7ppm and 1.0 ppm in drinking-water as the most effective and efficient way of preventing dental decay. This is in line with WHO guidelines.

Water fluoridation has been endorsed by WHO and a number of international health authorities as the most effective public health measure for the prevention of dental decay. The US Centers for Disease Control and Prevention have recognised water fluoridation as one of the ten great public health achievements of the twentieth century. There is a large body of evidence about the safety, efficacy and cost-effectiveness of water fluoridation, and this underpins the position of expert groups in New Zealand and overseas.

Evidence of the health benefits of fluoridation

A recent Cochrane review³, which provided the most rigorous review of the international evidence on water fluoridation to date, found that the:

...introduction of water fluoridation resulted in a 35 percent reduction in decayed, missing or filled baby teeth and a 26 percent reduction in decayed, missing or filled permanent teeth. It also increased the percentage of children with no decay by 15 percent.

The Prime Minister's Chief Science Advisor and the Royal Society of New Zealand conducted their own systematic review of the local and international evidence on water fluoridation in 2014. Their report concluded that:

There is compelling evidence that fluoridation of water at the established and recommended levels produces broad benefits for the dental health of New Zealanders. In this context it is worth noting that dental health remains a major issue for much of the New Zealand population and that, economically and from the equity perspective, fluoridation remains the safest and most appropriate approach for promoting dental public health.

The only side effect of fluoridation at levels used in New Zealand is minimal fluorosis, and this is not of major cosmetic significance.

Given the caveat that science can never be absolute, the panel is unanimous in its conclusion that there are no adverse effects of fluoride of any significance arising from fluoridation at the levels used in New Zealand.

The Ministry commissioned an independent report on the economic impacts of water fluoridation in New Zealand (the Sapere Report)⁴. The findings suggest that for people living in areas with fluoridated drinking-water there is a:

- 40 percent lower lifetime incidence of tooth decay among children and adolescents
- 48 percent reduction in hospital admissions for the treatment of tooth decay among children aged 0–4 years
- 21 percent reduction in tooth decay among adults aged 18–44 years
- 30 percent reduction in tooth decay among adults aged 45 years and over.

Fluoridation is cost-effective

Fluoridation is materially cost saving. In 1999, Wright et al. found that cost savings exceeded the cost of water fluoridation in drinking-water supplies that serviced over 1000 people.⁵

This finding was corroborated by the National Fluoride Information Service in 2012, which reviewed nine economic evaluations of water fluoridation undertaken between 2001 and 2012 in countries similar to New Zealand. All nine evaluations reported a cost saving from water fluoridation for communities of more than 1000 people. The review concluded that water fluoridation remains a cost-effective oral public health intervention in the New Zealand context, including for reduction of dental decay in high risk populations such as Māori and low income groups.

The Sapere report estimates that the fluoridation of all of New Zealand's networked water supply is likely to result in significant savings (approximately \$1,400 million) compared with

3 Iheozor-Ejiofor Z, Worthington HV, Walsh T, O'Malley L, Clarkson JE, Macey R, Alam R, Tugwell P, Welch V and Glenny AM. Water fluoridation for the prevention of dental caries. *Cochrane Database of Systematic Reviews* 2015, Issue 6. Art. No.: CD010856. DOI: 10.1002/14651858.CD010856.pub2.

4 Moore D and Poynton M. 2015. *Review of the benefits and costs of water fluoridation in New Zealand*. Wellington: Sapere Research Group.

5 Wright JC, Bates MN, Cutress T and Lee M. 1999. *The cost-effectiveness of fluoridating water supplies in New Zealand*. ESR Report for the Ministry of Health, Wellington.

no fluoridation. The report estimates that extending water fluoridation to those areas that do not currently have fluoridation would be associated with net savings of over \$600 million over 20 years. This estimate takes into account the lower cost-effectiveness of fluoridating water at the smaller water treatment plants which represent a greater proportion of the currently non-fluoridated water supplies. The conclusion that fluoridation and extended fluoridation would result in net savings was shown to be robust under a range of assumptions.

The results of Sapere's closer analysis of smaller treatment plants suggest that water fluoridation at even minor water treatment plants (serving a population of between 500 and 5,000) can result in net savings *on average*. There is some uncertainty as to whether every treatment plant in this range can adopt fluoridation cost-effectively. Some of the smaller plants are likely to require further economic evaluation on a case-by-case basis.

Fluoridation is supported by the public

The 2009 Oral Health Survey found 54 percent of respondents were in favour of water fluoridation in their area, 20 percent were against and 26 percent were neutral. Community support was also demonstrated by 2013 referendums in Hamilton, Hastings and Whakatane, in which more than 60 percent of those who voted in each of the referendums supported water fluoridation.

The Oral Health Survey also showed that a majority of the respondents thought that the final decision on fluoridating the water-supply should be made by a health sector agency.

