8.34 A number of explanations are possible for this variation. For example, the type of pipe materials used in the plumbing in the suburb may vary, and react differently. A more likely explanation is the build–up of fluoride that occurs on the walls of the pipes. This may be occurring more in some suburbs than in others for various reasons, such as how much the taps are used and therefore how much time the water is stationary in the pipes. The age of the pipes may be significant, with older pipes having more fluoride on them, some possibly being washed off increasing the fluoride concentration of the sample. Newer pipes will tend to absorb the fluoride from the water and therefore decrease the fluoride concentration. Distance may also be a factor. The further water has to travel from the point of inclusion, the more time it has to attach to the walls of the pipes.

8.35 However, Professor Irving emphasised that, while these variations were discovered, the differences in the concentration of reticulated fluoride in different areas of Canberra is small.

PART II

9 THE COMMITTEE'S ASSESSMENT – INTRODUCTION

The nature of the debate

9.1 The Social Policy Committee has found itself at the centre of a dispute which has occurred and recurred in many communities. As a contentious scientific and community debate it shares some of the characteristics identified by Cullen in relation to issues relating to environmental management. Cullen suggests that the emergence of "advocacy science", where scientists select evidence to support their position, is a threat to the traditional approach of science that is motivated by a search for truth.[1]

9.2 Cullen identifies five elements in environmental conflicts, all of which are recognisable in the fluoride debate. These are:

- **interest elements or distributional elements which refer to the self interest of the people involved;**

9.3 In the debate over fluoride, the anti–fluoridationists, in particular, accuse their opponents as acting out of self–interest. This supposed self–interest ranges from the financial interests of aluminium companies which produce fluoride to the self–interest of dentists who, it is alleged, benefit from fluoridation because it provides them with more work.

9.4 Indeed, it was suggested that the Committee might approach its analysis by considering first whose interest lay where, because people presenting evidence or views at odds with those of the proponents of fluoridation in the establishment were risking their careers . The pro–fluoridationists, it was suggested, had such vested interests in the continuation of fluoridation that they attempted to suppress scientists, doctors and dentists who raised awkward questions about fluoridation.

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1 Cullen, P, "Values and Science in Environmental Management", preprint of presentation to symposium on water management at Alligator Rivers Region, April 1990.

- **value elements which involve fundamental belief systems;**

9.5 The strongest value element in the fluoride debate is the objection to what is perceived as mass medication and a breach of the rights of the individual. Because this is a question of values rather than scientific evidence it broadens the debate from purely scientific to include civil liberties issues.

- **data elements which arise when people lack the information to make wise decisions;**

9.6 The data elements in the fluoride debate are particularly complex. It is not a matter of not having sufficient information – indeed, there is almost too much. It is more a matter of being able to assess the mass of data when the conflicting protagonists disagree over interpretations. This makes the task of a lay committee most difficult because it is faced with having to make judgements on the opposing scientific evidence before it.

- **labelling elements, which enter a conflict when players label other players with negative labels that may introduce misconceptions and stereotypes;**

9.7 Throughout its inquiry the Committee has been presented with evidence in which labels are given to other participants in the debate. For example, the NHMRC was described as:

> an impregnable giant of bureaucratic totalitarian health dictatorship with no accountability. It is the most undemocratic scientific operation in the whole of Australia's so–called democracy and Government in the interest of public health. It is purely a protective organisation for past performance of that organisation.[2]

9.8 Anti fluoridationists have been described in the following way:

> Anti fluoridationists worldwide have not been able to present any new evidence about the safety and efficacy of fluoride.
>
> In their endeavours to discredit original fluoride research, they have been quick to selectively misquote (out of context) the various findings and conclusions. Further, their analyses of their own research are anything but objective, as you will discover in this section.
>
> It is unfortunate that unsupported claims can be made without the proponents being held accountable.[3]

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2 Freedom from Fluoridation of Australia submission.

3 Australian Dental Association (ACT and Southern Tablelands Division) submission.

- **structural elements introduced by the organisational structure erected to manage a resource.**

9.9 This last characteristic applies less to the fluoride debate. The principal structures involved are the department responsible for the water resource and the department with responsibility for dental health (if one counts the nation's teeth as a resource).

9.10 The structure of science itself, and the various disciplines within it, affects the fluoride debate. For example, generally dentists speak with most authority about the effects of fluoride on dental caries. They are less qualified to argue the range of other, associated health issues, which involve other professionals. If a mathematician says that it is not known how fluoride acts on teeth but a biochemist says that it is, it is reasonable to give more weight to the evidence, on this issue, of the biochemist.

9.11 The debate is so broad that it encompasses many different health and ethical perspectives which have to be assessed against one another in the process of evaluating the evidence.

The Committee's assessment

9.12 The Committee has heard evidence and received submissions from a wide range of people, often with an equally wide range of strongly held views.

9.13 The Committee is aware of the responsibility it holds in recommending practices which will affect the health of present and future generations of residents of the Australian Capital Territory and the City of Queanbeyan. It is also only too aware of the fact that it is not possible to make any recommendation which will be universally well received.

9.14 The conclusions presented below address each of the Committee's terms of reference for this inquiry in turn. The Committee was asked to seek professional, technical and scientific advice on several matters, including:

(a) the effect of fluoride on public health;

(b) the issue of mass medication and civil liberties;

(c) other matters relating to the issue of fluoridation in the ACT which the Committee considers should be drawn to the attention of the Assembly.

9.15 Each of these topics is treated in a separate chapter in Part 2 of this report. The first, chapter 10 which follows, looks at the complex issue of the effect of fluoride on public health.

10 THE EFFECT OF FLUORIDE ON PUBLIC HEALTH

10.1 This chapter of the report, and those which follow, give the Social Policy Committee's assessment of the various arguments relating to water fluoridation.

10.2 The Committee is concerned, as other inquiries have expressed concern, at the polarisation which occurs on the question of fluoridation. This polarisation has sometimes led to quite offensive accusations by the protagonists of one another's motives, accusations which tend to act as a smokescreen inhibiting rational analysis.

10.3 However, for every new inquiry into water fluoridation the situation also becomes more complex. This complexity arises from the proliferation both of research findings (and disputes over such findings) and of alternative sources of fluoride.

The effectiveness of water fluoridation

10.4 The first issue to resolve is whether fluoride can still be seen as an effective measure in caries prevention. If the conclusion is that it can not, then none of the related safety and ethical issues are relevant.

10.5 In its terms of reference, the Committee was asked to seek professional, technical and scientific advice on the matter of fluoride and public health. The Committee took the view that the NHMRC Working Group, comprised of experts across a range of disciplines which approached the evaluation of water fluoridation from different perspectives, could be accepted as one of the principal Australian professional body whose assessment of fluoridation should be heeded. Members of the Working Group were:

> Prof A J McMichael, Professor of Occupational and Environmental Health, Department of Community Medicine, University of Adelaide
>
> Ms Hilda Bastian, Consumers' Health Forum, Canberra
>
> Professor R M Douglas, Director, National Centre for Epidemiology and Population Health, Australian National University
>
> Dr B T Homan, Department of Dentistry, University of Queensland
>
> Dr B G Priestly, Department of Clinical and Experimental Pharmacology, University of Adelaide
>
> Professor A J Spencer, Professor of Social and Preventive Dentistry, Dental School, University of Adelaide

Dr S R Wilson, Statistics Research Section, School of Mathematical Sciences, Australian National University

10.6 Because the Committee wished to await the conclusions of the Working Group, it extended the tabling date for its report from 31 May 1990 to 29 November 1990.

10.7 The Working Group has not yet completed its final report but has issued two interim reports. The first was issued in November 1989; the second on 2 November 1990. The Committee notes that the second interim report states that the full draft report is planned for completion within three months of that date.

10.8 The first interim report stated that:

> The application of 1 ppm fluoride to water has provided a public health measure of apparently great efficacy. Repeatedly, in observational and experimental studies, in which caries experience has been monitored, the standard index of decayed, missing and filled teeth or surfaces in which children who have been exposed to fluoridated water supplies has fallen substantially, and the reported differences between fluoridated and non–fluoridated areas have led to the inference that fluoridated water was the key determinant of the fall. The magnitude and consistency of the benefit and absence of convincing evidence of toxicity or harm from this measure has led many highly respected bodies in the health field including the Royal College of Physicians (England), the World Health Organisation, the American Medical Association, the American Dental Association and the National Health and Medical Research Council of Australia, to firmly advocate a policy of universal water fluoridation.

10.9 After some discussion, the first interim report concluded with the statement that:

> The Australian contribution to the international debate on fluoride has come principally from those opposed to adding fluoride to water supplies, using data that are less than optimal for answering the new and complex set of questions which the new sources of fluoride have introduced. We should now embark on research into this important area of public health which can contribute positively to international understanding of the complex relationship between the protective role of fluoride and the incidence of caries, and will inform the development of national public policy on this matter.

10.10 The second interim report, of November 1990, carried the following statement:

> This Interim Report provides the background to the Working Group's activities, and summarises its detailed review of the scientific evidence, along with its conclusions and recommendations, as currently drafted. The full draft report (approximately 130 pages long) is still being finalised. It is planned that it will be completed and submitted to the Health Care Committee of the NHMRC within three months.

10.11 The major conclusions of the Working Group were published with the interim report, but with the caveat that:

> The Working Group does not anticipate any substantive changes to its conclusions or recommendations. However, it wishes to reserve the right to make modifications to them if such changes become warranted during the completion of the full report.

10.12 The major conclusions from the review were:

1 In the assessment of the Working Group, the aggregate evidence establishes that fluoridation of water to around 1 ppm has, in the past, conferred a substantial protective effect against dental caries. The evidence for this protective effect is strongest in childhood, reflecting the preponderance of research in this age–group. In recent decades, the magnitude of the beneficial effect of water fluoridation appears to have decreased, as the pattern of dental disease has changed and as fluoride has become widely available from a number of discretionary sources. Nevertheless, water fluoridation continues to contribute to the prevention of dental caries, and therefore to provide an important, community–wide, and readily achievable, foundation to dental public health. While further confirmatory research is needed in contemporary adult populations, water fluoridation appears also to be of increasing importance to dental health in an ageing population.

2 Fluoridation of drinking water remains the most effective and socially equitable means of achieving community–wide exposure to the caries–prevention effects of fluoride. A fluoride concentration of 1 ppm in drinking water is still regarded as appropriate for the prevention of caries (in a temperate climate). A concentration of 1 ppm secures most of the caries prevention effect available from fluoridated water, while maintaining minimal contribution of water fluoride to dental fluorosis in children.

3 There is no evidence of adverse health effects attributable to fluoride in communities exposed to a combination of fluoridated water (1 ppm) and contemporary discretionary sources of fluoride. The increased total fluoride exposure in recent decades has been associated with some increase in the occurrence of dental fluorosis – predominantly in those individual children with a history of high total ingestion of fluoride, mostly from discretionary sources. While it is conceivable that some isolated cases of skeletal fluorosis may be occurring in individuals with either a high long–term intake or a particular metabolic susceptibility, no cases have been reported in Australia.

4 There is no evidence to justify a change in the view that fluoride supplementation within the intended normal range of daily intake is safe in human populations. The recent equivocal evidence of increased risk of bone neoplasms in one species of experimental animals exposed to very high doses indicates a need for a raised and ongoing attentiveness to these (and any other) possibilities of adverse effects in human populations experiencing lifelong exposure to fluoride supplementation.

