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health

# Evidence-based oral health promotion resource





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## Foreword

It is generally accepted that prevention is better than cure. So it is for dental or oral diseases. Anyone who has had toothache, seen a child with dental pain, or experienced not being able to eat or sleep properly or to smile, understands the benefits of preventing oral disease. The challenge is to identify and introduce cost effective and sustainable approaches.

The impact of oral disease is not only on the individual but also on the community generally through health system and other economic costs. Tooth decay is Australia's most prevalent health problem with over half of all children and almost all adults affected. While there have been improvements in oral health over the last decade, tooth decay is still over five times more prevalent than asthma among children. Moderate or severe gum disease is the fifth-most common problem, affecting over a third of Victorian concession card holders and over a quarter of non-cardholders.

Dental admissions are the highest cause of acute preventable hospital admissions. Oral health is also the second-most expensive disease group in Australia, with direct treatment costs of over \$6 billion annually. There are strong associations with other chronic diseases such as diabetes and coronary heart disease. Oral diseases are a key marker of disadvantage with people in low income households having over three times the impact of poor oral health on their quality of life compared to those in high income households.

This comprehensive resource on the evidence-base for oral health promotion shows the commitment of the department to support the implementation of policies and programs which will further reduce oral health disadvantage.

The resource is designed as a practical summary for policy development and program implementation. The question 'Why is action needed?' is addressed. Oral diseases and their causes are outlined along with the common risk factors between oral and other diseases. The most effective strategies for prevention are presented based on a systematic review of the literature. These strategies are outlined according to seven priority groups and settings and also by Victoria's Integrated Health Promotion categories. There are also sections on program planning and evaluation, and resources and references.

The next step is to consider the implications for Victoria of evidence presented in this resource. That is, what are the policy and practice ramifications? Further partnerships are required with all levels of government and key organisations, such as Dental Health Services Victoria, to achieve sustainable long-term oral health outcomes. It is time for the promotion of oral health to become more integrated into the broader prevention effort and this resource helps point the way.



**Professor Jim Hyde**  
**Director, Prevention and Population Health**  
**Department of Health**

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The 2001 resource was developed for the Department of Human Services by Dental Health Services Victoria (DHSV) in association with the University of Melbourne Dental School. The current resource has drawn on the 2006 report *Evidence based review of oral health promotion* prepared for the department by the Consortium of DHSV and the University of Melbourne Co-operative Research Centre (CRC) for Oral Health Science. Julie Satur from the University of Melbourne and Helen Keleher and Omar Abdulwadud from Monash University contributed to the development of the literature review protocol for the current resource.

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The resource was written by John Rogers in the Evidence and Evaluation Team of the Prevention and Population Health Branch of the Victorian Department of Health. Michelle Haby, Milica Markovic and Monika Merkes provided extensive support.

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# Executive summary

## Background

Oral diseases have a significant impact on the Victorian community. Oral health is fundamental to overall health, wellbeing and quality of life. A healthy mouth enables people to eat, speak and socialise without pain, discomfort or embarrassment. The impact of oral disease is not only on the individual, but also on the community generally through health system and economic costs.

The main oral conditions are tooth decay, gum disease, oral cancer and oral trauma. Tooth decay is Australia's most prevalent health problem, edentulism (loss of all natural teeth) the third-most prevalent and gum disease the fifth-most prevalent health problem.<sup>1</sup> Tooth decay is over five times more prevalent than asthma among children.<sup>2,3</sup> Decay is preventable and, in the early stages, reversible. Dental admissions are the highest cause of acute preventable hospital admissions.<sup>4</sup> Oral health is the second-most expensive disease group in Australia, with direct treatment costs of over \$6 billion annually,<sup>5</sup> with additional care costs exceeding a further \$1 billion.

Poor oral health is associated with poor diet,<sup>6,7</sup> aspiration pneumonia and infective endocarditis.<sup>8</sup> Chronic infection of gums has an adverse effect on the control of blood sugar and the incidence of diabetes complications.<sup>9</sup> Gum disease is associated with rheumatoid arthritis,<sup>10</sup> adverse pregnancy outcomes<sup>11,12</sup> and coronary heart disease,<sup>13,14</sup> although causation has not been proved.

Oral conditions are amenable to prevention, and because clinical treatment can be costly, and access to good quality and evidence-based care limited, it is important to understand what health promotion interventions work. It is not possible to 'treat oral diseases away'.

While there has been a significant reduction in tooth decay levels in children over the last generation in Australia as in other developed economies, marked inequalities in oral health exist. Indeed, oral diseases are a key marker of disadvantage. Greater levels of oral disease are experienced by people on low incomes, dependent older people, some Aboriginal and Torres Strait Islander peoples, rural dwellers, people with a disability, and some immigrant groups from culturally and linguistically diverse backgrounds (particularly refugees).<sup>1</sup>

This resource describes oral diseases and their determinants, and indicates the most effective health promotion strategies for prevention. The guide was developed to assist health promotion practitioners and policy makers to further promote oral health. By drawing together the evidence and considering implications for practice, the resource should be a practical summary for policy development and program implementation.

A framework for oral health promotion is presented that brings together determinants for oral health, key population groups, action areas, settings for actions, outcomes and long-term benefits.

## Literature review questions

The review questions were:

- What are effective oral health promotion strategies for the Victorian population?
- What innovative oral health promotion strategies show promise for the Victorian population?
- What information and research gaps exist?

## Methods

The oral health promotion literature in English for the period June 1999 to June 2010 was systematically searched for programs relevant for Victoria. The previous review (*Evidence-based Health Promotion: Resources for planning. Number 1 Oral Health*)<sup>15</sup> covered the literature up to May 1999. The search also included systematic reviews of broader health promotion interventions that promote oral health, such as those promoting a healthy diet.

The evidence for interventions is organised under seven priority groups and settings:

1. pregnant women, babies and young children (0–4 years)/childhood settings (Section 5)
2. children and adolescents/school settings (Section 6)
3. older people/residential care settings (Section 7)
4. Aboriginal and Torres Strait Islander people (Section 8)
5. culturally and linguistically diverse communities (Section 9)
6. people with special needs (Section 10)
7. workplace settings (Section 11).

The evidence is also presented under the five Integrated Health Promotion categories used in Victoria:

1. screening and individual risk assessment (Section 12.1)
2. health education and skill development (Section 12.2)
3. social marketing and health information (Section 12.3)
4. community action settings (Section 12.4)
5. supportive environments (Section 12.5).

## Summary of evidence

Many factors 'cause' oral diseases. Economic, political and environmental conditions influence the social and community context, which in turn affects oral health-related behaviour. The oral disease risk factors (such as high sugar diets, poor hygiene, smoking and excessive alcohol intake) are also risk factors for obesity, diabetes, cancers, heart disease and respiratory diseases. Incorporating oral health promotion into general health promotion by taking a 'common risk factor' approach is likely to be more efficient and effective than programs targeting a single disease or condition.<sup>16</sup>

While oral diseases share common risk factors, and an integrated approach is appropriate, certain specific oral health promotion aspects also require addressing. These aspects include the use of fluoride, oral hygiene and timely, preventively focused dental visits.

Effective and innovative oral health promotion interventions are summarised in Table 1 Summary of oral health promotion interventions by Integrated Health Promotion categories and population, settings and priority groups. The Integrated Health Promotion (IHP) categories are: screening and individual risk assessment; health education and skill development; social marketing and health information; community actions; and settings and supportive environments. Interventions are presented by population approaches and for high-risk groups in key settings. Table 1 shows the strength of evidence for each intervention type. The section in the resource relevant to the intervention type appears in brackets.

## Planning and evaluation

The IHP approach is to work in a collaborative manner using a mix of health promotion interventions and capacity-building strategies to address priority health and wellbeing issues.<sup>17</sup> Tools for planning and evaluation of IHP are available. An oral health promotion evaluation model is presented, which includes outcome indicators. Capacity building requires organisational development, partnerships, workforce development, leadership and resources.

## Gaps in the health promotion literature for promoting oral health

There is a need to improve the evidence base for the promotion of oral health in the following areas:

### Intervention development

- Investigate further the social determinants of oral health inequalities and identify causal pathways and key points in the life course amenable to intervention.
- Pilot and evaluate promising interventions targeting high risk population subgroups to reduce oral health inequalities.
- Improve the evidence base of upstream interventions that specifically tackle determinants of oral health inequalities.
- Improve the evidence base on nutritional interventions to reduce the amount and frequency of sugar consumption.
- Fund and evaluate programs that train and support primary health and welfare workers to promote oral health.
- Develop a mediating/advocating/expert role for oral health personnel as part of health care networks, in order to contribute to common risk factor approaches and capacity building/community oral health leadership.
- Investigate further ways to integrate oral health into general health promotion, in order to embed oral health outcomes in broader SNAPS (smoking, nutrition, alcohol, physical activity and stress) studies.
- Investigate the distribution and determinants of oral cancer and identify preventive interventions.



- Fund and evaluate programs in key settings (such as workplaces) where people who are at high risk of oral disease work.
- Identify measures of the value of collaboration across health professions and delivery networks.
- Evaluate social marketing for oral health promotion.
- Develop oral health literacy training programs and evaluation measures.
- Investigate the potential benefits and impact of oral health promotion interventions on general health outcomes, for example, reduction in gum disease and its effects on cardiovascular disease.

## Methodological development

- Improve the quality of the design and methodology of interventions.
- Improve the quality of evaluations.
- Find the appropriate methods to incorporate and value oral health education in schools.

**Table 1 Summary of oral health promotion interventions by Integrated Health Promotion categories and population, settings and priority groups (refer to legend at the end of table)**

Population approaches	Screening, individual risk assessment	Health education and skill development	Social marketing; health information	Community action	Settings and supportive environments (healthy public policy)
	<p>Integration of oral health into well persons visits, including, as appropriate, anticipatory guidance, motivational interviewing, Lift the Lip screening and referral for oral health care, by:</p> <ul style="list-style-type: none"> <li>maternal and child health (MCH) nurses (5.6, 8.3, 9.2)</li> <li>general practitioners and nurse practitioners (12.1.1)</li> <li>Aboriginal health workers (8.3.1)</li> <li>school nurses (12.1.3).</li> </ul>	<p>Health and welfare workers as oral health promoters:</p> <ul style="list-style-type: none"> <li>aged care workers (7.2.3)</li> <li>welfare and disability workers, diabetes educators, youth workers (10.3, 10.5, 10.10)</li> <li>pharmacists (12.1.2)</li> <li>midwives (12.1.3)</li> <li>domiciliary (district) nurses (12.2.1).</li> </ul> <p>Development and consistent use of evidence-based oral health messages (12.3).</p> <p>Integration of oral health information with other health information (12.3).</p> <p>Small groups and peer education (12.2.4).</p>	<p>Social marketing via mass media (12.3).</p> <p>Use of local media (12.3).</p>	<p>Advocacy for oral health promoting environments (12.5):</p> <ul style="list-style-type: none"> <li>water fluoridation (12.5)</li> <li>healthy food and drink policies (12.5.2)</li> <li>restricted advertising of high sugar content products (12.5.4)</li> <li>sugar-free medicine (12.4.2)</li> <li>access to preventive oral health care (12.4).</li> </ul>	<p><b>Water fluoridation</b> (12.5.1).</p> <p><b>Targeted use of topical fluoride</b> (12.5.1).</p> <p><b>Sugar-free products, chewing gum and confectionery</b> (12.5.3).</p> <p>Healthy food and drink policies in key settings, childcare, school, workplace, residential care (12.5.2).</p> <p>Affordable oral health products - toothbrushes and fluoride toothpaste (5.4,12.5.5).</p> <p>Orally healthy policy and practice in residential care settings (7.2.5, 10.2).</p> <p>Restricted advertising of high sugar products (12.5.4).</p>
<p><b>Pregnant women, babies and young children/childhood</b></p>	<p>Integration of oral health into well child key Ages and Stages visits to MCH nurses, including anticipatory guidance, motivational interviewing, Lift the Lip screening and referral of children for oral care with use of parent-held child health records (5.7).</p> <p>Integration of oral health into sessions with general practitioners, nurse practitioners and Aboriginal health workers, including Lift the Lip screening, counselling, anticipatory guidance, application of fluoride varnish, and referral of children for oral care (5.8.1, 5.8.2, 5.8.3, 5.8.4).</p> <p>Targeted home visits (5.1).</p> <p>Comprehensive care programs for pregnant women and/or mothers of newborn babies (5.8.5).</p> <p>Carer-held child health record (12.2.5).</p>	<p>Community action, multi-strategy programs (5.7, 6.4.2).</p>	<p>Community action, multi-strategy programs (5.7, 6.4.2).</p>	<p><b>Targeted prevention in childcare settings: fluoride varnish programs</b> (5.2) and <b>supervised toothbrushing</b> (5.3).</p> <p>Healthy food and drink policies in childhood settings (5.5).</p>	

		<p>Targeted provision of free or low cost fluoride toothpaste and brushes via home visits, mailing or clinic (5.4).</p> <p>Anticipatory guidance and motivational interviewing for pregnant women and parents with young children (5.8.2, 5.8.1).</p> <p>Targeted use of xylitol chewing gum by pregnant women (5.8.4).</p> <p>Small group discussions and use of peer leaders (5.8.3).</p> <p>Integration of oral health into antenatal care sessions* (12.1.3).</p>		
<p><b>Children and adolescents /school settings</b></p>	<p>School nurse assessments and referral (12.1.3).</p>	<p>School-based oral health educational programs, incorporating:</p> <ul style="list-style-type: none"> <li>• links to the home environment</li> <li>• creative and interactive learning</li> <li>• use of peer leaders, theory-based approaches (6.3.3, 6.3.4).</li> </ul> <p>Community/school and clinic-based programs (6.5).</p> <p>Annual classroom lessons (for prevention of tooth decay; 6.3.5).</p> <p>Non-integrated health promotion to reduce at-school snacking (for prevention of tooth decay; 6.4).</p>	<p>Social marketing to increase fruit and vegetable consumption (12.3).</p>	<p>Targeted school-based supervised toothbrushing programs (6.1).</p> <p>School-based fluoride mouthrinsing programs (6.2).</p> <p>Orally healthy school policies and practices, including integration of oral health information into the school curriculum (6.4.1).</p> <p>Non-targeted school-based supervised toothbrushing programs (6.1).</p>
<p><b>Older people</b></p>	<p>Oral health checks within general health checks for older people living in the community (7.1.1).</p> <p>Oral health assessment by non-oral health professionals for older people in residential care (7.2.1).</p>	<p>Health education for people living in the community, plus use of chlorhexidine, electric toothbrushes, and sugar-free chewing gum (7.1.2).</p> <p>Training aged-care workers and appointing oral care champions for older people in residential care (7.2.3).</p>	<p>Preventive oral care in nursing homes, including use of fluoride in toothpaste and rinses, and use of sugar-free sweets or chewing gum (7.2.4).</p> <p>Health promoting policies and procedures in nursing homes (7.2.5).</p>	<p>Integrated health promotion programs to improve consumption of healthy food and drink (6.4.2).</p>

Screening, individual risk assessment	Health education and skill development	Social marketing; health information	Community action	Settings and supportive environments (healthy public policy)
Individualised oral health care plans for older people in residential care (7.2.2). Use of dental hygienists to perform examinations and treatment planning in nursing homes (7.2.6).	Community-based program for community-dwelling elderly migrants (7.1.3).			
<b>Aboriginal and Torres Strait Islanders</b>	<b>Community fluoride varnish programs with oral health education and community promotion</b> (8.1 and 8.2). Enhancing access to oral care through a combination of screening by Aboriginal health workers, facilitating referral, giving priority for treatment, and waiving dental fees (8.6).	Use of Aboriginal and other primary health workers as oral health champions (8.3). Non-engagement with community (8.2).	Community-based oral health promotion (8.2).	<b>Water fluoridation</b> (12.5.1). Affordable oral health products (12.5.5). Preschool and school-based supervised toothbrushing programs with oral health integrated into the curriculum (8.4). Healthy policies and practices in childhood and school settings (8.5).
<b>Culturally and linguistically diverse communities</b>	MCH nurses' enhanced focus on oral health with referrer system to oral care services (5.6, 9.2).	Peer oral health workers as educators (9.1). Community development multi-strategy approaches (9.3). Community-based participatory research (CBPR) (9.4). Community-based programs for community-dwelling migrants (9.5).		<b>Targeted use of fluoride varnish</b> (5.2)
<b>People with special needs</b>	Use of health and welfare workers as oral health champions: • oral health, mental health and allied health workers (via assertive outreach) • welfare and disability workers • pharmacists • diabetes educators • youth workers • other health workers with training and support (10).			Policy and practice in residential care settings: • oral care plans for residents • access to oral health aids (toothbrushes and fluoride paste) • timely access to oral health care (10).
<b>Workplace settings</b>	Oral health literacy sessions and employee funded oral health care (11.1). Multicomponent interventions that include physical activity as well as nutrition (11.1). Group oral health literacy sessions (11.1).	Oral health literacy sessions for people with special needs: • groups and/or individuals • motivational interviewing • creative use of other senses to teach oral hygiene to people with visual impairments • access to oral health aids, including electric toothbrushes (10.1).		Healthy food and drink policy and practice to enhance access to nutritious food (11.1).

## Legend

Strength of evidence for interventions is shown by variations in font. The public health strength of evaluation and research evidence for intervention effectiveness has been used as outlined in Table 3:

Level 1 - **strong evidence**

Level 2 - sufficient evidence

Level 3 - some evidence

Level 4 - weak evidence\*

Level 7 - evidence of ineffectiveness

Choosing interventions - as well as choosing interventions based on strength of evidence, consideration needs to be given to implementing a mix of interventions across the IHP categories. An appropriate mix of interventions has maximum impact.<sup>17</sup>

# Introduction

The Department of Health developed this oral health promotion resource to assist health promotion practitioners and policy makers to further promote oral health. By drawing together the evidence and considering implications for practice, the resource should be a practical summary for policy development and program implementation.

Most advanced oral diseases are irreversible and the consequences can last a lifetime. Oral conditions are amenable to prevention, and because clinical treatment can be costly, and access to good quality and evidence-based care limited, it is important to understand what health promotion interventions work.

The resource is divided into five parts.

**Part A** Oral disease and oral health promotion includes four sections:

**Section 1** Why is action needed? The impact of poor oral health presents the public health significance of oral health, including the personal, social and economic impacts of oral disease, and the association of poor oral health with poor general health. Inequalities in oral health are also discussed.

**Section 2** Oral disease and determinants considers oral disease and determinants, as well as population groups at greatest risk. Common risk factors between oral and other chronic diseases plus oral health links to the Victorian health promotion priorities are reviewed.

**Section 3** Framework for oral health promotion outlines the Victorian Integrated Health Promotion approach <[http://www.health.vic.gov.au/healthpromotion/evidence\\_res/integrated.htm](http://www.health.vic.gov.au/healthpromotion/evidence_res/integrated.htm)>, and presents a framework for oral health promotion.

**Section 4** Methodology for review of the literature details the methodology for the review of the evidence and the criteria used to identify the strength of evidence for relevant health promotion studies. Both specific oral health promotion interventions and broader programs that affect oral health (such as nutrition) are reviewed.

**Part B** Interventions by priority groups and settings, Sections 5–11 present the evidence for interventions by seven priority groups and settings. Key points are identified for each section. The context for each group is outlined and strength of evidence for interventions given. Good practice examples and implementation issues are presented.

**Part C** Interventions by Integrated Health Promotion categories presents the evidence for interventions according to the five Integrated Health Promotion categories. Cross-links are made to Part B Interventions by priority groups and settings.

**Part D** Oral health promotion planning and research gaps includes two sections.

**Section 13** Program planning and evaluation provides a guide on how to develop, implement and evaluate oral health promotion programs and outlines opportunities to integrate oral health promotion into general health promotion.

**Section 14** Gaps in the health promotion literature for promoting oral health outlines gaps in the health promotion literature for promoting oral health.

**Part E** Resources and references contains useful resources for oral health promotion planning, implementation and evaluation, and a references list (section 15.1). Section 15.2 Online resources contains a list of addresses for online resources mentioned in this document.

Part A Oral disease and  
oral health promotion



# 1 Why is action needed?

## The impact of poor oral health

### Summary

Oral disease affects the individual (through pain, discomfort and reduced general health and quality of life) and the community (through health system and economic costs).

Oral diseases are common in Australia, with over 25 per cent of adults having untreated dental decay, and tooth decay at over five times more prevalent than asthma among children.

Poor oral health is associated with poor overall health, and oral conditions are the second-most expensive disease group to treat (after cardiovascular disease).

Oral disease is a key marker of disadvantage, with greater levels of oral disease experienced by:

- people on low incomes
- dependent older people
- some Aboriginal and Torres Strait Islander peoples
- rural dwellers
- people with a disability
- some immigrant groups from culturally and linguistically diverse backgrounds (particularly refugees).

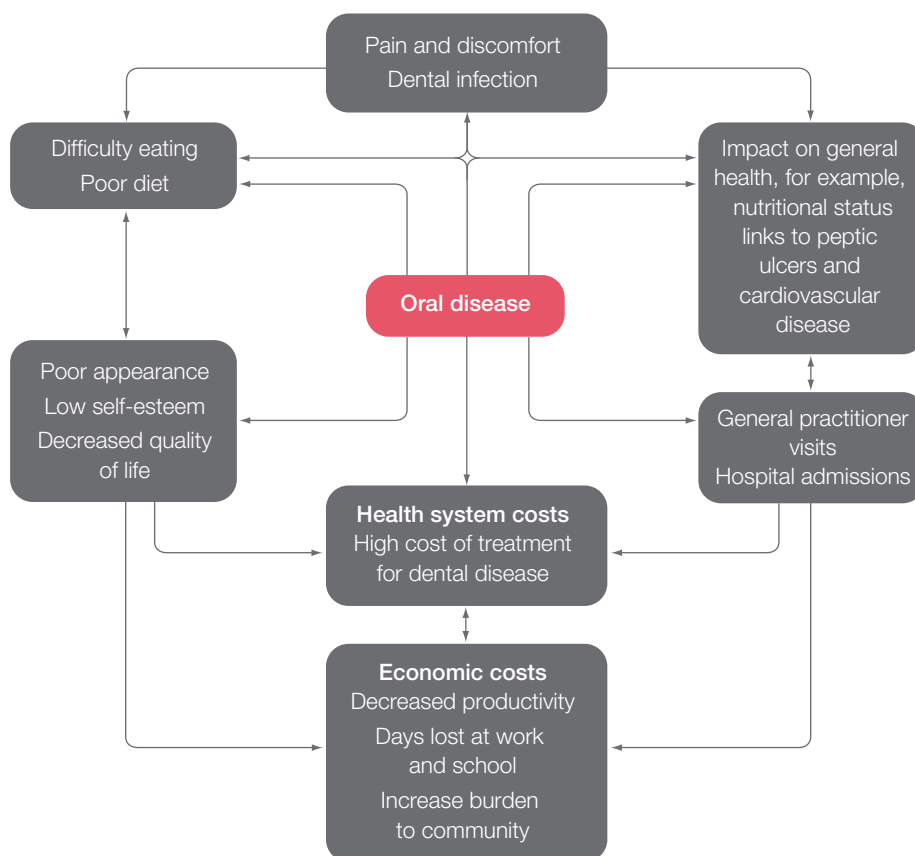
### 1.1 Public health significance of oral health

Good oral health is a prerequisite for good health. Oral health is fundamental to overall health, wellbeing and quality of life. A healthy mouth enables people to eat, speak and socialise without pain, discomfort or embarrassment.<sup>1</sup>

The impact of oral disease is not only on the individual (through pain and discomfort) and the broader impact on their general health and quality of life, but also on the community generally, through the health system and associated economic costs (see Figure 1 Impact of oral disease).



Figure 1 Impact of oral disease



### 1.2 The burden of oral disease

Oral diseases place a considerable burden on individuals, families and the community. Tooth decay is Australia’s most prevalent health problem, with edentulism (loss of all natural teeth) the third-most prevalent, and gum (periodontal) disease the fifth-most prevalent health problem.<sup>1</sup>

Tooth decay is over five times more prevalent than asthma among children.<sup>2,31,i</sup> Decay severity is concentrated according to disadvantage, with 10–30 per cent of children experiencing most of the disease.<sup>19</sup>

Over 25 per cent of adults have untreated tooth decay.<sup>20</sup>

Almost one-quarter of Australians report experiencing orofacial pain in the previous month.<sup>21</sup>

Dental admissions are the highest cause of acute preventable hospital admissions.<sup>4</sup> More than 40,000 Australians per year are hospitalised for preventable dental conditions. Over 26,000 are under 15 years who are given a general anaesthetic for dental fillings and extractions.<sup>22</sup>

Over 670 Australians die of oral cancer each year.<sup>23</sup>

In 2006 there were 6,010 potential years of life lost (PYLL) to oral cancer.<sup>24</sup>

Re-evaluation of the disability weighting for oral disease based on Australian data, raised oral diseases from seventeenth to seventh ranking in the number of disability adjusted life years (DALYs).<sup>1</sup>

i The 2003–04 national child dental health survey of children visiting public dental clinics determined that the prevalence of tooth decay in 5–15 year olds was 58 per cent.<sup>9</sup> The 2007–08 national health survey determined that asthma prevalence in under 15 year olds was 10 per cent.<sup>18</sup>

### 1.3 Expenditure on oral care

Direct annual expenditure on dental treatment in Australia was \$6.7 billion during 2008–09 and \$1.9 billion in Victoria.<sup>5</sup> The high cost makes oral conditions the second-most expensive disease group to treat, just below cardiovascular disease.<sup>25</sup> Oral health-related costs of presentations to general practitioners and emergency departments, hospital admission expenses, plus lost productivity and tax concessions, amounted to at least an additional \$1 billion. Dental conditions are more expensive to treat than all cancers combined.

### 1.4 The association of poor oral health with poor general health

The mouth is home to millions of microorganisms. Most are harmless, but can cause tooth decay or periodontal disease. Oral bacteria may also enter the bloodstream, which can cause systemic problems, especially for people without a healthy immune system.<sup>26</sup>

A range of health conditions are associated with oral disease. Chronic infection of gums has an adverse effect on the control of blood sugar and the incidence of diabetes complications.<sup>9</sup> Poor oral health is associated with poor diet,<sup>6,7</sup> aspiration pneumonia and infective endocarditis.<sup>8</sup> Gum disease is associated with rheumatoid arthritis,<sup>10</sup> adverse pregnancy outcomes<sup>11,12</sup> and coronary heart disease,<sup>13,14</sup> although causation has not been proved.

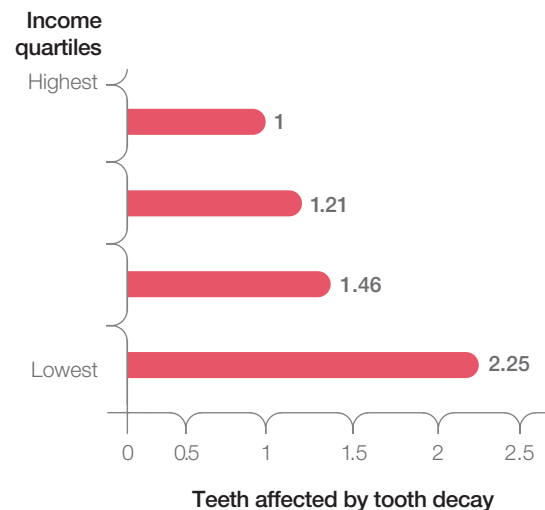
People with diabetes or strokes are twice as likely to have urgent dental treatment needs as those without these conditions.<sup>27</sup> Sufferers of rheumatoid arthritis, emphysema or liver conditions are 2.5, three and five times as likely to have urgent dental treatment needs compared to non-sufferers. These associations persist after controlling for common risk factors.

### 1.5 Inequalities in oral health

Significant inequalities exist in oral health. Oral disease is a key marker of disadvantage. Greater levels of oral disease are experienced by people on low incomes, dependent older people, some Aboriginal and Torres Strait Islander peoples, rural dwellers, people with a disability and some immigrant groups from culturally and linguistically diverse backgrounds (particularly refugees).<sup>1</sup>

Young children in low socioeconomic groups experience more than twice the extent of tooth decay as those in high socioeconomic groups.<sup>28</sup> The social gradient in oral health for Australian 5–10 year olds accessing school dental services is shown in Figure 2 Average number of teeth affected by tooth decay in Australian 5–10 year olds, 2002–03. A significant increase occurred in income-related inequality in young children's experience of tooth decay from 1992–93 to 2002–03.<sup>28</sup>

**Figure 2 Average number of teeth affected by tooth decay in Australian 5–10 year olds, 2002–03**

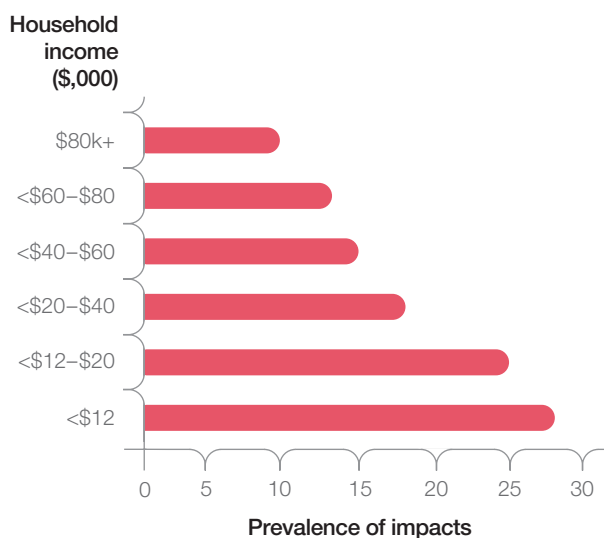


Source: 1992/93 and 2002/03 Child Fluoride Studies<sup>28</sup>

In 2005 Australians over 65 year of age in the lowest income quartile were over 80 times more likely to have had all their teeth extracted than those in the highest income quartile (37.6 per cent, compared to 0.5 per cent).<sup>29</sup>

The social impact of poor oral health shows a strong socioeconomic gradient. Adults living in households with an annual income of less than \$12,000 had three times the impact on quality of life compared to adults living in households with incomes of \$80,000 and above (Figure 3 Proportion of adults reporting impacts of poor oral health on quality of life according to annual household income).

**Figure 3 Proportion of adults reporting impacts of poor oral health on quality of life according to annual household income**



Source: 2002 National Dental Telephone Interview Survey<sup>30</sup>

## 2 Oral disease and determinants

### Summary

The main oral conditions are tooth decay, gum diseases, oral cancer and oral trauma.

Tooth decay is a process of infection and destruction of the hard tissues of the teeth. It is Australia's most prevalent health problem, while loss of all natural teeth (edentulism) is the third-most prevalent.

A causative link has been shown to exist between sugar and dental decay. Consumption of non-milk extrinsic sugars (such as sugars added to food and drinks during processing, manufacturing or preparation) in particular can increase the risk of tooth decay; while unsweetened milk

and sugars naturally present in fruit and vegetables are not considered to cause decay. Sugared soft drinks are a common risk factor, because they are associated with overweight, obesity and diabetes as well as tooth decay.

Fluoride in toothpastes and drinking water mediates the decay-causing effect of sugar.

Gingivitis and periodontitis are the main gum diseases. Gingivitis is inflammation of the gum tissue, characterised by redness, swelling and bleeding. Periodontitis is the chronic destruction of the soft tissues and bones that support the teeth. In advanced periodontitis, teeth can become loose and must be extracted. Periodontal disease is the fifth-most prevalent health problem in Australia, with a higher prevalence in lower socioeconomic groups. Risk factors for periodontal gum disease include smoking, diabetes, HIV, stress, genetic factors and crowded teeth.

Oral cancer was the sixth-most common cancer in Victorian males, and the twelfth-most common in females over the five years to 2007. Smoking and frequent consumption of alcohol are the primary causes.

Oral trauma extends from the chipping of teeth to more extensive oral injuries, and is often acquired through sport, leisure or work. Males are more likely to present with a dental or oral injury than females.

