

Date: September 2005

THE CHIEF EXECUTIVE

COMMITTEE: ASSETS

SUBJECT: FLUORIDATION OF THE CITY WATER SUPPLY

1.0 EXECUTIVE SUMMARY

- 1.1 The Gisborne City water supply is fluoridated and has been since approximately the mid 1960's.
- 1.2 Fluoride is added for no reason except for dental health reasons and does not form part of the treatment process.
- 1.3 There are arguments promoting and opposing fluoride addition. The Ministry of Health supports and promotes fluoride addition.
- 1.4 The cost of fluoride addition is not significant when looking at the water utility operation.
- 1.5 In assessing the arguments this report promotes the continuation of fluoridation.

4.0 BACKGROUND

- 2.1 In the 1900's fluoridation researchers discovered that fluoride levels in water supplies had a significant effect on teeth. By the 1930's was recognised that if fluoride in the water was between 0.7 and 1.2 g/m³, teeth had an increased resistance to decay but were not stained as was the outcome with excessive fluoride levels.
- 2.2 In 1954 Hastings became the first fluoridated supply in New Zealand. In the 1960's many other local authorities began fluoride additions to municipal water supplies. While details of exactly when are unavailable, the Gisborne District Council (formally Gisborne City Council) is likely to have begun fluoride addition at this time.
- 2.3 Fluoride continues to be dosed to the city water at a concentration of between 0.7 and 1.2g/m³ and the cost of fluoridation is minimal when looking at the costs associated with water treatment and the overall operation of the water utility.

3.0 THE DETAILS

- 3.1 Earlier this year Council staff received a letter from Fluoride Action Network NZ Incorporated (FANNZ). This letter requested all Councils'

to cease fluoridation and the following 8 points;

summarises it's reasoning to

- Flouridation without frist assessing the total dietary intake of fluoride would be in breach of World Health Organisation directives.
- The Ministry of Health has ignored studies that have shown adverse health effects from flouoridation.
- Silicofluorides used to add fluoride have never been tested for human safety.
- The Ministry of Health privately acknowledges the varying sides of the debate but publically denies this.
- Latest statistics form Hastings (fluoridated) and Napier (unfluoridated) show no health benefits.
- The New Zealand example has been confirmed in over seas studies.
- The ESR reviews done in the past have been flawed.
- A percentage of the population is allergic to fluoride.

3.2 In response the Ministry of Health disputes FANNZ statements and while acknowledging that it is an optional addition recommends the continuation of fluoridation programmes. The Ministry position is supported by the following key points;

- The role of fluoride in the prevention of dental decay is well documented in both international studies and from NZ data.
- As a whole dental decay has reduced but recent studies show that dental decay is reduced greater in fluoridated area compared to unfluoridated areas.
- A number of studies of the benefits of fluoridation to the primary and permanent teeth of children have demonstrated significant reductions in decay rates (ranging from 20 to 80 percent).
- A review of the efficacy of water fluoridation, based on surveys conducted from 1979 to 1989 in Australia, Britain, Canada, Ireland, New Zealand and the United States concluded that the current data show a consistently and substantially lower decay prevalence in fluoridated communities (Newbrun 1989).
- Most studies show that water fluoridation provides benefits above and beyond those from other fluoride vehicles alone (for example, toothpastes, tablets). Recent information has shown that water fluoridation is effective throughout the lifespan, preventing root caries in adults and older people, so that fluoride can be seen to be of benefit to anyone with their natural teeth, not just children
- The risk of dental decay is highest for lower socio-economic groups, who can least afford dental care, and for Māori (Hunter et al 1992). It is also these groups that benefit most from caries prevention due to water fluoridation. There are more than 30 refereed papers in the international literature which have examined socio-economic status (SES) or social class and the relative effectiveness of fluoridation.
- In the review of published literature and other reports on fluoride research, it is noticeable that many of the articles that raise fears about water fluoridation relate to dosages well in excess of

intakes from consuming drinking-water containing fluoride at the recommended levels of 0.7 to 1.0 mg/L; lack of fluoride; or repeat previous statements already shown to be without scientific validity.