5 In attempting to estimate the consequences of reducing the concentration of fluoride in drinking water below 1 ppm, the Working Group concluded that such a reduction would inevitably result in an increase in the occurrence of dental caries. If one uses as a best estimate of the magnitude of any such increase an interpolation of the data describing increases in childhood caries in communities in which water fluoridation has been terminated, and, further, assumes that the historically–documented curvilinear relationship between natural water fluoride concentration and community dental caries rates is applicable, the predicted increase for a reduction in fluoride concentration from 1 ppm to 0.5 ppm (chosen here for illustrative purposes only) would be of the order of 10–15% in the short to medium term (ie within 5–10 years). However, the Working Group is aware of the constraints to adopting this approach – most notably the lack of direct data on the change in caries rates consequent upon changes in water fluoride concentration within this range (0.5–1.0 ppm). Therefore, it is acknowledged that the actual change could range from a very small figure to – in the case of certain groups that have a higher caries rate, including older adults – a substantially higher figure.

6 In children, the current major need is for effective control over discretionary sources of supplementary fluoride, to avoid excessive intake in some individuals. Avoidance of high individual intake of fluoride in childhood can best be achieved by control of discretionary sources of fluoride. This includes: the introduction of controls directed at reducing the ingestion of discretionary fluoride in fluoridated toothpaste; reductions in the fluoride concentration of infant formula powders; and discouraging the inappropriate use of fluoride tablets and drops.

7 If, in the light of future health surveillance, there were any future need for a community–wide reduction in long–term exposure to fluoride in adults, this would be best achieved by reduction in the concentration of fluoride in drinking water.

8 There is a general and urgent need to upgrade substantially our monitoring dental health to include older children and adults, and to monitor the levels of fluoride exposure and the occurrence of dental fluorosis in Australia.

10.13 While recording the weight which it has given to the NHMRC interim report, and with the same caveat given by the Working Group, the Committee also wishes to give its own overview of some of the points about the efficacy of water fluoridation which emerged during its own inquiry.

10.14 One of the fundamental questions under debate is whether water fluoridation is an effective measure in preventing dental caries. As has been indicated earlier, absolute proof is impossible. Epidemiology is a science which establishes links between causes and effects. Establishing such a link is a matter of training, experience and judgement.

10.15 Valid epidemiological deduction is a far cry from claiming, as did one submission, that because the United States teenage suicide rate had increased over the past 30 years, a period coinciding with the increase in water fluoridation, fluoride was to blame for the suicide rate. It is the business of epidemiology to eliminate falsely attributed causal relationships, partly by identifying other influences which might cause the effect and isolating one from the other.

Brisbane – the unfluoridated State capital

10.16 Much has been made of statistics about dental caries reduction in Brisbane, the only unfluoridated capital city in Australia. It is therefore of particular interest as a form of "control" against which to measure the effectiveness of fluoride in other State capitals.

10.17 Dr L M Carr, for many years Dental Services Adviser with the Commonwealth Department of Health, wrote several articles on the prevalence of dental caries in Australian children. In an Australia–wide comparison published in 1988 "Dental health of children in Australia, 1977–85"[1], Dr Carr incorporated a table (see Appendix 4) which provided a State by State comparison of dental caries experience in children. This table showed apparently insignificant differences between Queensland, where only 6 percent of people had access to fluoridated water, and the ACT with 100 percent, Western Australia 86 percent, New South Wales 82 percent, the Northern Territory 78 percent, Tasmania 76 percent, South Australia 73 percent and Victoria 71 percent.[2]

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1 Carr, L M, "Dental health of children in Australia, 1977–1985", **Australian Dental Journal**, 1988, 33(3), pp 205–11.

2 Carr, L M, "Dental health of children in Australia, 1977–1985", **op cit.** For the table, see Appendix 4.

10.18 The debate over this table demonstrates the difficulty in drawing conclusions from such data. Interpretation of the results has been hotly disputed. Opponents of fluoridation claim that the Queensland figure proves that water fluoridation is not the primary cause of reduced dental caries. Its proponents, including Dr Carr, do not agree:

> Such a comparison between dental caries indices in Queensland and other States does not take into account issues such as differences in basic dental health trends, the use of preventive measures other than fluoridation of water, the movement of people to Queensland from fluoridated areas in other States, and the use of soft drinks and food products which were processed in fluoridated areas and sent to Queensland. The extensive and successful School Dental Service in Queensland emphasises topical fluoride applications as part of the dental care programme, and also recommends fluoride supplements. While the extent of the use of these supplements is not known, McEniery and Davies reported that in Brisbane 21 percent of children consumed fluoride tablets regularly.[3]

10.19 Dr Diesendorf, in particular, has disputed this analysis, holding strongly to the view that the case for fluoridation is seriously undermined by these results.

10.20 He claims, for example, that the majority of soft drinks are not imported across the border but are reconstituted in Brisbane, using local non–fluoridated water.[4] This claim is interesting because it differs from the findings of a research project undertaken in two cities in Canada where children kept "drink diaries" and it was found that a substantial source of fluoride was shown to be available in the non–fluoridated community from beverages other than water, primarily from carbonated beverages commercially prepared with fluoridated water. This researcher recommends that available beverages and actual consumption should be considered in the prescription of fluoride supplementation for children with minimal fluoride in their drinking water.[5]

10.21 Professors Brown (United States) and Craig (Sydney), dispute Diesendorf's objections. In a letter to the Social Policy Committee, Professor John Brown, a Queensland dental expert now working in Kansas, alleges that Diesendorf overlooks the regular topical fluoride applications made by the School Dental Service in Queensland as an alternate source of fluoride. Topical fluoride treatment is widespread in Queensland.

10.22 Until now, the Queensland Government has adopted the policy that water fluoridation is a local authority matter (thus, for example, Brisbane is not fluoridated while Townsville is).

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3 Carr, L M, "Dental health of children in Australia, 1977–1985", **op cit**, p 205.

4 Diesendorf, M, **A Summary of Scientific Evidence that the Benefit of Water Fluoridation have been greatly exaggerated,** unpublished paper, July 1989.

5 Clovis, J and Hargreaves, J A, "Fluoride Intake from Beverage Consumption", **Community Dental Oral Epidemiology**, 1988, 16(1), pp 11–15.

10.23 The significant mobility of the population also makes between–State comparisons difficult. The example of the Gold Coast illustrates this problem. The Gold Coast water supply was fluoridated 1966. Thirteen years later, in 1979, the Gold Coast Council, under pressure from anti–fluoride groups, decided to cease fluoridation. A post–fluoridation study of the Gold Coast would be of great interest, but the mobility of the population makes it virtually impossible. The Committee was told of schools which had 50 percent turnover of students in one year. It would be hard to elicit any valid information from a transient population with access to multiple fluoride sources.

10.24 The Committee was told that natural caries levels tend to be lower the closer an area is to the equator. It is therefore necessary, when measuring the effects of fluoridation, to consider the **rate of decline** rather than simply compare caries prevalence. In a submission to the Brisbane City Council, arguing for fluoridation, the ADA uses this argument:

> There has been a general decline in the incidence of dental caries (decay) in Australia and elsewhere in the last generation. Figures published in "Dental Health of Children in Australia 1977–1986" from the Commonwealth Department of Health, 1987, indicate that of all Australian states Queensland has the poorest rate of decline. Furthermore, the 1986 figures indicate that the amount of tooth decay of Queensland's children aged 4–9 years was some 70 percent higher than the Australian average. Queensland also has the least amount of fluoridation.[6]

10.25 Writing of New Zealand, R Harvey Brown dismisses widespread diet change as a significant cause of caries reduction. He points out that there appears to be an increase in advertising aimed directly at children. Much of this advertising is for potentially cariogenic snacks and sweets.[7] Because of the lack of evidence of any reduction in sugar consumption, this author also rejects the suggestion that bacteriological change might have taken place, because such a change would have to be associated with sugar reduction.

10.26 Harvey Brown also suggests that epidemiologically, the effect of fluoride in reducing tooth decay can be deduced through (a) the strength of the association between apparent cause and effect; and (b) the consistency of the association in a large number of studies.

10.27 In 1988, it was agreed that there would be an Australia–wide oral health survey, conducted by individual States using common research protocols. Although some individual State results were available to the Committee during the course of its inquiry, the Committee was disappointed that despite assurances in hearings that the complete survey would be available, the overall comparison had still not been completed by the conclusion of this report.

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6 The Australian Dental Association (Queensland Branch), **Water fluoridation: a submission to the Brisbane City Council**, 1989, p 1. Brisbane is Australia's only unfluoridated capital city.

7 Harvey Brown, R, "Fluoride and the prevention of dental caries. Part 1: The role of fluoride in the decline of caries", **New Zealand Dental Journal**, October 1988, p 103.

10.28 The results of the Tasmanian Oral Health Survey were available to the Committee. These results indicate that before the age of 30, a smaller proportion of teeth in Tasmanians show the effects of dental caries compared to those of other States, while after this age the reverse is true.[8] This is a startling reversal of the comparative status of Tasmanian teeth since the evidence recorded by Justice Crisp. It is hard not to draw the conclusion that fluoridation of much of Tasmania's water supply, together with the efficacy of the School Dental Service, must have played the major part in this change.

10.29 What evidence to accept and what to reject, when proponents and opponents of fluoride are locked into battles over the validity of research findings, was obviously a difficulty for the Committee. For example, opponents of fluoridation argue that scientists do not know how fluoride acts on the teeth. A biochemist, Professor Irving, gave a clear account of exactly how it did.[9]

10.30 It is possible to criticise many of the studies of fluoridation, as Diesendorf has done, and argue about whether there have been adequate controls, the merits of longitudinal studies (self–control studies), blind studies and double blind studies. But human beings are not rats and the perfect study is therefore impossible to undertake. The consistency of the existing findings is, nonetheless, hard to ignore.

10.31 The Committee concludes that:

> **On the balance of the evidence before it, the Committee accepts that fluoride is an effective agent in reducing the level of dental caries.**

Safety – optimum level

10.32 A Swedish parliamentary committee (the Fluoride Commission) described the safety of fluoride as follows:

> Like many other substances used in preventive health care, eg vitamin D, iodine and iron, fluoride can have adverse effects when administered in excessive quantities and efforts have therefore been made to establish the daily fluoride intake required for effective caries prevention without harmful side effects. In areas with a temperate climate a fluoride level of 1–1.2 mg per litre has proved to be the most suitable level.

10.33 Fluoride exists naturally at different concentrations in water, and water fluoridation seeks to raise (or lower) the concentration to the level at which it is most effective in preventing caries without reaching a toxic level.

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8 **National Oral Health Survey 1987–1988 – Tasmania**, p 28.

9 See Chapter 4.

10.34 The European Economic Community Directive on Drinking Water lists a number of toxic substances providing parameters for their concentration in drinking water.[10] These substances include arsenic, beryllium, cadmium, cyanides, chromium, mercury, nickel, lead, antimony, selenium, vanadium, pesticides and related products, and polycyclic aromatic hydrocarbons. Only vanadium carries no maximum admissible concentration.

10.35 Apart from vanadium, all these substances, though toxic, are naturally present in drinking water at various concentrations.

10.36 Fluoride, on the other hand, is listed under "Substances undesirable in excessive amounts" (with the proviso that "Certain of these substances may even be toxic when present in very substantial quantities"). These substances include nitrates, nitrites, ammonium, hydrogen sulphide, phenols, boron, iron, manganese, zinc, phosphorus and so on.

10.37 There are many substances which, if ingested in excessive amounts, do physical harm but which, when ingested in reasonable amounts, are beneficial. These substances do not exist in the same concentrations in all natural water supplies, nor does fluoride.

10.38 It has been estimated[11] that the lowest toxic dose for even a 9 lb baby would be the amount contained in 26 gallons of fluoridated water at 1 ppm. The Committee notes the caution that was expressed in respect of babies who may be formula rather than breast fed. Obviously they ingest more fluoride.