The broader determinants of oral health are generally those that affect general health, with several that are more specific, such as water fluoridation, and common risk factors exist for oral and other chronic diseases. Therefore, an integrated approach to the promotion of both oral and general health is likely to be more efficient and effective than programs targeting a single disease or condition.

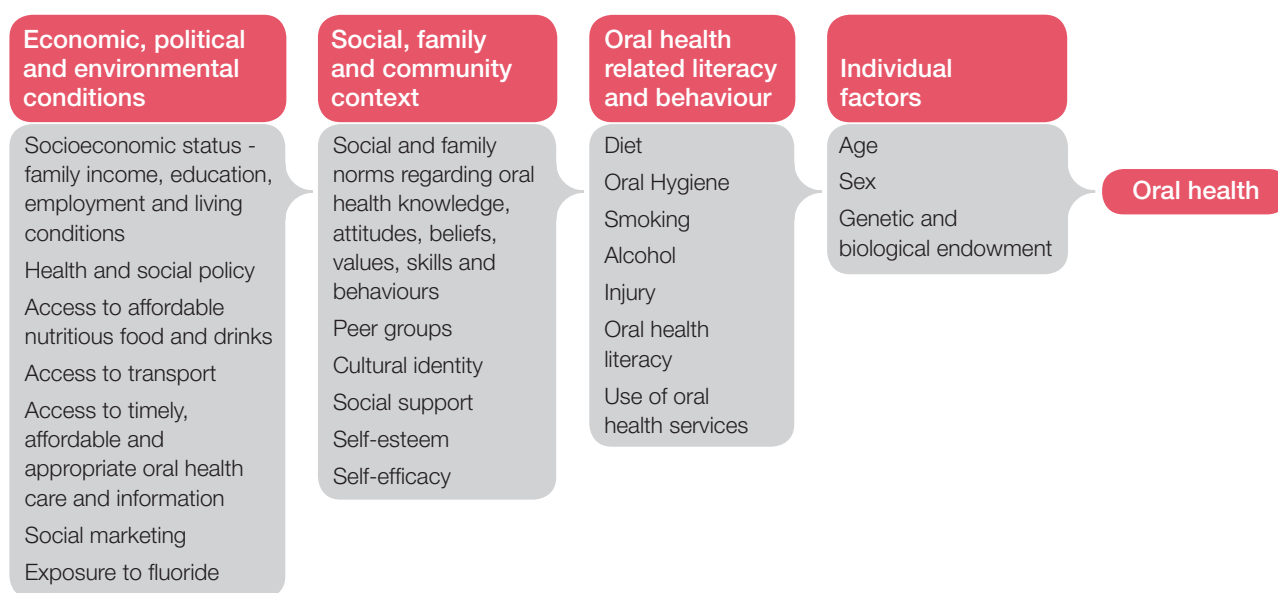
### 2.1 Determinants of oral health

The main oral conditions are tooth decay, gum diseases, oral cancer and oral trauma. Each condition is considered by prevalence, determinants or causation and broad prevention approaches. The evidence for effectiveness of specific health promotion interventions that promote oral health is presented in Part B Interventions by priority groups and settings and Part C Interventions by Integrated Health Promotion categories.

The range of determinants for oral conditions is outlined in Figure 4 Determinants of oral health.

Economic, political and environmental conditions influence the social and community context, which in turn affect oral health-related behaviour and oral health.

**Figure 4 Determinants of oral health**



Source: Adapted from Watt and Fuller<sup>31</sup>

The broader determinants of oral health are generally those that affect general health, with several that are more specific. Determinants include:

- socioeconomic status, including family income, education, employment and living conditions<sup>32,33,34</sup>
- income inequality in a community that affects children's oral health<sup>35</sup>
- factors such as access to nutritious food and drink and access to transport, which are influenced by government policy and are necessary for people to engage in orally healthy behaviours (such as eating an orally healthy diet<sup>16</sup> and undertaking timely dental visits<sup>36</sup>)

- marketing, peer groups and cultural identity, which can influence social and family norms that link to oral health knowledge, attitudes, beliefs, values, skills and behaviours<sup>32</sup>
- environmental conditions, such as water fluoridation<sup>37</sup>
- self-esteem<sup>38</sup> and self-efficacy/sense of control,<sup>32</sup> which are protective factors and can be linked to social capital
- diet has a key impact on tooth decay (sugary food as a cause of tooth decay is discussed in Section 2.2 Tooth decay) and the health of gums (for example, where severe vitamin C deficiency exists, leading to scurvy)

- the consumption of fruit and vegetables, which is associated with a reduced risk of oral cancer<sup>39</sup>
- smoking, which is closely linked to gum disease<sup>40</sup> and, combined with excess alcohol, is a causative factor in oral cancer<sup>41</sup>
- age - risks and preventive factors for oral disease accumulate over a lifetime in a dynamic process<sup>42</sup>
- gender differences in oral health behaviour have an impact; for example, where a higher proportion of women seek oral health care than men<sup>43</sup>
- biologic and genetic endowments influence oral disease, by affecting, for example, the shape of the grooves on teeth.<sup>32</sup>

## 2.2 Tooth decay

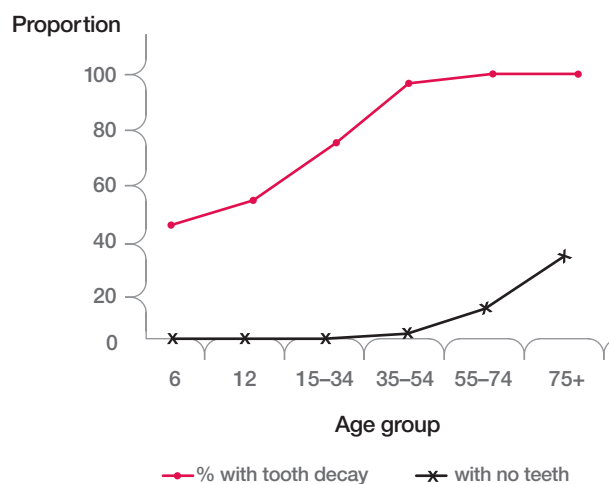
Tooth decay is a process of infection and destruction of the hard tissues of the teeth. This can lead to pain and, if not repaired, an abscess, and the eventual need to extract the tooth. Significant reductions in decay levels have occurred in children over the last generation in Australia, as in other developed economies, which is considered to be due to the widespread exposure to fluoride (particularly in toothpaste<sup>44</sup>) and/or linked to broad socioeconomic factors.<sup>45</sup> However, tooth decay remains a considerable health issue.

### 2.2.1 Prevalence

Tooth decay is Australia's most prevalent health problem, and loss of all natural teeth (edentulism) the third-most prevalent.<sup>1</sup> See Figure 5 Proportions of Australians with tooth decay and those without any natural teeth and Figure 6 Average number of teeth affected by tooth decay by age in Australia.

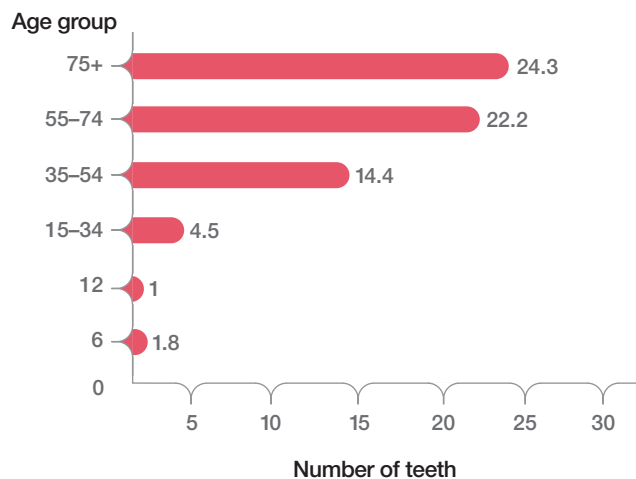
Decay is over five times more prevalent than asthma among children, with severity concentrated according to disadvantage (see Section 1.2 The burden of oral disease). Over 25 per cent of adults have untreated tooth decay.<sup>20</sup>

**Figure 5 Proportions of Australians with tooth decay and those without any natural teeth**



Source: Child Dental Health Survey 2003–04<sup>18</sup> and National Survey of Adult Oral Health 2004–06<sup>20</sup>

**Figure 6 Average number of teeth affected by tooth decay by age in Australia**



Note that for six year olds, the tooth decay shown is in the primary, not permanent, teeth.

Source: Child Dental Health Survey 2003–04<sup>18</sup> and National Survey of Adult Oral Health 2004–06<sup>20</sup>

### 2.2.2 Determinants

Tooth decay is a multifactorial disease. The range of determinants for decay and other oral conditions is outlined in Figure 4 Determinants of oral health. Economic, political and environmental conditions influence the social and community context, which in turn affect oral health-related behaviour.

Decay occurs when a diet high in refined carbohydrates (sugar) causes microorganisms to grow (dental plaque) on the surface of the tooth. Over time the microorganisms produce acid that can lead to demineralisation (dissolving) of the tooth. Dietary acids, for example, in cola drinks, can also cause demineralisation.

Tooth decay is reversible, because remineralisation (repair) of the tooth can occur. A delicate balance, or constant see-saw, exists between damage and repair. Saliva acts as a natural protective factor by neutralising the acid and by carrying fluoride. Fluoride strengthens the tooth, making demineralisation less likely. It also promotes remineralisation and disrupts the acid production process.

Decay is transmissible to the extent that decay-causing microorganisms can be transmitted to babies who are not born with these microorganisms.

Behavioural risk factors for decay include:

- a high sugar diet
- excessive plaque build-up
- limited exposure to fluoride available in toothpastes, fluoridated public water or other sources.

#### Sugar and tooth decay

Epidemiological, human clinical and laboratory studies over the last 60 years show a causative link between sugar and dental decay.<sup>16</sup> The sugars most responsible are classified as non-milk extrinsic sugars (NMES). These are sugars that are added to food and drinks during processing, manufacturing or preparation. NMES also include sugars naturally present in fresh fruit juices, honey and syrups. Concentrated fruit juices and dried fruits have a high concentration of sugars, and their frequent consumption (especially between meals) can increase the risk of decay.

Sugars naturally present in fruit and vegetables are not considered to cause decay,<sup>46</sup> because the sugars are contained within the cell structure of the plant and may not be fully released into the mouth during eating. Lactose (the sugar in milk) is not as decay-causing as other sugars. When naturally present in milk, it appears to be virtually non-decay causing.<sup>46</sup> However, adding table sugar to milk makes it able to cause decay.

The impact of fluoride has been shown to mediate the decay-causing effect of sugar. Burt and Pai conclude from their systematic review of 36 studies conducted in countries where widescale exposure to fluoride occurred, that restriction of sugar consumption had a role in the prevention of decay. However, this role is not as strong as it was in the pre-fluoride era (that is, that the relationship between sugar consumption and tooth decay is much weaker in the modern age of fluoride exposure than it had been previously).<sup>47</sup>

The frequency and time of consumption of sugars-sweetened food and drinks have both been shown to be related to decay.<sup>48</sup> Each time sugary food or drinks are consumed; the acidity or pH of the dental plaque falls to a level where the tooth may start to demineralise. During meals, sugars are cleared from the mouth by other foods and the higher salivary flow. Bedtime is the worst time to consume a sugar-sweetened drink or snack.<sup>46</sup>

Recent research identifies the decay-causing role of sugared soft drinks.<sup>49,50,51</sup> Soft drinks potentially cause decay because of their high sugar content as well as their acidity. In their meta-analysis of studies from 1972 to 2004, Vartanian et al. found a small correlation between dental decay and soft drinks.<sup>51</sup> More recent studies among low-income groups in the US found that the higher the frequency of consumption of soft drinks, the greater the extent and severity of tooth decay.<sup>50</sup> The link is shown to be strongest when poor oral hygiene exists. Soft drinks seem to have replaced confectionery as the prime source of sugar in these groups.<sup>49</sup> Sugar-sweetened drinks are now possibly more important in causing decay than sugar-sweetened food.<sup>52</sup>

Australia is among the top-ten countries for per capita consumption of soft drinks.<sup>53</sup> According to the 1995 National Nutrition Survey, young males and adolescents were the highest consumers, with users drinking almost one litre (approximately three cans) per day.<sup>53</sup> A regular can contains 10 teaspoons of sugar and 640 kJ (150 calories).<sup>53</sup> The consumption of sweet drinks is higher in low-income groups.<sup>54,55</sup>

Soft drinks are a common risk factor, because they are associated with overweight, obesity and diabetes,<sup>16</sup> as well as tooth decay.

### Breastfeeding

The World Health Organization and the Australian dietary guidelines recommend exclusive breastfeeding of infants until they are six months old. A comprehensive review by Ip and colleagues of 400 studies demonstrates that breastfeeding is associated with a reduction in the risk of several infant and child health outcomes, including acute otitis media, nonspecific gastroenteritis, severe lower respiratory tract infections, atopic dermatitis, asthma, obesity, Type 1 and Type 2 diabetes, childhood leukaemia and sudden infant death syndrome. The authors did not investigate the impact of breastfeeding on infant oral health.<sup>56</sup>

In their systematic review in 2000, Valaitis and colleagues concluded that there is 'a lack of methodological consistency related to the study of the association of breastfeeding' and early childhood tooth decay.<sup>57</sup> Some studies indicate that there may be an association between breastfeeding at night and tooth decay. Valaitis recommends that parents should commence the cleaning of children's teeth early. Iida and colleagues, in their examination of the US 1999–2002 National Health and Nutrition Examination survey, found that breastfeeding and its duration were not associated with the risk for tooth decay.<sup>58</sup>

Richards et al. reviewed the literature in 2008 and found that a small number of studies of low quality have linked on-demand breastfeeding at night to tooth decay. They conclude that further high-quality studies are required.<sup>59</sup>

A key benefit of breastfeeding is that it avoids the introduction of inappropriate bottle feeding. Exclusive breastfeeding may reduce the risk of the development of tooth decay due to decreased and delayed consumption of sugary meals and snacks.<sup>60,61</sup>

### 2.2.3 Prevention approaches

Opportunities for prevention range from the individual ('downstream') to the broader population level ('upstream'). It is important to recognise that behavioural choices are largely determined by the social environment where people live and work.<sup>34</sup> Behaviours are socially patterned. A 'level playing field' for all does not exist. The challenge is to make the orally healthier choices the easier choices.

The approaches needed to prevent tooth decay at the tooth level are:

- strengthening the tooth to inhibit tooth demineralisation and to enhance remineralisation (for example, by using fluoride toothpaste twice a day and by fluoridating water supplies)
- a diet with the amount of sugar in balance with the tooth-strengthening protective factors
- screening for early disease.

The evidence for oral health promotion interventions at the population level and targeted at priority groups are presented in Part B Interventions by priority groups and settings, Sections 5–11 and Part C Interventions by Integrated Health Promotion categories.

Tooth decay is a disease of social deprivation, just as it is a disease of bad diet (indeed, these two factors are frequently found together). The key to eventual control of decay thus lies in improving the broad social environments for affected populations just as much as it does in intervening to improve the intraoral environment.

Adapted from Burt et al., 2008<sup>62</sup>

## 2.3 Gum diseases

There are two main gum diseases: gingivitis and periodontitis. Gingivitis is inflammation of the gum tissue, characterised by redness, swelling and bleeding. Periodontitis is the chronic destruction of the soft tissues and bones that support the teeth. In advanced periodontitis teeth can become loose and often need to be extracted. As mentioned in Section 1.4 The association of poor oral health with poor general health, periodontitis has an adverse effect on the control of blood sugar and the incidence of diabetes complications.<sup>63</sup>

### 2.3.1 Prevalence

Periodontal disease is the fifth-most prevalent health problem in Australia.<sup>1</sup>

Lower socioeconomic groups have a higher prevalence of periodontal disease. The National Survey of Adult Oral Health 2004–06 found that 37 per cent of Victorian concession cardholders and 27 per cent of non-cardholders had moderate or severe periodontitis.<sup>18,20</sup>

### 2.3.2 Determinants

Plaque on the gum margins of teeth is a necessary (but not the only) factor that causes gum disease.<sup>64</sup>

Smoking is closely linked to gum disease. Estimations are that one-third of Australia's two million cases of more severe periodontal gum disease could be prevented by not smoking.<sup>40</sup> Other factors that increase susceptibility include diabetes, HIV, stress, genetic disorders and local factors (such as crowded teeth).<sup>64</sup> Microorganisms in plaque produce toxins that damage the supporting structures around the teeth. The 'causes of the causes' are the broader determinants, as outlined in Figure 4 Determinants of oral health.

### 2.3.3 Prevention approaches

These include:

- removal of plaque by good oral hygiene
- smoking reduction
- screening for early disease
- addressing broader determinants.

Oral health promotion measures that have been shown to support these approaches are outlined in Part B Interventions by priority groups and settings and Part C Interventions by Integrated Health Promotion categories. A recent Cochrane review found that reducing inflammation of the gums in diabetics may assist in lowering blood sugar levels, and so can reduce the risk of serious complications such as eye problems and heart disease.<sup>65</sup>

## 2.4 Oral cancer

Cancerous lesions can occur in the mouth as elsewhere in the body. The most common sites are the lip and tongue.

### 2.4.1 Prevalence

Oral cancer was the sixth-most common cancer in Victorian males, and the twelfth-most common in females over the five years to 2007.<sup>66</sup>

In 2007, 676 Australians<sup>23</sup> and 202 Victorians died from oral cancer.<sup>67</sup>

In 2006, 6,010 potential years of life were lost (PYLL) to oral cancer in Australia.<sup>24</sup>

A strong socioeconomic gradient exists, with people in low-income groups at much higher risk.<sup>68</sup>

A general decrease has occurred in the death rates from oral cancer in males over the last century.<sup>24</sup> More recently, an increasing incidence of cancers in the throat has been evident in younger non-smokers, related to the human papillomavirus.<sup>69</sup>

The five-year survival rate is relatively low, depending on the site: in the back of the mouth (pharynx), the rate is 49 per cent.<sup>70</sup> This rate is low, compared to 87 per cent for breast cancer and 84 per cent for prostate cancer.

### 2.4.2 Determinants

Tobacco smoking and alcohol consumption have been implicated as the primary causes of oral cancer in Australia.<sup>41</sup> Lip cancer is associated with unprotected exposure to the sun. The 'causes of the causes' of oral cancers are the broader determinants, as outlined in Figure 4 Determinants of oral health.



### 2.4.3 Prevention approaches

These include:

- modification of smoking and frequent alcohol consumption
- targeted screening for early disease (see Section 12.1.4 Targeted screening for those at high risk for oral cancer)
- addressing broader determinants.

## 2.5 Oral trauma

Oral trauma extends from the chipping of teeth to more extensive oral injuries. Broken teeth can affect a person's appearance and self-confidence, and can be expensive to treat.

### 2.5.1 Prevalence

More than 9,000 people present to Victorian hospitals annually with oral or dental injuries as the primary injury.<sup>71</sup> Based on 2007–09 data, approximately 30 per cent are admitted, and the remainder are treated in emergency departments. Approximately 2,700 further people are admitted who have an oral or dental injury which was not the primary injury.

A systematic review of international studies determined that up to one-third of preschool children, one-quarter of school children and one-third of adults have suffered a traumatic dental injury.<sup>72</sup>

Among hospital presentations, intentional injuries (such as assault) make up approximately 16 per cent of the total. This may underestimate the extent of intentional injuries, because 'intention' may not always be reported accurately.

Young people are more commonly injured. Of those visiting emergency departments for unintentional (accidental) injury, 75 per cent are aged 0–24 years, and about one-half are aged 0–9.

Males are more likely to present (70 per cent) with a dental or oral injury compared to females.

Because no common data collection system exists, obtaining a comprehensive picture of the true extent of dental injuries in Victoria is not possible. Not all hospitals contribute to the injury data set, and data on people presenting to private or public dental clinics is not compiled.

### 2.5.2 Determinants

The primary causes of injury for emergency department presentations are low-level falls (33 per cent), being struck by or colliding with a person (21 per cent), or being struck by or colliding with an object (17 per cent).<sup>71</sup> For hospital admissions, the activity being undertaken when injured is most commonly described as sport, leisure or work. The 'causes of the causes' are the broader determinants, as outlined in Figure 4 Determinants of oral health, particularly social deprivation and unsafe environments.

### 2.5.3 Prevention approaches

These include:

- creation of safer play areas
- creation of supportive environments in schools as part of health-promoting schools (see Section 6.3 School-based oral health education programs)
- use of mouthguards during contact sports (see Section 12.2.3 Mouthguards)
- addressing broader determinants.

## 2.6 Population groups at greatest risk

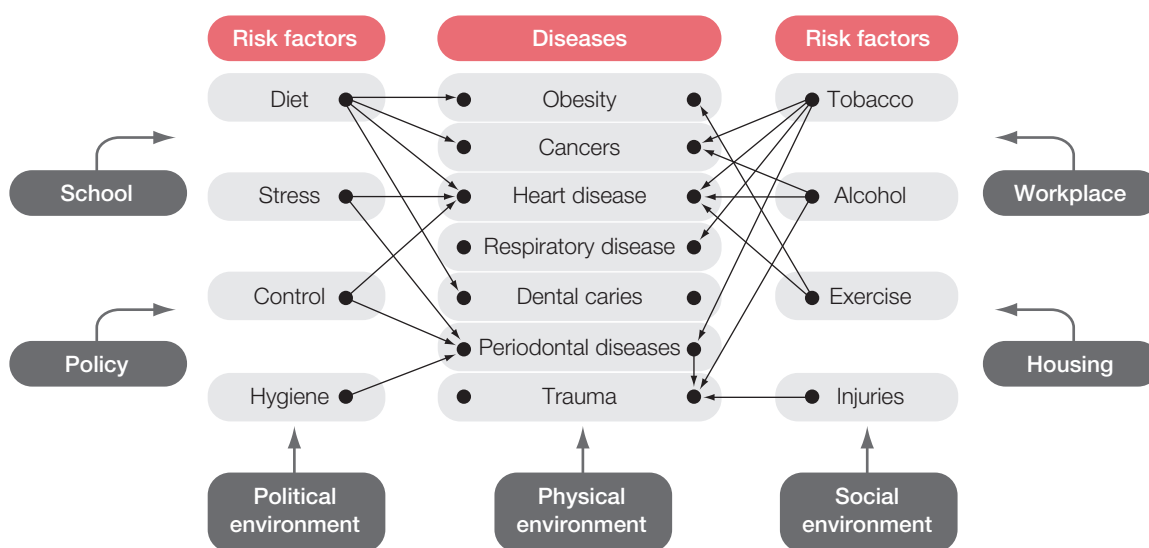
As mentioned in Section 1.4 The association of poor oral health with poor general health, significant inequalities exist in oral health. Poorer people have poorer oral health. Greater levels of oral disease are experienced by people on low incomes, dependent older people, some Aboriginal and Torres Strait Islander peoples, rural dwellers, people with a disability and some immigrant groups from culturally and linguistically diverse backgrounds (particularly refugees).<sup>1</sup> People with chronic and complex conditions and low-income pregnant women are also at higher risk for oral disease.<sup>73</sup>

## 2.7 Common risk factors between oral and other chronic diseases

The general health risk factors (such as excessive alcohol intake, smoking or other tobacco use and poor dietary practices that also affect oral health) are shown in Figure 4 Determinants of oral health. The correlation between these lifestyle behaviours and increased risk of dental tooth decay, periodontal disease, oral infections, oral cancer and other oral conditions indicate the need to adopt an integrated approach to the promotion of both oral and general health. The common risk factor approach provides a valuable opportunity to incorporate oral health promotion into general health promotion that addresses obesity, diabetes, cancers, heart disease and respiratory diseases. Such an approach is likely to be more efficient and effective than programs targeting a single disease or condition.<sup>74</sup>

While oral diseases share common risk factors, and an integrated approach is appropriate, certain specific oral health promotion aspects also require addressing. These aspects include the use of fluoride, oral hygiene and timely, preventively focused dental visits.

Figure 7 Common risk factor approach



Source: Modified from Sheiham and Watt, 2000<sup>74</sup>

## 2.8 Oral health links to Victorian health promotion priorities

Significant oral health links exist with each of Victoria's seven health promotion priorities, as outlined in Table 2 Oral health links to Victorian health promotion priority areas.

**Table 2 Oral health links to Victorian health promotion priority areas**

Health promotion priorities	Oral health links
Accessible and nutritious food and drink	<p>Poor diet can lead to dental decay (associated with a high sugar intake) and gum disease (associated with lack of vitamins).</p> <p>Poor oral health (insufficient teeth for chewing or toothache) can lead to difficulty in eating a nutritious diet.<sup>75,6,7</sup></p> <p>One in six Victorian adults report avoiding certain foods because of dental problems.<sup>76</sup></p> <p>The avoidance of eating raw fruits and vegetables reduces the intake of fibre and vitamins, which can lead to an increased risk of cardiovascular disease and colon cancer.</p> <p>The chewing capacity of people with dentures can be reduced to as low as one-sixth that of people with natural teeth.<sup>77</sup></p> <p>The consumption of fruit and vegetables is associated with a reduced risk of oral cancer.<sup>39</sup></p> <p>Breastfeeding supports oral health by avoiding the introduction of inappropriate bottle feeding.<sup>60,61</sup></p>
Mental health and wellbeing	<p>Feelings of depression, hopelessness and social isolation have been shown to be associated with self-reported oral health problems in older people.<sup>78</sup></p> <p>Poor oral health because of appearance or pain can limit the possibility of gaining employment, which can affect mental health and wellbeing.<sup>79</sup></p> <p>Almost one-quarter of Victorian adults reports experiencing orofacial pain in the previous month.<sup>21</sup></p> <p>People with mental health problems have significantly higher levels of oral disease and dental phobias than the general population.<sup>80</sup></p>
Physical activity and active communities	<p>Traumatic orodental injuries are a common dental public health problem.<sup>72</sup></p>
Reducing tobacco-related harm	<p>Smoking is closely linked to gum disease. One-third of Australia's two million cases of moderate to severe periodontal gum disease could be prevented by not smoking.<sup>40</sup></p> <p>Tobacco and alcohol use are key risk factors in causing oral cancer.<sup>41</sup></p> <p>Smoking is correlated with tooth staining, bad breath and impaired healing of oral wounds.<sup>81</sup></p> <p>Oral health clinicians have been shown to be able to facilitate smokers to quit.<sup>82</sup></p> <p>Smokers attending dentists have positive attitudes towards dentists' role in smoking cessation.<sup>83</sup></p>
Reducing and minimising harm from alcohol and other drugs	<p>Alcohol and tobacco use are key risk factors in causing oral cancer.<sup>41</sup></p> <p>Drug use can lead to poor oral health, particularly tooth decay, because of the impact on drying out the mouth and through lifestyle changes to diet and oral hygiene.</p>
Safe environments to prevent unintentional injury	<p>Traumatic orodental injuries are a common dental public health problem.<sup>72</sup></p>
Sexual and reproductive health	<p>A likely association between periodontal disease and adverse pregnancy outcomes exists.<sup>11,12</sup></p> <p>A range of oral problems are associated with HIV/AIDS.</p>

### 3 Framework for oral health promotion

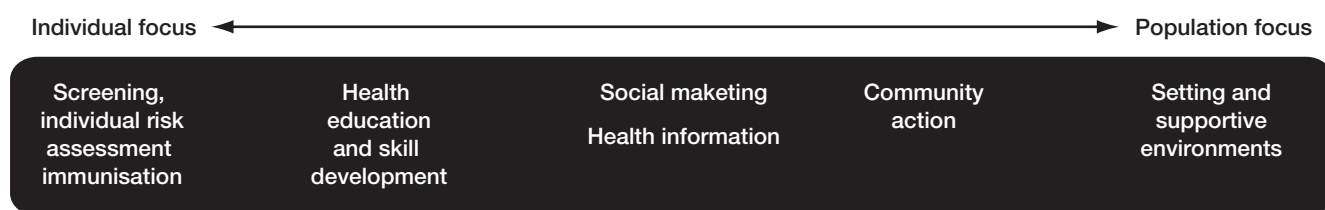
This section presents a framework for oral health promotion, which outlines key determinants for oral health, population groups and action areas, settings for action, intermediate outcomes and long-term benefits.

#### 3.1 Health promotion

The Ottawa Charter defines health promotion as ‘the process of enabling people to increase control over, and to improve, their health’.<sup>84</sup> Victoria takes an integrated health promotion approach that builds on the Ottawa Charter philosophy. Five categories of health promotion interventions are identified, as shown in Figure 8 Health promotion interventions according to the Victorian Integrated Health Promotion framework.<sup>17</sup> The Integrated Health Promotion (IHP) approach is outlined at What is integrated health promotion (IHP)? <[http://www.health.vic.gov.au/healthpromotion/what\\_is/integrated.htm](http://www.health.vic.gov.au/healthpromotion/what_is/integrated.htm)>.

**Figure 8 Health promotion interventions according to the Victorian Integrated Health Promotion framework**

The Integrated Health Promotion framework is used to categorise effective oral health promotion interventions in Part C Interventions by Integrated Health Promotion categories.

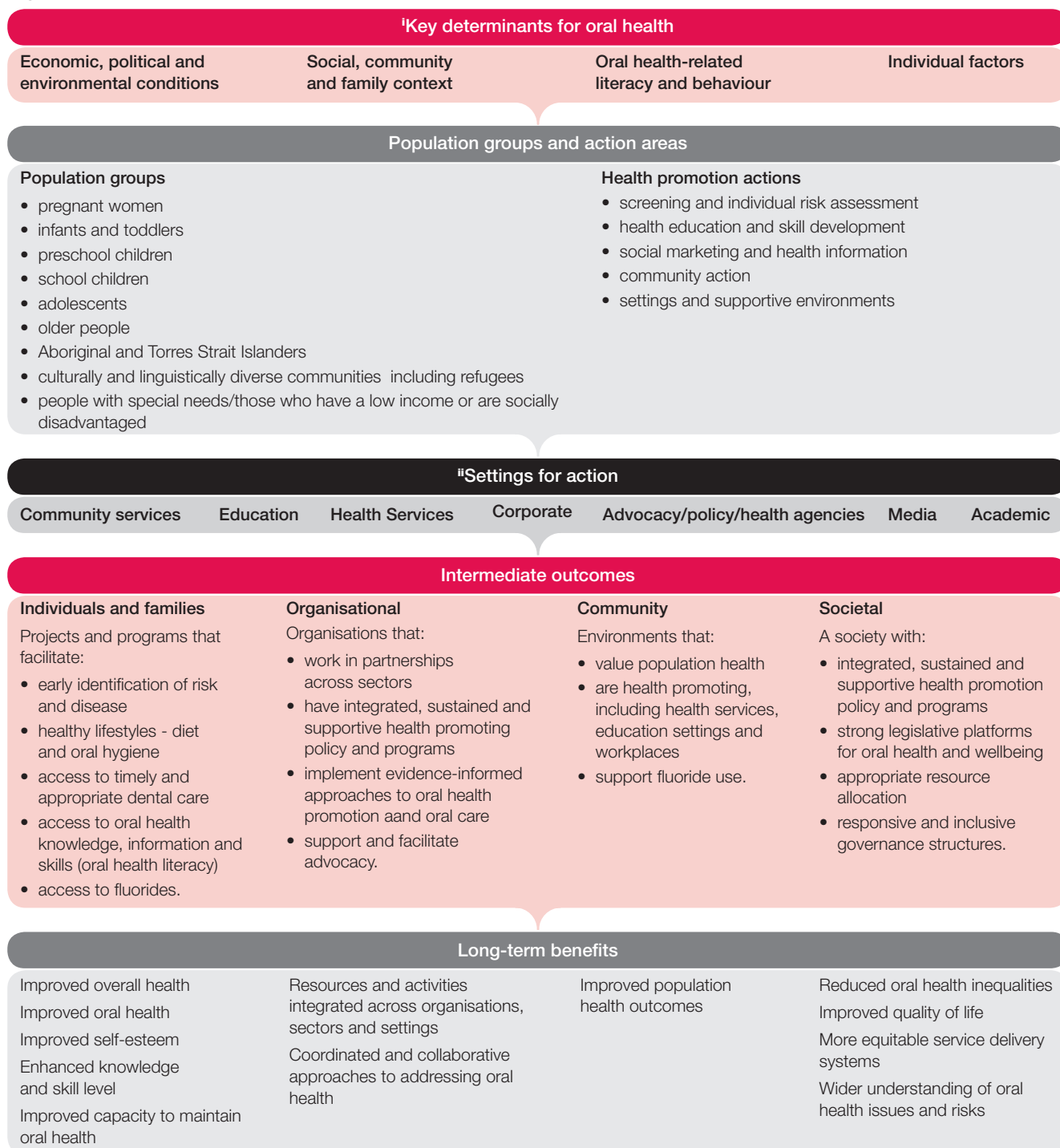


Ensuring the capacity to deliver quality programs through capacity building strategies including:

- Organisational development
- Workforce Development
- Resources

Source: Integrated Health Promotion Kit, Department of Health.<sup>17</sup> See Section 15.2 Online resources for a list of addresses for online resources.