Water fluoridation status for reticulated water supplies in NZ, by district council, as at January 2014

Local authority	Fluoridated (>70%)	Mixed (10%-70%)	Not fluoridated (<10%)	Less than 50% public supply
Far North				
Whangarei				
Kaipara				
Auckland				
Thames-Coromandel				
Hauraki				
Matamata-Piako				
Waikato				
Hamilton				
Waipa				
Otorohonga				
Waitomo				
South Waikato				
Tauranga				
Western Bay of Plenty				
Rotorua				
Kawerau				
Whakatane				
Opotiki				
Gisborne				
Wairoa				
Hastings				
Napier				
Central Hawkes Bay				
Tararua				
Masterton				
Carterton				
South Wairarapa				
Taupo				
Ruapehu				
New Plymouth				
Stratford				
South Taranaki				
Wanganui				
Rangitikei				
Manawatu				
Palmerston North				
Horowhenua				
Kapiti Coast				
Porirua				
Wellington				
Upper Hutt				
Lower Hutt				
Marlborough				
Nelson				
Tasman				
Buller				
Grey				
Westland				
Southland				
Kaikoura				
Hurunui				

Waimakariri				
Selwyn				
Christchurch				
Ashburton				
Timaru				
Mackenzie				
Waimate				
Waitaki				
Queenstown-Lakes				
Central Otago				
Dunedin				
Clutha				
Gore				
Invercargill				
Chatham Islands				

APPENDIX THREE

Summary of recent water fluoridation decisions by territorial local authorities	
From: National Fluoridation Information Service (2014). Environmental Scan: The status of community water fluoridation in New Zealand March 2013 – July 2014.	
Hamilton	Following community consultation, the Council voted to discontinue fluoridation in June 2013. A referendum followed, and fluoridation was reintroduced in July 2014, reflecting the majority vote.
Thames	Fluoridated. Council voted in May 2013 to continue fluoridation but was to consider the issue again as part of its 2015 Long Term Plan process.
Whakatane	Fluoridated. A referendum in 2013 supported retaining fluoridation. In 2016, the Council voted to remove fluoride and then reversed this decision.
Rotorua	Unfluoridated. In July 2014 a council sub-committee voted to hold a binding referendum on fluoridation but this decision was overturned by the full Council.
New Plymouth	Unfluoridated. Ceased fluoridation in 2011/12.
Patea & Waverley	Unfluoridated, pending court decision.
Hastings	Fluoridated. The Council held a binding referendum in 2013, and fluoridation was retained, reflecting the majority opinion of the community. As part of 2014/15 annual plan, the Council is installing an unfluoridated water tap.
Lower Hutt	Fluoridated. The Council decided in 2014/15 to continue fluoridation but to provide additional access to unfluoridated water through two new bores.
Wairarapa	Unfluoridated. Carterton District Council voted against introducing fluoridation in April 2014.
Ranfurly	In 2011/12 the Council decided to fluoridate but the water supply is still unfluoridated. The decision has been further delayed pending the result of South Taranaki court case.
Dunedin	Fluoridated. Council voted in May 2013 to retain fluoridation in Dunedin but at a reduced target level of 0.75mg/L. The Council commissioned a feasibility report on extending fluoridation to outlying areas to inform its 2015 Long Term Planning process.
Gore	Unfluoridated. Gore District Council voted against introducing fluoridation in June 2013.

OUTLINE OF THE PROVISIONS TO BE INCLUDED IN LEGISLATION

...amend the Health Act 1956 through the Drinking Water provisions at Part 2A and the New Zealand Public Health and Disability Act 2000, including any consequential amendments to provide for the following –

DHBs to make decisions on the fluoridation of drinking water supplies

- 1 Each District Health Board (DHB) is to:
 - 1) make decisions about the fluoridation of drinking-water supplies in its area
 - 2) may direct drinking-water suppliers to fluoridate drinking-water supplies where they have made a decision in support of fluoridation.
- 2 In making decisions about fluoridation of drinking-water supplies, the DHB must consider the:
 - 1) oral health status of the community
 - 2) evidence on the effectiveness of fluoridation in improving dental health and reducing the prevalence and severity of dental decay
 - 3) practicality of fluoridating a particular water supply, taking account of:
 - a) the size of the population being served
 - b) technical matters related to the particular water supply system
 - c) the technical resources available to the territorial local authority to manage water fluoridation.
- 3 When a DHB makes a decision not to fluoridate a drinking-water supply, it:
 - 1) must publish the reasons for its decision;
 - 2) may introduce other measures in the relevant community to promote the use of fluoride to improve dental health and to reduce the prevalence and severity of dental decay.
- 5 Once a DHB has decided that a water-supply is to be fluoridated, it is not required to revisit its decision unless it considers on reasonable grounds that this is warranted due to significant new information related to the matters outlined in paragraph 2 above.
- 6 Drinking-water suppliers must give effect to the decision of the relevant DHB about the fluoridation of a drinking-water supply by taking all practicable steps to fluoridate the water-supply within the range recommended in the Drinking-Water Standards for New Zealand.
- 7 A drinking-water supplier must not cause or permit a public water supply to be fluoridated by any person who is not a qualified operator. (*cf NSW*)
- 8 A drinking-water supplier which has been directed to fluoridate a water-supply shall not discontinue fluoridating the water-supply unless the direction is revoked. (*cf NSW*)