10.39 The equivalent amount for an adult[12] would be more than 450 gallons consumed at one time. The approximate scale of toxicity of fluoride in adults is given at:

Acute fatal poisoning	2,500 mg
Acute non–fatal symptoms	125 mg
Chronic poisoning	more than 20 mg (daily)

10.40 One submission referred to the use of the term "optimal levels" as a form of scientific dogma which was in fact fallacious. It argued that it should not be accepted that because fluoride was a substance found in natural water supplies there was some "optimal level" to which public supplies should be adjusted.

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10 "Council Directive of 15 July 1980 relating to the quality of water intended for human consumption", **Official Journal of the European Communities**, No L 229/11, 30.8.80.

11 British Dental Association, **Fluoridation of Water Supplies**, January 1976.

12 British Dental Association, **Fluoridation of Water Supplies**, op cit.

10.41 However, if fluoride is accepted as beneficial to teeth at certain levels but harmful to bones at a higher ingestion level, it seems reasonable to try to establish an optimum level. For example, in the Ethiopian Rift Valley, would one argue that the fluoride level be maintained at its natural level or should attempts be made to reduce it? If attempts are made to reduce it, what level should it be reduced to?

. Fluoride and dental fluorosis

10.42 It is well established that the more fluoride ingested the greater the likelihood for dental fluorosis to appear. It is also clear that the incidence of dental fluorosis provides an indication of the overall level of ingested fluoride.

10.43 The Victorian Committee of Inquiry reported that:

> Endemic dental fluorosis does not occur in those communities where drinking water supplies contain less that 0.5 ppm fluoride. At concentrations of fluoride above 0.8 ppm the extent and degree of mottling is influenced by the climatic conditions of the region concerned and the effect of higher ambient temperatures on the daily quantity of water consumed. Various other geographical factors may play their part and, in communities with drinking water supplies containing between 0.8–1.2 ppm F, up to 12 percent of residents may show mild mottling of teeth due to fluoride. At such fluoride concentrations the mottling is "very mild" and can be seen only in good fluorescent light. It is not unsightly and is generally not noticeable to most people. With fluoride concentrations greater than 2.0–2.5 ppm, more than 30–35 percent of persons constantly exposed during tooth formation are affected by increasing degrees of dental fluorosis in permanent teeth. The deciduous teeth are rarely affected at the latter concentrations.[13]

10.44 The cosmetic aspects of this problem have to be weighed against the demonstrated reduction in the incidence of dental caries. This reduction in dental caries means that children no longer have to suffer the pain and unsightliness of numerous fillings, and the population no longer expects its young adults to lose all their teeth.

10.45 While this may have led to an increase in the number of practising dentists, it should be seen as a positive rather than a suspect result of fluoridation. However, different claims about numbers of dentists are made by different participants. One (unverified) figure quoted to the Committee was that in Europe there was now one dentist for every 10,000 in the population as against 1:2,000 several years ago. However, the dental profession, previously having a great deal of work to do on children but little on the largely edentulate adult population, can now expect to treat adults. This could mean,

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[13] **Report of the Committee of Inquiry into the Fluoridation of Victorian Water Supplies for 1979–80,** op cit, p 56.

say, sixty years of additional treatment for a significant proportion of individuals. So knowing the proportion of dentists per head of population means little without knowing the pattern of visits of the patients. The nature of this treatment will have changed, with less concentration on caries and fillings. In addition, people increasingly undertake orthodontic treatment because this is seen as a worthwhile lifetime investment. Whatever the statistics on dentists numbers, it seems totally illogical to consider dentists' motives as suspect because of such a remarkable advance in dental health.

10.46 In **Fluoridation in Canberra: Part I. Prefluoridation data: dental caries and mottled enamel**[14] Dr Carr concentrated specifically on Canberra before water fluoridation. This study indicated that 42.2 percent of seven–year–old children and 53.4 percent of twelve–year–old children had mottled tooth enamel before fluoride was introduced.

10.47 Justice Crisp, in the Tasmanian Royal Commission Report, noted that defects in developing enamel similar to dental fluorosis but due to wholly unrelated causes are common:

> It is convenient to refer to them as idiopathic defects to distinguish them from fluorotic. They may be due to a variety of causes, such as vitamin deficiency, trauma, febrile illnesses of childhood and other matters. In recent years the administration during infancy and childhood of the antibiotic tetracycline has been recognised as a potent cause.[15]

10.48 However, an increase in dental fluorosis was specifically identified in evidence to the Committee. Professor Douglas agreed that if the incidence of dental fluorosis was increasing this should not be ignored:

> There are legitimate questions about the magnitude of the independent effect of water fluoridation and the size of the dose of fluoride which the population, especially certain groups including infants and renal patients, are now receiving. Evidence from overseas communities suggests that dental fluorosis is increasing and this is our most sensitive indicator of the likelihood that we could be moving closer to a toxic level.

10.49 A similar point was made by Justice Crisp. This will be discussed later in relation to skeletal fluorosis.

10.50 The Committee recalls evidence from a parent who reported that her bottle fed child had fluorosis while no fluorosis was evident in her breast fed child.

10.51 So while it is legitimate to argue that the cosmetic disfigurement associated with fluorosis is far outweighed by the benefits of keeping one's teeth, often caries free, through life, significant increases in dental fluorosis can also be seen as an indicator that fluoride intake is reaching too high a level.

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14 Carr, L M, "Fluoridation in Canberra: Part I. Prefluoridation data: dental caries and mottled enamel", **Australian Dental Journal**, August 1966, pp 248–257.

15 **Report of the Royal Commissioner into the Fluoridation of Public Water Supplies**, Hobart, 1968, p 83.

Fluoride as a health hazard

10.52 A large number of ailments and allergies have been attributed to fluoride. These have already been discussed in previous sections. The Committee's assessment of these claims is given below.

. Fluoride ingestion and skeletal fluorosis

10.53 The Victorian Committee of Inquiry reported that:

> Subclinical osteofluorosis has been detected by X–rays in a few people in Oklahoma and Texas where drinking waters contain from 4–8 ppm fluoride, and in 10–15 percent of adults studied in areas served by drinking waters containing 8 ppm fluoride. All such persons were completely symptom–free. Symptomatic endemic skeletal fluorosis has never been reported in North America, Great Britain or Australia. Except in tropical countries no symptomatic case of skeletal fluorosis has been attributed to drinking water with less than 4 ppm fluoride. In these countries the condition may be exacerbated by ingesting fluoride in dust, sediments and foodstuffs grown in soils high in fluoride.[16]

10.54 A study of endemic fluorosis in the Ethiopian Rift Valley was reported in 1987. Cases of skeletal fluorosis appeared among workers in some sugar estates, where a linear relationship was observed between the development of crippling fluorosis, fluoride concentration of drinking water, and period of exposure to it. Cases of skeletal fluorosis appeared among workers who had been consuming water with a fluoride content of more than 8 ppm for over ten years.[17]

10.55 This does not, in the Committee's opinion, constitute a case against fluoridation. There are a great many substances which are essential in small amounts but dangerous, or even lethal, in large ones. It does constitute a case for establishing optimum levels and either fluoridating or de–fluoridating in the attempt to achieve them.

10.56 Justice Crisp suggested that the occurrence of dental fluorosis could be used as a warning of potential skeletal fluorosis:

> It is ... completely clear that such a warning would be grossly apparent at a level of fluoride exposure much lower and years before symptoms of skeletal fluorosis could be expected in the same community. It therefore, as

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16 **Report of the Committee of Inquiry into the Fluoridation of Victorian Water Supplies for 1979–80**, op cit, pp 50–51.

17 Haimanot, R T, Fekadu, A and Bushra, B, "Endemic Fluorosis in the Ethiopian Rift Valley", **Tropical Geographical Medicine**, July 1987, 39(3), pp 209–17.

> a sign of over–exposure, constitutes a community warning of great importance, particularly as it lends itself to official surveillance through the school by the agency of the School Dental Service and also because ... the levels of fluoride exposure likely to produce such degrees of dental fluorosis are known with reasonable certainty. In other words, if there is no objectionable dental fluorosis there is no reason to fear that skeletal fluorosis will ever be found in the same community.[18]

10.57 But the Committee noted conclusion no 3 of the NHMRC Working Group's second interim report, that:

> While it is conceivable that some isolated cases of skeletal fluorosis may be occurring in individuals, with either a high long–term intake or a particular metabolic susceptibility, no cases have been reported in Australia.[19]

. Allergic reactions and fluoride

10.58 A wealth of allergies have been attributed to fluoride. These have already been described in Chapter 6.

10.59 Professor Stephen, writing of the fluoridation experience in the United Kingdom, commented that:

> Some of the complaints raised by anti–fluoridationists in Kilmarnock included the fact that both water and tea tasted different, goldfish and canary death rates rose, the human death rate rose and the suicide rate increased, to say nothing of the allergies experienced both from washing in, and the drinking of fluoridated water! Any cup of tea, however, even if made with water from an extremely low fluoride area, contains substantial quantities of fluoride which is naturally present in the tealeaf and allergies to contact with sea water (all of which contains 1.2–1.3 ppm fluoride) are unknown![20]

10.60 It has also been reported that a research experiment which attempted to produce an allergic response to fluoride in rats failed to do so.[21]

10.61 Professor D N Martin, then Professor of Preventive Dentistry at the University of Sydney, described to the Tasmanian Royal Commission an extensive program of dietary supplementation by fluoride tablets conducted under the supervision of the Dental Department of the University of Sydney since 1945.

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18 **Report of the Royal Commissioner into the Fluoridation of Public Water Supplies for 1979–80**, op cit, p 83.

19 National Health and Medical Research Council Working Group on the Effectiveness of Water Fluoridation, **Interim Report**, November 1990.

20 Stephen, K W, "Fluoridation Experience in the United Kingdom", **The Journal of The Royal Society of Health**, Vol 104, No 4, August 1985, p 116.

21 Blohm, G and Nilzen, A, **Report to the Swedish Board of Health and Social Affairs**, 1971.

10.62 In 1968 2,000 children were participating in the program:

> In this study, conducted over twenty–two years there have been no reports of allergy to fluoride, either in tablet form or in solution, which have been substantiated. Three which did present with symptoms suggestive of fluoride toxicity presented the same symptoms when the fluoride was removed and a placebo substituted. A psychosomatic origin was demonstrated in each case.[22]

10.63 Some individual submissions received by the Committee described allergies or ill effects attributed to fluoride. The causal relationship was not clearly established, however, and the Committee felt that it was necessary to seek advice from an allergy specialist about these claims.

10.64 Professor Robert Clancy, Professor of Pathology at the Newcastle Medical School, was invited to give evidence to the Committee in order to assist it in assessing the relationship between these disorders and fluoride ingestion.

10.65 Professor Clancy described symptoms which patients frequently suffered, and which they also frequently attributed to such things as sugar, gluten in wheat, petrol fumes or fluoridated water. These symptoms included dizziness, rashes, depression or fatigue. Often such patients are quite certain of the causal relationship and feel better when they exclude whatever cause they have identified. Professor Clancy pointed out, however, that it had been proved that 30 percent of people who tried anything under these circumstances would improve.

10.66 Professor Clancy discussed exclusion diet testing (of over 400 substances) which had been undertaken over several years at Prince Alfred Hospital in Sydney. Because fluoride had not been considered a likely cause of diet–related problems it had not been included in these tests. Indeed it is impossible to carry out total deprivation tests on man, because nearly all foods contain some fluoride.[23]

10.67 The word "allergy", he suggested, was also used too loosely. According to Professor Clancy "allergy" means a specific type of body reaction which depends upon the body's own capacity to detect that substance as being foreign and reacting against it. When people have a symptom and identify it with a substance they then deduce that they are "allergic" to it. But more frequently than not these are not allergy symptoms but rather symptoms which may be due to a toxic effect of a substance or an idiosyncratic effect where people's biochemistry differ.

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22 **Report of the Royal Commissioner into the Fluoridation of Public Water Supplies**, op cit, p 117.