Figure 9 Victorian framework for oral health promotion



## Key determinants for oral health

### Economic, political and environmental conditions

- socioeconomic status - family income, education, employment and living conditions
- health and social policy
- access to nutritious food
- access to transport
- access to timely, affordable and appropriate oral health care
- social marketing
- exposure to fluoride

### Social, community and family context

- social and family norms re oral health knowledge, attitudes, beliefs, values, skills and behaviours
- peer groups
- cultural identity
- social support
- self-esteem
- self-efficacy/sense of control

### Oral health related literacy and behaviour

- diet
- oral hygiene
- smoking
- alcohol
- injury
- use of oral health services

### Individual factors

- age
- sex
- genetic and biological endowment

## Settings for action

### Community services

- child care
- aged care
- supported residential services
- migrant resource services

### Education

- preschool/ kindergarten
- primary schools
- secondary schools
- special schools

### Health Services

- community health
- GPs, pharmacists, MCH and school nurses
- allied health
- oral health (including private sector)
- acute health
- Aboriginal-controlled health services

### Corporate

- workplaces
- dental product manufacturers
- food industry

### Advocacy/policy/health agencies

- peak NGOs
- government departments
- community organisations

### Media

- advertising
- print, radio, TV
- mainstream and culturally specific

### Academic

- undergraduate and postgraduate oral health
- undergraduate and postgraduate medical, nursing, pharmacy, Aboriginal health workers and other allied health
- research/evaluation

Adapted from Preston, Satur and White 2006<sup>85</sup> and Watt and Fuller 2007<sup>31</sup>

The World Health Organization (WHO) recently developed a social determinants framework which lists interventions that can address oral health inequities.<sup>86</sup> The framework, as shown in Section 15.1 World Health Organization (WHO) framework - social determinants, entry-points and interventions to address oral health inequalities considers five components:

1. socioeconomic context and position
2. differential exposure
3. differential vulnerability
4. differential health care outcomes
5. differential consequences.

Oral health promotion interventions listed in the WHO framework are included in the Victorian framework under population groups and key settings (see Part B Interventions by priority groups and settings and Part C Interventions by Integrated Health Promotion categories).

## 4 Methodology for review of the literature

### 4.1 Background

The review of the literature was conducted for the preparation of an evidence-based guide to oral health promotion for the Victorian population. It updates an earlier report, *Evidence-based Health Promotion: Resources for planning: Number 1 Oral Health*.<sup>15</sup> The current review has drawn on the 2006 report *Evidence-based review of oral health promotion* prepared under a contract with the department by the Consortium of Dental Health Services Victoria (DHSV) and the University of Melbourne Co-operative Research Centre (CRC) for Oral Health Science.

### 4.2 Review questions

The review questions were:

- What are effective oral health promotion strategies for the Victorian population?
- What innovative oral health promotion strategies show promise for the Victorian population?
- What information and research gaps exist?

### 4.3 Criteria for selecting studies

#### 4.3.1 Types of studies

Preference was given to systematic reviews of oral health promotion interventions, but other study types were included if they incorporated an evaluation (process, impact or outcome). Systematic reviews of interventions that are likely to promote oral health as part of broader outcomes, or that had lessons for oral health promotion were also included (for example, on nutrition, social marketing and school-based health promotion approaches). Individual studies were included that had oral health promotion as the primary focus or oral health promotion explicitly included and evaluated as a secondary focus.

### 4.3.2 Types of participants

Groups and settings given priority were:

- antenatal and early childhood (preschool) settings
- school-aged children and adolescents/school settings
- older people/residential care settings
- Aboriginal and Torres Strait Islanders
- culturally and linguistically diverse (CALD) communities
- people with special needs/low income and socially disadvantaged groups
- workplace settings.

### 4.3.3 Types of interventions

Interventions that can be applied across priority groups were included as per the Integrated Health Promotion categories:

- screening and individual risk assessment
- health education and skills development
- social marketing and health information
- community action
- settings and supportive environments.

### 4.3.4 Types of outcome measures

Measures deemed relevant were oral health knowledge, attitudes, behaviour and oral health status. Process, impact and/or outcome measures using qualitative and/or quantitative methods were also included.

### 4.3.5 Exclusion criteria

Dental clinic-based treatment interventions or preventive treatment (such as the application of fluoride varnish or dental sealants) were not included unless the study incorporated implementation in childcare, school, workplace, community or residential care settings.

Screening and referral programs that used or collaborated with non-dental personnel were included; however, the relationship between dental clinic attendance and improved oral health has not been evaluated.

Interventions aimed at increasing access to dental services were considered as being beyond the scope of this review, except where they overlapped with broader oral health promotion interventions.

Interventions assessed as not relevant to Victoria (such as salt and milk fluoridation) were not included.

## 4.4 Search methods for identification of studies

The oral health promotion literature in English for the period June 1999 to June 2010 was systematically searched. Also, systematic reviews of interventions that promote oral health as part of broader outcomes or with lessons for oral health promotion were included (see Section 4.3 Criteria for selecting studies). Studies where a comprehensive abstract in English were available but the article was in another language, were included. The previous review, *Evidence-based Health Promotion: Resources for planning. Number 1 Oral Health*,<sup>15</sup> covered the literature up to May 1999. Details of studies published prior to May 1999 were included when this helped determine the strength of evidence for an intervention.

Sources included:

- MEDLINE, CINAHL, ERIC, PsycINFO, PROQUEST Health and Medicine, INFORIT Health Collection, Academic Search Premier, Health Source–Nursing/Academic Edition–Psychology and Behavioural Sciences Collection, PsycARTICLES, Social Sciences Citation Index, Expanded Academic ASAP
- Google, Google Scholar
- Cochrane Database of Systematic Reviews
- Centre for Reviews and Dissemination databases: particularly the Database of Abstracts of Reviews of Effectiveness (DARE) <<http://www.crd.york.ac.uk/crdweb>>
- network investigation using Australian state oral health promotion/public health units and professional peer networks (including the Public Health Association of Australia and Australian Health Promotion Associations) to identify community, state and national oral health promotion activities published outside the peer reviewed literature ('grey literature')
- textbooks on oral public health
- experts in the oral health promotion field
- scanning of reference lists of reviewed articles
- websites:
  - Oral Health Promotion Clearinghouse <<http://www.adelaide.edu.au/oral-health-promotion/>>
  - Australian Indigenous HealthInfoNet <<http://http://www.healthinonet.ecu.edu.au/>>



NHS Evidence - Oral health promotion

<<http://www.evidence.nhs.uk/search?q=Oral+Health+Promotion>>

Community Preventive Services, The Community Guide Supporting Materials: Oral Health

<<http://www.thecommunityguide.org/oral/supportingmaterials/caries.html>>

health-evidence.ca

<<http://www.health-evidence.ca/articles/search>>.

See Section 15.2 Online resources for a list of addresses for online resources.

In summary, search terms included:

- oral/dental and health promotion/education
- oral/dental and health promotion/education and evaluation
- community/population/public and oral/dental health prevention
- community and education and health nurses
- child/adolescent/ageing/elderly/migrant and oral/dental health
- fluoridation.

## 4.5 Data collection and analysis

Studies were selected by the principal reviewer, John Rogers (JR). A second reviewer, Julie Satur (JS), selected studies in the school settings area and agreement was reached with the principal reviewer when selections varied. The principal reviewer evaluated all of the selected non-school settings studies, assessed their quality and tabulated data according to the principles for critical appraisal of studies as described by the Cochrane Health Promotion and Public Health Field guidelines.<sup>87</sup> Systematic reviews were assessed using the screening questions proposed by the Critical Appraisal Skills Program (CASP).<sup>88</sup> JS undertook these tasks for studies in the school settings area in addition to JR for studies not included in the 2006 report. The quality of each study was appraised. Quality ratings of studies by the Centre for Reviews and Dissemination Data base of Abstracts of Reviews of Effectiveness (DARE), Health-evidence Canada, and from the *Evidence-Based Dentistry Journal* were also considered when assessments had been undertaken.

A review data base was established that included: author/year of publication; population/context/problem addressed; intervention type; evaluation method; comparison; outcome; time; likely impact on inequalities; and relevant other issues for consideration, such as feasibility, acceptability to stakeholders and sustainability.<sup>89</sup>

Two sets of criteria were used to evaluate studies: the Victorian Department of Health Public Health criteria to determine the strength of evidence of effectiveness of studies (Table 3 Public health strength of evaluation and research evidence for intervention effectiveness),<sup>89</sup> and the National Health and Medical Research Council (NHMRC) criteria to determine the level of evidence (Table 4 NHMRC levels of evidence criteria).<sup>90</sup> Each study was given both a Public Health score and a NHMRC score.

**Table 3 Public health strength of evaluation and research evidence for intervention effectiveness**

Strength of evaluation and research evidence	Description
1 Strong evidence of effectiveness	One systematic review or meta-analysis of comparative studies; or several good quality randomised controlled trials or comparative studies <sup>i</sup>
2 Sufficient evidence of effectiveness	One randomised controlled trial; one comparative study of high quality; or several comparative studies of lower quality <sup>ii</sup>
3 Some evidence of effectiveness	Impact evaluation (internal or external) with pre- and post-testing; <sup>iii</sup> or indirect, parallel or modelling evidence with sound theoretical rationale and program logic for the intervention
4 Weak evidence of effectiveness	Impact evaluation conducted, but limited by pre- or post-testing only; <sup>iii</sup> or only indirect, parallel or modelling evidence of effectiveness
5 Inconclusive evidence of effectiveness	No position could be reached because existing research/evaluations give conflicting results; or available studies were of poor quality
6 No evidence of effectiveness	No position could be reached because no evidence of impact/outcome was available
7 Evidence of ineffectiveness	Good evaluations (high quality comparative studies) <sup>i</sup> show no effect or a negative effect

The categories are linked to the NHMRC levels of evidence, that is <sup>i</sup>Levels I–III, <sup>ii</sup>Levels II–III and <sup>iii</sup>Level IV. When a comparative study that was determined to be of lower quality showed positive impact, it was assessed as Level 3 effectiveness.

Source: Haby and Bowen<sup>89</sup>

**Table 4 NHMRC levels of evidence criteria**

Level	Description
I	Evidence obtained from a systematic review of all relevant randomised controlled trials
II	Evidence obtained from at least one properly designed randomised controlled trial
III–1	Evidence obtained from well-designed pseudo-randomised controlled trials (alternative allocation or some other method)
III–2	Evidence obtained from comparative studies with concurrent controls and allocation not randomised (cohort studies), case-control studies or interrupted time series with a control group
III–3	Evidence obtained from comparative studies with historical control, two or more single-arm studies or interrupted time series without a parallel control group
IV	Evidence obtained from case series, either post-test or pre-test and post-test

Source: NHMRC designation of levels of evidence<sup>90</sup>

## 4.6 Results

A total of 791 articles were identified through electronic searches, and an additional 355 articles via broader network searches. After a review of abstracts and relevant full articles, 202 articles were included, describing 181 studies. This included 28 ‘grey literature’ papers such as project reports. A total of 31 systematic reviews and two literature reviews were included.

Most studies included were deemed to be of medium or high quality. Lower quality studies were included if they added to intervention approaches. These studies limitations are noted when quoted. Similarly, only medium to high quality systematic reviews have been included. Where systematic reviews differed in interpretation of the literature, a closer review of individual studies was undertaken.

# Part B Intervention by priority groups and settings



# Introduction

There are key life stages when prevention of oral disease and promotion of oral health is particularly relevant. Certain settings are useful for oral health promotion. Some population groups are more at risk of oral disease. This section presents oral health promotion interventions for the age groups of pregnant women, babies and young children; school children and adolescents; people in the workforce; and older people—in the key settings of early childhood; schools; workplaces; and aged care establishments. Interventions are outlined for groups at higher risk of poor oral health: Aboriginal people, people from culturally and linguistically diverse backgrounds and people with special needs. Not all people in these groups have poor oral health, but on average, it is more likely than in the general population.

Oral health promotion interventions, including population-wide approaches, are presented in Part C Interventions by Integrated Health Promotion categories. Cross-references are made between Part B Interventions by priority groups and settings and Part C Interventions by Integrated Health Promotion categories.

## 5 Pregnant women, babies and young children

### Summary

Targeted home visits for high-risk young children can reduce tooth decay. Annual visits can be as effective as more frequent visits. Primary health workers can be as effective as specialised oral health promoters. Oral health advice as part of general nutrition advice can reduce tooth decay.

Targeted fluoride varnish programs for high-risk young children can reduce tooth decay.

Targeted supervised toothbrushing programs with young children can reduce tooth decay.

Targeted provision of fluoride toothpaste and toothbrushes reduces tooth decay. Targeted three-monthly mailing of fluoride toothpaste, brushes and oral health education material to parents of high-risk young children can be a cost-effective way of reducing tooth decay. Targeted provision of free oral health aids (during health centre visits and mailed) to parents of young children reduces tooth decay.

There is some evidence that healthy food and drink policy in childcare/kindergarten settings can reduce tooth decay.

Integration of oral health into well child visits can be effective.

Lift the Lip screening programs during maternal child health or other well child visits can be effective in identifying early childhood tooth decay.

Interventions using existing mother and child health programs have shown more success in increasing toothbrushing frequency than improving diet.

Some evidence exists that community action and multi-strategy programs, culturally sensitive practices and participatory approaches are effective in reducing tooth decay in preschool children, including:

- multilevel, multifaceted interventions that target multiple behaviours among population and high-risk groups of children and adolescents are likely to be most effective
- the achievement of equity in program implementation requires special attention and specific strategies
- parent, baby and children fairs can be useful for increasing oral health knowledge, but may not reach high-risk families.

Community-based preventive programs for expectant and/or new mothers are effective, incorporating:

- anticipatory guidance in the prenatal and postnatal period can prevent tooth decay (mailed information is preferred to phone calls)
- motivational interviewing of parents can be effective in preventing tooth decay in young children
- small group discussions and the use of peers can improve feeding practices and tooth decay rates in preschool children
- the use of xylitol chewing gum by mothers prevents transmission of *Streptococcus mutans* to their children, leading to lower tooth decay rates
- community programs using topical fluoride and/or xylitol have shown significant impact in preventing decay in young children.

Common elements in successful programs include:

- integrating oral health into general health programs
- the use of fluoride
- targeting high-risk populations
- tailored approaches based on active participation and addressing social, cultural and personal norms and values
- the existence of surveillance and referral systems
- multiple interventions.

### Context

During pregnancy women can experience increased risks of gum disease and tooth decay, but poor oral health is not inevitable.

Primary teeth are important because they:

- are needed for eating
- are critical for speech development
- aid in the development of the facial bones and muscles
- hold space for the permanent teeth and help guide them into position.

Teeth can decay as soon as they erupt into the mouth. Usually the primary (first) teeth appear at approximately six months, and by two years all 20 primary teeth have erupted.

Severe tooth decay in young children causes pain, problems with sleep and may keep young children from reaching normal weight.<sup>91</sup>

Decay in young children is a disease of disadvantage. About 20 per cent of Australian four year old children examined in public dental clinics had 90 per cent of the tooth decay for that age group.<sup>19</sup>

Children frequently consuming high sugar foods, drink and medicine are at higher risk of tooth decay.

Parents (particularly the mother) can transmit decay-causing bacteria (predominantly *Streptococcus mutans*) to their children, especially when they have high levels themselves.<sup>92</sup>

The earlier the transmission, the greater the risk of decay, although this may be partly compensated by other factors (such as good oral hygiene and a non-decay causing diet).

Early childhood is when many lifetime habits are established, and offers the opportunity to provide socialisation for good health.

New parents are often receptive to health information and have considerable contact with primary health care workers (maternal and child health nurses, general practitioners and pharmacists) during a child's early years.

Childcare settings provide opportunities for promoting oral health.

Three recent systematic reviews have identified interventions to prevent oral disease and to promote health for pregnant women, babies and young children.<sup>93,92,94</sup>

These reviews included a total of 51 studies. An additional 55 papers describing 42 intervention studies met the inclusion criteria for this review. Two further systematic reviews of the effectiveness of nutrition programs were included. Overall, the relevant studies can be categorised into eight main interventions, as outlined in Table 5.

**Table 5 Oral health promotion interventions for pregnant women, babies and young children**

Intervention	Highest strength of evidence		Outcome measure	Target group
	Public health criteria <sup>i</sup>	NHMRC criteria <sup>ii</sup>		
1 Targeted home visits by health workers <sup>95,96,97,60,61</sup>	2	II	Behavioural change Prevention of tooth decay	High-risk young children and their families
2 Targeted fluoride varnish programs in childhood settings <sup>98,99,100,101</sup>	1	I	Prevention of tooth decay	
3 Targeted supervised toothbrushing in childhood settings <sup>102,103,104</sup>	2	II	Behavioural change Prevention of tooth decay	
4 Targeted provision of fluoride toothpaste and toothbrushes-mailing, home visit or via clinic <sup>105,106,107,108,109,110,111,112,113</sup>	2	II	Behavioural change Prevention of tooth decay	
5 Healthy food and drink policy in childhood settings <sup>114,115,116</sup>	2	III-2	Behavioural change Policy change	Young children and their families
6 Integration of oral health into well child visits, including Lift the Lip screening <sup>117,118,119,91 120,121,122,123,124,125,126,127,128,129</sup>	3	IV	Behavioural change Policy change	
7 Community action, multi-strategy programs <sup>130,131,132,133,134</sup>	2	III-2	Behavioural change Prevention of tooth decay	High-risk communities
8 Community-based preventive programs for expectant and/or new mothers <sup>135,136,137,138,139,140,141,142,143,144,145,146,147,148</sup>	2	II	Behavioural change Prevention of tooth decay	Expectant and/or new mothers

i As described in Table 3 Public health strength of evaluation and research evidence for intervention effectiveness.

ii As described in Table 4 NHMRC levels of evidence criteria.

## 5.1 Targeted home visits

Home visits for preschoolers at higher risk of oral disease show strong evidence of effectiveness. However, most programs published have not considered cost-effectiveness.

A program incorporating regular home visits by dental health educators providing oral health aids plus diet and oral hygiene advice in a low socioeconomic and non-fluoridated high tooth decay area in Leeds, UK, demonstrated significant improvements in feeding practices, reduction in consumption of high sugar food and drink, higher toothbrushing frequency and less decay after three years<sup>95,96</sup>—strength of evidence 2, II.

Visits commenced at eight months. Annual visits were found to be as effective as more frequent visits. A significant improvement also occurred in the oral health of the mother—even though the focus of the program was on the children. An analysis of costs and benefits showed that program was cost-effective.<sup>96</sup> A review by the Centre for Reviews and Dissemination indicates that the review is a cost-effectiveness and not a cost-benefit analysis.<sup>149</sup>

Home visits using primary health workers who integrate oral health promotion into their general work may be as effective as employing specialised oral health promoters.

A program in a disadvantaged non-fluoridated area in northern England that compared the impact of an oral health promoter visiting homes when children were eight and 20 months old and providing oral health advice and aids, with a control group that received the usual health visitor visits at these ages without free oral hygiene materials, showed that each group had lower decay rates at three and five years of age compared to other children living in the area<sup>97</sup>—strength of evidence 2, III.1. The group that received the specialised oral health promoter visits had lower decay rates, but these were not statistically significant.

Early and regular home visits by nutrition fieldworkers to low-income families with babies in a non-fluoridated urban setting in Brazil showed that, as part of general nutrition advice, oral health advice can prevent tooth decay, along with reduced incidence of diarrhoea and respiratory symptoms<sup>60,61</sup>—strength of evidence 2, II. The proportion of children with decay was 22 per cent lower in the intervention group at four years of age compared to the randomised control group, and the proportion with severe decay was 32 per cent lower. This impact is likely to have been the result of a higher proportion of children who were exclusively breast fed, and who had decreased and delayed consumption of sugary meals and snacks.

Home visits have also been a key part of the comprehensive preventive programs for pregnant women, and are outlined in Section 5.8 Community-based preventive programs for expectant and/or new mothers.

## 5.2 Targeted fluoride varnish programs in childcare settings

A Cochrane review, and a more recent systematic review, have determined the tooth decay preventing impact of fluoride varnish (see Section 12.5.1 Use of fluorides).

Fluoride varnish programs have been successful in preventing decay in Aboriginal young children living in remote communities—in the Northern Territory,<sup>98</sup> and in Indigenous young children in Canada,<sup>99</sup> as described in Section 8.1 Community fluoride varnish programs with oral health education and community promotion. Varnish programs have also been used successfully with preschool children from low-income Hispanic and Chinese communities in San Francisco,<sup>100</sup> as described in Section 9 Culturally and linguistically diverse (CALD) communities.

The comprehensive Childsmile Program operating in predominantly non-fluoridated Scotland incorporates biannual application of fluoride varnish to high-risk young children, oral health education, referral to dental services and targeted supervised toothbrushing programs (see Childsmile—improving the oral health of children in Scotland <<http://www.child-smile.org/>>). This comprises three components: practice, nursery and school. Health visitors undertake a decay risk assessment when they visit families with babies, and refer babies at high risk to dental services. Trained dental nurses apply the fluoride varnish in childcare settings. Childsmile has achieved considerable reach,<sup>101</sup> but evaluation on the impact on oral health is not yet available.

## 5.3 Targeted supervised toothbrushing in childcare settings

Supervised toothbrushing programs in childcare settings have achieved up to 40 per cent reduction in tooth decay<sup>102,103,104</sup>—highest strength of evidence 2, II. All these studies were in non-fluoridated areas, and mostly with children who were not likely to be brushing twice a day with fluoride toothpaste at home. See Section 6.1 School-based toothbrushing programs for evidence and implementation issues for supervised toothbrushing programs in schools. As in school-based toothbrushing programs, targeted programs in childcare settings are more likely to be cost-effective.

## 5.4 Targeted provision of fluoride toothpaste and toothbrushes

### 5.4.1 Targeted mailing of oral health aids

The three-monthly mailing of fluoride toothpaste, brushes and oral health education material to parents of children at high risk of tooth decay in a non-fluoridated northern England city reduced tooth decay rates by 16 per cent when the children reached five years of age compared to the randomised control group<sup>105</sup>—strength of evidence 2, II. The toothpaste was adult strength. Mailing commenced when the children were 12 months old. The program was determined to be cost-effective, with an estimated cost per tooth saved of £81.00.<sup>106,107</sup> The authors suggest that further cost savings would occur, and the impact on decay prevention would be almost as beneficial, if the program commenced when children were two to two-and-half years old rather than 12 months old.

#### 5.4.2 Use of health centre visits and mailing

A five-stage approach in non-fluoridated Manchester, UK, used health visitors and timely oral health gifts to encourage parents of children, initially aged eight months, to adopt positive oral health behaviours. The area had high decay rates in young children. A 29 per cent decrease in decay prevalence occurred at three years, and a 38 per cent decrease by five years of age. Health visitors gave a gift bag of trainer cup and leaflet to parents bringing their babies for their eight month development check and/or 12–15 month vaccination visit. Fluoride toothpaste, brushes and leaflets were mailed to families when their child was 20, 26 and 32 months old<sup>108,109</sup>—strength of evidence 2, II.<sup>ii</sup>

#### 5.4.3 Providing oral health aids and integrating oral health advice into well child visits

Significant increases in mothers' oral health-related knowledge and reported behaviour were shown when oral health advice, toothpaste and toothbrushes were given at the eight-month routine developmental checks by English health visitors<sup>110</sup>—strength of evidence 3, IV.

In the English Brushing for Life Program, health visitors provided packs containing toothpaste, a toothbrush and a health education pamphlet at the eight, 18 and 23 month development checks, plus offering oral health advice. The program targeted children at higher risk of tooth decay. A sound theoretical rationale and program logic for this approach exists, and process evaluation has shown support from participating health visitors, but the impact on oral health has not been reported<sup>111</sup>—strength of evidence 4, IV (see Section 5.1 Targeted home visits).

#### 5.4.4 Community centre visits

Providing oral health aids and advice to immigrant families with preschoolers via an accessible community centre showed some success in preventing tooth decay in Scandinavia,<sup>112,113</sup>—strength of evidence 3, IV (see Section 9 Culturally and linguistically diverse (CALD) communities).

### 5.5 Healthy food and drink policy in childcare/ kindergarten settings

Healthy food policies in preschools have been shown to reduce tooth decay levels. A longitudinal study of Brazilian three year olds showed that children who attended preschools with dietary guidelines in place were 3.6 times less likely to have decay than their counterparts in preschools without dietary guidelines<sup>114</sup>—strength of evidence 3, III.

Three Victorian programs in childhood settings show promise: Romp and Chomp, Smiles 4 Miles and 'Go for your life'. While impacts on oral health have not yet been reported, process evaluation has shown success, and the programs have sound theoretical rationale and program logic.

Romp and Chomp was a whole-of-community obesity prevention demonstration project that promoted healthy eating and active play to achieve healthy weight in children less than five years of age in Geelong, Victoria<sup>115</sup>—strength of evidence 2, III–2. The program focused on capacity building and developing sustainable changes in early childhood environments, with particular attention to the policy, sociocultural and physical environments. Children in the intervention group had a significantly lower intake of packaged snacks, fruit juice and cordial, and a higher vegetable consumption compared to the comparison sample at follow-up. A significant increase occurred in the intake of vegetables, fruit, water and plain milk. There was also a significant decrease in the intake of fruit juice and cordial from baseline to follow-up. Romp and Chomp is presented as a good practice study at the end of this section.

The Smiles 4 Miles Program in Victoria, which is based on the WHO Health Promoting Schools framework, has shown some success in supporting childcare settings in high tooth decay risk communities to introduce healthy food and drink policies, especially when reinforcing other health promotion programs such as 'Kids - Go for your life'<sup>116</sup>—strength of evidence 3, IV. These programs support healthy food choices and the drinking of water or milk, not soft drinks. Impact on oral health has not been evaluated.

ii The authors caution that while the outcome was positive, only about half (53 per cent) of the children completed the program and were able to be examined at five years of age. The participants may have been more likely to have been from the more settled families with possibly better health related behaviour.



‘Kids - Go for your life’ is an award program that encourages the promotion of healthy eating and physical activity in early childhood and primary school settings. Based on the Health Promoting Schools approach, it includes strategies that address the curriculum, policy, supportive environments, families and the wider community. In 2010 the program was working with one-half of Victorian early childhood and primary schools and influencing over 320,000 children (see ‘Go for your life’ <<http://www.goforyourlife.vic.gov.au/>>).

At least three Australian states have also developed Lift the Lip programs for maternal health nurses or equivalents: Victoria, New South Wales and South Australia. General practitioners and practice nurses are also involved in the latter two states. The procedure is to lift the top lip of a child to check the outer surfaces of the top front teeth. White spots are early signs of decay, while brown areas are more advanced decay. Referral systems to dental care have been established. Process evaluation has determined that Lift the Lip screening and referral is increasing.<sup>118,119</sup>

### 5.6 Integration of oral health into well child visits, including Lift the Lip

Programs where oral health promotion was integrated into well child visits for under five year olds. have been described for children in the UK (see Section 5.1 Targeted home visits), Indigenous children in Canada and the US (see Section 8.2.2 International programs), and in most Australian states (see Table 6 Programs in Victoria where oral health promotion has been integrated into well child visits). In Victoria, oral health promotion is part of the anticipatory guidance within the Ages for Stages approach provided by maternal and child health nurses (MCHNs).

**Table 6 Programs in Victoria where oral health promotion has been integrated into well child visits**

Program	Strength of evidence	Comments
Oral health promotion included in MCH Key Ages and Stages consultations: First mouth check at 6–8 months Lift the lip at 18 month and 3.5 year consultation Anticipatory guidance provided at 8, 12 and 18 months	No published evaluation of the population-wide impact	Training of all MCHNs conducted in 2005 Follow-up training using updated resources to occur in 2011
Country KIDS Program <sup>117</sup> MCHN support	Strength of evidence 2, III–2 See Section 5.6 Integration of oral health into well child visits, including Lift the Lip	Targeted to two non-fluoridated rural communities
Dandenong MCHN <sup>120</sup> MCHN support and establishment of referral system to public dental clinic	Strength of evidence 4 See Section 9.3 Community development approaches	Targeted to communities with a CALD background
Plenty Valley MCHN <sup>126</sup> MCHN support and establishment of referral system to public dental clinic	Strength of evidence 3, IV See Section 9.2 Maternal child health nurses’ enhanced focus on oral health	Targeted to the Somali community

A program in non-fluoridated rural Victoria, Country KIDS, that aimed to reduce tooth decay in under three year olds by providing consistent information to parents and working with health professionals to reorient health services to include a strong oral health promotion and prevention focus had some impact on knowledge, behaviour and tooth decay<sup>121</sup>—strength of evidence 2, III–2. Support was given to MCHNs to provide oral health advice, to identify early signs of dental decay by ‘lifting the lip’ of children attending for their regular health checks, and to refer those at risk to dental services. Five key messages developed collaboratively with health professionals and focus groups were promoted via posters, pamphlets, videos and CDs, and displayed in MCH centres and GP waiting rooms. Dental health starter kits were provided to mothers of infants between 12 and 24 months of age. All MCHNs, dentists and general practitioners in the area were invited to participate in a multidisciplinary educational program and to use the program resources. Child oral health screenings were conducted annually and parental surveys conducted biannually.

The program led to an increase in mothers’ knowledge, and MCHNs were more confident to provide oral health advice. MCHNs significantly increased their provision of dental checks, but according to parents, less than one-quarter (22.5 per cent) of MCHNs checked their children’s teeth and demonstrated good toothbrushing technique.<sup>150</sup> The frequency and time MCHNs spent giving oral health advice did not change appreciably. After two years the proportion of children affected by tooth decay was significantly lower in the intervention than in the control group. While no difference was evident after three years in the proportion of children with decay, a higher level of severe decay occurred in the control group children. The researchers surmised that greater early effects may have been because of the initial intensity of activity and newness of the program. Later, the enthusiasm of the MCHNs may have waned and/or the drop-off in use of MCH services when children reach 24 months meant that oral health advice was no longer being accessed. The conclusion was that programs for preschool children ‘need to be joined up to ensure a continuum between birth, early childhood, preschool/kindergarten and primary school to maximise dental health outcomes’.

Country KIDS initial qualitative research determined that MCHNs believed that they had a role in the oral health of preschool children, but were not confident in assuming this role. MCHNs expressed concern about identifying tooth decay when problems with low-income families accessing dental care existed. Private practice dentists interviewed were reluctant to accept a primary role in the oral health of preschool children.<sup>122</sup>

Interventions using existing mother and child health programs have shown more success in increasing toothbrushing frequency than improving diet. A maternal and child health nurse program in Israel incorporating training for nurses and provision of toothbrushes, toothpaste and oral health education to mothers increased the regularity of brushing of 6–12 month old infants’ teeth, but had no effect on bottle feeding habits<sup>127,128</sup>—strength of evidence 3, III for brushing. Programs in British Columbia, Canada<sup>123</sup> and Thailand<sup>129</sup> had similar outcomes for older preschoolers. A follow-up of the Israeli program when the children were two-and-half years old showed no impact on decay prevalence, suggesting that higher than the child-strength fluoride toothpaste used, and more effort on diet modification and other preventive interventions were required among high-risk groups, especially where there is no water fluoridation<sup>124</sup>—strength of evidence 7 for prevention of tooth decay, that is evidence of ineffectiveness as outlined in Table 3 Public health strength of evaluation and research evidence for intervention effectiveness.