- The only effect that has been associated with water fluoridation (apart from improved oral health status) is very mild dental fluorosis in a small number of children. Dental fluorosis is a defect of the tooth enamel caused by the ingestion of fluoride during the development of the tooth. It is only one of a wide range of developmental effects that can occur in tooth enamel. Clinically, dental fluorosis is characterised by opaque white areas in the enamel.
- The level of fluoride recommended in the *New Zealand Drinking Water Standards 2005* of 0.7 to 1.0 mg/litre is specifically designed to minimise the risk of dental fluorosis.
- Reports of independent experts, both nationally and internationally, in relevant fields of medicine, epidemiology, oral health and water engineering have been unanimous that benefits of water fluoridation outweigh any (very small) potential risks. Research studies on the safety of water fluoridation have been reviewed repeatedly by international and Australasian experts, including a World Health Organisation expert group. The conclusion of all these reports is uniform. There are no significant health risks associated with water fluoridation at optimal levels. Mortality rates and health statistics (other than for oral health) in fluoridated and unfluoridated communities are similar and decay rates are significantly lower in communities with fluoridated water. There is no evidence to link fluoridation of water supplies to cancer. There is no increase risk of bone fractures associated with water fluoridation.

4.0 DISCUSSION

- 4.1 The cost of fluoridating the city water supply is around 6% of the annual water treatment chemical budget. In the 2004/5 financial year this equated to around \$15,000.
- 4.2 As with any discussion there are varying view points held about fluoridation and it's appropriateness. In this report a summary has been provided of the material supplied from both sides of the issues.
- 4.3 The Ministry of Health promote a fluoride level of between 0.7 and 1.0g/m³ and this maximum levels has be included in it's flagship document for water supplies the New Zealand Dinking Water Standards (NZDWS). The Gisborne City supply has fluoride target 0.8g/m³. Monitoring of the city water supply and the treatment process confirms that this target is being met and that we are 100% compliant with the NZDWS.
- 4.4 Medically and scientifically the bulk of the evidence supports fluoridation although in the minority there are other reports against fluoridation. The Ministry of Health has held Commissioner Inquiries,

assessed health data and reviewed national and international studies and continue to promote flurodation.

4.5 All chemicals other than fluoride are added either to effect treatment or provide disinfection, fluoride does not contribute to the treatment process. Fluoride is the only mass medicated element for health reasons. This issue raises not questions about the health benefits or not but the moral issue that should the population be subjected to a element added for purely medical reasons. This moral issue of bulk medication of the population is a matter of personal opinion.

5.0 THE DECISION MAKING PROCESS UNDER THE LGA 2002

5.1 The proposed recommendation is not a significant decision and has been subjected and verified by council's adopted decision making framework. There is no change of service provision and this report simply confirms the existing policy to flurodate. Should the committee decide that flurodation be ceased then this would be considered a significant change in levels of service and require additional consultation and processes to ensure the correct decision making process was adhered to.

RECOMMENDATION AS A MATTER OF POLICY

THAT

1. The report be received.
2. Fluoridation if the Gisborne City water supply continues in strict accordance with the New Zealand Drinking water standards.

L J Evans
UTILITIES ENGINEER (WATER)

N E West
UTILITIES ASSET MANAGER

W J Turner
MANAGER : ENGINEERING & WORKS



MANATU HAUORA

Fluoridation of water supplies

Ministry of Health Policy

The New Zealand Ministry of Health policy on water fluoridation is:

- The adjustment of fluoride to between 0.7 and 1.0 mg/litre in drinking water is the most effective and efficient way of preventing dental caries in communities receiving a reticulated water supply.
- The Ministry of Health recommends the continuation of water fluoridation programmes and their extension where technically feasible.
- *The Drinking Water Standards for New Zealand 2005* note that the fluoride levels in drinking water supplies may be adjusted to between 0.7 mg/L and 1.0 mg/L for oral health reasons.