23 The British Dental Association, **Fluoridation of Water Supplies**, 1976, p 11.

10.68 Essentially there are three different mechanisms which can account for people having symptoms in relation to something from outside. First, there is the allergic reaction which is the body's active response manifest in certain disease processes (classically in those operating at surfaces either of the lungs, the gut or the skin). Second, there are idiosyncratic reactions of a biochemical, metabolic nature due to variations within a population or a toxicity effect due to too much of something that is going to affect everybody. Third, there are psychological causes (for example, where someone allergic to roses will react to seeing a picture of a rose).

10.69 Several reports on water fluoridation have drawn attention to the fact that tea has a high natural fluoride level. For example, the Tasmanian Royal Commissioner reported that tea:

> is unique in its capacity to concentrate fluoride and on infusion much of it will be released in ionic form and will therefore be assimilable. For this reason it has been of much interest to British, New Zealand, Australian, South African and Japanese researchers. In its dried leaf form it may range in fluoride content as high as 400 ppm but the Indian and Ceylon brands are much lower than the Chinese. The amount extracted in the infusion will be proportional to the amount of tea used and the time spent in brewing and whether the pot is "topped up".[24]

10.70 While Justice Crisp discusses tea largely to argue that even tea drinkers in water–fluoridated areas would not consume toxic doses of fluoride, it is significant also that the same allergy claims are not made of tea as are of fluoridated water.

10.71 Clearly the symptoms identified to the Committee cause or have caused considerable distress to the sufferers. The evidence however has to be clear before attributing problems to fluoride.

. Fluoride and Down's Syndrome

10.72 Some submissions suggested that there was a link between water fluoridation and Down's Syndrome. This claim was examined by the Victorian Committee of Inquiry, which drew attention to a study of 1,387,027 children across areas where the water was fluoridated and those with a low natural fluoride level. The authors concluded:

> These data show no association between water fluoridation and the incidence of congenital malformations. Furthermore, this population–based study, with data relating to 1,387,027 births, is the third that has specifically found no correlation between Down's syndrome and fluoridation.[25]

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24 **Report of the Royal Commissioner into the Fluoridation of Public Water Supplies**, op cit, p 123.

25 **Report of the Committee of Inquiry into the Fluoridation of Victorian Water Supplies 1979–80**, op cit, p 113.

. Fluoride and risks of thyroid malfunction

10.73 The Victorian Report considered the topic so irrelevant that it barely considered the claim that fluoride might lead to thyroid malfunction. Justice Crisp, however, did consider the claim, primarily because Tasmania had a history of endemic goitre. After an extensive review of the medical literature, Justice Crisp concluded that:

> On the evidence taken and on the literature to which I have been referred or to which I have myself referred in an endeavour to elucidate the technicalities in which this subject abounds I can only report that I can find no reason for suspecting fluoridation at 1 ppm will affect the size or function of the thyroid gland.[26]

. Fluoride and kidney dialysis

10.74 The Victorian Inquiry reported that a causal role for fluoride in producing renal pathology (as is sometimes claimed) had not been established. Nor was there evidence that the incidence or mortality of any renal disorder was increased by fluoride in water at a concentration of 1 ppm.

10.75 There was, however, evidence that patients maintained on long–term haemodialysis using fluoridated water for a period of years could experience an unacceptable frequency and degree of osteomalacia. The report cites a joint working party established in 1979 by the Australasian Society of Nephrology and the Australian Kidney Foundation Dialysis and Transplant Committee which considered the subject of "water for dialysis". The report recommended a level of 0.2 ppm fluoride for dialysis, with the following rationale:

> It is acknowledged that this is an arbitrary limit erring on the side of safety. There is not convincing evidence, even when the water for dialysis is not specially treated to reduce the fluoride levels, that the fluoride which accumulates in the body (and there is little debate about that) is harmful in any way ... There is increasing interest in purifying the water of long–term dialysis patients for reasons other than fluoride. In this process, fluoride levels will be reduced to approximately 0.2 parts per million.[27]

10.76 Professor Douglas, in his evidence, also referred to potential problems with the dose of fluoride which renal patients might currently be subjected to.

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[26] **Report of the Royal Commissioner into the Fluoridation of Public Water Supplies**, Hobart, 1968, op cit, p 155.

[27] Cited in **Report of the Committee into the Fluoridation of the Victorian Water Supply for 1979–80**, op cit, p 133.

. Fluoride and cancer

10.77 The question of whether fluoride is carcinogenic has been raised and refuted and raised again over many years. The debate has focused in particular on an American study published in 1975 by Dr Yiamouyiannis which claimed to demonstrate an increasing cancer death rate in ten cities with fluoridated water compared with ten cities with non–fluoridated water.[28] In 1977 Dr Yiamouyiannis and a co–researcher, Dr Burk, published a further paper claiming to demonstrate this link between cancer and fluoride.[29]

10.78 This research has since been subjected to close scrutiny and has been dismissed by other scientists who have questioned statistical methodology employed. For example the Victorian Committee of Inquiry into Fluoridation had the findings assessed, independently of one another, by two scientists.[30] Their assessments were:

> There is no real evidence supplied by Drs Yiamouyiannis and Burk which would convince a trained statistician that a positive case had been made that the prophylactic addition of fluorides to water causes an increase in cancer death rates. (Professor H O Lancaster)

> In the light of my own comments on the appropriateness of the statistical analysis by Yiamouyiannis and Burk, and other critical appraisals of the works of these authors I have to state that a positive association between fluoridation and increased cancer incidence has not been established. (Professor J S Maritz)

10.79 In the United Kingdom a Working Party was established to investigate the possibility of a cancer/fluoride link. Its terms of reference were:

> to appraise the published and otherwise available data and conclusions on cancer incidence and mortality amongst populations where drinking water is either artificially fluoridated or contains high levels of fluoride from natural sources.

10.80 The Working Party, which reported in January 1985, comprised nine scientists with expertise in epidemiology, cancer research and medical statistics. In the course of its inquiry it assessed 110 scientific papers.

10.81 The Working Party considered the claim by Drs Yiamouyiannis and Burk that their methods of analysis should be preferred to the standard methods universally used by epidemiologists and medical statisticians. The Working Party rejected the claim for the following reasons:

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28 Yiamouyiannis, J, "A definite link between fluoridation and cancer death rate", **National Health Federation**, March 25, 1975.

29 Yiamouyiannis, J and Burk, D, "Fluoridation and cancer age dependence of cancer mortality related to artificial fluoridation", **Fluoride**, 10, 102, 1977.

30 **Report of the Committee of Inquiry into the Fluoridation of the Victorian Water Supply for 1979–80**, op cit, p 118.

- A major weakness in the method was the failure to make comparisons between cancer death rates in different populations as fair as possible with regard to the demographic structure of the populations that were compared – in other words to compare like with like as far as possible.

- The researchers made mistakes and inconsistencies in the handling of data.

- The researchers failed to conduct acceptable tests of statistical significance.[31]

10.82 A more recent study of the possible carcinogenic properties of fluoride has been undertaken in the United States, by the National Toxicology Program through an experiment with rats. Both the NHMRC Working Group and the Social Policy Committee have awaited an evaluation of the results of this experiment.

10.83 The preliminary results of this research were brought to the Committee's attention in April 1990. The NHMRC Working Group also became aware of this research. The Working Group extended its inquiry to include an assessment of the study and another subsequently–reported animal experimental study. In its second interim report it concluded that there was no evidence that fluoride is a risk factor for cancer in humans:

> None of the properly–conducted epidemiological studies support such a contention, either in relation to all cancers combined or in relation to cancer at specific sites, including bone. To date, the only indication of such a risk is the finding that the occurrence of osteogenic sarcomas (that is, bone neoplasms) in male rats was equivocally related to the ingestion of high intakes of fluoride at doses causing damage to teeth and bones. This relationship was not observed in female rats or in mice of either sex. Furthermore, the occurrence of neoplasms was not corroborated in another recently–published rodent study. However, the Working Group recognises that the deposition of fluoride in bone provides a reason for monitoring the future bone cancer rates in human populations in relation to their fluoride exposure.[32]

The Committee notes the Working Group's conclusion that

> **there is no evidence that fluoride is a risk factor for cancer in humans. ..... However the Working Group recognises that the deposition of fluoride in bone provides a reason for monitoring the future bone cancer rates in human populations in relation to their fluoride exposure.**[33]

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31 The British Fluoridation Society, **A Summary of the Knox Report and How it Refutes the Alleged Fluoridation–Cancer Link**, March 1985.

32 National Health and Medical Research Council Working Group on the Effectiveness of Water Fluoridation, **Interim Report**, November 1990, p 8.

33 National Health and Medical Research Council Working Group on the Effectiveness of Water Fluoridation, **op cit**, p 8.

Availability of fluoride other than in water

10.84 It was clear from the responses the Committee received from embassies, high commissions and consulates that in many countries which responded, whether or not the water supplies were fluoridated, steps had been taken to make fluoride available in some form or other. These included both topical (to the tooth surface) and systemic (ingested) applications.

Sources other than water: Topical Fluoride Application

. Toothpaste

10.85 Fluoride toothpastes are readily available. In fact it is difficult to buy unfluoridated toothpaste in Canberra and elsewhere in Australia. Most unfluoridated toothpastes are considerably more expensive than the fluoridated range. The Committee believes that many people are unaware that unfluoridated toothpaste is available. While it is difficult to find unfluoridated toothpaste it is usually stocked by health food stores and some pharmacies. The Committee notes that there is an inequity in the choice of toothpaste. Those on low incomes are denied a ready source of supply of unfluoridated toothpaste within their price range.

10.86 Toothpastes containing 1000mg/kg or less of fluoride ion are excepted from Schedule 2 of the National Health and Medical Research Council's Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) and can therefore be sold in general stores. Such toothpastes are not subject to the labelling requirements as specified for Schedule 2 items, however the amount of fluoride contained in toothpastes is usually listed in small print on the container eg *Active Ingredient 0.76% Sodiummonofluorophosphate.*

10.87 Fluoride toothpastes are one of the commonest means of providing topical fluoride on a regular basis. There has been a concern for some time about young children ingesting excessive amounts of supplementary fluoride. Swallowing toothpaste is common among young children and the Committee urges that more be done to educate the public of the dangers of this practice through local dental and general health campaigns. The Committee also notes that the practice of adding flavours and colour to fluoridated toothpaste may encourage children to swallow it and should therefore be discouraged.

10.88 The concentration of fluoride in toothpastes, it was put to the Committee, was not monitored by the Commonwealth Government and it was argued that this was an area where there should be greater control.

10.89 One of the arguments against relying solely on fluoridated toothpastes was that its access for socially disadvantaged groups in particular may be limited by economic or other circumstances.

10.90 The Committee recommends that:

- **the ACT Government initiate proposals through its membership on various interstate councils and make direct representations to toothpaste manufacturers to:**

  - **make unfluoridated toothpaste readily available at prices comparable with fluoridated toothpaste; and**

  - **cease practices that make fluoridated toothpaste unduly enticing and palatable to children (eg the addition of colourings (other than white) and flavourings).**

- **Application by dentist (fissure sealants, gels)**

10.91 Dentists may also apply fluoride in the form of topical gels and varnishes to "at risk" patients. Again, there is some danger of highly concentrated fluoride being ingested at a toxic level. This treatment also fails to reach those people who do not visit dentists.

- **Mouthrinses**

10.92 Fluoridated mouthrinses are another form of topical application and except for those containing 15mg/kg or less of fluoride ion are only available from pharmacies. However because young children tend to swallow mouthrinses they are not considered suitable for children under six.

10.93 School mouthrinsing programs are a measure which Governments may introduce as an alternative to water fluoridation. Sweden, for example, has introduced a school mouthrinsing program (either once a week or fortnightly). This has the advantage of reaching all children of school age.

