11. Oral health

Health status

Key point

▶ *Tamariki Māori and children from socioeconomically disadvantaged homes have less satisfactory oral health than other children in New Zealand.*

- Dental health of children in New Zealand improved steadily for many years until the early 1990s.
  Possible explanations for the recent increase in reported caries prevalence in children include:
  - greater use of radiography in school dental services, which has enhanced sensitivity for detecting caries (that is, increased detection rate) (Ministry of Health 1997b)
  - increasing socioeconomic marginalisation of substantial sections of New Zealand society (Thomson 1997).
- Data indicate that Māori children have substantially more missing and filled teeth (MFT) than non-Māori children, and Pacific children fall between tamariki Māori and European children (Ministry of Health 1997b; Thomson 1997).
- Dental caries is a disease which is more predominant in disadvantaged socioeconomic groups (NHMRC 1991; Treasure and Dever 1992).
- Data indicate that in most areas the number of teenagers accessing dental health services do not reach targets. These services are provided free through the Dental Benefits Scheme. There are no national outcome data on the dental health of adolescents (Ministry of Health 1998).

Implications

Key point

▶ *Serious and persistent dental problems can disrupt work and social life.*

Dental caries (tooth decay) is a chronic, progressive lesion, and once cavitation has occurred repair by a dental health professional is essential to prevent progress of the condition. Good dental health is important for health, self-esteem and pain-free living, and serious and persistent dental problems can disrupt work and social life. Untreated caries can lead to hospitalisation for acute medical complications.

Factors influencing health status

Key point

▶ *Fluoridation of water supplies is the most significant factor in protecting against caries development.*

Factors associated with poor oral health in children:

- unfluoridated water supplies (WHO 1994; Attwood and Blinkhorn 1991; Ripa 1993)
- use of non-fluoride toothpaste (Murray et al 1991)
- Māori ethnicity (Thomson 1993)
- low socioeconomic status (NHMRC 1991; Treasure and Dever 1992)
- adolescence is a risk factor for accessing services (Ministry of Health 1998)
- frequent or high dietary intake of simple sugars (Glinsmann et al 1986).

Interventions

1 Fluoridating water supplies

Key point

▶ *Fluoridation of water supplies is the most effective protective measure against the development of caries.*

Fluoridation of water supplies is the most effective protective measure against the development of caries (Attwood and Blinkhorn 1991; Ripa 1993). In areas supplied with reticulated drinking-water, water fluoridation is the most effective and efficient means of reducing dental caries (WHO 1994). A review of research in New Zealand, the United States, Australia, Britain, Canada, and Ireland concluded that water fluoridation:

- reduces dental caries by 30–60 percent in children's primary teeth
- reduces caries by 20–40 percent in the mixed dentition in ages 8–12 years
- reduces caries by 15–35 percent in the permanent teeth of adolescents aged 14–17 years (Newbrun 1989).

Caries prevalence increases within a few years in communities where water fluoridation is discontinued (Attwood and Blinkhorn 1991; Ripa 1993). Exposure to fluoride via drinking-water has an advantage over other sources (for example, fluoridated toothpaste) in that high fluoride exposure is less likely.

Water fluoridation is of greatest benefit to those with poorer dental health, including Māori and lower socioeconomic groups. Thus, water fluoridation contributes to equity in health outcomes. The effectiveness of water fluoridation in preventing missing or filled primary teeth at age five years has been estimated in New Zealand (Table 2 below).

Table 2 Protective effect of water fluoridation against dental caries in five-year-old New Zealand children, by socioeconomic group

Socioeconomic group*	dmft** prevented per child
Groups 1 and 2 (least socioeconomic disadvantage)	0.2
Groups 3 and 4	2.5
Groups 5 and 6 (greatest socioeconomic disadvantage)	3.5

* Determined by parental socioeconomic status (Elley and Irving 1985).
** Decayed, missing or filled primary teeth.
Source of data: Treasure and Dever 1992.

Research has continued to provide evidence concerning the effectiveness and safety of water fluoridation in New Zealand and overseas. Despite the work done by agencies and individuals, there is still some level of concern about the safety of community water fluoridation among various groups in the community (Diesendorf et al 1997). There is no good evidence for adverse health effects of community water fluoridation (Durham 1997).