Programs in Canada<sup>123</sup> have used immunisation visits to access young children and their carers for oral health promotion screening and provision of information. This was identified as a valid approach in an inner city program in Melbourne.<sup>125</sup>

Programs that utilised general practitioners and pharmacists as oral health champions are examined in Section 12.1 Screening and individual risk assessment.

## 5.7 Community action– multi-strategy programs

### 5.7.1 Participatory community-based oral health interventions

A large community participative and multi-strategy program in disadvantaged areas of non-fluoridated Glasgow, Scotland, reduced tooth decay increment by 37–46 per cent in 3–5 year olds compared to matched communities<sup>130,131</sup>—strength of evidence 2, III–2. Extensive discussion took place with community leaders and groups to raise awareness of the impact of preschool tooth decay and encourage people to take ownership of the problem. Strategies included:

- nutrition projects in schools and nurseries (such as breakfast clubs, school fruit, snack and meal policies in nurseries)
- toothbrushing schemes in nurseries, breakfast clubs and after-school care schemes
- distribution of free fluoride toothpaste and brushes
- promotion of sugar-free medicine
- health education by health visitors at surveillance checks, baby clubs and other community settings
- opportunistic interventions at community fairs and primary care settings.

The multi-strategy approach makes it difficult to attribute causality clearly and isolate specific effective strategies.

Other programs that worked in consultation with populations at high risk of oral disease and took account of the cultural factors that affect oral health have also shown success; for example, among American Indian and Alaskan Native communities, and with Canada's Indigenous populations, as outlined in Section 8 Aboriginal and Torres Strait Islander people. A community program showed success in preventing tooth decay amongst Vietnamese preschoolers in Vancouver, Canada—see Section 5.8.3 Small group discussions/use of peers and Section 9 Culturally and linguistically diverse (CALD) communities. Key elements of these programs were cultural sensitivity, participatory approaches, use of fluoride and flexibility to meet local needs.

Further programs promoting oral health that used community action which would affect young children include social marketing (see Section 12.3 Social marketing and health information) and food and drink campaigns (see Section 12.4 Community action (for social and community change)).

### 5.7.2 Nutrition interventions

A review of reviews identified five systematic reviews (plus one update) and a further 11 studies that considered interventions to increase healthy eating in young children aged 4–6 months to four years.<sup>132</sup> It was identified that successful interventions target:

- parents and/or families, using group, peer and individualised models
- children's services settings
- advertising and marketing (see Section 12.3 Social marketing and health information).

A recent systematic review of community-based obesity prevention interventions for children and adolescents aged 0–18 years identified similar necessary elements as in the community action oral health promotion programs.<sup>133</sup> An evidence summary was developed based on findings from 20 systematic reviews and one meta-analysis of obesity prevention interventions conducted between 2004 and 2009. While oral health impacts were not considered specifically, the common risk factors for all chronic health problems being addressed were unhealthy food and drink. The conclusion was that multilevel, multifaceted interventions that target multiple behaviours among population and high-risk groups are likely to be most effective. The evidence was that to understand and achieve equity in program implementation, it is necessary to:

- work to tackle the social determinants across the broad community which can impact on obesity
- continue to work across settings (including schools) with consideration for equity-relevant dimensions which are appropriate to the setting and population
- consider equity at three levels—social determinants (whole population), communities (such as geographical and cultural), and high-risk individuals (population distribution)

- get to know the community, to enable interventions to be targeted to subgroups who need it most, so reducing rather than increasing inequalities
- look at studies relevant to the target group within and outside of obesity prevention, and consider targeting different interventions for different populations
- take a partnership approach to intervention design, implementation and evaluation working with communities and key stakeholders across sectors and organisations relevant to obesity prevention.

### 5.7.3 Parent, baby and children fairs

Impact evaluation of participation in parent, baby and children fairs show that they have been useful in raising the profile of oral health and knowledge among receptive parents and child health care workers. However, free giveaways are important in attracting people to the stand, and it is possible that the information may not be reaching higher-risk families because of the entry cost<sup>134</sup>—strength of evidence 4, IV. Multi-strategy programs incorporating this type of event have shown effectiveness in oral health outcomes.<sup>130,131</sup>

## 5.8 Community-based preventive programs for expectant and/or new mothers

### 5.8.1 Anticipatory guidance

An anticipatory guidance program in South Australia that provided appropriate information to mothers in the prenatal and postnatal period about the needs of their child at particular stages of life was successful in preventing tooth decay when the children reached two years of age<sup>135</sup>—strength of evidence 2, II. Three rounds of guidance and provision of printed information were provided: at enrolment and with information mailed when children were six and 12 months old. Mothers preferred mailed information to phone calls, as did pregnant women surveyed in a community in Minnesota, US.<sup>136</sup>

### 5.8.2 Motivational interviewing

Motivational interviewing (MI), which is person-centred counselling when reasons for change and barriers are explored within a supportive environment, has shown promise in preventing tooth decay in young children compared to traditional oral health education. Children 6–18 months old in a high-risk South Asian community in British Columbia, Canada, whose parents had an MI counselling session on feeding and hygiene and six follow-up phone calls, watched a video and were given a pamphlet, had significantly lower decay rates after two years than children whose parents did not have the MI interventions<sup>146,147,151</sup>—strength of evidence 2, II. MI also increased the compliance with the recommended fluoride varnish treatments. A recent systematic review of models of individual health promotion found that MI interventions were the most effective method for altering health behaviours in a clinical setting.<sup>137</sup>

### 5.8.3 Small group discussions/use of peers

A peer-led program run by a lay person of similar background and culture was combined with a community-wide program for the Vietnamese population in Vancouver, Canada. The program showed a significant impact on feeding practices and decay rates in preschool children<sup>152</sup>—strength of evidence 3, III. See Section 9.1 Peer oral health worker (CALD community health worker).

The small group discussion technique has led to mothers/carers improving their brushing of their young children's teeth, but had no demonstrated impact on tooth decay rates in a program in rural Thailand<sup>129</sup>—strength of evidence 2, III–2 for improved oral hygiene practice. Health centre staff moderated discussions on preventing decay with mothers/carers of 6–19 month old children. After 12 months these children had improved oral hygiene practice compared to the control group where carers received didactic health education talks. However, feeding practices and decay rates were similar in both groups.

#### 5.8.4 Prevention of infection

Programs that reduce the transmission of tooth decay-causing bacteria (predominantly *S. mutans*) from mothers to their babies have shown success in preventing decay.

The three most recent systematic reviews on preventing decay in young children report that the evidence is strongest for the use of xylitol chewing gum by mothers in preventing transmission of *Streptococcus mutans* to their children.<sup>93,92,94</sup> Mothers in two key Nordic studies chewed xylitol-containing chewing gum during the period of primary teeth eruption, which led to their children having significantly lower tooth decay rates<sup>138,153</sup>—strength of evidence 2, III–2. A recent Japanese study found that maternal xylitol gum chewing led to less *S. mutans* colonisation in their young children compared to the control group<sup>139</sup>—strength of evidence 2, II.

#### 5.8.5 Comprehensive care programs

Programs directed to pregnant women and/or mothers of newborn babies that provide oral health education, treatment of active tooth decay and antimicrobial mouth rinses or varnishes (fluoride and/or chlorhexidine) show promise<sup>94</sup>—strength of evidence predominantly 3, IV. These programs combined community interventions with clinical preventive care and generally have a sound theoretical rationale and program logic. However, shortfalls in their evaluation exist, because most programs had only a small number of subjects at follow-up and, in some cases, no randomisation of the control group occurred. Most of these programs were also highly intensive, and so cost-effectiveness would need to be considered if extending to a population level.

Gomez et al. undertook a long-term follow-up of children in a mother–child oral health promotion program in Chile. The program started when the women were pregnant and continued until the children were six years of age. Tooth decay prevalence was significantly lower at the end of the program,<sup>140</sup> and benefits were found to have continued when the children were examined at 9–10 years of age.<sup>141</sup>

Community programs using topical fluoride and/or xylitol have shown significant impact on preventing tooth decay in young children. Strong evidence of decay prevention effectiveness was found when young children in a population with high decay rates were given xylitol syrup twice a day by carers. The program was resource intensive, with local outreach workers visiting families at least twice a week. Cost effectiveness information has not yet been reported<sup>142</sup>—strength of evidence 2, II. Use of slow-release pacifiers containing xylitol, sorbitol and fluoride showed significant reductions in *S. mutans* levels, dental decay and otitis media in a Finnish controlled clinical trial<sup>143</sup>—strength of evidence 2, III. The effectiveness of topical fluoride is presented in Section 12.5.1 Use of fluorides.

Chlorhexidine gel has not shown the same level of effectiveness as fluoride or xylitol. When chlorhexidine gel was applied weekly to infants with high *S. mutans* counts from 10 months of age, reduced bacterial counts were found after three months, but no differences compared to the control children after 15 months were found<sup>144</sup>—strength of evidence 7. The greatest individual reductions were in children who brushed more often and used fluoride toothpaste. Twetman's conclusion of his review of chlorhexidine varnish studies was that the anti-decay effects were inconclusive for children and adolescents with regular fluoride exposure.<sup>145</sup>

### 5.9 Implementation issues

Common elements in successful programs:

- integrate oral health into general health programs (for example, toothbrushing in breakfast clubs, anticipatory guidance and motivational interviewing in maternal child health visits) and include an oral health component in home visits for high-risk families
- use fluoride in toothpaste, water and varnish
- target high-risk populations, and recognise that tooth decay follows a social gradient
- tailor approaches based on active participation and addressing social, cultural and personal norms and values
- have surveillance and referral systems in place
- use multiple interventions.

Early childhood tooth decay is a social, political, behavioural, medical and dental problem that can only be controlled through understanding the dynamic changes that are taking place in society, particularly as they pertain to family structure, nurturing of children and socioeconomic status.

Adapted from Ismail, 1998<sup>154</sup>

### Good practice case study: Romp and Chomp

This whole-of-community obesity prevention demonstration project (2005–08) promoted healthy eating and active play to achieve healthy weight in children under five years of age in Geelong, Victoria<sup>115</sup> –strength of evidence 2, III–2. Over 90 long day care facilities, family day care centres and kindergartens consented to being involved in the evaluation of the project. During implementation, Romp and Chomp became linked with the Smiles 4 Miles oral health promotion program.

Romp and Chomp focused on capacity building and developing sustainable changes in early childhood environments, with particular attention on the policy, sociocultural and physical environments. Key messages targeted daily water consumption, daily active play, daily fruit and vegetables intake and less screen time for children.

Process evaluation of the capacity-building aspects of the intervention identified the importance of project management, leadership, collaboration, funding, governance and communication structures and processes throughout the life of the project in order to promote long-term sustainable health outcomes across a community.

The outcome evaluation utilised a repeat cross-sectional quasi-experimental design with measures taken pre- and post-intervention in Geelong (intervention sample) and a comparison sample drawn from local government areas across the rest of Victoria. Post-intervention, children in the intervention group had a significantly lower intake of packaged snacks, fruit juice and cordial and a higher vegetable consumption compared to the comparison sample.

A significant increase also occurred in the intake of vegetables, fruit, water and plain milk, and a significant decrease occurred in the intake of fruit juice and cordial from pre-intervention levels in the intervention sample.

As a result of Romp and Chomp and its partnership with other health promotion programs such as Smiles 4 Miles, early childhood settings in Geelong now consistently promote healthy eating and physical activity for young children. Children's diets have been improved and a reduction in the prevalence of childhood overweight and obesity has occurred. No oral health indicators were studied. However, the reduction in consumption of sugary food and drinks is likely to have led to lower tooth decay rates.

In addition to improving children's health right now, the intervention may prevent the development of overweight, obesity and potentially tooth decay throughout the child's lifespan by establishing healthier behaviours early. Further, the implementation of sustainable policy-based strategies means that the intervention may benefit future cohorts of children.

For further information visit Romp and Chomp <[http://www.goforyourlife.vic.gov.au/hav/articles.nsf/pracpages/Romp\\_and\\_Chomp?Open](http://www.goforyourlife.vic.gov.au/hav/articles.nsf/pracpages/Romp_and_Chomp?Open)>.

## 6 Children and adolescents

### Summary

Strong evidence exists for the effectiveness of targeted school-based toothbrushing programs and targeted chewing gum programs.

School-based oral health education programs have shown short-term positive effect on plaque levels. However, whether benefits are sustained is unclear.

Fluoride mouth rinse programs can have a decay preventing effect in school children with limited access to other fluoride sources.

Orally healthy school policies can assist schools in improving the oral health of children. However, evidence also exists of the potential for harm if only one component is introduced instead of a comprehensive approach.

Some evidence exists for the long-term positive impact on oral health of integrating oral health promotion into the school curriculum.

Community/school and clinic-based programs such as applying fluoride, placing dental sealants on teeth and the professional cleaning of teeth can be effective, but these are resource intensive.

School-based oral health interventions are more likely to be successful and/or sustainable if they:

- link to the home
- actively involve parents in primary school interventions
- create supportive environments (for example, increase the availability of fruit and vegetables, and promote access to healthy food and drink)
- are integrated with other health issues
- provide support for teachers or use non-teacher supervisors
- occur in non-fluoridated areas with high tooth decay rates
- are interactive and based on experiential learning relevant to students' lives
- use peer leaders
- employ oral health professionals to support health-promoting school approaches, rather than classroom lessons alone
- have a national school curriculum that specifically requires the inclusion of oral health promotion
- target schools where students have poor oral health status and oral health literacy.

## Context

### Prevalence of tooth decay

While a significant decline in child tooth decay rates over the last generation has occurred, most Australian children and adolescents still experience tooth decay. Decay is over five times more prevalent than asthma in children<sup>2,3</sup>—see Section 1.2 The burden of oral disease.

A minority of children experience a greater than average burden of disease. Approximately 20 per cent of four year olds and 15 year olds have approximately 90 per cent of the total tooth decay for their age group.<sup>19</sup> While for children between these ages decay is more evenly distributed, 10–30 per cent of children have most of the decay.

The 2003–04 Australian Child Dental Health Survey<sup>18</sup> determined that:

- nearly one-half (49 per cent) of six year old children had a history of decay in the primary (baby) teeth
- approximately 40 per cent of Australian 12 year olds had a history of decay in their permanent teeth
- fifty seven per cent of 15 year olds had some history of decay in their permanent teeth.

### Oral health-related behaviour

Fifty seven per cent of Victorian 2–4 year olds and 75 per cent of 5–12 year olds were reported to use toothpaste twice or more a day, with lower rates for dependants of concession cardholders.<sup>155</sup>

Children of all ages are eating less than the recommended amount of fruit and vegetables.<sup>156</sup>

A high proportion of 2–16 year olds were reported to obtain more than their recommended energy from sugars—ranging from almost 80 per cent for 2–3 year olds to almost 60 per cent for 14–16 year olds.<sup>157</sup>

Adolescents demonstrate a need for greater autonomy in oral health decision making, and generally considered teeth to be important because of their contribution to appearance, rather than health.<sup>158</sup> Barriers to carrying out oral healthy behaviours include lack of time, forgetfulness, the unattractiveness or unavailability of healthy food and drink and taste preferences for less healthy food and drink.<sup>158</sup>

An extensive literature exists on oral health interventions for children (5–12 year olds) and adolescents (13–17 year olds). Most programs were based in schools. Clinic-based programs were not included in this resource unless they had a community or school component. The two most recent reviews that included oral health promotion programs for children and adolescents include 38 relevant studies and five previous systematic reviews. The 2005 systematic review by Watt and Marinho<sup>159</sup> includes five studies with school children and five systematic reviews. Brukiene and Aleksejuniene's 2009 general (but not systematic) review of oral health promotion in adolescents includes 31 studies.<sup>160</sup> In addition, another 37 articles, describing 34 interventions, met the search criteria. The studies can be broadly categorised into the six interventions shown in Table 7 Oral health promotion interventions for children and adolescents. Overlaps exist between the interventions in that some studies incorporate a number of approaches.



Table 7 Oral health promotion interventions for children and adolescents

Intervention	Highest strength of evidence		Outcome measure	Target group
	Public health criteria	NHMRC criteria		
1 Targeted school-based toothbrushing programs 161,162,163,164,165,166,167,168	2	II	Behavioural change Prevention of tooth decay	Primary school children
2 Targeted school-based fluoride mouth rinsing programs <sup>169,170</sup>	2	III-3	Prevention of tooth decay	Primary school children
3 School-based oral health education <sup>160,163,164,171,172,173,174,168,175,176,177,178,31,159</sup>	2	II	Behavioural change Prevention of gum disease Prevention of tooth decay when fluorides and/or dental sealants used	Primary and secondary school children
4 Orally healthy school policies, including integration of oral health promotion into the school curriculum <sup>179,171,180,181,182,183,184,185,186,187,156,188</sup>	2	III-2	Behavioural change Prevention of tooth decay Prevention of dental trauma Policy change	
5 Community/school and clinic-based programs <sup>189,190</sup>	2	III-1	Behavioural change Prevention of gum disease Prevention of tooth decay when fluorides and/or dental sealants used	
6 Targeted chewing gum programs <sup>191,192</sup> (see Section 12.5.3 Sugar-free products)	1	I	Prevention of tooth decay	
<b>Ineffective programs</b>				
1 Supervised school-based toothbrushing programs: • with low dose fluoride toothpaste in non-fluoridated area <sup>193</sup> • not sustained <sup>194,195</sup>	7 7	III-1 II	Prevention of tooth decay	Primary school children
2 Annual classroom lessons <sup>196,197</sup>	7	IV	Prevention of tooth decay	Primary school children
3 Non-integrated health promotion programs to prevent school snacking <sup>198</sup>	7	III-1	Prevention of tooth decay	Primary school children

## 6.1 School-based toothbrushing programs

Nine studies (with eleven papers) were found where school-based toothbrushing studies were a key element of the intervention. The programs that had the strongest evidence for preventing tooth decay were in Scotland<sup>163,165,168</sup>—strength of evidence 2, II, London, England<sup>166</sup>—strength of evidence 3, IV and Jordan<sup>161</sup>—strength of evidence 2, III-1. School-based toothbrushing programs can also be integrated with other health programs, as in the Philippines,<sup>167</sup> and be a useful entry point to engage children, schools and the community with dental health services, as in rural New South Wales<sup>162</sup>—see Section 8.4 Preschool and school-based supervised toothbrushing programs with oral health education integrated into the curriculum.

Two programs did not achieve a reduction in tooth decay: a Chinese study that did show positive impacts on other aspects of oral health<sup>199</sup>—strength of evidence 7 for tooth decay, and a Queensland study that used child-strength toothpaste in a non-fluoridated area<sup>193</sup>—strength of evidence 7, III-1. A program in the Netherlands achieved an increase in toothbrushing frequency while the program was underway, but these improvements were not sustained<sup>195</sup>—strength of evidence 2, II. Sustainability was also an issue in a rural Victorian study—supervised brushing ceased when the key champion left the school.<sup>194</sup>

Long-term impacts of supervised toothbrushing programs have been shown in a disadvantaged, non-fluoridated area in Scotland. A randomised control program that employed mothers for an hour a day to supervise five year olds to brush their teeth at school showed a 32–56 per cent reduction in tooth decay in first permanent (adult) molar teeth<sup>165,168</sup>—strength of evidence 2, II. Toothbrushes, adult-strength fluoride toothpaste and toothbrushing charts and paper stars to stick on the chart were provided for children to take home. Children were given rewards for twice-daily brushing. The program ran for 30 months. A 20–26 per cent reduction of tooth decay was evident six and a half years after the end of the program<sup>164</sup>—strength of evidence 2, II. In addition, children in the intervention group had 29 per cent fewer large cavities in the permanent teeth that had not erupted during the program. This provides evidence that the program resulted in a long-term effect on toothbrushing habits<sup>163</sup>—strength of evidence 2, II.

In a non-fluoridated disadvantaged area in London, England, teacher-supervised toothbrushing with fluoride toothpaste (1,400 ppm), led to reductions in tooth decay compared to control schools of 11–21 per cent over the 21-month program<sup>166</sup>—strength of evidence 2, II. Unlike in the Scottish program mentioned above, no engagement of parents or the provision of toothpaste and brushes for home use occurred. It is not known if teachers were happy to continue to supervise brushing and whether the impact was sustained.

In the four-year Jordan program, primary school students who brushed daily at school were up to six times less likely to develop tooth decay than children who did not brush<sup>161</sup>—strength of evidence 2, III-1.

A three-year school dental program in China that included daily supervised toothbrushing and monthly oral health lessons showed significant impacts on gum health, increased toothbrushing and dental clinic attendance, less frequent consumption of cakes and biscuits and increased teachers' and parents' oral health knowledge, attitude and behaviour<sup>199</sup>—strength of evidence 2, III-1. However, no statistically significant impact was shown on tooth decay rates after three years. This may be attributed to the limited uptake of toothbrushing twice a day with fluoride toothpaste, even in the intervention schools where only about one-half of the children followed this practice.

School-based toothbrushing programs are not likely to be cost-effective when children are already brushing (with fluoride toothpaste) twice a day. A program run in the Netherlands over three years involving teacher-supervised toothbrushing at school showed that significant improvements in toothbrushing frequency could be achieved for 7–10 year old children while the program was underway, but these improvements were not sustained when examined one year after the program had ceased<sup>195</sup>—strength of evidence 2, II during the program; strength of evidence post-program 7 (evidence of ineffectiveness) when considering sustainability. However, the need for this program is questionable, because the average toothbrushing frequency was acceptable at baseline for both groups (about twice per day) and was similar after four years.

Integration of school-based toothbrushing with other health programs was shown in early reports to be feasible. In the Filipino Fit for School Program daily toothbrushing (when older children supervise younger children) is combined with handwashing and biannual de-worming.<sup>167</sup>

In some Aboriginal and Torres Strait Islander communities toothbrushing frequency is low, and school-based toothbrushing programs have been successful. Community, school and health service support have been important for the sustainability of the Clean Teeth Wicked Smiles Program in western New South Wales (Buckland and Kennedy, see Section 8.4 Preschool and school-based supervised toothbrushing programs with oral health education integrated into the curriculum). Where these supports are not in place, a toothbrushing program can fold when the key champion leaves—as occurred in the Victorian Latrobe Valley Top Tips for Teeth Program<sup>194</sup>—see Section 8 Aboriginal and Torres Strait Islander people.

The conditions for successful school-based toothbrushing programs include:

- high tooth decay rates in non-fluoridated areas
- links with parents
- programs commencing with five year olds
- children not brushing at least twice a day with a fluoride toothpaste (at home and/or school)
- support for teachers or use of non-teacher supervisors.

Toothbrushing programs can also link to other health programs<sup>167</sup> and be a useful entry point to engage children, schools and the community with dental health services<sup>162</sup> (see Section 8.4 Preschool and school-based supervised toothbrushing programs with oral health education integrated into the curriculum).

Implementation issues for supervised toothbrushing programs are summarised in Section 6.6.2 Targeted supervised toothbrushing programs.

## 6.2 School-based fluoride mouth rinsing programs

Two systematic reviews have considered the impact of school-based fluoride mouth rinsing programs. Most programs conducted weekly mouth rinsing. Twetman et al. determined a dental decay preventive fraction of 29 per cent,<sup>170</sup> while Marinho et al. identified an average reduction in dental decay of 26 per cent.<sup>169</sup> Twetman et al. concluded that fluoride mouth rinses may have a decay preventing effect in children with limited access to other fluoride sources, while its additional effect in children with daily use of fluoride toothpaste could be questioned. They proposed that fluoride rinsing should be considered in schools where children have high decay rates and irregular fluoride exposure.

More recently, a study in non-fluoridated Edinburgh, Scotland, found that school-based fluoride rinsing programs can be used to target children from deprived areas and are successful in preventing dental decay<sup>200</sup>—strength of evidence 2, III–3. The likelihood of children getting decay was reduced by 21 per cent, adjusting for deprivation.

## 6.3 School-based oral health education programs

In their 2005 review of oral health promotion programs effects on oral hygiene and gum health, Watt and Marinho conclude that the majority of the well-designed recent studies in schools had shown short-term positive effect on plaque levels.<sup>159</sup> These programs included four one-hour oral health lessons for ten year olds in a four-month period, three lessons over six months for adolescents and intensive school-based oral hygiene instruction. While the highest strength of evidence was 2, II, Watt and Marinho note that future studies are required to assess whether benefits are sustained. They also note that limited evidence exists on intervention costs and that many programs rely on expensive professional input.

In their review of oral health promotion programs for adolescents, Brukiene and Aleksejuniene<sup>160</sup> determined that the majority of studies were school based and used conventional lectures on aetiology and prevention of dental diseases and/or instructions in toothbrushing and flossing. All studies showed increase in knowledge (11–55 per cent), yet only slight improvement in attitudes, and average improvement in oral hygiene from 30–50 per cent. Effects on gum health showed a wide range: from 0–50 per cent. A tendency to relapse occurred in knowledge and/or oral hygiene with time. Only studies including fluoride (gel or mouth rinse) and application of dental sealants in addition to the educational activities reported significantly lower tooth decay incidence.

School-based approaches that have shown promise include the following:

### 6.3.1 Link to the home environment

A key element of the successful supervised toothbrushing program in Scotland was the strong links made with the home environment<sup>163,164,168</sup> (see Section 6.1 School-based toothbrushing programs). Such links were also shown to be important in a more recent program in Tehran, Iran. The impact of classroom-based oral health education for nine year olds (a three-month program using puzzles) was compared with one home visit by a health counsellor<sup>177</sup>—strength of evidence 2, III–1. The counsellor discussed parents' oral health modelling roles and gave an oral health information leaflet and a diary to record children's brushing frequency. No improvement in gum health was found in the classroom education group compared to a control group, but the parent group had a statistically significant improvement. When considering reproducing this approach, it should be noted that the children's gum health was poor at baseline and evaluation was conducted only after three months. Additionally, the authors note that in the Iranian culture, 'family cohesiveness and structure are considered important for children's wellbeing'.

### 6.3.2 Creative and interactive learning based on students interests

Programs that are interactive and use games and age-appropriate topics have shown success. However, evaluations have only been over a short period and have not measured impact on tooth decay. In a review of practical aspects of oral health promotion, Watt and Fuller identified school-based oral health promotion programs that were based on experiential learning relevant to students' everyday lives.<sup>31</sup> The most significant changes were improvements in knowledge, attitudes and beliefs where baseline levels were poor.

Alves de Farias et al. found statistically significant improvements in gum health and plaque health among Brazilian 7–15 year olds after a program that was interactive and used games as well as didactic approaches<sup>172</sup>—strength of evidence 2, III–1. Evaluation of a pamphlet designed to address adolescent identified needs (based on a romantic story in a narrative style, using montages of real people, promoting the immediate rewards of toothbrushing in increasing attractiveness to the opposite sex) showed success in engaging adolescents and increasing self-reported toothbrushing (by 58 per cent), thus supporting the value of well-designed printed media<sup>175</sup>—strength of evidence 3, III–1.

Innovative resources have been developed for school settings which have shown indications of success; however, evaluations have generally involved process, rather than outcome, and were only short term. These resources have included an interactive video for Australian adolescents (*Megabite*, Australian Dental Association) and curriculum materials (*Dental Health Education—A Curriculum Approach*).<sup>171</sup>

### 6.3.3 Use of peer leaders

Studies with primary school-aged children in disadvantaged areas of Germany and Ireland have shown benefits with the use of peers to teach younger children about oral health. Grade 4 students devised a toothbrushing instruction program for Grade 1 children in Cologne, Germany, and in the process increased their own oral hygiene skills<sup>176</sup>—strength of evidence 3, IV. Eleven year old children in a disadvantaged area of Belfast, Ireland were trained as ‘tooth teachers’ to teach five year olds about diet and snacking. The older children first undertook a classroom ‘snack facts’ program and then taught the younger children using their own ideas such as games. A decrease in sugary snacking occurred, as well as an increase in knowledge among the tooth teachers compared to children attending the control schools<sup>173</sup>—strength of evidence 3, III–1. The five year olds in schools in higher socioeconomic areas enjoyed a significant decrease in snacking scores compared to children attending schools in lower socioeconomic areas, indicating that family food choices are among the most important determinants of snacking in small children.

### 6.3.4 Theory-based approaches

Brukiene and Aleksejuniene<sup>160</sup> conclude from their review of oral health education programs for adolescents up to September 2007 that theory-based approaches for oral health promotion in adolescents should be explored as an alternative to traditional oral health education strategies. Approaches reported since then that have shown some success include interventions at a personal level based on behavioural models (such as motivational interviewing) and approaches tailored to stages of change<sup>174</sup>—highest strength of evidence 3, IV. Social psychological approaches using loss- or gains-based messages that are tailored to particular personality types also demonstrated some success in a US college setting.<sup>178</sup>

School-based approaches that have shown less promise include stand-alone annual classroom lessons, as outlined below.

### 6.3.5 Annual classroom lessons

The strength of evidence is not strong for less frequent (such as annual) classroom oral health education lessons. Oral health lessons delivered by dental therapists as part of the public school dental service in Victoria, Australia, were shown to lead to increases in oral health knowledge of students, but not to lower tooth decay prevalence<sup>196</sup>—strength of evidence 3, IV for improvement in oral health knowledge, but 7 for evidence of ineffectiveness for prevention of tooth decay. These findings led to classroom lessons being discontinued and effort put into supporting teachers to provide oral health education (see Section 6.4 Orally healthy school policies and practices, including integration of oral health promotion into the school curriculum).

Similarly, annual lessons conducted for six years covering oral hygiene, fluorides and diet for Belgium 7–12 year olds had no significant effect on tooth decay levels, although improvements in plaque scores and the extent of the treatment of tooth decay were significant in the intervention group compared to the control group<sup>197</sup>—overall strength of evidence 3, III–2 but with strength of evidence 7 for prevention of tooth decay.

## 6.4 Orally healthy school policies and practices, including integration of oral health promotion into the school curriculum

The World Health Organization advocates using Health Promoting Schools programs to promote general and oral health.<sup>181</sup> Some evidence exists that these programs can assist schools in improving the oral health of children through advocating a common risk factor approach to health promotion, and by more explicit consideration of oral health<sup>183,184,187</sup>—highest strength of evidence 3, III–2. Evidence also exists of the potential for harm if only one component is introduced instead of a comprehensive approach<sup>198</sup>—strength of evidence 7, III–1. This study shows that restricting food and drink choices at school without also helping to shape the out-of-school environment can lead to a compensatory increase in unhealthy eating and drinking outside school.

Children attending Brazilian schools with comprehensive orally healthy policies as part of the Health Promoting Schools approach were found to have statistically significant lower tooth decay and dental trauma levels than in schools without these policies<sup>184</sup>—strength of evidence 2, III–2. Policies covered food and drink choices, playground safety and engagement with parents and the community. Schools were in fluoridated socially deprived areas. This study is presented as a good practice case study at the end of this section. Similarly, schools with supportive social characteristics were found to be associated with lower levels of traumatic dental injury in a Thai school study<sup>183</sup>—strength of evidence 4, IV.

A qualitative review in northern England of the drivers and barriers to the incorporation of oral health-promoting activities in schools taking the more holistic approach to health promotion was conducted recently.<sup>187</sup> The review found that drivers included the involvement of people with specialist oral health expertise. Consensus occurred that expert input was necessary. Healthy eating interventions were seen as the most appropriate way to promote oral health in schools. Less than one-half of the 22 Healthy Schools coordinators interviewed made the link between oral health and the Healthy Schools strand of emotional health and wellbeing. The lack of a specific mention of oral health promotion in the National Healthy Schools guidance was seen as a key barrier to schools addressing oral health.