Sources, other than water: Ingested fluoride

- **Tablets**

10.94 Generally fluoride tablets are only available from pharmacies, or where there is no pharmacy service available, from persons licensed to sell Schedule 2 poisons.

10.95 In the ACT fluoride tablets are only available from pharmacies. In Queensland, to ensure that they are available, some local authorities are authorised to distribute them. However, in 1988 the Department of Health survey showed tablet use as low as 13.4 percent in 5–9 year old Queensland children.[34]

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[34] The Australian Dental Association (Queensland Branch), op cit, p 2.

10.96 There are also problems with the safety of fluoride tablets. It has been reported in a study of acute fluoride poisoning after ingestion of sodium fluoride tablets that between 1978 and 1983 at least 20 children with fluoride poisoning were admitted to two major children's hospitals in Brisbane.[35]

10.97 The standard of packaging and appropriate dosage marking, as well as the ease of overdose, have also been criticised. A survey of these supplements in Western Australia showed that all products provided age–dose schedules which would give fluoride supplementation at levels great than the NHMRC guidelines. In one case cited, infants following the schedule would receive four times the recommended dose in the first two years of life. This overdose would be certain to cause significant dental fluorosis.[36] There is a need to educate the community (particularly parents of young children) about the dangers of using fluoride supplements.

10.98 A survey undertaken of fluoride supplements in Australia concluded that there was a generalised disregard on the part of the ethical pharmaceutical industry for the risk of dental fluorosis, and that there was a need for a voluntary, or legally enforced, code of conduct for manufacturers of fluoride supplements. While the NHMRC had issued guidelines on dosage, these were not monitored.[37]

10.99 It has been reported that:

> Whenever a public health scheme has been commenced in which fluoride supplements have been provided free of charge or at low cost, the uptake by mothers has been so low, in spite of wide publicity, that it has been abandoned within several months. Even highly motivated professional people have found it difficult to keep up the daily routine of providing fluoride supplements during the period of tooth development.[38]

. Salt

10.100 In Switzerland only one Canton (Basle) fluoridates its water. However, fluoridated salt (250 mg of fluoride to every kg of salt) is sold. Approximately 80 percent of all salt sold in Switzerland is fluoridated.

10.101 The Swedish response indicated that of all foods with fluoride supplements, bar water, salt appeared to be the most effective.

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35 Monsour, P A et al, "Acute Fluoride Poisoning After Ingestion of Sodium Fluoride Tablets", **Medical Journal of Australia**, 1984, 141, pp 503–505.

36 Riordan, P J, "Guidelines for the Use of Dietary Fluoride Supplements in Australia", **Australian Dental Journal**, 1989, 34(4),pp 359–362.

37 Riordan, P J, "Guidelines for the use of dietary fluoride supplements in Australia", **Australian Dental Journal**, 34(4), 1989, pp 359–62.

38 The British Fluoridation Society, **Making Decisions on Water Fluoridation**, April 1985.

10.102 Justice Crisp agreed. Having discussed the problems associated with it, he concluded that:

> While all these uncertainties remain, I feel ... that it cannot be recommended, but, if water fluoridation, as the proven and most successful single measure in this field of public health, be not acceptable, then fluoridated salt would, I suggest, be the next best and a worthwhile method of achieving some success to the same end.[39]

10.103 However, it has been pointed out that:

> Toxicologically, it is highly debatable whether this method should ever be recommended as it is impossible to control the individual intake of salt. In addition an increase in salt intake should not be encouraged for general health reasons.[40]

- **Sugar**

10.104 Finland is exploring the fluoridation of sugar for use in candy (sweets).

- **Milk**

10.105 Justice Crisp rejected milk as a vehicle for administering fluoride for a number of reasons, the principal of which being the administrative difficulties especially the analytical determination of fluoride content:

> This with milk is a tedious and difficult business as the relatively straightforward colormetric methods used for the primary analysis of water are not suitable for milk which requires evaporation, ashing, distillation and titration. Moreover it would, I am informed, take approximately 24 hours to complete the analysis of each sample.[41]

- **Other**

10.106 Other foods such as flour and bread have been suggested as suitable vehicles for fluoridation.

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39 **Report of the Royal Commissioner into the Fluoridation of Public Water Supplies**, op cit, p 219.

40 Ekstrand J, Fejerskov, O and Silverstone, L M (eds), "Rational use of fluorides in caries prevention and treatment", **Fluoride in Dentistry**, Munksgaard, Copenhagen, 1988, p 287.

41 **Report of the Royal Commissioner into the Fluoridation of Public Water Supplies**, op cit, p 220.

Availability of unfluoridated water

10.107 Residents of Canberra and the City of Queanbeyan who do not wish to drink fluoridated water must install a water purifier in their homes. There are several types of water purifiers available. According to a survey done by *Choice* magazine in 1989 only reverse osmosis and ion exchange water purifiers and distillation units removed all of the water fluoride. Some activated carbon water purifiers removed some of the fluoride. *Choice* also reported that all water purifiers require some effort, expense and regular maintenance.[42]

10.108 The cost of installing a water purifier varies according to the type and model. For example a reverse osmosis tap unit is currently available in Canberra for about $400 and the under sink unit with storage tank for about $1100. An ion exchange tap unit can be purchased for about $150 to $200 and an under sink unit for approximately $500. These units require servicing from time to time at minor cost.

Socio–economic differences

10.109 The one conclusion which both opponents and proponents of fluoridation agreed upon was that dental caries rates, whether in fluoridated or non–fluoridated areas, are much higher amongst low socio–economic groups than amongst more affluent communities. Results of the Tasmanian section of the National Oral Health Survey showed that 70 percent of the caries was present in 30 percent of the population.

10.110 However, opposing stances are taken on the implications of this. Proponents argue that it means that water should be fluoridated because this helped protect the teeth of those whose oral hygiene was inadequate. Opponents argued that it was better to leave fluoride out of the water supply but target lower socio–economic groups with better oral health education and school dental services.

10.111 The Committee noted that the availability of unfluoridated toothpaste at comparable prices to fluoridated toothpaste is especially important for the lower socio–economic groups if they are to have a realistic choice of toothpaste. The cost of water purifiers severely restricts the lower socio–economic groups in having access to unfluoridated water, if that is their choice.

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42 "Water Purifiers", **Choice**, May 1989.

Water fluoridation

10.112 Since water fluoridation was first introduced in Australia more than 25 years ago there have been other factors which may have contributed to the improvements in dental health. Dietary changes, such as reduced sugar intake have been considered and researched. In a review of the literature on diet and dental caries for the NHMRC Working Group on the Effectiveness of Water Fluoridation Dr B T Homan concluded:

> Trends from a number of countries DO NOT indicate a reduction in sugar consumption – of a magnitude or more importantly in frequency of ingestion– that could be expected to influence the prevalence of dental caries.[43]

10.113 The availability and effectiveness of discretionary fluoride supplements such as fluoride toothpaste, and tablets has also been examined. Fluoride toothpastes have been accepted as reducing dental caries. When used in areas with fluoridated water supplies they have an additive effect. The NHMRC Working Group reported:

> Subsequent studies conducted since the 1960s have confirmed that toothpastes with a fluoride concentration of 1000 ppm (ie the prevailing commercial concentration), when used regularly, confer additional protective effect beyond that attributable to fluoridated water.[44]

10.114 The use of fluoride tablets has not been as successful a public health measure in the reduction of dental caries in Australia, as demonstrated by the Queensland experience.

10.115 Despite some communities rejecting water fluoridation, there is a strong weight of evidence supporting it as the most effective, safe and efficient means of providing fluoride to the community at the optimum level.

10.116 The Committee recommends that:

- **the ACT Government continue adding fluoride to the water supply.**

The optimum level

10.117 In examining the question of the optimum level of fluoride for the Canberra water supply the Committee drew on evidence presented in submissions and at public hearings as well as the research studies currently available.

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43 Homan, B T, **Effectiveness of Water Fluoridation: Diet–Dental Caries** (Diesendorf's claim re cheese/tooth decay), unpublished paper, 1990.

44 National Health and Medical Research Council Working Group on the Effectiveness of Water Fluoridation, **Interim Report**, November 1990, p 8.

10.118 In its interim report the NHMRC Working Group concluded

> There is no evidence of adverse health effects attributable to fluoride in communities exposed to a combination of fluoridated water (1ppm) and discretionary sources of fluoride. The increased total fluoride exposure in recent decades has been associated with some increase in the occurence of dental fluorisis – predominantly in those individual children with a history of high ingestion of fluoride, mostly from discretionary sources.[45]

10.119 In initially determining the level of fluoride to be added to water supplies it was concluded by Dean et al[46] that in temperate climates 1ppm represented the optimum level beyond which no advantage would be gained in the prevention of dental caries and which was low enough to result in no serious side effects. While the passage of time has demonstrated that fluoride in water is safe and effective at this level it is not necessarily the level that is established irrevocably.

10.120 Because there is now such a diversity of sources of fluoride , both naturally and artificially in food and through topical applications it was suggested to the Committee that it may be sensible to reduce the level of fluoride added to the water to ensure that the total intake of fluoride was not greater than required.

10.121 A study conducted by Ms Alison Hill and Professor Robert Douglas of the ANU National Centre for Epidemiology and Population Health concludes that based on the current scientific knowledge, the benefits of water fluoridation outweigh any demonstrable risk. The study however argues for more research to be done and for consideration to be given to the possibility of lowering the level of artificial fluoridation. In their conclusion Hill and Douglas state:

> Australians have probably benefited profoundly from the public health policy of fluoridating water supplies. The situation has now changed with the proliferation of sources of fluoride, and the growing evidence that the most important protective effect resides in topical application of the fluoride ion to teeth. Widespread availability of topical applications makes it likely that the total load of fluoride to which Australians are exposed has increased in recent years, and that increasing amounts of fluoride are accumulating in Australian skeletons, but these matters have not been systematically studied. Studies of the costs, possible risks and benefits of continuing this dose of fluoride should be undertaken. In the meantime we favour reduction of the dose."[47]

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45 National Health and Medical Research Council Working Group on the Effectiveness of Water Fluoridation, **op cit**, p 11.

46 Dean H T, Arnold F A and Elvolve E "Domestic Water and Dental Caries. V. Additional Studies of the Relation of Fluoride Domestic Waters to Dental Caries Experience in 4,425 White Children, Aged 12–14 Years, of 13 Cities in 4 States", **Public Health Report**, (Wash), 57:pp 1155–1179, 1942.

47 Hill, Alison M and Douglas, Robert M, **Fluoridation of public water supplies and public health: an old controversy revisited**. Working Paper Number 17. National Centre for Epidemiology and Population Health. Canberra, 1990.

10.122 In evaluating the risk–benefit of water fluoridation at 1ppm the NHMRC Working Group recognised that there is a need for long term follow up studies on populations experiencing total fluoride intakes at contemporary levels.

10.123 Of particular concern are children. In its review of the evidence on the effectiveness of water fluoridation the NHMRC Working Group found that

> The major source of high individual intakes of ingested fluoride in infancy is via bottle feeding in those instances when the infant formula powder has a high fluoride content. In such cases, the formula powder and the added fluoridated drinking water appear to contribute approximately equal amounts of fluoride.
>
> The major sources of high individual intakes of ingested fluoride in children aged 1–6 years are the inappropriate use of fluoride tablets or drops and the swallowing of fluoridated toothpaste.[48]

The Committee has made recommendations at 10.90 on the use of fluoridated toothpaste by children.

10.124 The NHMRC provided results of studies (see Appendix 6) which demonstrate that reducing the fluoride level in water will only marginally reduce the overall intake of fluoride among two–year–old children.