While high exposure to fluoride can cause dental fluorosis (mottling of tooth enamel) there is little risk from fluoridated water at levels used in New Zealand. The recommended range for the level of fluoride in the water supply is 0.7 to 1.0 mg/l (National Drinking-Water Standards Review Expert Working Group 1995; WHO 1994).

2 Use of fluoride toothpaste

Key point

- *Fluoridated toothpaste provides protection when water is not fluoridated and additional protection when it is.*

Regular use of toothpaste containing fluoride is an effective method of reducing the development of dental caries. For people whose drinking-water is fluoridated, regular use of fluoride toothpaste provides an additional degree of protection against tooth decay. In unfluoridated areas it is the prime method of preventing decay (Murray et al 1991; USPSTF 1996).

High exposure to fluoride from swallowing toothpaste can contribute to dental fluorosis. This is a risk for young children because they are prone to swallowing toothpaste. In most cases fluorosis is of no more than minor cosmetic significance (PHC 1994). Most fluoridated toothpastes on sale in New Zealand contain 1000 ppm of fluoride although a 400 ppm fluoride toothpaste is available in New Zealand for use by preschool children. Important health information messages include encouraging children to use no more than a smear of toothpaste, discouraging them from swallowing or eating toothpaste and encouraging parental supervision of brushing.

The percentage of toothpaste sold that contains fluoride decreased from 92 percent in 1991 to 86 percent in 1996 (Ministry of Health 1997b).

3 Health education

Key point

- *Overall health education can improve knowledge and behaviour at least in the short term.*

One review of oral health education interventions which included a meta-analysis of seven RCTs found that oral health education interventions have a small positive, but temporary effect on plaque accumulation and no discernible effect on caries increment but consistent effect on knowledge levels (Kay and Locker 1996). Another review of research in oral health education and health promotion involving 57 studies found that there were methodological problems with much of this work. The overall findings were that oral health education can result in improved objective measures of oral health behaviours and actual oral health measures but only limited success in changing attitudes towards dental issues (Brown 1994).

(Intensive early intervention home-visiting services are discussed in the section Key Interventions to Improve Health Gain for Children and Improve Family Functioning, in the front of this document). Although this review did not look at their potential usefulness in regard to oral health it is plausible that the impact of home visitors would positively influence and encourage enrolment in the dental services at a preschool level and would deliver important oral health promotion information.

4 Fissure sealants and topical fluoride applications[10]

Key point

- *Fissure sealants and topical fluoride applications are effective preventive interventions when used selectively on the teeth of children who are particularly at risk of developing caries (Johnson and Lewis 1995; Llodra et al 1993).*

5 Fluoride mouth rinses[10]

Key point

- *There is good evidence from RCTs for the effectiveness of fluoride mouth rinses with individuals who have very active decay but poor evidence for effectiveness with individuals who have a low risk of caries (CTF 1994).*

There is good evidence from RCTs for the effectiveness of fluoride mouth rinses with individuals who have very active decay but poor evidence for the effectiveness of fluoride mouth rinses with individuals who have a low risk of caries (CTF 1994). Allocation of this intervention therefore needs to be done on clinical grounds.

6 Population-based preventive and treatment services

Key point

- *The school dental service is a valuable means of promoting equity of health outcomes.*

The school dental service is a valuable means of promoting equity of health outcomes through the important part it plays in increasing access to care for preschool and school age children.

Providing age-appropriate services for adolescents will encourage use of dental services under the General Dental Benefit Scheme.

Implications for policy and services

1 Water fluoridation

Key point

- *Fluoridation of water supplies should be extended.*

10 These are treatments for individuals and not recommendations for general population use.

Fifty-five percent of New Zealanders were supplied with reticulated fluoridated water in 1996 (Ministry of Health 1997b). The Public Health Commission included a target of 70 percent of the population on reticulated water supplies to receive fluoridated water by the year 2000 in its policy paper *Fluoride and Oral Health: The Public Health Commission's advice to the Minister of Health 1995* (PHC 1995a). At that time it was believed that about 63 percent of the population connected to reticulated water supplies had its water fluoridated. However, improvements in the quality of data on water supplies has meant this figure has been revised downwards. It does not necessarily indicate a decrease in the size of the population supplied with fluoridated water (Ministry of Health 1997b).