A ‘research–community–industry’ partnership program in Northern Ireland called Boosting Better Breaks established policies and practices in small rural schools in support of healthy food (provision of milk and fruit snacks, closure of tuckshops and teachers not using sugary food as rewards or prizes). Community and school engagement ensued, but minimal change in tooth decay levels occurred over two years. The program did though narrow oral health discrepancies between children from lower and higher socioeconomic groups and facilitated healthier snacking among children from more disadvantaged schools over this period<sup>180</sup>—strength of evidence 3, III–1.

A more recent study, Boosting Better Breaks, among 9–11 year olds provided some evidence that just limiting snack and drink choices just at school may lead to a compensatory increase in outside school consumption, at least for this age group. After two years, children in intervention schools had similar sugar snacks scores to children in control schools and greater increases in more severe tooth decay<sup>198</sup>—strength of evidence 7, III–1. Parents noted that their pre-adolescent children were beginning to take more control over their snacking behaviour, and that this was difficult for them to influence. Some parents considered that buying sweets, chocolates and biscuits were an expression of affection and a means of ensuring that their children ‘at least ate something’. While the high dropout rate in the study limits the ability to make conclusions, the authors’ summation that restricting children’s choices of food and drink at school on its own is not sufficient to prevent tooth decay appears to be valid. They recommend the inclusion of classroom oral health education, including the promotion of fluoride toothpaste use, and developing and encouraging children’s experiences of healthier snack choices.

#### **6.4.1 Integration of oral health into the school curriculum**

Studies from Victoria, Australia<sup>188</sup> (see Section 9.3 Community development approaches), the UK<sup>179</sup> and the US<sup>185</sup> have shown that oral health information can be integrated into school curriculum. However, limited evaluations exist of take-up of the oral health components and subsequent long-term impact.

Oral health has been demonstrated as integratable into media, mathematics and arts subjects<sup>188</sup> plus science and English classes.<sup>185</sup> Kwan et al. identify the link between oral health topics and eight subject areas, based on the Danish school curricula.<sup>181</sup>

In Victoria, use of a comprehensive oral health resource for primary school teachers, Dental Health Education—A Curriculum Approach, was hampered because it did not easily link into the statewide curriculum framework that was released soon after the completion of the resource.<sup>171</sup> Almost two-thirds of all primary schools had purchased the resource, one-half of teachers surveyed recalled seeing the resource, and two-thirds of these teachers stated that it had increased their knowledge and confidence to teach oral health<sup>171</sup>—strength of evidence 3, IV.

Chapman and colleagues suggest that there is an ethical responsibility to provide oral health education and that access to information is one of the rights of individuals under the Ottawa Charter. They acknowledge that knowledge is often not sufficient for behavioural change, and that supportive environments are required.<sup>179</sup>

#### 6.4.2 Increasing fruit and vegetable consumption

The evidence from three systematic reviews and 14 studies indicates that fruit and vegetable consumption by children can be increased, and that positive outcomes can be achieved using a variety of interventions.<sup>156</sup> Successful approaches include the following.

##### Home-based interventions

Levels of fruit and vegetable consumption by children are higher when parents regularly eat fruit and vegetables, and they are available and accessible at home.

Television viewing and exposure to television advertisements are associated with lower intakes of fruit and vegetables.

##### School-based interventions

Multi-component approaches at schools are more likely to be successful, including:

- school policy
- curriculum activities
- classroom practices (for example, fruit and vegetable breaks)
- canteen services
- media activities
- parent resources
- mailings.

To increase the chance of success, school-based interventions should:

- increase the availability of fruit and vegetables
- give clear messages on fruit and vegetable intake, and include behavioural goals
- actively involve parents in primary school interventions
- provide longer and more intense interventions.

Key factors in programs include:

- listening to children
- providing supportive environments.

Providing supportive environments requires population-wide action supported with state and national policy and environmental approaches. Community-wide activities have been shown to enhance the outcomes of school-based programs.

#### 6.4.3 Integrated health promotion programs in Victoria

Health promotion programs that aim to improve children's diets to address obesity can potentially also improve oral health. Three health promotion programs in Victoria promoting healthy food and drink policies and practices in school settings have shown some success: Fresh Kids, Be Active Eat Well, and 'Go for your life'.

The Fresh Kids Program used the Health Promoting Schools framework to design a whole-of-school, multifaceted intervention that targeted healthy eating in four primary schools in relatively deprived western Melbourne suburbs. Strategies included facilitating organisational change within the school; integrating curriculum activities; formalising school policy and establishing project partnerships with local community nutrition and dietetic services. Lunchbox audits were used to assess the frequency of children bringing fresh fruit, water and sweet drinks for lunch. After two years all schools recorded increases of between 15 and 60 per cent in the proportion of children bringing water bottles to school and reductions of between eight and 38 per cent in the proportion of children bringing sweet drinks<sup>182</sup>—strength of evidence 3, III–3.

The Be Active Eat Well Project was a three-year, multifaceted, community capacity-building program in rural Victoria that promoted healthy eating and physical activity for 4–12 year olds. Lower increases in body weight

were shown compared to a stratified random selection of schools from the same health region<sup>186</sup>—strength of evidence 2, III–2. The main characteristics of the community capacity-building approach were to:

- enhance the skills of health professionals and stakeholders
- reorient organisational priorities
- develop networks and partnerships
- build leadership and community ownership
- develop sustainable health-promotion strategies.

Another Victorian program that promotes healthy food and drink in schools is ‘Go for your life’ <<http://www.goforyourlife.vic.gov.au/>>, which is described in Section 5.5 Healthy food and drink policy in childcare/kindergarten settings. The ‘Go for your life’ Canteen Advisory Service collaborates with ‘Go for your life’ and provides supporting resource for schools, including the ‘Go for your life’ Healthy Canteen Kit <<http://www.education.vic.gov.au/management/schooloperations/healthycanteen/>>.

Victorian Government policy has been important in establishing a healthy food and drink environment in schools. The *School canteens and other school food services policy* dictates that high-sugar content drinks and confectionery should not be supplied through Victorian Government primary and secondary school canteens and other food services. This includes energy drinks and flavoured mineral waters with high sugar content (see the Department of Education and Early Childhood Development School Canteen/Food Service Policy <<http://www.education.vic.gov.au/management/schooloperations/healthycanteen/policy/canteenpolicy.htm>>).

See Section 15.2 Online resources for a list of addresses for online resources.

## 6.5 Community/school and clinic-based programs

Programs that have shown success in preventing tooth decay and/or improving oral hygiene and gum health in children and adolescents have included childcare and then school-based oral health education in addition to dental clinic interventions in Moscow, Russia<sup>190</sup>—strength of evidence 2, III–1; and in Brazil<sup>189</sup>—strength of evidence 3, IV. The interventions included applying fluoride, placing dental sealants on teeth and the professional cleaning of teeth. Positive impacts of these programs were generally attributed to the clinical interventions, primarily the use of fluoride and sealants. Most of these programs were resource intensive. No cost-benefit evaluations have been published.

## 6.6 Implementation issues

### 6.6.1 General programs

School-based oral health interventions are more likely to be successful and/or sustainable if they:

- link to the home
- actively involve parents in primary school interventions
- create supportive environments (for example, increase the availability of fruit and vegetables, and promote access to healthy food and drink)
- are integrated with other health issues
- provide support for teachers or use non-teacher supervisors
- occur in non-fluoridated areas with high tooth decay rates
- are interactive and based on experiential learning relevant to students lives
- use peer leaders
- employ oral health professionals to provide support for Health Promoting Schools approaches, rather than only provide classroom lessons
- adhere to the national school curriculum, which specifically requires the inclusion of oral health promotion
- target schools where students have poor oral health status and oral health literacy.



Oral public health expertise is important for developing and supporting orally health-promoting schools. Such support is more successful in achieving oral health improvement than only providing classroom lessons.

### 6.6.2 Targeted supervised toothbrushing programs

Supervised toothbrushing programs are likely to be more cost-effective when children's tooth decay rates are high, when no water fluoridation exists and when children are not brushing with fluoride toothpaste twice a day.

Links to the home increase the chances of sustained impacts; for example, providing families toothpaste, toothbrushes, toothbrushing charts and stickers was a key aspect of the successful Scottish program.<sup>168</sup>

Programs offer an opportunity to engage with parents and the community to discuss issues such as the importance of twice-daily brushing with a fluoride toothpaste and avoiding sugar snacking. Programs can be a positive initiative to introduce children to dental health staff and so recruit them for treatment<sup>162</sup>—see Section 8.4 Preschool and school-based supervised toothbrushing programs with oral health education integrated into the curriculum.

Teachers and childcare staff have many demands on their time, and adding supervising toothbrushing may not be appropriate. Options for supervision include using older students<sup>167</sup> and paying mothers (an hour a day).<sup>168</sup> The latter approach provides an employment opportunity that may be useful for parents wanting to enter or re-enter the labour market.

Long-term school support is needed.

Integration with other health issues enhances the likelihood of sustainability.<sup>167</sup>

Programs may be established opportunistically, such as implementing toothbrushing after-school based breakfast programs.

The fluoride strength of the toothpaste used may need to be higher in communities without systemic fluoridation.

Potential barriers such as infection control, storage of brushes and access to affordable brushes and paste can be overcome (see the Childsmile <<http://www.child-smile.org/>> standards for the Scotland-wide toothbrushing program in targeted preschools and schools).

### Good practice case study: Health promoting schools

A Brazilian study demonstrated that a systems approach, through the health promoting schools concept, is associated with better dental health outcomes in adolescents. According to the World Health Organization a health promoting school needs to have:

- a school health policy (for example policies on food, smoking, alcohol, drugs)
- an appropriate physical environment (for example traffic hazards and accidents control, environmental projects, physical conditions of the school)
- an appropriate social environment (for example policies on drop-out rate and failing exams, positive relationships between members of the school community)
- community relationships (for example parental involvement, community activities in school, health services)
- personal health skills developed through the formal and informal curriculum.

Moyses and colleagues analysed 33 health promoting schools in a socially deprived areas of Brazil with fluoridated water and demonstrated an association between a more comprehensive school curriculum (measured by 10 different indicators) and the mean percentage of children with no tooth decay<sup>184</sup>—strength of evidence 2, III–2.

Further, the more the schools were committed towards health and safety at the schools, the less likely adolescents were to experience dental trauma. The authors concluded that while school health promotion activities were associated with better oral health outcomes in schools, the schools' physical environment and adolescents' individual characteristics also contribute to more favourable oral health outcomes.

## 7 Older people

### Summary

Effective interventions for older people living in the community include oral health checks within general health checks and preventive oral care with health education. Community-based programs for community-dwelling older migrants can improve oral health.

Effective interventions for older people living in residential care include oral health assessment by non-oral health professionals, training carers, preventive oral care (such as the use of fluoride in toothpaste and rinses) and the use of sugar-free sweets or chewing gum.

Some evidence exists for the effectiveness of oral health care plans and the development of policy and procedures.

The following approaches have been recommended for residential care settings:

- use of assessment screening tools
- care plans
- carer education
- oral health policy
- the appointment of oral care 'champions'
- oral health education included in nursing education
- ongoing staff training.

### Context

An increasing trend exists for older people to retain their natural teeth for longer. In 1979, 40 per cent of Australians 75 years and older had retained some natural teeth, and the proportion had increased to 64 per cent in 2004–06.<sup>20</sup> These teeth can often have large fillings, are covered by crowns or bridges, or can be badly broken down. They require more care than dentures.

Gum disease also becomes more of a problem in older age—61 per cent of Australians 75 years and over with some natural teeth have moderate or severe gum disease.<sup>20</sup>

Poor oral health (insufficient teeth for chewing or toothache) can lead to difficulty in eating a nutritious diet.<sup>75</sup> The chewing capacity of people with dentures can be reduced to as low as one-sixth that of people with natural teeth.<sup>77</sup>

High levels of oral disease persist in residential care facilities.<sup>201</sup>

A range of medications decrease salivary flow which, when combined with a diet high in sugary foods, leaves older people more prone to tooth decay. Reduced manual dexterity can further place older people at risk because of the difficulty they may have in cleaning their teeth properly.

The psycho-social changes associated with retirement, loss of lifelong partner, changes in daily routine or moving to retirement accommodation can have a significant impact on oral health through changes in diet or oral health behaviour.

Older people with dementia present a challenge to carers. Additional barriers to good oral health include impaired sensory function, reduced cognition, challenging behavioural issues, difficulty accessing professional dental care and multiple medications.

Two recent systematic reviews have examined the effectiveness of oral health promotion programs for older people. Miegel and Wachtel reviewed studies related to improving the oral health of older people in long-term residential care; while McGrath et al. reviewed the effectiveness of oral health promotion activities among all older people.<sup>202,203</sup>

Miegel and Wachtel included 30 studies in their review, all published between 2000 and 2007. McGrath et al. identified 17 studies published between 1997 and 2007 that met their relatively limited review criteria. Most studies (13) were randomised controlled trials.

No cost-benefit studies were included in either of the two systematic reviews. This review has identified a further 18 relevant studies published after the cut-off dates of the two systematic reviews.

Interventions can be categorised into programs for older people living in the community and for those who live in residential care, as outlined in Table 8 Oral health promotion interventions for older people.

**Table 8 Oral health promotion interventions for older people**

Intervention	Highest strength of evidence		Outcome measure	Target group
	Public health criteria	NHMRC criteria		
<b>Programs for older people living in the community</b>				
1 Oral health checks within general health checks <sup>204,205</sup>	2	II	Behavioural change	Community-dwelling older people
2 Preventive oral care with health education: <ul style="list-style-type: none"> <li>oral health education, fluorides, chlorhexidine and gum care<sup>206</sup></li> <li>electric toothbrushes<sup>207,208</sup></li> <li>chewing gum<sup>209</sup></li> </ul>	2	II	Behavioural change Prevention of tooth decay	Community-dwelling older people
3 Community-based program for community-dwelling older migrants <sup>210,211</sup>	3	IV	Behavioural change	Community-dwelling older migrants
<b>Programs for older people living in residential care</b>				
1 Oral health assessment by non-oral health professionals <sup>201,212,213</sup>	2	III-1	Behavioural change	General practitioners, carers
2 Oral health care plans <sup>201,214,212</sup>	3	IV	Behavioural change	Nursing staff
3 Training carers <sup>212,203</sup>	2	II	Behavioural change	Carers
4 Preventive oral care: <ul style="list-style-type: none"> <li>fluorides<sup>215</sup></li> <li>chewing gum<sup>216</sup></li> </ul>	2	II	Behavioural change Prevention of tooth decay	Residents
5 Development of policy and procedures <sup>201,217,218,219</sup>	3	III-3	Behavioural change	Management and staff
6 Use of dental hygienists to manage oral health care <sup>220</sup>	3	IV	Management of dental care	Residents

## 7.1 Older people living in the community

### 7.1.1 Oral health checks within general health checks

Inclusion of six oral health questions into the existing Enhanced Primary Health Assessment conducted by general practitioners for older people living in the community in South Australia led to significantly improved oral health for participants<sup>205</sup>—strength of evidence 3, IV. In the Oral Health for Older People Project, low-income older people who were identified by general practitioners as being in need of a dental visit were referred for public dental care. Care was made available with minimal waiting times. Those receiving care reported less pain, increased comfort, more pleasure in eating and improvements in emotional wellbeing and in self-nominated goals for dental treatment. The six-question screening tool was determined to be effective in identifying those most likely to benefit from dental treatment.

A randomised controlled trial in three general medical practices in rural England found that including a dentist examination as part of older persons' preventive health checks led to a significant increase in dental attendance compared to the control group that was not offered a clinical exam. Primary health staff considered that the dental check was a valuable addition to the preventive health check<sup>204</sup>—strength of evidence 2, II.

### 7.1.2 Preventive oral care with health education

A three-year randomised controlled trial with low-income older people living in the community in Seattle, US, showed reductions in tooth decay with health education (two hours twice per year) plus a weekly rinse of chlorhexidine compared to the group who had health education alone or just their usual dental care<sup>206</sup>—strength of evidence 3, IV. Reductions occurred with or without twice-yearly fluoride varnish application and gum treatment (scaling and tooth root cleaning). This is an area where further research is needed given the increasing number of older people living in the community with compromised teeth.

### Electric toothbrushes

Use of powered toothbrushes led to improved gum health in two short-term studies<sup>207,208</sup>—strength of evidence 3, IV. However, vibration can be a concern for some older people using powered toothbrushes. Cost and maintenance can also be issues.

### Chewing gum

A randomised controlled trial in England with over 60 year olds living in the community found that those who chewed gum for 15 minutes twice a day had statistically significant lower plaque scores and better gum health after six months compared to the non-chewing control group<sup>209</sup>—strength of evidence 2, II. While a promising result, more research is required, because the study was relatively short term and no cost-effectiveness data was reported.

### 7.1.3 Community-based program for community-dwelling elderly migrants

A program using culturally adapted oral health education, outreach examination and referral using existing social networks has demonstrated improvement in oral health attitudes, oral health knowledge and self-assessed physical health status among community-dwelling elderly migrants<sup>210,211</sup>—strength of evidence 3, IV. Significant improvements were achieved in denture hygiene and self-reported oral hygiene practices, particularly dental flossing. In addition, a significant increase occurred in the proportion of participants who sought dental treatment.

## 7.2 Older people in residential care

Successful interventions for older people in residential care can be categorised into five approaches:

- oral health assessment by non-oral health professionals
- oral care plans
- training carers
- oral care
- development of policy and procedures.

### 7.2.1 Oral health assessment by non-oral health professionals

The two-year Better Oral Health in Residential Care Project completed in 2009 in five Australian aged care homes determined that general practitioners and registered nurses were able to identify residents requiring a dental referral<sup>212</sup> –strength of evidence 3, IV. This project built on evidence by Spencer et al. that general practitioners could reach agreement with dentists on oral health assessments (OHA) of South Australian nursing home residents<sup>213</sup>–strength of evidence 2, III–1. The general practitioners agreed that the OHA fitted into the existing comprehensive medical assessment for residents.

Nurses and carers have also been found to be capable of assessing the oral health status of nursing home residents. The Better Oral Health in Residential Care Project found that registered nurses could successfully use an Oral Health Assessment Tool (OHAT) to inform care planning, monitor residents' oral health and evaluate oral hygiene interventions.<sup>212</sup> Chalmers et al. trained carers in 21 Australian residential care facilities to use an earlier version of an OHAT, and found that that the tool was valid and reliable<sup>201</sup>–strength of evidence 2, III–1. The OHAT was seen as practical and easy to use by carers. Barriers to appropriate referral for oral health care were found to include residents' and their families' perceptions of need for care and financial issues.

### 7.2.2 Oral health care plans

Individualised oral health care plans were found to increase the participation of carers and residents in oral care, and improve oral health in the Better Oral Health in Residential Care Project<sup>212</sup> and in an earlier US study<sup>214</sup>–strength of evidence 3, IV. In the Chalmers et al's study, carers found that oral health care plans (OHCPs) used in association with oral health assessment tools (OHATs), were practical and easy to use<sup>201</sup>–strength of evidence 3,IV.

### 7.2.3 Training care workers and appointing oral care 'champions'

Miegel and Wachtel identified six studies that showed that oral health education programs increased carers' knowledge<sup>203</sup>–highest strength of evidence 2, II, and two studies where this translated into better oral care for residents–highest strength of evidence 2, II. However, not all studies increased knowledge in the long term, nor were increases in knowledge sustained.

The Better Oral Health in Residential Care Project determined that a training program for carers can increase knowledge, and that the training can be delivered successfully by non-dental health professionals.<sup>212</sup> However, evaluation was only short term.

Regular reinforcement of education has been identified as important–highest strength of evidence 2, II. A strong focus on practical skills training that targets daily care needs has also been found to be more effective–highest strength of evidence 2, III–1.

Miegel and Wachtel noted that studies of carer training showed inconsistent findings on effectiveness, which could be the result of the quality of the training and level of managerial support. McGrath et al.<sup>202</sup> state that studies of longer duration are required to determine whether changes in oral health behaviour are sustained.

An additional benefit to training carers is that many are themselves from lower-income groups and thus they could benefit personally from programs that develop oral health knowledge and skills in an occupational setting.

Appointment of oral care 'champions' within facilities has been found to improve the knowledge, motivation, commitment of work colleagues and standard of care<sup>212,203</sup>–highest strength of evidence 3, III–1.

### 7.2.4 Preventive oral care in nursing homes

Elements of a preventive oral care regime include the following:

#### Use of fluoride

Use of fluoride in toothpaste and rinses showed significant reductions in tooth decay compared to controls with less frequent exposure in an 18-month randomised control trial<sup>215</sup>—strength of evidence 2, II.

#### Use of sugar-free sweets or chewing gum

A one-year randomised controlled trial found that nursing home residents who chewed gum containing chlorhexidine and xylitol had lower plaque scores and healthier gums than residents chewing xylitol gum. The xylitol gum group had better oral health than residents who did not chew gum<sup>216</sup>—strength of evidence 2, II.

### 7.2.5 Development of policy and procedures

Identification and implementation of health-promoting policies and procedures is a key intervention for the development of supportive environments. Four programs in Australian nursing homes have used audits and re-audits against best practice guidelines to shape policy and procedures to improve oral health care for residents. Some improvements have been found in compliance, but the impact on oral health status has not been shown<sup>201,217,218,219</sup>—strength of evidence 3, III–3.

### 7.2.6 Use of dental hygienists to manage oral health care

A study in Melbourne nursing homes determined that dental hygienists have the skills and knowledge necessary for undertaking a dental examination for nursing home residents, correctly identifying the majority or residents who required a referral to a dentist<sup>220</sup>—strength of evidence 3, IV. The hygienists provided treatment for which they were trained, and referred residents to dentists for treatment that was beyond their scope.

## 7.3 Implementation issues

In their systematic review, Miegel and Wachtel<sup>203</sup> identified multiple barriers to implementation of oral health programs in residential care facilities that need to be addressed, including:

- lack of supportive policies and documentation
- high workloads and insufficient staff time
- unsupportive facility managers
- high staff turnover
- low oral health literacy among carers and lack of oral health carer education
- low priority for oral health education among carers—providing oral health care is seen as the most difficult area of carers' work
- residents' behavioural problems
- lack of dentists interested in treating elderly residents, particularly those with behavioural problems
- cost of dental treatment and difficulties with transporting residents to off-site services.

A multifaceted approach is required to address these barriers, including use of assessment screening tools, care plans and carer education, backed up by oral health policy in residential care settings and the appointment of oral care 'champions'.<sup>212,203</sup>

Oral health education programs for nurses and care providers should be included within all levels of nursing education.<sup>203</sup>

The Better Oral Health in Residential Care Project recommended that residential aged care providers should be encouraged and supported to:

- make available and support registered nurses to participate in a train-the-trainer program
- make provision for all direct care nurses and care workers to undertake education and training
- integrate the model elements (such as oral health assessments and oral health care plans) into operating policies and procedures
- integrate oral health competencies into ongoing staff training agenda and auditing skills.

### Good practice case study: the Better Oral Health in Residential Care Project

The Better Oral Health in Residential Care Project was a multi-strategy program to improve oral health care in six Australian nursing homes. This was a two-year project that aimed to identify an evidence-based model to promote better oral health in residential care<sup>212</sup>—strength of evidence 3, IV.

The four elements of the project were:

- an oral health assessment performed by a general practitioner or registered nurse when a person was admitted to the residence and subsequently on a regular basis and as the need arose
- oral care planning was undertaken by a registered nurse based on a simple protective oral health care regimen
- nurses and care workers maintaining daily oral hygiene by implementing the oral health care plan
- referral for a more detailed assessment and treatment by a dental professional made on the basis of the oral health assessment.

The programs key findings were:

Oral health assessment by non-dental professionals does not replace a dental examination, but can be successfully used by general medical practitioners and registered nurses to identify residents requiring a dental referral.

Registered nurses can successfully use the oral health assessment tool to inform oral care planning, monitor residents' oral health and evaluate oral hygiene interventions.

Dentists and other dental professionals can be encouraged to visit residential aged care facilities to deliver dental care if they are supported and have access to portable equipment.

Residents' oral health status improves rapidly with the implementation of the Better Oral Health in Residential Care Model.

Nursing care can make a significant difference to all residents' oral health and improve their quality of life. The program concerns not only dental treatment, but involves the difference daily oral hygiene activities can make.

A simple toothbrush that can be bent easily is the most economic and effective tool for improving oral hygiene.

The Better Oral Health in Residential Care education and training program can be delivered successfully by non-dental health professionals.

An aged care facility's registered nurse is best placed to become the oral health champion and deliver the training to other staff, following a train-the-trainer model.

One successful outcome of the project has been that the Australian Government has undertaken to train a staff member from all of Australia's 2,830 aged care homes in a train-the-trainer program in oral hygiene. This is part of Australia's first Nursing Home Oral and Dental Plan. The program links into the Australian Government Residential Care Standard 2.15 Oral and Dental Care that requires that residents' oral health must be maintained.

See the Better Oral Health in Residential Care Project Report <<http://www.sadental.sa.gov.au/desktopdefault.aspx?tabid=305>>.

## 8 Aboriginal and Torres Strait Islander people

In this resource, the term 'Aboriginal' is inclusive of both Aboriginal and Torres Strait Islander people. The term 'Indigenous people' is used when describing relevant overseas programs in high-income countries.

### Summary

Effective interventions for Aboriginal and Torres Strait Islander people include community fluoride varnish programs with oral health education and community promotion, comprehensive nutrition programs with multiple strategies, community-based oral health promotion and the use of health workers as oral health champions.

Some evidence exists for the effectiveness of preschool and school-based supervised tooth brushing programs with oral health education integrated into the curriculum, healthy policies and practices in childcare and school settings and enhancing access to oral care services.

Interventions are more likely to be effective if they:

- address the social determinants of poor health, such as educational attainment, family and community connections, access to economic and material resources, freedom from race-based discrimination and connection to country
- are guided by best practice principles, such as being inclusive of historical, social and cultural context, and being sustainable in terms of funding, program and governance
- achieve community ownership of the intervention or program.

### Context

Traditionally, Aboriginal and Torres Strait Islander (Aboriginal) people experienced good oral health, with no or minimal oral diseases.<sup>221,222</sup>

With changes in lifestyle and the dependence on new, introduced foods, dental diseases are now common in Aboriginal communities.<sup>223</sup>

While the level of oral health among Aboriginal people is, on average, poorer than the general population, many Aboriginal people have good oral health. For example, 36 per cent of Aboriginal 12–17 year olds attending Victorian public dental services between 2005 and 2007 had no tooth decay, and 39 per cent brushed their teeth twice a day or more.<sup>224</sup>

However, on average, Aboriginal children have twice the levels of tooth decay, with greater levels of untreated disease compared to the non-Aboriginal population.<sup>225,226</sup> In some communities over 90 per cent of young children have tooth decay.<sup>98</sup>

Aboriginal adults also have a higher burden of oral disease than the non-Aboriginal Australian population with, on average, twice the amount of untreated dental tooth decay, and higher rates of gum disease.<sup>20</sup>

The recent evidence-based review of health promotion interventions for Aboriginal people in Victoria identifies the determinants of health as educational attainment, family and community connections, access to economic and material resources, freedom from race-based discrimination and connection to country.<sup>227</sup> Tobacco, physical activity, nutrition and access to food, alcohol, and access and treatment in the health system are identified as contributing factors to health.



A total of 16 relevant articles were identified describing interventions with Aboriginal people, including a systematic review of nutrition interventions for Aboriginal people.

Seven North American Native American Nations studies and a Brazilian study were found that have relevance to Australian communities. Over one-half of all the programs identified have a focus on preventing tooth decay in preschool children. The highest level of evidence found was strong evidence of effectiveness for two community-based fluoride varnish programs. No cost-benefit or cost-effectiveness studies were identified. The studies can be categorised into six main interventions as summarised in Table 9 Oral health promotion interventions for Aboriginal people.

While a wide range of culturally appropriate oral health education resources have been developed for Aboriginal communities, few have published evaluations. Links to resources are listed in Part E Resources and references.

**Table 9 Oral health promotion interventions for Aboriginal people**

Intervention	Highest strength of evidence		Outcome measure	Target group
	Public health criteria	NHMRC criteria		
1 Community fluoride varnish programs with oral health education and community promotion <sup>228,229,225,99,230,231,98</sup>	1	II	Prevention of tooth decay	Preschool children
2 Community-based oral health promotion <sup>232,233,227,234,235</sup>	2	III-2	Behavioural change Prevention of tooth decay	
3 Use of health workers as oral health champions <sup>236,229,237,230,238,231,98</sup>	3	IV	Behavioural change	Communities
4 Preschool and school-based supervised toothbrushing programs with oral health education integrated into the curriculum <sup>162,239</sup>	3	IV	Behavioural change	Preschool and primary school children
5 Healthy policies and practices in childcare and school settings <sup>240,241,242</sup>	3	IV	Behavioural change	Preschool and school children
6 Enhancing access to oral care services <sup>243,244,245,246,247</sup>	3	IV	Behavioural change	Communities
<b>Ineffective programs</b>				
Where there is limited community support <sup>248,249</sup>	7	IV	Prevention of tooth decay	Communities

## 8.1 Community fluoride varnish programs with oral health education and community promotion

Two community fluoride varnish programs have been successful in preventing 18–36 per cent of tooth decay in Aboriginal and Canadian Indigenous preschool children living in remote communities<sup>99,98</sup>—strength of evidence 1, I. Although these programs were conducted in remote communities, the elements of community engagement and use of fluoride have relevance for less remote and urban communities.

### 8.1.1 Australian programs

The Strong Teeth for Little Kids Program targeted preschool Aboriginal children and their remote communities in the Northern Territory.<sup>98</sup> The intervention was a two-year community randomised controlled trial of six-monthly fluoride varnish application plus family and community health promotion. Oral health education was provided to parents and family groups during varnish application and in children's playgroups and preschools. Community health promotion activities included training health care workers in oral screening and varnish application, meetings with community groups and work with community stores to address issues such as the availability of healthy food, toothbrushes and fluoride toothpaste.

A tooth decay reduction of 31 per cent was achieved compared to the non-fluoride varnish intervention communities. Adjustment for community fluoridation status of water supply increased the preventive proportion to 36 per cent—strength of evidence 2, II. With age and sex adjustment, the prevention impact was 26 per cent. An observed association was that a non-fluoridated community that adopted fluoride varnish and fluoridated its water supply could expect an average reduction of almost eight decayed tooth surfaces per child—more than halving the decay rate. Just 17 varnish applications were applied by non-dental primary health staff. All of the communities had high decay rate even at the end of the program—over 90 per cent of children in both intervention and control communities had decay at the final examination. A greater preventive impact might have occurred if adult-strength, rather than child-strength, toothpaste had been used.

### 8.1.2 International programs

Four North American programs (two Canadian and two US) utilised fluoride and counselling approaches to promote oral health in Indigenous communities.

Indigenous preschool children in Ontario, Canada, were the focus of a community randomised controlled trial that achieved an 18 per cent reduction in tooth decay after two years. Fluoride varnish was offered at least twice per year, and counselling was provided to care givers by dental hygienists during the baseline, 12- and 24-month follow-up visits<sup>99</sup>—strength of evidence 1, II. The control communities received only the caregiver counselling.

A school- and clinic-based program using fluoride (varnish, mouth rinses and toothpaste), which was requested by the community and supported by visiting paediatric residents, showed some success in a remote Canadian Indigenous community<sup>228,230</sup>—strength of evidence 3, III–3. The Brighter Smiles program incorporated service learning, inter-professional collaboration and health promotion. A small remote community in British Columbia, Canada, identified children's dental health as a primary concern. In consultation with a university medical and dental faculty, a program was developed of school-based daily 'brush-ins' with fluoride toothpaste, weekly fluoride rinses for those nine years and older, tri-annual fluoride varnish applications for children under nine years, classroom presentations and anticipatory guidance at health centre visits. Incentives in the form of small rewards were given for participation in the fluoride programs. The program was a service-learning experience for trainee paediatric residents who regularly flew into the community.