The Ministry of Health notes that there is a large body of scientific material from peer-reviewed journals showing overwhelming evidence of the effectiveness and safety of water fluoridation. Further direct evidence from the New Zealand school dental service data shows that fluoridation improves the oral health status of New Zealand children.

The Ministry believes that there is overwhelming evidence of the effectiveness and safety of water fluoridation in improving the dental health of New Zealanders, and in preventing dental decay. The Ministry considers that the fluoridation of water supplies at levels between 0.7 and 1.0 mg/litre is safe and effective in promoting oral health.

Subsidies for water fluoridation

On 23 May 2002, the Minister of Health announced Government approval of a sanitary works subsidy scheme. As well as improved sewage treatment, the scheme also covers new works to add fluoride to community drinking-water supplies where communities chose to do so. The subsidies for water fluoridation will cover 50 percent of the cost of the eligible capital works and may cover up to 100 percent with the approval of the Minister of Health.

Differences in oral health status

The role of fluoride in the prevention of dental decay is well documented in both international studies and from New Zealand data (PHC 1994; PHC 1995). While it is unquestionable that decay rates have fallen in unfluoridated communities, this is not to the same extent as communities with fluoridated water (Newbrun 1996).

A number of studies of the benefits of fluoridation to the primary and permanent teeth of children have demonstrated significant reductions in decay rates (ranging from 20 to 80 percent). These studies included control populations, a history of continuous residence in their particular community, and no historical comparisons (to reduce bias

from the decline in dental caries prevalence in developed countries) (Newbrun 1989, Ripa 1993, Jackson et al 1985).

A review of the efficacy of water fluoridation, based on surveys conducted from 1979 to 1989 in Australia, Britain, Canada, Ireland, New Zealand and the United States concluded that the current data show a consistently and substantially lower decay prevalence in fluoridated communities (Newbrun 1989). The effectiveness of water fluoridation has decreased as the benefits of other forms of fluoride have spread to communities lacking optimal water fluoridation but there is still a significant benefit from water fluoridation (PHC 1995).

Most studies show that water fluoridation provides benefits above and beyond those from other fluoride vehicles alone (for example, toothpastes, tablets). Recent information has shown that water fluoridation is effective throughout the lifespan, preventing root caries in adults and older people, so that fluoride can be seen to be of benefit to anyone with their natural teeth, not just children (Grembowski et al 1992; Hunt et al 1989; Newbrun 1989; PHC 1995; Thomas et al 1992; WHO 1994). A recent report on Preventative Dental Strategies for Older Populations, noted that 'fluoride [is] the most important preventive measure available against decay at both the individual and population levels' (Thomson 1997).

The risk of dental decay is highest for lower socio-economic groups, who can least afford dental care, and for Māori (Hunter et al 1992). It is also these groups that benefit most from caries prevention due to water fluoridation. There are more than 30 refereed papers in the international literature which have examined socio-economic status (SES) or social class and the relative effectiveness of fluoridation. Most have noted a 'social gradient' with numbers of caries in deciduous and permanent teeth increasing as socio-economic status decreases. A New Zealand survey (Treasure et al 1992) showed that fluoridation protected 5-year-olds in SES groups 4-6 from more decay than it did for SES groups 1-2 (because their levels of decay were already lower).

Water fluoridation is likely to be the main source of fluoride where significant proportions of these groups do not brush their teeth daily, and do not always use fluoride toothpaste when they do. For instance, 1997 data for 5-year-olds from the Porirua basin, a fluoridated, low SES area in the Wellington region, shows that 95 percent of European children brushed at least daily with a fluoride toothpaste, compared with only 77 percent of Maori and 64 of percent Pacific Islanders (Peter Dennison, Public Health Dentist for Wellington, personal communication, 14 January 1999). This shows that fluoridated water is likely to be the only major source of fluoride intake for some sectors of the population.