10.125 The Committee sought research studies which addressed the effect on dental health of reducing the level of fluoride in the water supply. To date this issue has not been researched either in Australia or overseas, however the NHMRC Working Group drew the following conclusions based on an interpolation of data.

> In attempting to estimate the consequences of reducing the concentration of fluoride in drinking water below 1ppm the Working Group concluded that such a reduction would inevitably result in an increase in the occurrence of dental caries. If one uses as a best estimate of the magnitude of any such increase an interpolation of the data describing increases in childhood caries in communities in which water fluoridation has been terminated, and, further, assumes that the historically documented curvilinear relationship between natural water fluoride concentration and community dental caries rates is applicable, the predicted increase for a reduction in fluoride concentration from 1ppm to 0.5 ppm (chosen here for illustrative purposes only) would be of the order of 10– 15% in the short to medium term (i.e. within 5–10 years). However the Working Group is aware of the constraints to adopting this approach – most notably the lack of direct data

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48 National Health and Medical Research Council Working Group on the Effectiveness of Water Fluoridation, **Interim Report**, November 1990, p 9.

> on the change in caries rates consequent upon changes in water fluoride concentration within this range (0.5–1.0ppm). Therefore, it is acknowledged that the actual change could range from a very small figure to – in the case of certain groups that have a higher caries rate, including older adults – a substantially higher figure.[49]

10.126 According to the Child Health Dental Survey of the Australian School Dental Service, in 1987 the DIMFT index (a measure of tooth decay approximately equal to DMFT) in 12 year– old children in Canberra was 1.43. If the NHMRC higher estimate proved to be true a 15% increase in the DIMFT index would result in an increase to 1.64 after a period of 5 to 10 years. Expressed in another way this would equate approximately to 215 more affected teeth per thousand 12 year–old children after a period of 5 to 10 years.

10.127 Some researchers believe that the level of deterioration in dental health would be insignificant if the fluoride level was reduced to 0.5 ppm. However until research is conducted on this issue Australians like the rest of the world can only speculate on the effects of such a measure. With the acknowledged effects of other sources of fluoride, the comparatively high socio economic position of the population and the quality of dental services in the ACT, the Committee believes that a reduction of fluoride concentration to 0.5 ppm would be unlikely to have a significant impact on dental health.

10 128 The extensive scientific research provides no evidence of adverse health effects attributable to a combination of fluoridated water at 1ppm and discretionary sources of fluoride. However the Committee believes that it is responsible and sensible practice to keep the amount of any additive to the water supply at the lowest level that will achieve maximum effect. As already stated there is a dearth of research on the effect of reducing the level of fluoride in the water supply. There is always uncertainty about scientific truth and public health costs and benefits until the data exists. On current indications the Committee is of the view that any negative effects on dental health would be minimal given the total level of fluoride now ingested and applied.

10.129 The Committee recommends that:

- **the concentration of fluoride in the ACT water supply be reduced to 0.5 parts per million.**

Monitoring and Research

10.130 The issue of fluoride supplementation has become more and more complex. Although so much research has focused on different facets of fluoridation, there is a need for more Australian research and research into the effects of a reduction in the level of fluoride in the water supply.

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[49] National Health and Medical Research Council Working Group on the Effectiveness of Water Fluoridation, **Interim Report**, November 1990, pp 11, 12.

10.131 The NHMRC Working Group acknowledged the need for more Australian research and concluded:

> There is a general and urgent need to upgrade substantially our monitoring of dental health to include older children and adults, and to monitor the levels of fluoride exposure and the occurence of dental fluorosis in Australia.[50]

10.132 The Working Group made the following recommendations in relation to research and monitoring:

> Develop monitoring mechanisms to document total fluoride intakes by adults with a view to estimating levels of deposition in bone, bearing in mind that water fluoridation at around 1 ppm appears, on present evidence, to be the main single source of fluoride intake in adults.
>
> Increase immediately the support for dental public health research and evaluation in Australia. It is necessary to establish a much more detailed and higher-quality data base for the purpose of monitoring trends in dental health (including dental fluorosis) in Australia, and, specifically, for the future evaluation of the effectiveness of water fluoridation, both in children and adults.[51]

10.133 The ACT is well placed to be a centre of further research in this area. There are academic instutions and researchers of the highest calibre who could carry out the work and a well established network of school dental clinics.

10.134 Upon the adoption of the recommendations of this report to reduce the level of fluoride in the water supply to 0.5 ppm it will be essential for funds to be available to monitor the effects of this measure over a 6 to 10 year period. The Committee strongly believes that not to do so would be totally irresponsible.

10.135 With the strong emphasis given to the need for monitoring and research by the NHMRC the Committee has the confident expectation that funds would be made available for this purpose. The NHMRC has recently called for applications for 1992 for funds for research in special areas including public health . Applications close on 12 March 1991. The ACT Government would need to act quickly if it wished to secure funds from this source.

10.136 The Committee recommends that:

- **The ACT Government urgently seeks NHMRC funding to establish a major independent study on the effects on dental health of a reduced level of fluoride in the ACT water supply.**

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50 National Health and Medical Research Council, op cit, p 12.

51 National Health and Medical Council, op cit, p 13.

10.137 The Committee acknowledges that there are other issues which require further research including:

. the levels of intake of fluoride from all sources;

. the incidence of skeletal fluorosis in Australia; and

. the possible allergic or toxic reactions to fluoride and other adverse health effects.

10.138 The Committee strongly supports the cooperation between the Commonwealth and State governments and the NHMRC in conducting the National Oral Health Survey. The establishment of a protocol and the efforts to exclude examiner bias go a long way to allaying any criticism of faulty methodology.

10.139 It is clearly important to continue to monitor the state of the nation's teeth and the Oral Health Survey monitors this in the most accurate and authoritative way. Repeated on a period basis it will provide an invaluable overview of the nation's dental health and the opportunity to draw valid conclusions from its data.

11 THE ISSUE OF MASS MEDICATION AND INDIVIDUAL LIBERTY

11.1 The Committee recognises the difficulties in dealing with this aspect of the terms of reference. Is the fluoridation of public water supplies a form of mass medication? Whether it may or may not be so described, is the adding of a substance to public water supplies an infringement of civil liberties?

Mass medication

11.2 The question of whether fluoridation of the water supply is mass medication has been extensively debated over many years and no consensus has been reached. The Committee received evidence from many individuals and organisations which addressed this question. There are at least two differing viewpoints. Some see the practice clearly as mass medication and unacceptable while others see it simply as adding nutriments to the water as a preventive measure.

11.3 Those objecting to fluoridation on the grounds that it is mass medication argued **inter alia** that:

- medical dictionaries define "medication" to be "impregnation with a medicine", and a medicine is "any drug or remedy", including a preventive medicine;
- fluoridation is compulsory medication in that everyone is compelled to drink fluoridated water;
- administration of fluorides is morally wrong because it has not been proven safe beyond doubt;
- fluoridation constitutes experimentation on human beings without their consent;
- it interferes with medication in the home;
- a person's dental health is their own affair;
- dental caries is not contagious, so there is no legal authority to invoke the police power of the health department to force flouridation on the people.

11.4 The question of mass medication was also considered by Lord Avebury in 1984. Lord Avebury was at the time President of the United Kingdom Fluoridation Society and Chairman of the House of Commons Parliamentary Human Rights Committee. From 1963 to 1970 he had been Chairman of the Parliamentary Civil Liberties Committee. He wrote:

> Fluoride is of course a natural constituent of water supplies – as indeed it is of many foods. The adjustment of the quantity to an optimum level cannot be compared with the addition to the water supply of a substance not found there ordinarily. Nor can it be described as "mass medication", a term frequently used by the opponents, since it is not a means of curing a disease. A substance which has the effect of maintaining medical or dental health is more in the nature of a food or nutriment than a medicine.[1]

11.5 This opinion of the fluoridation of water may be seen in somewhat the same light as the addition of other substances for public health purposes. Whether the term "medication" is used is a matter of individual choice, depending on the understanding of "medication" to be palliative, preventive or curative. Whether fluoride may be so described is a matter of dispute.

Civil liberties

11.6 A crucial question for the Committee is that of civil liberties, that is to say, the implied conflict between the complete freedom of the individual, and the right of the community to insist that individuals should accept general laws and actions taken for the overall benefit of the community.

11.7 Some argue that nothing should be done to interfere with the "state of nature". There should be no additives to natural foods, no pesticides to be used in agriculture, no compulsory public health measures, no chlorine or fluoride in the water supply. Some individuals might even argue that such measures are contrary to their basic political, religious and social beliefs.

11.8 In the evidence received those who argued that fluoridation is an infringement of individual (human) rights argued, **inter alia**, that fluoridation:

. insofar as it might be seen to be interfering with freedom of religion is unconstitutional;

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1 Avebury, Lord, "Fluoridation and Individual Freedom", **British Dental Journal**, vol 156, 21 April 1984, p 277.

- promotes or furthers moves to "socialised medicine";
- has been undertaken without the consent of the people;
- is a step in the direction of socialism;
- deprives people of the right to take personal care of one's body;
- does not adhere to the ten standards set up by the Nuremberg War Crimes Tribunal for experimentation on the lives of human beings;
- is a measure to extend the omnipotence of BIG BROTHER Government.

11.9 The Committee notes that fluoride was first introduced into the ACT water supply arbitrarily and without direct consultation with the community. (refer chapter 3, 3.26)

11.10 Mr Justice Crisp considered the objections of those who believed that compulsory fluoridation interfered with the freedom of the individual. He did not dismiss the issues lightly:

> The conflict between the individual's right to live his life as he pleases and the demands of a civilised orderly and healthy society is more apparent than real, because society in its own interests as a group has an interest in the preservation of a high degree of individual liberty. But it does presuppose a balance. The problem is not one of black or white but to choose the correct shade of grey.[2]

11.11 Indeed, Justice Crisp, to emphasise the fact that this problem has never been simple to resolve, cited Heracleitus:

> The major problem of human society is to combine that degree of liberty without which law is tyranny with that degree of law without which liberty becomes licence.[3]

11.12 Justice Crisp agreed that fluoridation of communal water supplies had inescapable consequences for all members of the community concerned. He suggested, however, that as children were the primary beneficiaries those who objected on the basis of personal freedom were faced by the difficulty of establishing who had the right in relation to the children's good: the parents or society. Justice Crisp drew attention to the fact that:

> in the interests of children as a class, society has long recognised and accepts without reservation as right and proper a considerable limitation on the right of parents to do what they like in regard to their children's health, education and welfare and this is so whether they are acting conscientiously or otherwise ....

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2 **Report of the Royal Commissioner into the Fluoridation of Public Water Supplies**, op cit, p 193.

3 **Report of the Royal Commissioner into the Fluoridation of Public Water Supplies**, op cit, p 193.

> The fact that children of tender years are the primary object of benefit is, I would suggest, a consideration of great, in fact of preponderating weight. Such children as a class are incapable of group initiative in matters relating to their health and welfare. The evidence as to the prevalence and incidence of juvenile caries in this State makes it clear that reliance on parental responsibility is not an answer to the problem that it raises. It also suggests strongly that it is those children in particular who are least likely to have a high degree of parental care and competence directed to their health and welfare who would be most in need of the benefits that fluoridation can afford.[4]

11.13 While these philosophical issues cannot be decided conclusively either way by proof, rather than by judgement, nonetheless the Committee respects the view of a civil libertarian on this matter. Lord Avebury concluded:

> The individual liberty arguments against fluoridation are invalid, as can be judged from the fact that the issue has never been taken up by the National Council for Civil Liberties. No consumer has the right to dictate the chemical composition of the water supply, a recipe for anarchy. What is at stake is not the erosion of liberty but, in the words of a former Minister of Health, "the erosion of millions of teeth and the resultant suffering and misery of thousands of children which fluoridation would go far to prevent".[5]

11.14 The Committee recognises that some individuals will wish to take personal measures, such as filtering devices to exclude fluoride from their own personal water supplies. That is their civil right and, and a proper way to insist on carrying out their individual views on the matter. Given that possibility of individual filtering, the Committee rejects the view that water fluoridation is a serious impediment to civil liberties.