Evaluation after three years showed reductions in the prevalence of decay, with an increase in the proportion of children without decay. While methodological issues about the clinical evaluation exist, other indicators of success were that the participating children required less dental treatment and there were positive community and training impacts. The community was consistently positive about the program and asked that other preventive interventions (such as immunisation and screening for diabetes) be introduced. Paediatric trainees considered that the rotation was one of their best learning experiences. The program showed how non-oral health workers can also be oral health champions. The authors note that a key factor in the program's success was the small, compact population and committed community key players.

Integration of oral health promotion into well child care visits achieved up to a 35 per cent lower tooth decay rate for three year olds in an Indian Health Service program in south-western US<sup>229</sup>—strength of evidence 3, IV. The program involved trainee paediatricians applying fluoride varnish.

A program among Northern Plains Tribal community in the US employed community oral health specialists (COHS) to provide caregivers with the knowledge and skills to maintain their children's oral health<sup>231</sup>—strength of evidence 3, IV. After a four-week training program the community workers made home visits when they provided oral health information and applied fluoride varnish to young children's teeth.

## 8.2 Community-based oral health promotion

### 8.2.1 Australian programs

A multi-intervention integrated program in the Northern Territory, From Little Things Big Things Grow, has shown promise, but has not yet been formally evaluated to determine its impact on oral health<sup>232</sup>—strength of evidence 4. Aboriginal health workers were trained to identify young children with tooth decay and refer them for oral health care. Cooperation with nutrition workers led to an increase in the range of healthy food and drinks and more affordable toothbrushes and paste in the community store. High school students helped support a toothbrushing program in the primary school. A toothbrush security program was established in workplaces for those who did not have a secure place at home to store a toothbrush.

The recent evidence-based review of health promotion interventions for Aboriginal people in Victoria is relevant to oral health because it addressed the broader social determinants as well as nutrition.<sup>227</sup> The review found that:

- little evaluation of nutrition and food access programs for Aboriginal Australians exists
- lifestyle programs, incorporating nutrition interventions, appear to have had some positive outcomes, but long-term benefits have not been demonstrated
- comprehensive nutrition programs with multiple strategies in Aboriginal communities and in indigenous communities overseas have had a positive influence on health outcomes, such as improved child growth and dietary behaviour.

The review supports the approaches outlined in the 2009 Victorian Aboriginal Nutrition & Physical Activity Strategy –Closing the nutrition and physical activity gap in Victoria <<http://www.vaccho.org.au/vcwp/wp-content/uploads/2011/03/VANPHS.pdf>>.<sup>250</sup>

A program that was not successful was the attempted introduction of small water fluoridation plants into two remote Northern Territory Aboriginal communities—strength of evidence 7, IV.<sup>249</sup> Barriers included a lack of a supportive policy environment, inadequate training and support of the onsite workforce and lack of community support and ownership.

### 8.2.2 International programs

Three North American community-based oral health promotion programs have shown some success in preventing tooth decay in Indigenous preschool children. A fourth program was not successful.

Community-based prevention and individual counselling were the key interventions to prevent tooth decay in preschoolers in 12 American Indigenous and Alaskan native communities<sup>233</sup>—strength of evidence 2, III–2. The approach was multidisciplinary and multi-strategic, with a focus on oral hygiene and nutrition. Activities included a media campaign (TV, radio, newspaper articles and posters), participation in health fairs, mailing of oral health education materials to the caregivers of one year olds and parenting workshops. Oral health education was integrated into well child visits undertaken by the Women, Infant and Children Program and by doctors.

A 25 per cent decrease in tooth decay in preschool children compared with baseline was reported after three years. In the five communities that then continued the community-based program, a 38 per cent decrease in decay was reported after eight years. Decay rates increased in communities that did not maintain the full program. While methodological problems (such as no random assigning of communities or families and volunteer bias) reduce the strength of this evidence, the program appeared to show that preventive initiatives with families and communities can make an impact.

The Healthy Smile Happy Child Program is a multi-agency collaborative project that adopted a population health and community development approach to foster community solutions to early childhood decay prevention in four communities in Manitoba, Canada—two First Nations communities and two in urban centres<sup>235</sup>—strength of evidence 3, IV. Three key pillars were community identification and relationship building, oral health education and education delivery and research and evaluation.

Initiatives included the identification of key individuals; embedding oral health promotion activities into existing programs and services; undertaking baseline research and sharing this information with the community; training leaders and primary health care nurses and physicians to check children's teeth for early signs of decay by regularly lifting the lip; health fairs; and development of resources with the community. Resources developed included fact sheets, games (true/false game and the dental bingo game) and anticipatory guidance packs given out at immunisation visits.

A five-year evaluation undertaken in 2005 found statistically significant improvements in caregivers' knowledge, attitudes and supportive practices toward oral health, and a small (but not statistically significant) impact on decay prevention. Behaviour changes included bottle feeding behaviour and toothbrushing (88 per cent of caregivers reported they were brushing their children's teeth at home compared with 53 per cent at baseline). If communities developed particular resources they seemed to use them more. Methodological issues (such as non-matched control groups and possible volunteer bias among the families who participated) limit the strength of evidence for the program.

A culturally sensitive community-based program in an Indigenous community in Canada built on traditional childrearing practices and one-on-one counselling by the community health nurse<sup>234</sup>—strength of evidence 3, IV—to prevent decay in preschoolers. The program had a high degree of local ownership, being designed and implemented by a committee of mothers and local community workers. Reports from community members indicated that bottles were not traditionally used in First Nations communities for pacifying anxious infants. Willow cradles had served this purpose, but the tradition of making cradles had been lost. The project supported the fabrication of cradles by community elders, and the completed cradles were then loaned to parents. In addition, pamphlets and posters with a local first nations theme were developed, and the community health nurse provided individual counselling for mothers of infants and toddlers.

On completion of the program childrearing practices had improved, with more children reported to be off the bottle by the age of two years and fewer sleeping with a bottle. An increased general awareness of the program within the community was reported. While improvements in tooth decay rates were shown in children of 30 months, and these gains were better than those obtained in a neighbouring community, the improvements were not statistically significant. However the re-adoption of a traditional childrearing practice, coupled with a modest improvement in dental health and an increase in community awareness of the problem of early childhood tooth decay was seen as beneficial for community capacity-building for oral health promotion.

A program aimed at reducing childhood tooth decay in an Alaskan Indigenous community was not completed because of difficulty in recruiting participants.<sup>248</sup> This was acknowledged as due to the project staff not working with the community to assess needs and from there to design appropriate interventions.

### 8.3 Use of health workers as oral health champions

#### 8.3.1 Australian programs

Aboriginal and primary health workers have been utilised in two evaluated Aboriginal oral health promotion programs.

The fluoride varnish program in the Northern Territory, Strong Teeth for Little Kids, worked with primary health care workers, supporting them to apply varnish to preschool children's teeth.<sup>98</sup> The very low rate of application by health workers that occurred was explained by their busy workloads, the high turnover of health staff, and the possibility that the health workers did not consider it necessary for them to apply varnish because this was the role of the intervention team.

A program that utilised Aboriginal health workers to be oral health champions in Aboriginal communities in northern Queensland had some success in engaging the health workers and raising awareness of oral health. Capacity building in oral health promotion was achieved. The evaluation report of the Crocodile Smiles Project recommended that the program be expanded into the Cairns and Cape York districts<sup>238</sup>—strength of evidence 3, IV.

#### 8.3.2 International programs

Indigenous and primary health workers have been utilised in five American programs. Approaches have included women and child community nutrition workers,<sup>237</sup> community oral health specialists<sup>231</sup> (see Section 8.1 Community fluoride varnish programs with oral health education and community promotion), trainee paediatricians<sup>229,230</sup> and primary health workers.<sup>236</sup>

A community-based dental preventive initiative for Indigenous preschool children in Ontario, Canada integrated oral health promotion into existing services, including working with women and child community nutrition workers<sup>237</sup>—strength of evidence 3, IV. These workers aim to improve the nutritional status and wellbeing of prenatal women and their children up to 12 months after birth via home visits. Changes were made to oral health knowledge, attitudes and some practices, but limited impact on tooth decay rates occurred. Unlike the programs in Section 8.1 Community fluoride varnish programs with oral health education and community promotion, fluoride varnish was not used.

Oral health promotion aids (toothbrushes and paste, drinking cups, and oral health education material) were provided to families at age specific times. Other initiatives were reinforcement of healthy dental care practices by nursing staff during Well Child Clinics, food store visits with prenatal women and new mother to promote healthy food choices, and biannual media campaigns run by dental hygienists and nutrition workers that included public service announcements on radio and the distribution of posters and pamphlets in public areas.

Significant impacts on caregivers' knowledge, attitudes and practices were found, such as more frequent cleaning of children's teeth and cleaning starting at an earlier age, less use of bottles as a comforter when the child was crying, less use of both sweetened milk and the adding of sugar or sweeteners in children's bottles. The program was found to be necessary, but not sufficient for preventing tooth decay in preschool children. While a reduction in more severe tooth decay was evident, decay remained high, with over 90 per cent of four year olds affected, and dental care under general anaesthesia was delayed, rather than prevented.

The authors conclude that more intensive preventive interventions for 2–4 year old children (such as use of fluoride varnish) are needed to augment the existing prenatal/new mothers' nutrition program. The program exposed the difficulty of changing practices (such as the use of bottles to help babies fall asleep) because they may be an important coping mechanism for stressed caregivers and a behaviour that could be seen as culturally acceptable.

#### **8.4 Preschool and school-based supervised toothbrushing programs with oral health education integrated into the curriculum**

A school toothbrushing program, Clean Teeth Wicked Smiles, which works with rural Aboriginal primary school children in NSW, has had some success in promoting oral health<sup>162,239</sup>—strength of evidence 3, IV. Oral health literacy sessions have been integrated into the health curriculum. Free toothbrushes and paste are provided. A statistically significant increase in the number of children brushing twice or more a day, plus an increase in the number of children with a toothbrush, has been reported.

The program was developed after a community consultation process, and is supported by the board of the local Aboriginal community-controlled health service and by local health care workers. It has proved to be a positive initiative to introduce children to the dental health staff and to recruit them for treatment. Culturally appropriate resources have been developed. By the third year, teachers were running the program in some schools, while in others, the local dental staff needed to provide more support.

A similar program for Aboriginal preschool and primary school children in rural Victoria was successful in introducing oral health into the school curriculum, but the toothbrushing component was not sustained<sup>194</sup>—strength of evidence 4, IV in the short term and strength of evidence 7 for prevention of tooth decay in the longer term. After-lunch toothbrushing and four education sessions using culturally appropriate resources were introduced as part of the Top Tips for Teeth Program. Process evaluation revealed that younger children responded more positively to the program than older children. Improvements in plaque scores were evident in the short term.

However, toothbrushing ceased when the teacher who had been the strongest advocate left the school.

#### **8.5 Healthy policies and practices in childcare and school settings**

The Water Sipper Bottle Program showed some success in getting Aboriginal preschoolers to drink water rather than sugary and acidic drinks<sup>241</sup>—strength of evidence 3, IV. This central Queensland program trained Aboriginal health workers, used culturally appropriate resources and provided a water bottle to each child. While parent reports showed that the proportion of preschoolers drinking only water when thirsty increased from 18 per cent to 55 per cent, the evaluation was compromised because of a low return rate of questionnaires.

Promotion of drinking water in childcare settings was also the focus of the NSW program, Tiddalick Takes on Teeth<sup>240</sup>—strength of evidence 3, IV. Culturally appropriate resources have been developed, childcare staff trained and support provided for development of orally healthy policy. A 'successful' pilot in six childcare centres led to statewide rollout. It was reported that 'children identify and have pride in Aboriginal dreaming character Tiddalick the frog, which promotes cultural and spiritual meaning'. The impact on oral health is not known.

The Smiles 4 Miles Program in Victoria works in communities with preschool children with poor oral health. Childcare settings are supported to develop and implement orally healthy policies. Support is also provided to develop referral pathways to local dental services and to develop culturally appropriate resources. Partnerships have been established with Aboriginal community controlled health organisations (see Section 5.5 Healthy food and drink policy in childcare/kindergarten settings).

Aboriginal preschool children in childcare settings are the focus of the Strong Smiles Program in New South Wales<sup>242</sup>—strength of evidence 3, IV. Strong Smiles uses interactive stories, songs, games and role-playing to teach nutrition and oral hygiene messages. Evaluation has shown an increase in knowledge and that the children enjoy the songs and stories. The impact on oral health is not known.

## 8.6 Enhancing access to oral care services

While many of the oral health promotion programs for Aboriginal communities include a component of enhancing access to oral health care; this is the priority for several published programs<sup>243,244,245,251,247</sup>—strength of evidence 3, IV.

The South Australian Dental Service Aboriginal Liaison Project has increased the number of low-income Aboriginal people accessing public dental care<sup>251</sup>—strength of evidence 3, IV. Non-dental workers such as Aboriginal health workers in Aboriginal-controlled community health centres screen people using a six-question oral assessment tool and refer those requiring treatment. Aboriginal liaison officers facilitate the referral. Those referred are given priority care and are not placed on long-term waiting lists. Dental fees are waived in necessitous circumstances.

In Victoria and NSW two health services have increased access to dental care by consulting with the local Aboriginal community to understand access barriers (Koori Kids Koori Smiles [KKKS])<sup>243,245</sup>—strength of evidence 3, IV. Success strategies have included holding Aboriginal-specific sessions where families can attend, employment of Aboriginal staff, using culturally appropriate oral health education materials, not charging fees and having short or no waiting times. Other initiatives include offering mouthguards as an incentive for children to complete their treatment (KKKS), providing transport, having other primary health staff available for consultation during the dental clinic session, a volunteer driver and a 'breakfast table' where people eat a healthy breakfast together.<sup>245</sup>

Another approach to increase access to services is to use volunteer dentists in situations where it is difficult to recruit and retain oral health professionals<sup>244</sup>—strength of evidence 3, IV. The Filling the Gap Program uses volunteer dentists to staff an Aboriginal-controlled dental service in Cairns, Queensland. Qualitative and quantitative evaluation determined that volunteer dentists found the cross-cultural experience 'enriching', and over half said that they would return. The health service and community appreciated the dental treatment provided. A further positive outcome of the program has been the partnership developed between private dentists and Aboriginal organisations.

An intensive collaborative community development approach in a remote community in the Northern Territory, the Strong Teeth Project, proved successful, with over 80 per cent of the community presenting for 'strong teeth checks' and 80 per cent of those examined completing treatment<sup>247</sup>—strength of evidence 3, IV. No charge for the check-ups or treatment were made. The oral health staff spent several days consulting with the community. Treatment was provided to the 300 participants during visits from the oral health team over several months.

## 8.7 Implementation issues

Addressing the social determinants of poor health is fundamental for achieving significant improvements in health in Aboriginal communities,<sup>227</sup> and impacts are likely to be felt on oral health. Oral health is influenced by the broad determinants of health that include educational attainment, family and community connections, access to economic and material resources, freedom from race-based discrimination and connection to country. Contributing factors to health include tobacco and alcohol use, oral hygiene, nutrition and access to food and access and treatment in the health system.

### 8.7.1 Health promotion principles

To be effective, health promotion action in Victorian Aboriginal communities must be guided by best practice principles.<sup>227</sup> Programs should be:

- inclusive of historical, social and cultural context
- applying a 'community centred practice' approach: community owned and driven, building on strengths to address community identified priorities
- flexible, allowing for innovation and accountable
- comprehensive, with multiple strategies to address all the determinants
- sustainable in terms of funding, program and governance
- evidence based, with built-in monitoring and evaluation systems
- building and sustaining the social, human and economic capital from a strengths-based perspective.

While many of the oral health promotion programs for Aboriginal and Indigenous communities reviewed included some of these best practice principles, considerable scope exists for improved planning and implementation of programs.

### 8.7.2 Good practice elements of successful oral health promotion programs

Such elements include:

- long-term commitment to the community and the development of trusted relationships<sup>228</sup>—a partnership approach often needs adequate time for oral health staff and community members to get to know each other
- community interest, leadership and community engagement for community ownership<sup>228,230</sup>
- involving oral health champions (for example, respected members of the community such as professional footballers)<sup>232,238</sup>
- presenting baseline survey information on oral health to a community—this can be a powerful tool to engage people in tooth decay preventive activities<sup>235,247</sup>
- use of a strength-based approach such as a ‘good teeth story’<sup>247</sup>
- use of fluoride—fluoride varnish, fluoride toothpaste, fluoride mouth rinse and fluoridated water
- use of primary health workers who incorporate oral health promotion into their work (Aboriginal health workers,<sup>236,231,246</sup> primary health nurses and physicians,<sup>235</sup> paediatric trainees,<sup>228,229,230</sup> women and child community nutrition workers and nursing staff<sup>237</sup> and community health nurses<sup>234</sup>)
- support for Aboriginal health workers to promote oral health through promotion of healthy food and drink
- support for supervised toothbrushing programs in schools and applying fluoride varnish to young children at high risk of dental tooth decay<sup>98</sup>
- integration of oral health checks into well persons checks if processes are in place for referral for treatment<sup>233,246,235</sup>

- integration of oral health promotion into the general health promotion of areas that have common risk factors (for example, diabetes, smoking cessation and eye and ear health)—oral health programs can be an entry point for other preventive interventions into a community (such as immunisation and screening for diabetes)<sup>228,230</sup>
- development of culturally appropriate resources (interactive stories, songs, games and role-playing;<sup>240, 242</sup> dental awareness through art;<sup>162,252</sup> flip charts;<sup>253</sup> and traditional baby cradles to settle anxious infants<sup>234</sup>).
- cultural competency education for oral health staff
- consideration of sustainability—reliance on one key person means that a program may not be sustainable if that person leaves the community.<sup>194</sup>

### 8.7.3 School toothbrushing programs

In some Aboriginal communities many barriers exist that make twice-daily brushing with fluoride toothpaste less likely. Barriers include no running water or bathroom, no toothbrush at home, overcrowded houses with difficulty finding a safe place to store a toothbrush and children having a number of houses where they may sleep.

School toothbrushing programs can be a positive initiative to introduce children to the dental health staff and to recruit them for treatment. See Section 6.6.2 Targeted supervised toothbrushing programs.

### 8.7.4 Best practice approaches to enhance access to oral health services

Approaches include:<sup>243,244,245,251,247</sup>

- consulting with the community about perceived access barriers
- employing Aboriginal liaison workers
- ensuring that oral health staff understand issues relating to cultural safety (that is, the role of power in health care, the concerns expressed by the recipients of care and by the providers of care, and the limitations that cultural beliefs impose on practice)
- running specific Aboriginal sessions
- having no or limited waiting times
- integrating with other health and welfare services
- waiving fees in necessitous circumstances
- offering transport support.



## 9 Culturally and linguistically diverse (CALD) communities

### Summary

Approaches such as peer oral health workers, maternal child health nurses' enhanced focus on oral health, community development multi-strategy approaches, community-based participatory research and community-based programs for community-dwelling elderly migrants have been shown to be effective.

Interventions are more likely to be successful if they are tailored, involve active participation and address social, cultural and personal norms and values, build on social networks and supports and use community settings.

### Context

Cultural and linguistic diversity (CALD) refers to the range of different cultures and language groups represented in the population who identify as having particular cultural or linguistic affiliations by virtue of their place of birth, ancestry or ethnic origin, religion, preferred language or language spoken at home.

Almost one-quarter of Victorians (23.8 per cent) were born overseas, and over 20 per cent of Victorians speak a language other than English at home.<sup>254</sup>

Cultural variations in dental service experience have been found in reports of pain, labelling of symptoms, communication style, beliefs about causes of illness, attitudes towards health professionals and treatment expectations.<sup>255</sup>

Being part of an ethnic minority group may mean that common cultural beliefs and practices influence oral health (such as values placed on having healthy primary teeth or expectations about preventive or therapeutic interventions,<sup>255</sup> or delayed introduction of toothbrushing).<sup>256</sup> However, CALD groups are not homogeneous, and people hold diverse views and have different experiences. The extent of acculturation was shown to be associated with oral health in migrant communities.<sup>257</sup>

A recent systematic review found that in all studies (with a host-country comparison group), children's dental tooth decay experience was greater in migrant and refugee groups compared to the host community.<sup>258</sup> This may be linked to increased exposure to readily available cheap foods and beverages that are high in sugars.

Ethnicity may influence infant feeding practices, but socioeconomic factors (such as family income and education level of the mother) can be more important.<sup>259</sup>

Compared to Australian-born residents, overseas-born residents living in Australia who mainly speak a language other than English at home are more likely to have lost all of their natural teeth and are more likely to report difficulty in eating certain foods, especially if they have dentures.<sup>260</sup>

For refugees, oral health can be complicated by past experiences of trauma to the mouth or teeth before arrival in Australia, or through cultural practices of body modification or traditional healing (such as removal or filing of teeth).

Eleven articles, representing nine studies, describing oral health promotion interventions in CALD communities met the search criteria. These can be categorised into the six interventions in Table 10 Oral health promotion interventions for culturally and linguistically diverse communities (CALD). Four of the studies were from Victoria and found in the unpublished ‘grey’ literature.

A recent systematic review examined the child oral health research conducted with refugee and migrant communities and sought to identify best practice.<sup>261</sup> The review found that in the 48 studies identified, only a limited number of culturally competent oral health studies existed, at least at the reporting stage of the research. Most of the studies were from a clinical, rather than a health promotion perspective.

An earlier literature review of cost effectiveness of oral health promotion concluded that limited short-term behaviour changes are achievable using simply persuasive approaches, and greater longer-term changes appear possible by using more tailored approaches based on active participation and addressing social, cultural and personal norms and values.<sup>262</sup> The use of appropriate language and simple messages was identified as important in avoiding confusion.

**Table 10 Oral health promotion interventions for culturally and linguistically diverse communities (CALD)**

Intervention	Highest strength of evidence		Outcome measure	Target group
	Public health criteria	NHMRC criteria		
1 Peer oral health workers <sup>263,152</sup>	3	IV	Behavioural change Prevention of tooth decay	Families of CALD preschoolers
2 Maternal child health nurses' enhanced focus on oral health <sup>120,126</sup>	3	IV	Behavioural change	
3 Community development multi-strategy approaches <sup>120,264,126</sup>	3	IV	Behavioural change	
4 Community-based participatory research (CBPR) <sup>258</sup>	3	IV	Capacity building	
5 Community-based programs for community-dwelling elderly migrants <sup>265,210,211,266</sup>	3	IV	Behavioural change	Elderly migrants living in the community
6 Use of fluoride varnish—see Section 5 Pregnant women, babies and young children	2	II	Prevention of tooth decay	CALD preschoolers

### 9.1 Peer oral health worker (CALD community health worker)

A program for inner-city Vietnamese preschoolers in Vancouver, Canada, employed a Vietnamese community health worker to provide oral health anticipatory guidance at immunisation visits with follow-up by telephone. Community activities included use of the ethnic language press, booths at health fairs, a video, a brochure for nurses and window displays near bus stops. After seven years, mothers who had more than one counselling visit reported significantly less use of 'comfort' bottles for their children, and their children had significantly less tooth decay compared to similarly aged children at baseline. While the sample population was small, and those who attended the clinic may not have been representative, the use of a layperson of similar background and culture to the participants providing anticipatory guidance appeared to be an effective way to facilitate adoption of healthy behaviours and improve the oral health of young children<sup>152</sup>—strength of evidence 3, IV. Cost-effectiveness was not reported.

Peer educators were also used with a Somali community in a Melbourne community health centre. Carers of preschool children attended a five-session interactive program in Somali. Process evaluation showed improvements in oral health knowledge, greater use of the preschool dental service and linking to other centre services. A resource in English and Somali was produced and made available to other Somali communities<sup>263</sup>—strength of evidence 3, IV. Impact on oral health was not measured.

### 9.2 Maternal child health nurses' enhanced focus on oral health

MCHN screening of preschoolers from CALD backgrounds was a focus of two projects in Melbourne. Partnerships between local government MCH services, public dental services and a university were formed in the Teeth for Life Project to promote the oral health of preschool children. Interventions included the training of MCHN, development of culturally relevant resources, and improvements to data and referral systems. Process and impact evaluation found that MCH nurses significantly increased their knowledge of oral health, and indicated their intention to undertake the oral health screening of preschool children more frequently. Improved policies and procedures led to enhanced referral processes between maternal and child health services and public dental clinics and to an increase in CALD preschoolers' attendance<sup>126</sup>—strength of evidence 3, IV. A similar program in multicultural Dandenong enhanced MCH oral health screening with a consequent increase in preschooler attendance at the local public dental clinic<sup>120</sup>—strength of evidence 3, IV.

### 9.3 Community development approaches

Three programs working with CALD communities in Melbourne have shown positive impacts, but did not use rigorous evaluation nor measure oral health knowledge or status changes<sup>264,120,126</sup>. The programs had a sound theoretical rationale and program logic for addressing barriers to oral health in CALD communities at high risk of tooth decay. While the strength of evidence for these multi-strategy programs is at the public health 'some' or 'weak' level of evidence, impact and process evaluation have shown increases in awareness of oral health, enhanced social connection and greater use of the local public dental clinic by groups at high risk of dental disease.

Promising approaches for engaging these communities were found to include:

- development of culturally appropriate resources in partnership with communities—this is reported to have led to a sense of ownership and pride, plus the building of social capital via development of friendships
- community fairs—use of an oral health trivia quiz and a 'plaque shuttle'<sup>iii</sup>

iii A tent with a fluorescent light that shows up plaque stained by a fluorescent dye.

- use of existing community forums—childcare settings, MCH centres and English training sessions for new migrants
- production of a children’s play—young Sudanese refugees in inner western Melbourne who participated in an oral health play showed an increase in oral health knowledge and skills
- incorporation of oral health into schools’ health curricula
- mouthguards used as an incentive for adolescents to attend for dental care and to complete their treatment
- training/awareness raising of community health centre staff and mental health workers.

Three Melbourne CALD communities (Timorese preschoolers and Cambodian and Vietnamese adolescents) were the focus of an oral health promotion program based on community development principles that used some of the above approaches.<sup>187</sup> Coalitions of CALD community representatives, health and youth workers, teachers and local public dental staff formed planning groups in each community. The initiatives these groups developed included:

- information sessions for local community groups
- development and teaching of an integrated school oral health promotion program<sup>iv</sup>
- development of a bilingual oral health story colouring book
- dental health days
- fridge magnets
- use of local community media
- distribution of information at discos
- production of a play with a dental theme.

Outcomes included:

- community capacity building (shown by ethnic community representation on local health committees and community advocacy for more dental services)
- national distribution of the oral health school curriculum
- translation of the colouring book into other community languages with distribution by a commercial company<sup>188</sup>—strength of evidence 4, IV.

Oral health knowledge, behaviour and status were not measured.

iv Oral health topics were included in media studies via analysis of television food advertisements for their nutritional claims, production of posters in graphic art, and in personal development and home economics classes.

## 9.4 Community-based participatory research (CBPR)

Community-based participatory research (CBPR) is collaborative research that involves community members in all phases of the research process, including problem identification, development of culturally appropriate research methods and engagement in data collection and interpretation, as well as dissemination of findings. It is research ‘with us, not on us’.

Teeth Tales is a community-based participatory research (CBPR) project working in partnership with local cultural organisations in Melbourne.<sup>258</sup> It is described at the end of this section as a good practice study.

## 9.5 Community-based programs for community-dwelling elderly migrants

A program using culturally adapted oral health education, outreach examination and referral using existing social networks has demonstrated improvement in oral health attitudes, oral health knowledge and self-assessed physical health status among community-dwelling elderly migrants. Older Italian and Greek migrants attending community clubs in Melbourne attended a series of oral health seminars in their native language and were given oral health care products and information sheets. Significant improvements were achieved in denture hygiene and self-reported oral hygiene practices compared to the control group. A significant increase in the proportion of participants who independently went on to seek dental treatment occurred<sup>210,211,266</sup>—strength of evidence 3, IV. Further research is required to determine long-term impact and cost-effectiveness.

Italian social clubs in Melbourne formed venues for a similar program that provided oral health seminars and also four supervised toothbrushing sessions. While no significant improvements in plaque scores were found, a statistically significant improvement occurred in gum health (less bleeding) compared to the control group<sup>265</sup>—strength of evidence 3, IV.

## 9.6 Implementation issues

These included:

- tailored approaches based on active participation that addressed social, cultural and personal norms and values<sup>262</sup>
- peer education models that:<sup>267</sup>
  - increased parental knowledge and awareness in a culturally appropriate way and in cultural settings
  - built on social networks and supports
  - facilitated access to culturally appropriate dental and family support services

- use of groups of peers who could share their ways of managing what can be challenging practices (such as the control of frequency of sugar intake, getting children to brush their teeth twice a day with fluoride toothpaste and how to access good dental care)
- provision of information and dental services that are culturally sensitive and competent
- use of community settings, such as social clubs.

One lesson from the Dousta Galla program was the need to integrate health promotion campaigns for some migrant/refugee groups because of the risk of 'promotion saturation'. This was seen to diminish the impact of each health message and to 'instill apathy among the target group'.<sup>264</sup>

### Good practice case study: Teeth Tales

Teeth Tales is a community-based participatory research (CBPR) project working in partnership with local cultural organisations in Melbourne. Participatory research with Iraqi, Lebanese and Pakistani communities of refugee and migrant backgrounds in Melbourne found that tooth decay in children was of concern. The perceived importance of first or primary teeth varied. Generally, it was known that frequent consumption of sugary foods and drinks could cause tooth decay, but toothbrushing with a fluoride toothpaste did not commence until four or five years of age. Most participants were not aware of the benefits of fluoride.<sup>267</sup>

Teeth Tales participants were eager to learn more about why it is important to brush their younger children's teeth, particularly from such a young age, and to learn from peer leaders and fellow participants practical tips for achieving this, and also for reducing sugar intake. The collaborative approach led to the development of new skills and the building and strengthening of individual and organisational capacity of all involved.

Community solutions identified to reduce inequalities in oral health in these communities included:

- involving the community
- using settings such as community gatherings, childcare settings, schools and adult education sites
- making organisations and systems more culturally competent
- providing accurate information and parent support.

The next stage of Teeth Tales is to implement a community-based intervention using two key strategies:

1. A peer education model that will:
  - increase parental knowledge and awareness in a culturally appropriate manner and in cultural settings
  - build on social networks and supports by providing links to community programs and services
  - facilitate access to dental services through organised group dental clinic visits.
2. Reorient existing community services to become culturally competent at all organisational levels.

An assessment of potential costs and potential benefits of the CBPR approach used in Teeth Tales determined that the additional benefits (such as increased relevance and integrity of the findings, understanding and capacity for participation in future projects among the community and the researchers and changed oral health practices leading to improved oral health) was worth the slight additional cost compared to a more traditional research approach.<sup>268</sup>

## 10 People with special needs

### Summary

Health and welfare workers given training and support can be used as oral health champions to promote the oral health of people with disabilities.

Oral health-promoting policy and practice in residential care settings includes oral care plans for residents, access to dental health aids (toothbrushes and fluoride paste) and timely access to dental care.

Group and individual oral health literacy sessions for people with special needs can enhance oral health knowledge and behaviour. Successful approaches include motivational interviewing, dental bingo and crosswords and use of electric toothbrushes and oral health goal charts.

Measures found to enhance the oral health of low-income people with a mental illness include:

- assertive outreach by a dentist
- collaboration with mental, dental and other allied health workers and programs
- peer modelling
- efficient, flexible and sensitive clinical care.

Several approaches to engaging people with substance abuse issues have shown potential for increasing oral health literacy and use of dental services.

Some evidence exists that capacity-building approaches with hospital staff can improve the oral health of people who are medically compromised (that is, who have complex medical conditions).

A program with people with diabetes showed that simple reinforcement of oral health messages from other health care providers can be useful.