The lifetime benefit of exposure to water fluoridation is estimated to be the prevention of a total of 2.4 to 12.0 decayed, missing or filled teeth for the average individual (PHC 1994). At a population level, it is estimated that water fluoridation prevents between 58,000 and 267,000 decayed, missing or filled teeth in New Zealand per year (PHC 1994). Based on current levels of 50 percent of the population receiving fluoridated water, it is estimated that the annual cost savings are up to \$14.3 million (PHC 1995).

Adverse health effects

In the review of published literature and other reports on fluoride research, it is noticeable that many of the articles that raise fears about water fluoridation relate to dosages well in excess of intakes from consuming drinking-water containing fluoride at the recommended levels of 0.7 to 1.0 mg/L; lack substance; or repeat previous statements already shown to be without scientific validity. For example, many studies are in vitro and cannot, therefore, be extrapolated to public health effects on the human population. If the results were applicable to humans, there would be solid epidemiological evidence of increased rates of adverse health effects in fluoridated areas when compared with non-fluoridated areas. This is not the case, as there is no such epidemiological evidence.

The only effect that has been associated with water fluoridation (apart from improved oral health status) is very mild dental fluorosis in a small number of children. Dental fluorosis is a defect of the tooth enamel caused by the ingestion of fluoride during the development of the tooth. It is only one of a wide range of developmental effects that can occur in tooth enamel. Clinically, dental fluorosis is characterised by opaque white areas in the enamel. In its mild forms these opacities may be unrecognisable to other than a dental health professional or have no more than cosmetic significance. With increasing levels of fluoride ingestion the enamel can become pitted and mottled.

The Public Health Commission reported in 1994, that "It is possible that there is some level of cosmetic concern associated with dental fluorosis in New Zealand, however, fluorosis at a level that causes cosmetic concerns is more likely to be attributable to other forms of fluoride use (supplements and toothpaste ingestion) than to water fluoridation."

The level of fluoride recommended in the *New Zealand Drinking Water Standards 2005* of 0.7 to 1.0 mg/litre is specifically designed to minimise the risk of dental fluorosis.

A report by the Institute of Environmental Science and Research Ltd (ESR, 2000) updated the information in the Public Health Commission's (PHC) 1994 report on *Water Fluoridation in New Zealand*. The PHC report dealt, in part, with possible health risks associated with water fluoridation and noted the need for further research on hip fractures and osteosarcoma. The ESR review concluded that there was no persuasive evidence of harmful effects from optimal water fluoridation (between 0.7 and 1.0 ppm), and the evidence has strengthened that there are no serious health risks associated with water fluoridation.

Comment

Reports of independent experts, both nationally and internationally, in relevant fields of medicine, epidemiology, oral health and water engineering have been unanimous that benefits of water fluoridation outweigh any (very small) potential risks. Research studies on the safety of water fluoridation have been reviewed repeatedly by international and Australasian experts, including a World Health Organisation expert group. The conclusion of all these reports is uniform. There are no significant health risks associated with water fluoridation at optimal levels. Mortality rates and health statistics (other than for oral health) in fluoridated and unfluoridated communities are similar and decay rates are significantly lower in communities with fluoridated water.

The World Health Organization advises that water fluoridation is the most effective method of reaching the whole population, so that all social classes benefit without the need for active participation on the part of individuals (WHO 1994).

In summary, there is ample evidence to show the safety and efficacy of fluoride in promoting oral health and there has been no evidence to give a reason to change the policy advice that the fluoridation of water supplies at levels between 0.7 and 1.0 mg/litre is safe and effective in promoting oral health. The Ministry believes that there is overwhelming evidence of the effectiveness and safety of water fluoridation in improving the dental health of New Zealanders, and in preventing dental decay.

Sally Gilbert
Team Leader (Environmental Health)

29 August 2005