Balancing risk against benefit

11.15 The NHMRC Working Group second interim report, in November 1990, considered the way in which any risk associated with water fluoridation should be assessed against its benefits.

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4 **Report of the Royal Commissioner into the Fluoridation of Public Water Supplies**, op cit, p 194.

5 Avebury, Lord, op cit, p 277.

11.16 The Working Group concluded that risk–benefit evaluation of water fluoridation at around 1 ppm must consider the following:

a Its protective effect against dental caries, in both children and adults, within the contemporary Australian setting.

b The knowledge that dental caries significantly affects oral health and carries a small but finite risk of various other health consequences, including pain, infection, and various dietary, nutritional, social and psychological problems.

c The risk of dental fluorosis in those individual young children whose total intake of fluoride is high. In those children, fluoridated water is a (mostly minor) contributory sources of fluoride intake.

d The absence of any other demonstrated adverse health consequences of fluoridated water in humans. (However, the absence of long–term follow–up studies in populations experiencing total fluoride intakes at contemporary levels, and thus presumably experiencing prolonged deposition in bones, underscores a need for ongoing monitoring.)

e Its capacity to achieve population–wide coverage, which is likely to be of particular benefit for socially disadvantaged sections of the community.[6]

11.17 The Committee upholds civil liberties, and believes that the civil liberties of those opposed to fluoridation are upheld not only by the measures that can be taken to remove fluoride from the water, but more significantly also by the political process which continues to encourage open debate about and scientific analysis of the value and reliability of fluoridation. The very existence of this Committee is itself an upholding of those rights.

11.18 The Committee is divided on whether or not the fluoridation of public water supplies infringes civil liberties. The Committee recognises that many people do believe that their civil liberties are infringed.

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6 National Health and Medical Research Council Working Groupon the Effectiveness of Water Fluoridation, **Interim Report**, November 1990, p 10.

12 OTHER MATTERS RELATING TO THE ISSUE OF FLUORIDATION IN THE ACT

Consequences of ceasing water fluoridation in the ACT

12.1 Under an agreement with the City of Queanbeyan, ACT Electricity and Water (ACTEW) supplies the city with water. Queanbeyan has been supplied with water from the ACT system for many years and the latest agreement was signed in 1961 before Canberra's water supply was fluoridated.

12.2 ACTEW bills the City of Queanbeyan monthly for the supply of water. (refer to 8.21 and 8.22)

12.3 The ACT Government's decision on water fluoridation, whichever way it goes, will have an impact on the residents of the City of Queanbeyan.

12.4 The Committee was advised that if fluoridation of the ACT water supply ceased the City of Queanbeyan could include equipment in their reticulation system to add fluoride if it so desired. ACTEW was uncertain whether or not fluoride could be removed from the Queanbeyan water supply without also removing it from the Canberra supply as essentially the two cities have a common supply. Mr Glen Walker appearing before the Committee cited Gosford as an example of a city where fluoride has been removed from a common water supply for several other cities.

12.5 While Queanbeyan City Council did not wish to appear before the Social Policy Committee, it conveyed the following Council resolutions:

> that the ACT Legislative Assembly be asked to conduct a Referendum before any changes are made to fluoridation of the Queanbeyan/Canberra Water Supply;
>
> that the Assembly be advised that the Council would wish to give the people of Queanbeyan the same opportunity to express their wishes at a referendum on the fluoridation question and that the Council would continue to liaise with the ACT Legislative Assembly on matters relating to fluoridation.

12.6 A consequence of ceasing the addition of fluoride to the Canberra water supply would be a decrease in the cost of water treatment.

Referendum

12.7 The Committee considered the question, put to it in several submissions, of whether a referendum would be a suitable means of arriving at an appropriate policy position of water fluoridation. This is not the first time this suggestion has been made in relation to fluoride:

> An important feature of the experience with community water fluoridation in Canada and the USA has been the resort to popular referenda to decide the issue. In the 1960s, fluoridation was introduced in many places after referenda, but in recent years the opponents of fluoridation have become better organised and have more often than not succeeded in defeating proposals to introduce this measure. In 1980, 41 referenda on fluoridation were held in the USA. According the US Centers for Disease Control, only eight of these referenda resulted in the acceptance of fluoridation, and in 33 communities proposals for fluoridation were defeated.
>
> The reasons for rejecting a proved benefit to health when it is submitted to a popular vote have been the subject of many studies by social scientists. In essence, the phenomenon of the public's voting against its own interest is explained by a number of factors: (1) ignorance and confusion on the part of the public about the dental health benefits of fluoridation; (2) ambivalence of the public towards science and its by–products, with greater reservations about scientific findings concerning the human body than about those that are external to the individual, eg space exploration; (3) misrepresentation of the scientific and technical information involved, enabling the opposition to distort the issues and frighten the public. It has been pointed out that opponents of fluoridation need only sow a seed of doubt to ensure a "no" vote, whereas supporters need to prove beyond all question that fluoridation is safe and desirable in order to obtain a "yes" vote.[1]

12.8 Mr Justice Crisp considered referenda in the course of the Royal Commission into fluoridation in Tasmania and reached the following conclusion:

> Fluoridation is a complex and technical matter. The labours of this Commission I hope will bear witness to this. It was admitted even by those who supported a referendum that such a step would necessarily involve an appeal to an uninformed electorate in the sense that many of the issues would be beyond the ability of voters to comprehend. There was no unanimity as to whether it would be decided by compulsory or optional vote; whether it should be confined to adults or extended to minors; whether a vote should be the privilege of those who would bear the financial burden, whether as ratepayers or perhaps as taxpayers or whether

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1 Murray, J J (ed), **op cit**, p 67.

> it should be extended to the electorate generally and above all there was not any satisfactory answer to the argument that the interests of those most vitally interested in the result, viz. children up to fourteen years of age, would be the most poorly represented. I think there is no profit to be gained from pursuing such matters. In my opinion they reflect merely the unsatisfactory quality of a public referendum as the forum of choice in a technical and difficult matter of public health.[2]

12.9 Summarising his chapter "By Whom Decision Made – Parliament – Local Government – Referendum", the Commissioner wrote:

> The decision, whether or not fluoridation, as a measure of public health designed to protect the dental health of the young, should be put into force in this State, should not be left to local authorities. It is a matter for the decision of Parliament. A referendum as a means of arriving at this decision is not only without constitutional warrant but is highly unsuitable as well. It follows, consistently with the view I have expressed, that to refer the matter to a forum both technically incompetent and constitutionally incapable would constitute an abrogation of Parliament's responsibility.[3]

12.10 The Committee discussed methods of seeking input from the ACT community on various issues. The Committee notes with interest the methods used by the Gold Coast City Council in gauging community opinion. Officials from the Council described two methods used, Ratepayer Questionnaires and Statistical Sampling. Ratepayer Questionnaires have been conducted on a yearly basis since 1983 (with the exception of 1989), and have an estimated 18–20 % response rate. A wide variety of subjects have been covered, and questionnaires are sent out with rates notices. Statistical Sampling involves the polling of selected households in the city to gauge opinion on issues relating to Corporate Planning and services provided by the Council, and occurs every two years. Both methods are conducted "in house" by the Council. The ACT Government may wish to consider using both of these methods in seeking the opinions of the ACT community on issues such as fluoridation.

12.11 The Committee is of the view that water fluoridation can be justified as a matter of public health and therefore the decision to fluoridate is one for the legislative body. The Committee does not believe that a referendum on water fluoridation is necessary at present and does not recommend a referendum to this Assembly. The position may be different for future Assemblies. In reaching this view the Committee was cognizant of the fact that such a decision would also affect the residents of the City of Queanbeyan who are not represented in the ACT Legislative Assembly.

Bill Wood
Presiding Member
30 January 1991

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2 **Report of the Royal Commissioner into the Fluoridation of Public Water Supplies**, op cit, p 212–213.

3 **Report of the Royal Commissioner into the Fluoridation of Public Water Supplies**, op cit, p 213.

PART III

RECOMMENDATIONS

The Committee recommends that:

- **the ACT Government initiate proposals through its membership on various interstate councils and make direct representations to toothpaste manufacturers to:**
  - **make unfluoridated toothpaste readily available at prices comparable with fluoridated toothpaste; and**
  - **cease practices that make fluoridated toothpaste unduly enticing and palatable to children (eg the addition of colourings (other than white) and flavourings).**

  Paragraph 10.90

- **the ACT Government continue adding fluoride to the water supply.**

  Paragraph 10.116

- **the concentration of fluoride in the ACT water supply be reduced to 0.5 parts per million.**

  Paragraph 10.129

- **The ACT Government urgently seeks NHMRC funding to establish a major independent study on the effects on dental health of a reduced level of fluoride in the ACT water supply.**

  Paragraph 10.136

APPENDIX 1

LIST OF SUBMISSIONS

Submissions from national associations

Australian Dental Association
Freedom from Fluoridation Federation of Australia (8 submissions)

Submissions from the Australian Capital Territory

ACT Dental Hygienists' Association
ACT Electricity and Water
S Andrello
Australian Dental Association – ACT Division
Australian Medical Association – ACT Branch
L J Ball
Dr J W Bennett
Mr I Berick
C Besant
Dr Carmelo Bonanno
Les Butterworth
Ms A Carpenter
Dr L M Carr
Mrs B Cornhill
Mrs T Cox
Mr Michael P Day
Department of Health
G De Silva
I De Silva
Mrs D Devir
Mrs G Dickson
Dr M Diesendorf (4 submissions)
Dietitians' Association of Australia, Canberra Branch
J Evans
Ms Ruth Fearnside
Ms Marguerite Gloster
Mrs Anne Greig
Mr G & Mrs M B Hajdu
Mrs Carmen Hamilton
Ms Maureen Harney
Ms A Hill
Mr and Mrs J B Hindmarsh
Mrs W J Jay

Submissions from the Australian Capital Territory (Continued ...)

Mr Noel Kelly
Mrs Dorothy Kent
Dr Bill Kerrigan
Mrs J Knife
Mrs F Lawson
J Lawson
Mr Charles Maclean
Mr Donald A McDowall DC
Ms Christine McKegg
Ms Rowena McKeon
J McNeill
Mrs B Meyer
Ms P Miethke
Mr B M Mor and Ms J L Werner
Ms Nancy Morgan
Mr L J Murley
Mr G Petersilka
R Pfeiffer
Ms Gina Pinkas
Ms Beverley Prince
A Quinn
T Quinn
G & M Quixley
Mr R Redmond
Mrs E Reynolds
Mr Ian Riggs
Birthe Ross
Ms M Rouse
Mr & Mrs R Saxton
Mr Greg Scott
E Simon
Soroptomists International of Canberra
Dr G C Southwell
Mr J C Stannard
Mr Peter Strazdins
G Styles
J Sullivan
Ms Louise Sullivan
Ms Jacqueline Talip
Mrs Helen Teagle
Dr A K Tebecis
Ms Lianne Thomas
Mr Adam Trapp
Ms H Turyn
Kamala Udakandage
Nissanka Udakandage
Unknown
G Vollmer
G K Whittaker
Mrs Z Williams

Submissions from New South Wales

Australasian Health and Healing – Journal of Alternative Medicine
City of Queanbeyan Council
Mrs Roma Fisher
Mr Roger French
Mrs B Gauci
Hastings Anti–Fluoridation Association
Mr A S Hill
Australian Well–Being Magazine
Mr P M Malone
Mr Geoffrey Morgan–Smith
Nambucca Valley Association
Safe Water Association of New South Wales
Mrs R Slazenger (Queanbeyan)
Mrs E Smythe
Mr C J Thompson
Ms W Varney
Mr and Mrs Whitworth (Queanbeyan)

Submissions from Queensland

Hon D N Everingham
Mrs Joanne Lee
Mr C A Phillips (2 submissions)
Dr L P Ryan
T G Huygens Tholen
Mr M Wallace–Mitchell (2 submissions)

Submissions from Victoria

Mrs N R Albrecht
N C Archibald
Ballarat Anti–Fluoridation Association
Mrs B J Caddell
H Clapp
C Cray–Robinson
Mr C J Darroch
Mr H Dickinson
Miss L Esler
Geelong Association Against Compulsory Fluoridation
Dr William W Guthrie (3 submissions)
Ms Louise Hicks
J Jenkins
M Jenkins
Mrs R Leopoldseder

Submissions from Victoria (Continued ...)