Current strategies to maintain and promote fluoridation in New Zealand include the following: promotion by regional and local health services, promotion by professional groups and support from the academic community. Responsibility for providing the fluoridated water supplies rests with local authorities.

2 Dietary behaviour

Key point

- *Sugar is the most important dietary item in caries aetiology, but this review did not identify effective measures to reduce unhealthy consumption in part because possible interventions are untried.*

In an extensive review of animal, ecological and human-intervention studies, Rugg-Gunn (1996) concluded that sugar was the most important dietary item in caries aetiology and its presence around plaque-covered tooth surfaces is essential for more than very limited caries development. Sucrose was considered to be the most cariogenic sugar but glucose, fructose and maltose were similarly cariogenic.

The frequency of sugar intake and the form in which the sugar is consumed are considered more important dietary variables than the total quantity of sugar eaten (McMahon et al 1993). Sweet foods which stick to the teeth, such as raisins, or those which are kept in the mouth for a long time are particularly cariogenic. Raw vegetables are thought to promote the flow of saliva; its buffering action counteracts acid attack on the tooth (Network of the Federal/Provincial/Territorial Group on Nutrition and National Institute of Nutrition 1989). Cheese is also thought to have a buffering effect on acid attack (Bowen and Pearson 1993; Herod 1991).

National guidelines have recommended that children's snacks should be low in sugar. There is a national target for decreasing sucrose and simple sugars intake (Ministry of Health 1997b; PHC 1995b).

Fruit, carbonated drinks and sports drinks contain their own acids which can act directly on tooth acids. These can depress the pH level of the mouth below the point at which bacterial enzymes act. No new acid is formed, but because the dietary acid already present is strong, tooth enamel can be significantly dissolved.

Schools and education authorities may have a part to play in promoting oral health by having tuckshop policies which influence healthy choices, avoiding the use of sweets as rewards and by increasing awareness of relevant issues.

The review found insufficient evidence for the following potential interventions to reduce sugar consumption: use of sugar substitutes, sugar taxation, restrictions on advertising foods that are high in simple sugars, or food labelling, but this is because these approaches are largely untried in relation to sugar in products. Similar interventions have been found to be useful where tobacco and alcohol are concerned. The review found fair evidence for controls being placed on the use of sugar in some products. For example, sugar-containing syrup medicines have been associated with increased caries risk (Rugg-Gunn 1996).

3 Tamariki Māori

Form Two children had an average of 1.4 missing or filled permanent teeth (MFT), and 48 percent were caries-free in 1996. Form Two tamariki Māori have on average 60 percent more MFT than non-Māori children (Ministry of Health 1997b; Thomson 1993). Initiatives which promote oral health in a culturally effective way must be supported and extended.

(See section on Factors Influencing Health Status, at the front of this report.)

4 Socioeconomic status

Australian and New Zealand studies indicate that dental caries is a disease with a strong socioeconomic correlation; those most disadvantaged experience greater disease (NHMRC 1991; Treasure and Dever 1992). The school dental service provides equitable access to services for primary school children but teenagers and preschoolers are particularly vulnerable (Socio-economic disadvantage and health is discussed in the section Factors Influencing Health Status, at the front of this document). Services are largely treatment-based and the factors linking poor oral health with socioeconomic disadvantage must be addressed to improve caries prevention.

5 Adolescents

Key point

- *Little data exist on adolescent dental health outcomes at a national level. Existing data suggest teenagers do not access dental services as universally as is desirable. Consideration should be given to how to improve their attendance at dental services.*

The Health Funding Authority (HFA) is required to purchase annual dental examination, diagnosis, advice and basic dental services for adolescents through contracts with dentists who provide the service free of charge to the teenagers and their families. However, in some areas there have been problems letting these contracts. Adolescent coverage fell in all regional health authorities from 1996/97 to 1997/98. The number of teenagers receiving publicly funded dental treatment in New Zealand has decreased by 5 percent since 1995/96 (Ministry of Health 1998).

In 1996/97 service utilisation was thought to have decreased in at least one region (the Northern region) (Ministry of Health 1997c).

One region (Southern) has already made arrangements to collect data on decayed, missing or filled teeth (DMFT) in 15-year-olds (Ministry of Health 1997c). The data will show, after 18 months to two years, patterns of dental disease in adolescents in the Southern region as well as patterns of utilisation and uptake of dental benefits among the study group.

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