A program that developed tailored articles on oral health for people with cystic fibrosis found knowledge and skills were improved.

The oral health of prisoners is poorer than in the general population, and dental health is perceived as less important than other aspects of health.

### Context

An increased risk of dental problems can occur among people with special needs when people's ability to care for themselves is reduced. Diets and fluoride exposure may not be under personal control.

Some people may be given medications containing sugar. Medications can also dry out the mouth and increase the risk of tooth decay. Sucking on sweets to relieve the symptoms of dry mouth can add to the risk.

A recent systematic review of the oral health of people with intellectual disabilities found that this group has poorer oral hygiene, more gum disease and more untreated tooth decay than the general population.<sup>269</sup>

Psychiatric disabilities and their treatment may cause significant oral disease.

Disabilities can affect a person's ability and desire to perform preventive oral hygiene procedures. Cognitive deficits (for example, poor memory or attention) can limit the impact of skill training programs.

People with visual impairments can be at a disadvantage with regard to their oral health because they are not able to detect oral disease visually.

Many people with a disability are often in lower socioeconomic groups.<sup>270</sup>

Information about 16 programs focused on people with special needs were found in the literature review. All had sound theoretical rationale and program logic, some with pre- and post-testing and some with only post-testing. That places the strength of evidence for these programs at the public health level 3 or 4 and at the NHMRC level IV.

These programs were included because they provide an indication of current best practice for people with high oral health needs and can be considered promising interventions. Interventions with their impacts and strength of evidence are outlined in Table 11 Oral health promotion interventions for special needs groups. No cost-effectiveness studies were identified. Future oral health promotion programs for this group require stronger methodology with more rigorous evaluation.

Table 11 Oral health promotion interventions for special needs groups

Intervention	Highest strength of evidence		Outcome measure	Target group
	Public health criteria	NHMRC criteria		
1 Use of health and welfare workers as oral health champions: <ul style="list-style-type: none"> <li>welfare and disability workers and carers<sup>120,271,272,273</sup></li> <li>diabetes educators<sup>274</sup></li> <li>youth workers<sup>275</sup></li> <li>other health workers (see Sections 12.1.1 General practitioners as oral health promoters, 12.1.2 Pharmacists as oral health promoters and 12.1.3 Other health workers as oral health promoters with necessary training and support provided).<sup>276,120,277, 278,279</sup></li> </ul>	3	IV	Behavioural change Increase in knowledge and skills	People with: <ul style="list-style-type: none"> <li>mental illness</li> <li>disabilities</li> <li>diabetes</li> <li>substance abuse issues.</li> </ul>
2 Policy and practice in residential care settings <sup>280</sup> <ul style="list-style-type: none"> <li>oral care plans for residents</li> <li>access to dental health aids (toothbrushes and fluoride paste)</li> <li>timely access to dental care.</li> </ul>	3	IV	Behavioural change Policy change Increase in knowledge and skills	People in residential care
3 Oral health literacy sessions for people with special needs: <ul style="list-style-type: none"> <li>groups and/or individuals<sup>281,282,283,284</sup></li> <li>motivational interviewing<sup>282</sup></li> <li>electric toothbrushes.<sup>281</sup></li> </ul>	3	IV	Behavioural change Increase in knowledge and skills Improvement in plaque scores	People with special needs

A 2007 review of the literature on the oral health of people with special health care needs identifies four strategies to improve oral health:

- empowering individuals and their carers
- preparing the dental workforce to serve people with special needs
- making the financing systems for dental care more responsive to this group
- improving the organisation of community resources to improve access to dental care.<sup>285</sup>

The reviewers found that while there were studies to support these approaches, significant gaps in the literature about effective programs existed.

## 10.1 People with mental illness

Two Victorian programs have worked with people with a mental illness: Dental as Anything and the Richmond Community Health Centre Program.

The Dental as Anything Program in inner-city Melbourne targets low-income people with a mental illness, and utilises:

- assertive outreach by a dentist
- collaboration with mental, dental and other allied health workers and programs
- peer modelling
- efficient, flexible and sensitive clinical care.<sup>278</sup>

The key success of the program has been to reach people who have had little access to relevant oral health information and care.

The Yarra Oral Health Project—Oral health for people with mental illness, aimed to increase capacity among mental health workers to provide oral health information and mediate access to services for those with mental illnesses.<sup>120</sup> Referral pathways to public dental care were developed and mental health workers and dental staff increased their knowledge of oral health issues and skills for managing people with a mental illness.

Motivational interviewing appears to be effective—at least in the short term—in enhancing the impact of oral health education sessions for people with a mental illness.<sup>282</sup> In a US program with sixty participants, plaque and knowledge scores improved for the oral health education session-only group, but improvement was significantly higher in the education session plus motivational interviewing group. The intervention also included provision of electric toothbrushes and weekly reminder calls for four weeks during the eight-week program. A personal reminder system was used, whereby participants were encouraged to place Post-it notes in a box when they brushed their teeth.

Oral health education sessions and use of electric toothbrushes can improve oral hygiene for people with a mental illness.<sup>281</sup> Electric toothbrushes improved plaque scores, but not as much as use after an oral health education session.

A program in a midwestern US residential setting for people with a mental health illness found that training for carers combined with feedback on what improvement they had on the oral health of residents improved the plaque scores more than the training alone.<sup>273</sup>

## 10.2 People living in supported residential services

Two Victorian programs have worked in supported residential services.

The overall goal of the Pension-Level Supported Residential Services Oral Health Initiative in Melbourne was to improve the oral health of residents and increase access to dental care.<sup>271</sup> Many of the residents had mental health issues. Dental hygienists and assistants worked in these settings with staff and residents to understand the barriers to oral health. Two approaches were trialled: group education and provision of oral health kits and a more individually targeted approach with oral health assessments, referral for treatment, use of oral health goal charts, provision of oral health kits and education for residents and staff. The oral health kits contained toothbrushes, fluoride toothpaste and water bottles. Both approaches led to reported improvements in residents cleaning their teeth and increased access to dental care. The more individualised approach was judged to be more acceptable to residents, staff and other health services, because residents could participate at their own pace. The program was resource intensive.

The resources used in the Yarra Oral Health Project were adapted by a program in rural Victoria, the Primary Care Partnership—South West Oral Health Project.<sup>120</sup> Innovative ways to increase the oral health knowledge of residents in supported residential care facilities built on the residents' favourite pastimes by developing dental bingo and dental crosswords.



### 10.3 People with disabilities

Several programs have developed training packages for carers of people with disabilities. These, like the programs directed at the elderly, demonstrated some changes in knowledge, but over the short reporting period, little change was observable in oral health indicators. All programs highlight the difficulties in incorporating oral health practices into busy workplaces and the need for capacity-building approaches in these settings to establish organisational support.<sup>272,286</sup>

An accommodation service for people with an intellectual disability in the northern suburbs of Melbourne developed the Brush Up on Oral Health Project.<sup>280</sup> This project is presented as a good practice study at the end of this section.

An oral care link nurse was employed in a hospital for neuro-disability in the UK. Her role was to assist the dental team in the promotion of oral care within the hospital and aid communication within the multidisciplinary team. Oral care guidelines were developed in conjunction with the quality assurance department. Training was provided to at least one unqualified nursing auxiliary from each ward. Formal evaluation, by clinical audit, indicated that the project continued to improve the overall standard of oral care throughout the hospital, but required ongoing support, commitment and enthusiasm from the dental team.<sup>279</sup>

### 10.4 People with visual impairments

A combination of group and individual sessions was shown to increase oral hygiene levels in young visually impaired Taiwanese children.<sup>287</sup> This intensive program employed the creative use of other senses (touch, taste and smell), models and hand-over-hand instruction to teach oral hygiene.

Individual oral health education sessions can improve the oral health knowledge of visually impaired students. Significant increases in knowledge were shown when sixty-five Turkish special-school students received toothbrushes and paste and three individual sessions with two-month intervals.<sup>284</sup>

### 10.5 People with substance abuse issues

A community outreach program for homeless youth in Sydney had success in increasing oral health literacy and dental service use. Learnings included the importance of collaborating with youth workers, the need for dental professionals to understand cultural issues and being flexible in making appointments. The program was labour intensive, and long-term health outcomes were not evaluated.<sup>275</sup>

A multi-strategy approach using existing health care networks to improve knowledge and care planning for people engaged in methadone programs (general practitioners, pharmacists, drug and alcohol workers, community health centre and dental services staff) has shown potential.<sup>288</sup> Interventions in this outer eastern Melbourne program included Teeth Tips information wallet cards, priority access for dental care and health worker education sessions. Pharmacies were found to be an appropriate setting to access methadone users.

### 10.6 People who are medically compromised

Programs to promote the oral health of patients with complex medical conditions in hospitals through capacity-building approaches with hospital staff (oral health education, protocol development, patient information and network development with the hospital dental clinic) have shown potential to be effective, although the evidence base is small and not well evaluated for oral health outcomes and sustainability.<sup>276,277</sup>

### 10.7 People with diabetes

A program using diabetes educators to promote oral health in Finland showed improvement in knowledge and oral hygiene among clients. This program suggests that simple reinforcement of oral health messages from other health care providers can be useful.<sup>274</sup>

### 10.8 People with cystic fibrosis

A program that developed tailored articles on oral health for a cystic fibrosis support organisation found that the information was well received and knowledge and skills were improved among readers, but that a need for more information for dental care providers was also evident.<sup>283</sup>

## 10.9 Prison populations

A 2008 systematic review of the oral health of prisoners determined that oral health is poorer than in the general population, and that dental health is perceived as less important than other aspects of health.<sup>289</sup>

## 10.10 Implementation issues

Capacity building for implementation of programs to improve the oral health of people with disabilities requires workforce development, organisational development and resources.

Capacity building is needed in the organisations that provide care for people with a disability as well as in dental health care organisations.

Innovative approaches to providing oral health information for some people with a disability include use of favourite pastimes such as bingo and crosswords. Motivation for oral hygiene can include use of oral health goal charts.

### Good practice case study: Brush Up on Oral Health

The Brush Up on Oral Health Project was developed to improve the oral health of people with intellectual disabilities living in group homes managed by the Victorian Department of Human Services.<sup>280</sup> It focused on residents in seventeen group homes situated in the North West Metropolitan region of Melbourne.

Dental Health Services Victoria and Plenty Valley Community Health Service worked with staff from the Disability Accommodation Services of the department. Disability workers in each group home were selected as 'oral health champions'. These staff were trained how to:

- conduct oral health assessments
- develop oral health care plans
- provide daily oral care
- refer to oral health staff when necessary.

An oral care practice manual and a DVD were developed to facilitate the training. A second DVD was produced to increase dentists' skills and confidence in caring for people with an intellectual disability.

Outcomes of the project included a six-fold increase in referrals to dental services (private clinics, public dental hospital, community health service or dental vans). In addition, the Department of Human Services has adopted policies and practices to improve the oral health of people with intellectual disabilities living in departmentally managed group homes. Four strategies are now mandated:

1. annual general practitioner screening of residents' oral health
2. the provision of oral care practice manuals to staff
3. development of oral health care plans for each resident
4. regular dental reviews.

This project is a good example of the partnership approach to residents' oral health. Through training, and reinforced by policy, the capacity of the relevant workforce has been built, and residents have improved access to oral health assessments and appropriate oral health care.

## 11 Workplace settings

### Summary

Strong evidence exists for the effectiveness of multi-component interventions that include physical activity as well as nutrition, enhanced access to nutritious food and promotional strategies at point-of-purchase.

Oral health promotion programs in workplaces can improve oral hygiene, reduce the amount of work time lost and increase access to dental care.

Screening for gum health, immediate feedback and an oral health awareness session to randomly selected employees in four workplaces resulted in significant improvements in gum health after six weeks.

Two programs involving health education and examinations by dental hygienists resulted in reduced tooth decay rates, improved gum health and treatment attendance rates and decreased treatment costs after three years.

An oral health program in a Japanese company was found to be cost-effective for employers when employees participated twice to four times over a seven-year period.

### Context

An estimated 11 million Australians attend workplaces, and approximately 70 per cent of the population are in full-time employment.<sup>290</sup>

### 11.1 Evidence

Six studies were identified that involved oral health promotion programs in workplaces. Four were from Japan, where employers have provided dental care as part of workers' entitlements. The other two studies were from Europe. No studies were found from Australia. A recent rapid review of programs in the workplace to prevent chronic disease did not consider oral health promotion directly, but reviewed the evidence for programs that addressed the common risk factors of nutrition, smoking, alcohol and stress.<sup>291</sup>

Interventions, along with their impacts and strength of evidence, are outlined in Table 12 Oral health promotion interventions for workplaces.

**Table 12 Oral health promotion interventions for workplaces**

Intervention	Highest strength of evidence		Outcome measure	Target group
	Public health criteria	NHMRC criteria		
1 Multi-component interventions that include physical activity as well as nutrition <sup>291</sup>	1	I	Behavioural change regarding diet	Workers via workplaces
2 Group oral health literacy sessions <sup>292,293</sup>	2	II <sup>i</sup> III-1 <sup>ii</sup>	Behavioural change Improvement in gum health Increase in knowledge and skills	
3 Provision of oral health literacy sessions and employee-funded oral health care <sup>294,295,296,297</sup>	2	III-2	Improvement in gum health Increase in knowledge and skills Cost saving for employers after three years	

<sup>i</sup> For a short-term program of six weeks. No follow-up to determine if improvements were maintained.<sup>292</sup>

<sup>ii</sup> For a program that showed maintenance of improved gum health for 3.5 years.<sup>293</sup>

Bellew's rapid review included 16 systematic reviews and eight meta-analyses. Strong to definitive evidence was found for:

- multi-component interventions that include physical activity as well as nutrition
- enhanced access to nutritious food
- promotional strategies at the point of purchase.

Indicative evidence<sup>v</sup> was found for the 'cross-cutting approaches' of:

- use of the transtheoretical model (stages of change)
- individual tailoring of interventions, Internet-provided information
- benefits-linked financial incentives
- telephone-based high-risk intervention coaching
- self-directed goal-setting for change.

Workplace preventive and screening services improved oral hygiene and gum health among blue-collar workers and reduced the amount of work-time lost in a Scandinavian program included in the previous Victorian evidence-based oral health promotion review<sup>293</sup>—strength of evidence 2, III–1. The potential to increase access to dental care by reaching people who normally have low dental health awareness or sporadic contact with services was demonstrated. Workers who were known to be members of peer groups met monthly in small groups with a dentist for five months and discussed oral health issues raised by the groups. Plaque and gum health scores improved by approximately 50 per cent and were maintained for three-and-a-half years. Cost-effectiveness was not reported.

Fishwick et al. provided screening for gum health, immediate feedback and an oral health awareness session to randomly selected employees in four workplaces in London. A second examination after six weeks found a significant improvement in the participants' gum health; whereas the control group's scores remained static<sup>292</sup>—strength of evidence 2, II. No follow-up was conducted to determine if these improvements were maintained.

Two programs in shipyards, factories and offices in Japan reduced tooth decay rates, improved gum health and treatment attendance rates, and decreased treatment costs after three years<sup>296,297</sup>—strength of evidence 2, III–2. Both programs showed increased numbers of treatment services and costs in the first year, but overall benefits as far as employer treatment costs after three years. Dental hygienists were used to conduct examinations and group health education sessions. Economic reviews of the two Japanese programs have been undertaken. The Centre for Reviews and Dissemination determined that these reviews were cost studies and not economic evaluations.<sup>298, 299</sup>

An oral health program in another Japanese company was found to be cost-effective for employers when employees participated two to four times over a seven-year period<sup>295</sup>—strength of evidence 3, IV. Methodological problems (such as volunteer bias) limit the strength of evidence. In the fourth Japanese program, annual oral health examinations were provided to workers, followed by group oral health education sessions. After three years, oral hygiene and gum health amongst participants improved significantly compared to non-participants<sup>294</sup>—strength of evidence 3, IV. However, participation rates for the group health education sessions were low, prompting the author to suggest that individual approaches may also be necessary.

## 11.2 Implementation issues

Use of peer groups in workplaces has been shown to be successful.

The Japanese programs show that oral health programs in workplaces will be taken up by employees, that hygienists can play a major role in these settings and that there can be cost-benefits to employers who provide dental care.

An oral health component could be included in multi-component workplace interventions, for example, toothbrushing with fluoride toothpaste at work (see Section 8.2.1 Australian programs).

v Indicative evidence was considered to be when an association was found between the exposure to the intervention and improvement occurred, but where it was not possible to determine whether the association was causal

Part C Interventions by  
integrated health promotion categories



## 12 The Integrated Health Promotion categories

### Introduction

This section presents the strength of evidence for interventions according to the Integrated Health Promotion (IHP) framework as outlined in Section 3.1 Health promotion. Links are made to interventions presented in Part B Interventions by priority groups and settings. A summary of interventions by IHP categories and by high-risk groups/settings is presented in the Executive summary.

### Summary

Health and welfare professionals, such as general practitioners, pharmacists, maternal and child health nurses, aged care workers and Aboriginal/Indigenous health workers, can act as oral health promoters.

These professionals can provide some or all of the following preventive oral health services:

- oral health counselling/anticipatory guidance (for example, as part of well child visits)
- application of preventive oral health products, such as fluoride varnish to preschool children
- oral screening/early identification of oral problems, such as the Lift the Lip Program
- referral to oral health professionals
- assistance with oral hygiene care.

Limited evidence exists for the effectiveness of screening for early detection of oral cancer on a population basis, but examination of the oral soft tissues should be a routine part of dental examinations, especially for groups at higher risk of oral cancer, such as smokers and heavy drinkers.

Smoking cessation brief interventions by oral health professionals are effective.

Mouthguards decrease the risk of orofacial injuries.

Small groups and peer education approaches can be used successfully for oral health promotion.

Mass media can act as a viable tool for addressing a range of health behaviours.

Restricting TV food advertising to children has been identified as one of the most cost-effective population-based interventions for the prevention of obesity in children. The reduction in consumption of sugary food and drink is also likely to also reduce tooth decay rates.

Community action, such as the UK Chuck Sweets off the Checkout campaign, can encourage and empower communities to change health behaviours.

Water fluoridation remains a cost-effective preventive measure in Australia.

Strong evidence exists that topical fluorides (fluoride toothpaste, fluoride varnish and fluoride mouth rinses) prevent tooth decay.

Sugar-free products, including those that containing sugar substitutes such as xylitol and sorbitol, in chewing gums and confectionery, have the potential to reduce tooth decay.

Advocacy by health professionals is important for raising the profile of oral disease.

### 12.1 Screening and individual risk assessment

Screening is the use of a test or investigatory tool to detect individuals at risk of developing a disease that can be prevented or treated (see the IHP toolkit).<sup>17</sup> Individual risk factor assessment is a process of detecting the overall risk of a single disease or multiple diseases.

Extensive literature exists on the benefits of integrating an oral health focus into existing programs, particularly through using primary health workers such as well-child nurses (maternal and child health nurses or health visitors), general practitioners, paediatricians and pharmacists. Studies also exist that utilise aged care workers and Aboriginal/Indigenous health workers. Two recent literature reviews summarise studies.<sup>300,301</sup> Most reports were descriptive with process evaluation and not oral health impact evaluation. Only one cost-benefit analysis was found. The study by Kagihara et al. concludes that primary health care providers are uniquely positioned to play a significant role in the prevention of tooth decay and should be trained and supported to undertake decay risk assessment, intervention, education and referral.<sup>301</sup>

Five preventive oral health promotion services can potentially be provided by primary health workers:<sup>300,301</sup>

1. oral health counselling/anticipatory guidance—this may be integrated into well child visits and can include educating, motivating and instructing in practical aspects of oral health care
2. application of preventive oral health products (such as fluoride varnish) to preschool children
3. oral screening/early identification of oral problems such as Lift the Lip
4. referral to oral health professionals
5. assistance with oral hygiene care.

These interventions overlap with the second category of IHP—health education and skill development. The strength of evidence for the impact of health workers who can act as oral health promoters are summarised in Table 13 Evidence for the impact of health workers who can act as oral health promoters.

**Table 13 Evidence for the impact of health workers who can act as oral health promoters**

Health and welfare workers	Highest strength of evidence		Target group
	Public health criteria	NHMRC criteria	
1 General practitioners <small>302,303,304,305,306,307,308,119,309,205</small>	2	II	Preschool children and their carers
2 Pharmacists <sup>310,120,311,288,312,313</sup>	3	IV	Population
3 Maternal and child health nurses (see Sections 5.6 Integration of oral health into well child visits, including Lift the Lip, 8.3 Use of health workers as oral health champions, 9.2 Maternal child health nurses' enhanced focus on oral health)	3	IV	Preschool children and their carers
4 Aged care workers (see Section 7.2.3 Training care workers and appointing oral care 'champions')	2	II	Older people
5 Aboriginal/Indigenous health workers (see Section 8.3 Use of health workers as oral health champions)	2	1	Indigenous preschool children and their carers

### 12.1.1 General practitioners as oral health promoters

General medical practitioners ('physicians' in the US) have been shown to be capable of integrating oral health into their work:

#### Oral health counselling/anticipatory guidance

In North Carolina, US, physicians integrated oral health counselling/anticipatory guidance services into a well-child visit for underserved preschool children when publically (Medicaid) funded<sup>304</sup>—strength of evidence 3, IV. Evaluation was of the extent of integration and not the impact of oral health.

#### Application of preventive oral health products

In more than ten US states physicians receive Medicaid payments for applying fluoride varnish to the teeth of young disadvantaged children. Physicians applying fluoride varnish each six months as part of a well-child visit was effective in preventing tooth decay<sup>302,308</sup>—level of evidence 3, IV.

In the most recent cost-effectiveness study found, cost savings to Medicaid in North Carolina, US, were approached by the time a child reached 48 months of age, but not in the first 42 months of a child's life<sup>308</sup>—level of evidence 3, IV.

#### Oral screening/early identification of oral problems

After two hours of training, physicians and physician assistants can perform oral screenings approaching the accuracy of dentists which are suitable for the purposes of referral for a complete evaluation by a dentist<sup>307</sup>—strength of evidence 3, IV. Variations of general practitioner Lift the Lip programs have been introduced successfully in South Australia<sup>119</sup>—strength of evidence 3, IV. Process evaluation determined that general practitioners have accepted this role and have referred children to public dental services. General practitioner oral screening, as part of the older persons wellness check, has also been successful in South Australia<sup>205</sup>—strength of evidence 3, IV. General practitioners use a six-question screening check to identify people who require a referral to a dental professional.

### Referrals to dentists

In North Carolina's Into the Mouths of Babes Program, young children are assessed by physicians for early childhood tooth decay and referred to a dentist. Physicians' referrals increased access to dentists for children with early childhood decay by 36 per cent, compared to 12 per cent pre-program<sup>306</sup>—level of evidence 3, III–2.

The two most important factors affecting the likelihood of paediatric primary care providers' referral of high-risk children were found to be confidence in screening-risk assessment and self-perceived referral difficulty<sup>303</sup>—strength of evidence 3, IV. Gussy et al. determined that these two factors were also relevant for maternal child health nurses in rural Victoria<sup>122</sup>—see Section 5 Pregnant women, babies and young children.

#### Training programs

Training programs for family medicine residents in the US have shown increases in oral health knowledge plus a positive reception of teaching of the course by dental residents<sup>305</sup>—strength of evidence 3, IV. Paediatric residents sustained increases in knowledge of these services for at least one year after training<sup>309</sup>—strength of evidence 3, IV.

A relatively high proportion of medical practices appear capable of adopting these preventive dental services within a one-year period regardless of the methods used to train primary health care providers<sup>304</sup>—strength of evidence 2, II. The authors note that the financial incentives (\$38–\$42 per preventive dental visit) may have been sufficient motivation for practitioners to provide the service.



### 12.1.2 Pharmacists as oral health promoters

Six studies were found that related to use of pharmacists to promote oral health. Reviews in the UK<sup>310,313</sup> and South Africa<sup>312</sup> have identified that community pharmacists can make oral health education material available, recommend sugar-free medication, advise on minor oral health problems and make appropriate referrals to dental care. In a questionnaire of a randomised sample of community pharmacists in the UK, three-quarters said that they were asked about oral health topics at least weekly.<sup>311</sup> The study also determined that pharmacists received little information about oral health in their under or postgraduate education.

Pharmacists have contact with people who do not make regular dental visits. A program in outer eastern Melbourne used pharmacies as a setting to contact people who attended for their regular dose of methadone<sup>288</sup>—see Section 10 People with special needs.

An online continuing education program for community pharmacists to assist older people care for their mouths was developed in Victoria. Professional associations gave approval for the awarding of continuing professional education credit points to those who completed the online course<sup>120</sup>—strength of evidence 3, IV.

See also Section 12.5 Settings and supportive environments regarding the pharmacist's role in interventions to promote sugar-free medication.

### 12.1.3 Other health workers as oral health promoters

The roles that other health workers can carry out to promote oral health are outlined in the following sections: maternal and child health nurses (Section 5.6 Integration of oral health into well child visits, including Lift the Lip), aged care workers (Section 7.2.3 Training care workers and appointing oral care 'champions') and Aboriginal/Indigenous health workers (Section 8.3 Use of health workers as oral health champions). Midwives are potential oral health promoters through their promotion of the oral health of pregnant women and provision of information about care of babies' oral health.<sup>314</sup> School nurses, nurse practitioners and domiciliary (district) nurses can also undertake oral health promotion roles as part of their broader health promotion responsibilities.

### 12.1.4 Targeted screening for those at high risk for oral cancer

A 2006 Cochrane review of the evidence for screening for oral cancer concluded that limited evidence exists on the effectiveness of screening for the early detection of oral cancer, and that it could not be recommended as a whole-of-population strategy.<sup>315</sup> Downer et al. came to the same conclusion from their systematic review.<sup>316</sup>

Gomez et al. determined from their recent meta-analysis that delayed diagnosis of oral cancer was related to advanced stage of the disease when diagnosed.<sup>317</sup> However, their results need to be interpreted with caution, because of the small number of studies included and the methodological weaknesses of some of the studies. More research is required in this area.

General agreement exists that examination of the oral soft tissues should be a routine part of dental examinations, especially for groups at higher risk to oral cancer such as smokers and heavy drinkers. The World Health Organization recommends that prevention of oral cancer be an integral part of national cancer control programs and that oral health professionals or primary health personnel be involved in detection, early diagnosis and treatment.<sup>318</sup>

Social marketing has been used to raise awareness about oral cancer and to encourage people to have a mouth examination (see Section 12.3 Mass media).

## 12.2 Health education and skill development

Health education and skill development includes the provision of education to individuals (through discrete, planned sessions) or groups, with the aim of improving knowledge, attitudes, self-efficacy and individual capacity to change (*IHP toolkit*).

### 12.2.1 Use of health workers

The role of health workers in oral health education and skill development is outlined in Sections 12.1.1 General practitioners as oral health promoters, 12.1.2 Pharmacists as oral health promoters and 12.1.3 Other health workers as oral health promoters. The approaches of motivational interviewing and anticipatory guidance as promising practices in promotion of oral health are presented in Section 5.8 Community-based preventive programs for expectant and/or new mothers.

### 12.2.2 Smoking cessation brief interventions by oral health professionals

Oral health clinicians have been shown to be able to facilitate smokers to quit (Cochrane systematic review).<sup>82</sup> In addition, smokers attending dentists have positive attitudes towards dentists' role in smoking cessation.<sup>82,83</sup> Given the impact of smoking on oral health (see Section 2.8 Oral health links to Victorian health promotion priorities), and that smoking is a common risk factor for other diseases (such as cancer, respiratory and cardiovascular disease), oral health professionals have a valid role to contribute to smoking cessation.

Activity in Australia includes the South Australian Dental Service Smoking Cessation Project <<http://www.sadental.sa.gov.au/desktopdefault.aspx?tabid=197>>, and NSW Health's support and training for oral health professionals to provide smoking cessation advice. NSW Health has policies that:

- patients seen in the public dental sector must have their smoking status checked at their initial visit and each time their medical history is updated
- all patients who smoke must be approached in a non-judgemental way about their interest in quitting
- all patients who are interested in quitting must be advised of the Quitline and/or be provided with relevant information.

The policy and training material is available at the NSW Government Health Publications and Resources website <<http://www.health.nsw.gov.au/cohs/resources.asp>>.

The Australian Dental Association Victorian Branch (ADAVB) worked with QUIT Victoria in 2002 to develop training for dentists to provide short smoking cessation interventions under a Department of Human Services-funded oral health promotion program grant.<sup>120</sup> A QUIT self-training manual is available from QUIT <[http://www.quit.org.au/downloads/Dental\\_ordform.pdf](http://www.quit.org.au/downloads/Dental_ordform.pdf)>.

See Section 15.2 Online resources for a list of addresses for online resources.

### 12.2.3 Mouthguards

A recent systematic review has concluded that mouthguards have been consistently shown to decrease the risk of orofacial injuries.<sup>319</sup> In their meta-analysis, Knapik et al.<sup>320</sup> determined that the overall risk of an orofacial injury is 1.6 to 1.9 times higher when a mouthguard is not worn, relative to wearing a mouthguard. While some doubt exists as to whether the outcomes of the studies examined could be pooled because of their differing methodologies, strong evidence exists that mouthguards should be used where significant risk of orofacial injury exists.<sup>320</sup>

### 12.2.4 Small groups and peer education

Oral health promotion using small groups has been used successfully with mothers of young children (Section 6.9.3). The use of a layperson of similar background and culture to the participants has shown success in preventing tooth decay in young children in a Canadian Vietnamese population (Section 9.1 Peer oral health worker (CALD community health worker)) and in a community-based participatory research project with refugee and migrant communities in Melbourne (Sections 9.4 Community-based participatory research (CBPR) and 9.5 Community-based programs for community-dwelling elderly migrants). Use of peer leaders has shown some success in school oral health promotion programs (Section 6.3 School-based oral health education programs).

### 12.2.5 Carer-held child health records

Child health records that include health promotion information for key stages facilitate a more integrated care and health promotion approach for children. These parent-held records can be used by all primary health care workers who see children.<sup>321</sup>

## 12.3 Social marketing and health information

Social marketing involves programs designed to advocate for change and influence the voluntary behaviour of target audiences, which benefits this audience and society as a whole. It typically uses persuasive and cultural change processes (not just information). Health information aims to improve people's understanding about the causes of health and illness, the services and support available to help maintain or improve health, and encourage personal responsibility for actions affecting health (*IHP toolkit*).

## Mass media

A recent rapid review of the literature on mass media interventions concluded that mass media can act as a viable tool for addressing a range of health behaviours.<sup>322</sup> The review identified seven critical success factors:

1. use of theory—sound theoretical framework and a careful understanding of determinants of the behaviours being targeted
2. community involvement—in the development, implementation and evaluation
3. targeted and tailored—to suit the behaviour of the target audience
4. consider all influencing factors—that will, or are likely to influence the target groups
5. appropriate and supportive environment—identify and target barriers that prevent adoption of the recommended change
6. comprehensive and integrated strategy—complement mass media campaigns by other programs such as community mobilisation, social support, counselling, policy changes and access to services
7. assessment and analysis.

Earlier systematic reviews of oral health promotion conclude that only limited effects of oral health mass media campaigns had been demonstrated.<sup>323,262</sup> Kay and Locker note that because the evaluation methodologies of studies were inadequate, no specific conclusions regarding the role of mass media could be drawn.<sup>323</sup> Sprod et al. identify that the most effective mass media approach was through using oral health home packs distributed through schools to children for home use supervised by their parents.<sup>262</sup> Kay and Locker propose that local campaigns that have an active involvement component may have a role in promoting oral health awareness.

Four more recent studies that employed mass media to promote oral health were identified. A Stop Using the Bottle After Nine Months campaign in the Netherlands used print, radio and TV media, facts sheets for health care workers, parent and child information provision and dental practitioner and maternal and child health nurse education. The program had wide reach, and a 50 per cent recall of the slogan, but has yet to be evaluated in oral health outcome terms.<sup>324</sup> A campaign using brochures, newspapers, radio and TV to increase the knowledge of gum disease in Sweden resulted in increases in knowledge among 50–75 year olds<sup>325,326</sup>—strength of evidence 3, IV.