Mr K S McLean (2 submissions)
Mrs K McKinnon
N Patterson
Mrs Pamela Sirkel
Dr P R N Sutton (2 submissions)
Mr G Smith
M Smith
Mrs A Watson
Mrs B Wilks

Submissions from the United States of America:

Professor J P Brown
Professor A W Burgstahler
Ms L Escobar
Mr R F Fahey
Ms S Graves
Ms P N Jacobs
Isabel Jansen
Mr D C Kennedy
Professor Lennart Krook
Dr J R Lee
Mr W Miller (2 submissions)
Mountainview Medical Associates, Nyack, New York
New Jersey Citizens Opposing Forced Fluoridation
New York State Coalition Opposed to Fluoridation
Planning and Conservation League, Berkeley, California
Population Renewal Office, Kansas City
Safe Water Coalition of Washington State
Dr M B Schachter
Dr D E Winkler

Submissions from the United Kingdom:

Mr Clavell Blount
Mr D J Edmonson

Submissions from New Zealand:

Dr J Colquhoun (3 submissions)
Concerned Residents of Waimairi District

Submission from Sweden:

Dr J Sallstrom

Submission from South Africa:

Dr Frank Bertrand

Submissions from Canada:

Dr Pierre Morin
John Remington Graham

Submission from The Netherlands:

Dr Hans Moolenburgh

APPENDIX 2

LIST OF PEOPLE APPEARING BEFORE THE COMMITTEE

AT PUBLIC HEARINGS

Dr C Bonanno	Chairman of the ACT and Southern Tablelands Division of the Australian Dental Association
Dr M Bhuller	Chief Dental Officer School Dental Service, ACT Department of Health
Ms L Cable	
Dr L M Carr	formerly Head of the Dental Health Branch, Commonwealth Department of Health
Professor R Clancy	Professor Pathology Medical School, University of Newcastle
Dr J A Colquhoun	Honorary Research Fellow University of Auckland, New Zealand
Ms J B Currie	Soroptomists International, Canberra
Dr M O Diesendorf	
Dr J Donovan	Australian Medical Association, ACT Branch
Professor R M Douglas	Director National Centre for Epidemiology and Population Health, Australian National University
Dr H Fleming	Secretary of the Australian Dental Association, ACT and Southern Tablelands Division and President of the ACT Dental Group
Dr J Fricker	Deputy Chairman of the ACT and Southern Tablelands Divison of the Australian Dental Association
Ms C Hamilton	
Ms E Harley	Executive Director Community Health Services ACT Department of Health
Ms A M Hill	
Ms J Lemon	

Ms L McDowell	
Dr B Mor	
Mr A G Petersilka	
Dr M Pidcock	Australian Medical Association, ACT Branch
Mr O Ratford	
Ms P Riggs	
Ms R M T Slazenger	
Dr G E Smith	
Dr G C Southwell	
Ms F Thompson	
Mr G S R Walker	Chairman Freedom from Fluoridation Federation of Australia and Chairman, Anti–fluoridation Association of Victoria

APPENDIX 3

FLUORINE CONTENT OF FOODS AS REPORTED IN THE LITERATURE*

Food	Fluorine, parts per million	Food	Fluorine, parts per million
Fluorine reported in food as consumed			
Milk	0.07–0.22	Pork chop	1.00
Egg white	0.00–0.60	Frankfurters	1.70
Egg yolk	0.40–2.00	Round steak	1.30
Butter	1.50	Oysters	1.50
Cheese	1.60	Herring (smoked)	3.50
Beef	<0.20	Canned shrimp	4.40
Liver	1.50–1.60	Canned sardines	7.30–12.50
Veal	0.20	Canned salmon	8.50–9.00
Mutton	<0.20	Fresh fish	1.60–7.00
Chicken	1.40	Canned mackerel	26.89+
Pork	<0.20		
Fluorine reported in dry substance of food			
Rice	<1.00	Honey	1.00
Corn	<1.00	Cocoa	0.50–2.00
Corn (canned)	<0.20	Milk chocolate	0.50–2.00
Oats	1.30	Chocolate (plain)	0.50
Crushed oats	<0.20	Tea (various brands)	30.00–60.00
Dried beans	0.20	Cabbage	0.31–0.50
Whole buckwheat	1.70	Lettuce	0.60–0.80
Wheat bran	<1.00	Spinach	1.00
Whole wheat flour	1.30	Tomatoes	0.60–0.90
Biscuit flour	0.00	Turnips	<0.20
Flour	1.10–1.20	Carrots	<0.20
White bread	1.00	Potato (white)	<0.20
Ginger biscuits	2.00	Potato (sweet)	<0.20
Rye bread	5.30	Apples	0.80
Gelatin	0.00	Pineapple (canned)	0.00
Dextrose	0.50	Orange	0.22

* Table provided to the Committee by Professor M Irving, University of Canberra

APPENDIX 4

MEAN DIMF INDICES FOR CHILDREN IN STATES AND TERRITORIES, 1985

Age	Mean DIMF index							
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
6	0.08	0.11	0.13	0.12	0.10	0.09	0.10	0.11
7	0.27	0.42	0.40	0.40	0.32	0.23	0.31	0.31
8	0.44	0.76	0.68	0.70	0.70	0.38	0.50	0.51
9	0.66	1.09	0.99	1.10	1.16	0.64	0.78	0.77
10	0.84	1.52	1.31	1.47	1.55	0.90	1.03	1.04
11	1.20	2.13	1.77	1.85	2.01	1.35	1.39	1.39
12	1.53	2.72	2.29	2.31	2.43	1.83	1.91	1.71
13	2.13	3.26	3.00	2.95	3.00	2.54	1.86	2.44
All ages	0.89	1.50	1.32	1.36	1.40	0.99	0.98	1.03

Table from: Carr, L M, "Dental health of children in Australia, 1977–1985", **Australian Dental Journal**, 1988, 33(3), pp 205–211.

APPENDIX 5

NATURALLY FLUORIDATED WATER SUPPLIES IN AUSTRALIA

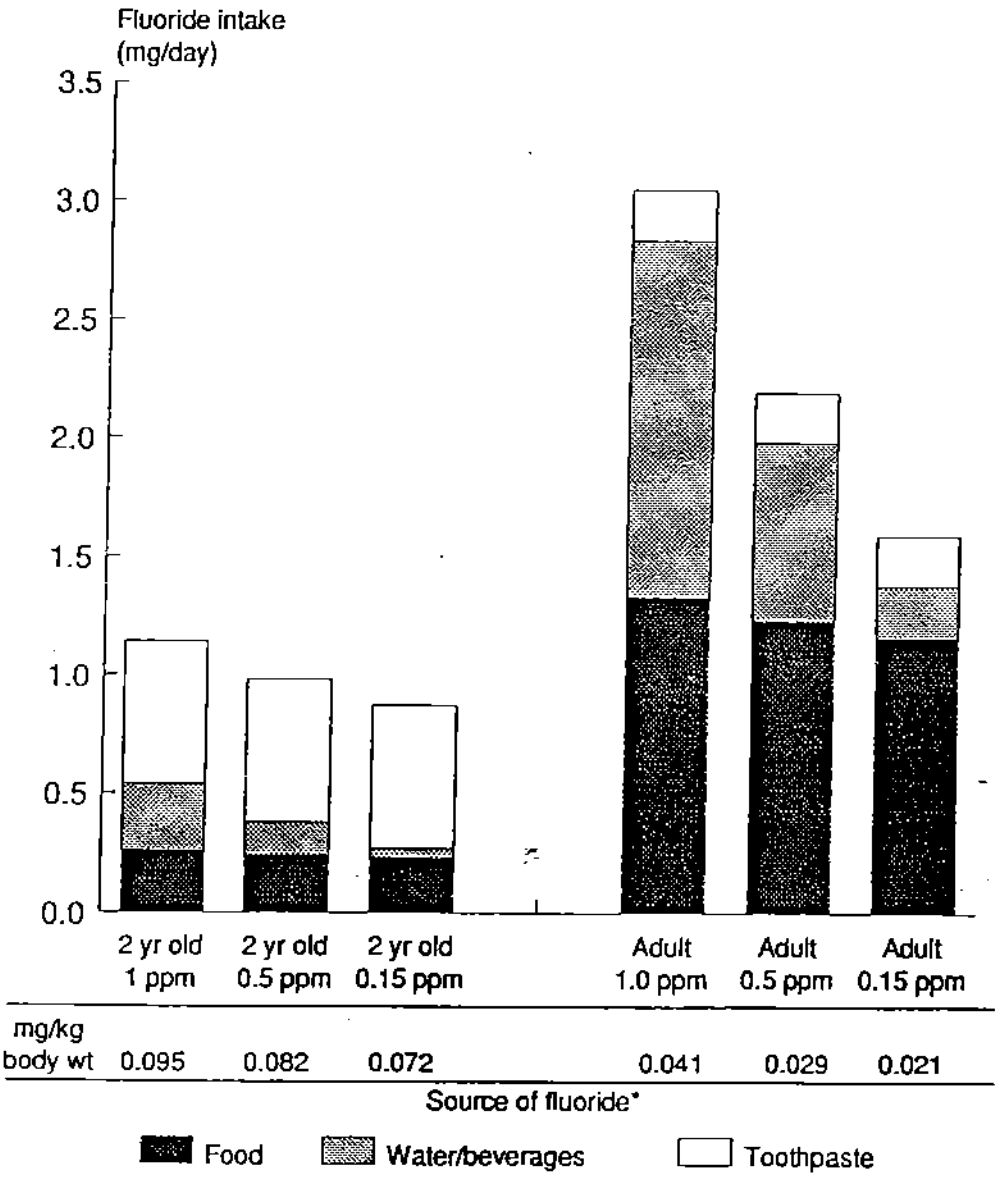
0.5 ppm and above

TABLE SHOWING NUMBERS OF PERSONS USING NATURALLY FLUORIDATED WATER – JUNE 1984*

State or Territory	Population at June 1984	Population using naturally Fluoridated water	
	Number (est.)	Number (est.)	% (est.)
NSW	5 407 900	10 800	0.2
VIC	4 078 600	16 200	0.4
QLD	2 518 900	22 600	0.4
SA	1 353 300	42 000	3.1
WA	1 387 000	31 300	2.3
TAS	435 100	–	–
NT	138 600	12 700	9.2
ACT	245 100	–	–
AUSTRALIA	15 564 500	135 600	0.9

* Commonwealth Department of Health, **Fluoridation of Water in Australia 1984**, AGPS Canberra 1985, p 24.

Figure 7. Sources of fluoride intake in 2 year old children and adults*



* 15 per cent of fluoride content of prepared food derived from reticulated water
Water/beverages include prepared beverages (for example, soft drinks) which are assumed to have the same fluoride concentration as reticulated water
Based on WHO (1970); Singer et al (1978); Baghurst et al (1987)