Papas et al. reported limited success in increasing public awareness of oral cancer via a billboard campaign in Florida, US<sup>327</sup>—strength of evidence 5. Their conclusion was that there should be a greater targeting of those at higher risk of oral cancer. Most recently, a multifaceted social marketing campaign to increase awareness of and screening for oral cancer in African Americans in the US showed that a campaign (including radio ads, billboards, a hotline and educational sessions) can effectively target a high-risk population and result in a significant number of people being screened<sup>328</sup>—strength of evidence 3, IV. Impacts on oral cancer incidence and mortality rates have not yet been reported.

Watt and Fuller recommend that because advertising can be prohibitively expensive, an alternative is to build relationships with local media. They suggest that regular, topical releases to local papers, radio and television can maintain awareness about oral health issues<sup>31</sup>—strength of evidence is ‘expert opinion’.

## 12.4 Community action (for social and community change)

Community action aims to encourage and empower communities (both geographic and communities of interest) to build their capacity to develop and sustain improvements in their social and physical environments (*IHP toolkit*). Community development approaches aim to facilitate change to people’s immediate social and political environment in a participative fashion, drawing on the skills, understandings and needs of local communities. Outcomes of such projects contribute to improvements in the social conditions which in turn shape the health choices of communities.

A recent systematic review of the literature on community-based interventions to prevent chronic disease<sup>329</sup> reviewed nine systematic reviews and two literature reviews, and concluded that the best evidence suggests that programs should be underpinned by six core elements:

1. programs are integrated and comprehensive
2. program implementation involves multiple settings
3. multiple interventions are employed
4. the intervention should target change among individuals, groups and organisations
5. active involvement of the community in planning, implementation and evaluation should occur
6. multiple individual-level interventions should be used.

Oral health promotion interventions that involve community action include programs for preschool children in low-income communities (Section 6.8.1), in Aboriginal and Indigenous communities (Section 8.2.1 Australian programs) and in culturally and linguistically diverse communities (Section 9.3 Community development approaches).

Strengthening social networks, social support, organisational capacity and increased consumer and community knowledge and self-efficacy in relation to health and skills in self-care are potentially beneficial to health gains. Oral health activities include:

- water fluoridation advocacy and implementation projects
- the development of healthy food supplies and services
- the establishment of outreach and preventive services
- oral health awareness campaigns.

Health professionals and primary care workers act as the gatekeepers of information and influence policy-making environments. The development of inter-professional relationships and networks contribute to the ability to sustain supportive community action, cross-referral and knowledge, as well as 'seeding' for common risk factor approaches. Examples of such activities include undergraduate health practitioner programs, continuing education programs for maternal and child health nurses, primary school nurses, child and aged care workers and the utilisation of pharmacists, in order to increase community capacity for oral health promotion.

#### 12.4.1 Food and drink campaigns

The UK Chuck Sweets off the Checkout campaign, which started in 1992, resulted in major supermarket chains removing sweets from checkout lines. The predicted proportion of checkouts free of sweets increased from 31 per cent to 67 per cent over three years. Sales of confectionery in supermarkets fell by 30 per cent.<sup>323</sup> The impact on oral health is not known.

Further good practice approaches to reduce sugar consumption include:<sup>330</sup>

- Improve labelling information on foods and drinks to specify per cent sugars and pH levels of drinks.
- Discourage addition of sugars to weaning foods, drinks and vitamin supplements.
- Encourage reduction in sugars content of soft drinks, breakfast cereals, confectionery and other sugary foods and drinks.
- Encourage caterers to reduce sugars content of prepared foods.
- Encourage vending machine providers to include sugar-free choices.

#### 12.4.2 Sugar-free medicine campaigns

Children taking long-term sugar containing medicine have an increased risk of developing dental decay. Four English studies were identified that promoted the use of sugar-free medicines. The most successful campaign used a prescribing incentive scheme with general practitioners in London. The proportion of medicines prescribed as sugar-free formulations was identified as a quality marker, with higher prescribing earning higher reimbursement<sup>331</sup> –strength of evidence 2, III–2. A publicity campaign for health care workers and the community occurred, which included use of leaflets and posters plus training for general practitioners, pharmacists, dentists and health visitors. The prescribing incentive scheme resulted in sugar-free prescribing increasing from 27 per cent to 45 per cent; whereas non-participating practices showed a decrease from 20 per cent to 14 per cent. The publicity campaign did not change prescribing practices.

A public information campaign to encourage parents to ask for sugar-free medicine in conjunction with training for health professionals led to a modest, but significant, increase in sugar-free prescribing<sup>332</sup>—strength of evidence 2, III–3. Modified prescribing computer software and information provided to doctors and pharmacists failed to increase knowledge and awareness of the role of liquid medicines in dental decay<sup>333</sup>—strength of evidence 3, IV. However, modification to the prescribing software did increase prescribing habits for sugar-free medicines<sup>334</sup>—strength of evidence 3, IV. Computer prescribing software can be designed to default to a sugar-free preparation where one exists.

## 12.5 Settings and supportive environments

Interventions in this category include organisational development, economic and regulatory activity and advocacy to develop a health-promoting environment (*IHP toolkit*). A key intervention for the prevention of dental decay is the use of fluorides.

### 12.5.1 Use of fluorides

#### Water fluoridation

Fluoridation is the controlled adjustment of the underlying fluoride concentration in drinking water to that level that prevents dental decay. The most recent systematic review by the National Health and Medical Research Council (NHMRC) in 2007 determined that fluoridation of drinking water remains safe and is the most effective and socially equitable means of achieving community-wide exposure to the dental decay prevention effects of fluoride<sup>37</sup>—strength of evidence, III–2. Water fluoridation has been identified by the Centers for Disease Control in the US as one of the top-ten great public health achievements in the twentieth century.<sup>26</sup>

The original studies on water fluoridation estimated a 50–60 per cent reduction in dental decay among US children. Since the widespread use of fluoride toothpaste, the impact of water fluoridation is estimated to be at 20–40 per cent in addition to the decay-preventing effect of toothpaste.<sup>335</sup>

Water fluoridation is one of the most effective interventions in reducing disparities in dental decay between high and low socioeconomic status groups.<sup>336,337</sup> Recent research has shown that community water fluoridation remains a cost-effective preventive measure in Australia.<sup>338</sup>

#### Topical fluorides—toothpaste, varnish and mouth rinses

The NHMRC meta-analysis concluded that strong evidence exists that topical fluorides prevent dental decay<sup>37</sup>—strength of evidence 1, I. Cochrane reviews have determined that fluoride toothpaste, fluoride varnish and fluoride mouth rinses reduce dental decay on average by 24 per cent,<sup>339</sup> 40 per cent<sup>340</sup> and 26 per cent<sup>169</sup> respectively. A more recent review of fluoride varnish confirmed the effectiveness of six-monthly fluoride varnish applications for children at high risk of tooth decay<sup>341</sup>—strength of evidence 1, I.

Fluoride toothpaste programs are described in Section 5.3 Targeted supervised toothbrushing in childcare settings, Section 5.4 Targeted provision of fluoride toothpaste and toothbrushes and Section 6.1 School-based toothbrushing programs.

Fluoride varnish programs are described in Section 5.2 Targeted fluoride varnish programs in childcare settings and Section 8.1 Community fluoride varnish programs with oral health education and community promotion.

Fluoride mouth rinsing programs are described in Section 6.2 School-based fluoride mouth rinsing programs.

#### Milk and salt fluoridation

These two fluoridation interventions have not been considered, because they are not relevant for Victoria as 90 per cent of the population has access to fluoridated water.

### 12.5.2 Settings approaches

Settings approaches are important for developing healthy food and drink policy and practices, for safer play and sporting environments, and for assessment and management of oral health. Settings include childcare (Section 5.5 Healthy food and drink policy in childcare/ kindergarten settings), health-promoting schools (Section 6.3 School-based oral health education programs) and residential care locations (Section 7.2.4 Preventive oral care in nursing homes).

### 12.5.3 Sugar-free products

Sugar-free products (such as chewing gum and confectionery) have sweetening agents other than the sugars that cause dental decay. The most commonly used sugar substitutes are the polyols such as xylitol, sorbitol and manitol.

Two recent systematic reviews have identified the tooth decay preventive impact of sugar-free chewing gum Deshpande and Jadad<sup>191</sup> and Ly and colleagues<sup>192</sup>—combined strength of evidence 1, I.

Sugar-free chewing gums containing xylitol or sorbitol have been shown to reduce dental decay by 20–59 per cent in school-aged children<sup>191</sup>—strength of evidence 1, I. Whether the preventive effect is due to the polyols themselves or to the general effect of saliva stimulation is unclear. While more research is required to identify the optimal dose, the relative efficacy of the different polyols, and cost-effectiveness, expert opinion is that good evidence exists to support the use of sugar-free chewing gum as a decay preventive measure in school children, especially those with an increased decay risk.<sup>342</sup>

As described in Section 5 Pregnant women, babies and young children, evidence exists that sugar-free gum chewing by mothers reduces the decay levels in their children (Section 5.8.4 Prevention of infection), and that xylitol syrup is effective in preventing decay in 9–15 month olds (Section 5.8.5 Comprehensive care programs).

Chewing gum containing a milk protein (casein phosphopeptide-amorphous calcium phosphate, or CPP-ACP) and sorbitol has been shown to prevent more dental decay in adolescents than a control sugar-free sorbitol gum<sup>343</sup>—strength of evidence 2, II.

The International Dental Association adopted a policy statement in 2008 based on generally accepted opinion on sugar substitutes that when sugars are replaced with non-decay causing sugar substitutes, the risk of tooth decay is reduced.<sup>344</sup> Sales of sugar-free confectionery are relatively high in some countries where promoted. Almost one-quarter of confectionery sold in Switzerland is sugar-free, sold under the logo Safe for Teeth (Zahnfreundlich). In Finland, ‘toothfriendly’ sweets have also been used extensively and are considered to have contributed to approximately ten per cent of the reduction in children’s tooth decay since the 1960s.<sup>345</sup>

A Victorian project that examined the possibility of promoting sugar-free labelling found that a lack of awareness of these products existed.<sup>120</sup> Support was given for the concept and a recommendation made that any strategy to promote sugar-free products should be associated with other nutrition messages and oral hygiene.

### 12.5.4 Advertising of high sugar products

A high proportion of food advertisements directed at children on television and other media are for food and drinks that are high in fats, sugars and/or salt and low in dietary fibre.<sup>132</sup> A 2005 survey determined that fruit and vegetable advertisements comprised five per cent of total food advertisements during children’s viewing periods, compared to 82 per cent for high-fat, high-sugar foods.<sup>118</sup>

Restricting TV food advertising to children has been suggested as one of the most cost-effective population based intervention for the prevention of obesity in children,<sup>346</sup> with the potential to achieve significant reductions in childhood obesity rates.<sup>347</sup> The reduction in consumption of sugary food and drink is also likely to reduce tooth decay rates.

### 12.5.5 Affordable oral health products

The targeted provision of fluoride toothpaste and toothbrushes to preschool children at high risk of tooth decay has been shown to reduce decay rates (Section 5.4 Targeted provision of fluoride toothpaste and toothbrushes). The recent WHO report on equity, social determinants and public health programs proposes removal of taxes for oral health products<sup>86</sup>—see Section 15.1 World Health Organization (WHO) framework - social determinants, entry-points and interventions to address oral health inequalities.

### 12.5.6 Advocacy

Advocacy involves a combination of individual, peer and social actions designed to gain political commitment, policy support, structural change, social acceptance and systems support for a particular goal (*IHP toolkit*).

Advocacy by health professionals is important for raising the profile of oral disease, the creation of policies supporting oral health and the social marketing of messages related to improving oral health. Advocacy can contribute to support for oral health interventions such as water fluoridation, increased access to services, policy supports for low-sugar (consumption and frequency) food and drink, oral hygiene practices in residential and day care settings, mouthguard usage in sporting environments, consumer support issues, the incorporation of oral health in early childhood settings, school and health professional undergraduate and postgraduate curricula, screening services and the increased perception of oral health as a general health issue.<sup>15</sup> This review also states that advocacy can be considered as not only a professional obligation of any health professional, given their social power and responsibilities, but also as an intervention which can easily be carried out opportunistically and at an individual level. However, it is difficult to evaluate in an evidence-based fashion.





Part D Oral health promotion  
planning and research gaps



## 13 Program planning and evaluation

The Integrated Health Promotion (IHP) framework for Victoria provides an approach to working in a collaborative manner using a mix of health promotion interventions and capacity-building strategies to address priority health and wellbeing issues.<sup>17</sup>

An oral health promotion evaluation model is presented that includes outcome indicators.

### 13.1 A common framework

According to the Integrated Health Promotion approach, agencies in a catchment area are encouraged to work in a collaborative manner using a mix of health promotion interventions and capacity-building strategies to address priority health and wellbeing issues. See the Department of Human Services 2003 Integrated health promotion resource kit <[http://www.health.vic.gov.au/healthpromotion/evidence\\_evaluation/cdp\\_tools.htm](http://www.health.vic.gov.au/healthpromotion/evidence_evaluation/cdp_tools.htm)>.

To achieve effective integrated health promotion program delivery in the current Victorian context, the following points should be considered:

1. The role of partnerships—integration intensifies from networking through to formalised collaborative partnerships.
2. Clear identification of the key stakeholders or partners is required to make a difference to the identified priority issue. Integration across a broad range of sectors, including nongovernment organisations and community groups, is essential to address the determinants of health. Other organisations outside the ‘traditional’ primary health care sector, such as local government, schools, housing, recreation clubs and commercial businesses, are seen as key partners in the development of the integrated health promotion strategy.
3. Quality integrated health promotion practice and delivery should focus on implementing an appropriate mix of health promotion interventions (which encompass a balance of both individual and population-wide health promotion interventions), supported by capacity-building strategies to address the priority issues identified.

### 13.2 Guiding principles for integrated health promotion

The following are the Victorian Government’s guiding principles for integrated health promotion. These are built from the social model of health philosophy, the Ottawa Charter definition of health promotion and key priorities identified in national health promotion documents.

These principles can be used as a guide for planning and delivering effective integrated health promotion programs.

- 1. Address the broader determinants of health**, recognising that health is influenced by more than genetics, individual lifestyles and provision of health care, and that political, social, economic and environmental factors are critical. The framework for oral health promotion (Figure 7 Common risk factor approach) presents these broader determinants plus factors that particularly affect oral health, such as exposure to fluoride and access to timely, affordable and appropriate oral health care.
- 2. Base activities on the best available data and evidence**, both with respect to why a need exists for action in a particular area and what is most likely to effect sustainable change. Interventions that promote oral health are presented in Part B Interventions by priority groups and settings and Part C Interventions by Integrated Health Promotion categories.
- 3. Act to reduce social inequities and injustice**, helping to ensure every individual, family and community group may benefit from living, learning and working in a health-promoting environment. Effective oral health interventions do not always reduce health inequalities—and may actually increase them—probably because the socially advantaged often have more knowledge, skills and resources to implement orally healthy behaviours.
- 4. Emphasise active consumer and community participation** in processes that enable and encourage people to have a say about what influences their health and wellbeing and what would make a difference. The first stage of an oral health promotion strategy is to understand the oral health needs of the community.

5. **Empower individuals and communities**, through information, skill development, support, advocacy and structural change strategies, to have an understanding of what promotes health, wellbeing and illness and to be able to mobilise resources necessary to take control of their own lives.
6. **Explicitly consider difference in gender and culture**, recognising that gender and culture lie at the heart of the way in which health beliefs and behaviours are developed and transmitted.
7. **Work in collaboration**, understanding that while programs may be initiated by the health sector, partnerships must be actively sought across a broad range of sectors, including organisations that may not have an explicit health focus. This focus aims to build on the capacity of a wide range of sectors to deliver quality integrated health promotion programs, and to reduce the duplication and fragmentation of health promotion effort.

In his review of how to tackle the social determinants of inequalities in oral health, Watt identified<sup>34</sup> all the above principles with additional emphasis on approaches that are:

- **multi-strategy**—a combination of complementary actions is needed, such as healthy public policies, community development and environmental change
- **holistic**—adopting a common risk factor approach, through which oral interventions seek to address conditions and risk factors common to other chronic conditions and diseases (see Section 2.7 Common risk factors between oral and other chronic diseases)
- **sustainable**—aiming to achieve long-term improvements in oral health
- **appropriately evaluated**—sufficient resources and appropriate methods are required for the monitoring and evaluation of oral health interventions.

### 13.3 Program planning

The *Integrated Health Promotion Resource Kit* outlines a common planning framework for integrated health promotion.<sup>17</sup> The IHP framework can be used with the oral health promotion framework that outlines key determinants for oral health, population groups and action areas, settings, and outcomes (see Figure 9 Victorian framework for oral health promotion in Section 3.2 Oral health promotion).

A useful guide for developing a program is *Making decisions about interventions—A guide for evidence-informed policy and practice* <[http://www.health.vic.gov.au/healthpromotion/evidence\\_evaluation/cdp\\_tools.htm](http://www.health.vic.gov.au/healthpromotion/evidence_evaluation/cdp_tools.htm)>.<sup>89</sup> This guide outlines an eleven-step process:

1. What is the issue?
2. What is your decision-making context?
3. Clarify your research question and inclusion criteria
4. Specify your search strategy and compile the evidence—  
If quantitative research evidence is found, go directly to Step 5.  
If quantitative research evidence is absent, go to Step 6.
5. Use program theory, program logic, expert opinion and/or qualitative research.
6. Review the evidence.
7. Classify the strength of evidence.
8. Assess the likely impacts on health inequalities, feasibility, acceptability and sustainability of the interventions.
9. Choose interventions.
10. Link to monitoring, evaluation and research
11. Consider how the intervention should be implemented.

The *Integrated Health Promotion Resource Kit* advises that planning an intervention should be done within the context of an overall integrated health promotion plan, and that planning to disseminate findings and budget planning should be included.

Watt and Fuller<sup>31</sup> suggest that it is necessary to consider a range of data sources to have a comprehensive view of need:

- oral health determinants, such as smoking patterns and availability of healthy choices
- disease levels and trends, such as tooth decay prevalence
- quality of life data, such as prevalence of pain due to tooth decay
- public demands, such as expressed needs of the community
- professional concerns, such as availability of specialist services
- political agenda, such as policy developments.

The framework for oral health promotion (Figure 9 Victorian framework for oral health promotion in Section 3.2 Oral health promotion) can assist in considering interventions for oral health. Evidence for interventions that can promote oral health are presented in Part B Interventions by priority groups and settings and Part C Interventions by Integrated Health Promotion categories and are summarised in Table 1 Summary of oral health promotion interventions by Integrated Health Promotion categories and population, settings and priority groups.

Oral health promotion practice should not be restricted only to interventions for which convincing evidence exists of effectiveness; otherwise, innovative approaches would never be discovered. Practitioners should adopt a balance between scientific evidence and information about interventions that may be effective in a particular community. In the absence of strong evidence, pilot studies should be rigorously evaluated to contribute to evidence building.

## 13.4 Evaluation

An Evaluation framework for health promotion and disease prevention <[http://www.health.vic.gov.au/healthpromotion/evidence\\_evaluation/cdp\\_tools.htm](http://www.health.vic.gov.au/healthpromotion/evidence_evaluation/cdp_tools.htm)> has been developed by the Department of Health.

The framework should be complemented by the following actions:

- evaluation plans should be developed jointly by program staff, key stakeholders and staff with evaluation or research expertise
- a commitment from management and staff to support quality evaluation by requiring that evaluation plans be written simultaneously with program plans and before program implementation or tendering
- a commitment from management and staff to use the results of evaluations in future program design.

This framework is designed to complement, but build on the Integrated Health Promotion evaluation resources.<sup>17</sup> Other useful evidence and evaluation tools and guidelines are available at the Victorian Government Health Information Evidence and evaluation tools website <[http://www.health.vic.gov.au/healthpromotion/evidence\\_evaluation/cdp\\_tools.htm](http://www.health.vic.gov.au/healthpromotion/evidence_evaluation/cdp_tools.htm)>.

Use of standardised and validated outcome measures for the evaluation of oral health promotion interventions is preferable, where possible. Watt et al. reviewed the quality of outcome measures and developed an oral health promotion toolkit.<sup>348</sup> They also propose an outcome model for oral health promotion evaluation that identifies measures for the levels of health promotion actions and outcomes, and intermediate health and health and social outcomes (Figure 9 Victorian framework for oral health promotion). This evaluation model recognises the importance of the social determinants of health and the need for multiple and integrated approaches to promote sustainable health improvements and reduce inequalities.<sup>349</sup>

**Table 14 Oral health promotion evaluation outcome model**

<b>Health and social outcomes</b>	<b>Morbidity</b> for example, change in tooth decay levels—proportion of children without decay, average no. of teeth affected by decay	<b>Quality of life, disability</b> for example, change in no. of episodes of toothache, dental pain and discomfort	<b>Equity</b> for example, equality of access to dental health services, reduction in disease levels in most disadvantaged versus advantaged groups
<b>Intermediate health outcomes</b>	<b>Healthy lifestyles</b> for example, change in water consumption in early childhood settings or schools, change in toothbrushing behaviour	<b>Effective dental health services</b> for example, timely access	<b>Healthy environments</b> for example, change in schools selling of healthy snacks
<b>Health promotion outcomes</b>	<b>Health literacy</b> for example, change in oral health knowledge and skills	<b>Social influence and action</b> for example, change in public support for water fluoridation	<b>Healthy public policy</b> for example, change in no. of early childhood settings or schools with healthy food and drink policy
<b>Health promotion actions</b>	<b>Education</b> for example, in-service training for schoolteachers and child health nurses on oral health issues	<b>Facilitation</b> for example, nutrition action in schools	<b>Advocacy</b> for example, lobbying for improvements in food labelling

Source: Watt et al.<sup>350</sup>

### 13.5 Building capacity to promote health

Capacity building for integrated health promotion enhances the potential of the system to prolong and multiply health effects.<sup>17</sup> Capacity building involves the development of sustainable skills, organisational structures, resources and commitment to health improvement. The key action areas are organisational development, partnerships, workforce development, leadership and resources. The *Integrated Health Promotion Toolkit* includes strategies to develop each of these action areas.

## 14 Gaps in the health promotion literature for promoting oral health

There is a need to improve the evidence base in the following areas:

### 14.1 Intervention development

Investigate further the social determinants of oral health inequalities and identify causal pathways and key points in the life course amenable to intervention.

Pilot and evaluate promising interventions targeting high risk population sub-groups to reduce oral health inequalities. In particular, more research is required on improving the oral health of:

- older people
- Aboriginal and Torres Strait Islander people
- people with special needs
- low-income pregnant women and their families
- preschool children
- some groups from culturally and linguistically diverse backgrounds (CALD).

Improve the evidence base of upstream interventions that specifically tackle determinants of oral health inequalities. Key examples include:

- healthy public policies that aim to improve the physical, social and policy environments
- community development approaches which seek to mobilise community action to achieve sustainable improvements in oral health
- fiscal policy which aims to promote cheaper and more affordable oral health choices and options
- regulations on the tighter control of commercial marketing and advertising of health compromising products and resources.

Improve the evidence base on nutritional interventions to reduce the amount and frequency of sugars consumptions. In particular, more research is needed on:

- food policies to reduce sugars consumption within a broader nutritional approach in a variety of settings; for example, schools, colleges, workplace, prisons, older people's homes
- development and evaluation of clinical preventive interventions to reduce sugars consumption amongst dental patients attending clinical services.

Fund and evaluate programs that train and support primary health and welfare workers to promote oral health. Programs should target general practitioners, maternal and child health nurses, pharmacists, aged care workers, residential care workers, Aboriginal health workers, youth workers and welfare workers.

Develop a mediating/advocating/expert role for oral health personnel as part of health care networks to contribute to common risk factor approaches and capacity building/ community oral health leadership.

Investigate further ways to integrate oral health into general health promotion, in order to embed oral health outcomes in broader SNAPS (smoking, nutrition, alcohol, physical activity and stress) studies.

Investigate the distribution and determinants of oral cancer and identify preventive interventions.

Fund and evaluate programs in key settings (such as workplaces) where people at high risk to oral disease work.

Undertake measures of the value of collaboration across health professions and delivery networks.

Evaluate social marketing for oral health promotion.

Produce oral health literacy training programs and evaluation measures.

Investigate the potential benefits and impact of oral health promotion interventions on general health outcomes; for example, reduction in periodontal inflammation and its effects on cardio-vascular diseases.

## 14.2 Methodological development

Improve the quality of the design and methodology of interventions. Approaches should include those that:

- are longer-term, participatory, community-based and focused
- use mixed methods and appropriate theoretical models
- work in key settings, including: communities, childcare, schools, workplaces and residential care.

Improve the quality of evaluations:

- sufficient funding (10 per cent of overall budget as recommended by the WHO) should be provided for evaluation
- address cost-effectiveness of programs
- consider comparative costs of programs
- include a range of appropriate outcomes and process measures
- assess longer-term outcomes of interventions
- assess relative impact of interventions on reducing oral health inequalities.

Find the appropriate methods to incorporate and value oral health education in schools.





# Part E Resources and references



## 15 Useful resources

### 15.1 World Health Organization (WHO) framework - social determinants, entry- points and interventions to address oral health inequalities

Component	Social determinants and entry points	Intervention to address oral health inequities
Socioeconomic context and position	<p>Inequality of social structures and socioeconomic positions</p> <p>Unequal distribution of resources and opportunities</p> <p>Promoting equitable policies; the availability of, and access to, resources</p> <p>Infrastructure</p> <p>Taxation and legislation</p>	<p>Legislate local production of quality, affordable oral health products (for example, toothpaste, toothbrushes)</p> <p>Removal of taxes on oral health products</p> <p>Placing oral health within the primary health care approach</p> <p>Fair and equitable policies</p> <p>Development of infrastructure for oral health services and population-based interventions</p>
Differential exposure	<p>Water and sanitation</p> <p>Fluorides and health food supply</p> <p>Unhealthy environments</p> <p>Lifestyles, beliefs, attitudes and health behaviours</p> <p>Targeting, setting and common risk factors</p> <p>Social stigma of oral conditions</p>	<p>Regulation on tobacco; fluoridation; better labelling (for example showing the amount of fats, sugars and salt in food and drinks); address excess use of alcohol; restrict advertising of unhealthy food</p> <p>Promote the use of mouthguards and safety helmets</p> <p>Encourage interventions that adopt a common risk factor approach (tobacco, diet, alcohol, stress and personal hygiene)</p> <p>Support healthy physical and psychosocial environments, for example, roads (design, lighting, traffic control, pedestrian facilities); living environments (physical, tackle overcrowding and so on) schools; workplace; sanitation facilities and safe water supply</p> <p>Encourage optimal exposure to fluorides: support implementation of fluoridation programs (water, milk, salt and toothpaste) and, in some areas where necessary, defluoridation programs</p> <p>Promote oral health through 'healthy settings' initiatives (schools, workplace, cities and community-based establishments), and encourage them to be part of a larger network, such as health-promoting schools networks</p>

Component	Social determinants and entry points	Intervention to address oral health inequities
Differential vulnerability	Poverty Stress-induced Responses to risk exposure General health conditions High-risk groups Early life experiences Access to oral health services, oral health products and protective options	Greater availability of sugar-free alternatives and medicines Support interventions and make tools available for breaking poverty and social inequalities Support measures that promote healthy eating and nutrition (for example, healthy school dinners and healthy vending machines) and reduce amount of sugars, salt and fats in foods and drinks Re-orient oral health services, including capacity building and community based oral health care provisions to improve access and availability Promote the availability of quality affordable oral health products (for example, toothpaste, toothbrushes), subsidised oral health products and healthy foods and drinks Regulate sale of harmful or unhealthy products to certain high-risk groups in certain settings Promote oral health through chronic disease prevention, health promotion and health education Integrate oral health into community, local, national and international health programs Work in collaboration across government departments and with local communities, other sectors, agencies and non-government and other organisations to promote oral health
Differential health care outcomes	Uptake of oral health services Inadequate oral health care provision and treatment options High-risk groups	Target resources that support disadvantaged or high-risk groups such as children, older people, people with HIV/AIDS and people with oral cancer Improve early detection of oral cancer and noma with timely treatment and referrals Tobacco cessation services in dental practices Include oral health in training of members of the primary health care team
Differential consequences	Impact on quality of life High personal, social and health service costs Impact on other communities and social groupings Social exclusion, stigma, effect on daily living	Regulate sale of harmful or unhealthy products to certain high-risk groups in certain settings Encourage healthy diets and moderate consumption of alcohol Outreach oral health care towards vulnerable and poor population groups Third-party payment systems reducing inequity in use of oral health service

Source: Kwan and Petersen<sup>86</sup>

## 15.2 Online resources

Title	Location
Australian Indigenous HealthInfoNet	< <a href="http://www.healthinonet.ecu.edu.au/">http://www.healthinonet.ecu.edu.au/</a> >
Better Oral Health in Residential Care Project Report	< <a href="http://www.sadental.sa.gov.au/desktopdefault.aspx?tabid=305">http://www.sadental.sa.gov.au/desktopdefault.aspx?tabid=305</a> >
Centre for Indigenous Australian Education and Research. Edith Cowan University Western Australia. Oral health. <i>Australian Indigenous HealthInfoNet</i>	< <a href="http://www.healthinonet.ecu.edu.au/other-health-conditions/oral">http://www.healthinonet.ecu.edu.au/other-health-conditions/oral</a> >
Childsmile—improving the oral health of children in Scotland	< <a href="http://www.child-smile.org/">http://www.child-smile.org/</a> >
Community Preventive Services, The Community Guide Supporting Materials: Oral Health	< <a href="http://www.thecommunityguide.org/oral/caries.html">http://www.thecommunityguide.org/oral/caries.html</a> >
COOPS Collaboration Advice and Support for Community based Obesity Prevention	< <a href="http://www.co-ops.net.au/">http://www.co-ops.net.au/</a> >
Database of Abstracts of Reviews of Effectiveness (DARE)	< <a href="http://www.crd.york.ac.uk/crdweb">http://www.crd.york.ac.uk/crdweb</a> >
Dental Health Services Victoria. <i>Oral health promotion resources</i>	< <a href="http://www.dhsv.org.au">http://www.dhsv.org.au</a> >
Department of Education and Early Childhood Development School Canteen/Food Service Policy	< <a href="http://www.education.vic.gov.au/management/schooloperations/healthycanteen/policy/canteenpolicy.htm">http://www.education.vic.gov.au/management/schooloperations/healthycanteen/policy/canteenpolicy.htm</a> >
Department of Health. <i>Valuing People's Oral Health: A Good Practice Guide for Improving the Oral Health of Disabled Children and Adults</i>	< <a href="http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_080919.pdf">http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_080919.pdf</a> >
Department of Human Services. 2003. Integrated health promotion resource kit	< <a href="http://www.health.vic.gov.au/healthpromotion/downloads/integrated_health_promo.pdf">http://www.health.vic.gov.au/healthpromotion/downloads/integrated_health_promo.pdf</a> >
Evaluation framework for health promotion and disease prevention	< <a href="http://www.health.vic.gov.au/healthpromotion/evidence_evaluation/cdp_tools.htm">http://www.health.vic.gov.au/healthpromotion/evidence_evaluation/cdp_tools.htm</a> >
'Go for your life'	< <a href="http://www.goforyourlife.vic.gov.au/">http://www.goforyourlife.vic.gov.au/</a> >
'Go for your life' Healthy Canteen Kit	< <a href="http://www.education.vic.gov.au/management/schooloperations/healthycanteen/policy/">http://www.education.vic.gov.au/management/schooloperations/healthycanteen/policy/</a> >
Health-evidence Canada	< <a href="http://http://health-evidence.ca/articles/search">http://http://health-evidence.ca/articles/search</a> >
La Trobe University. <i>The Strengthening Knowledge of Oral Health Project</i>	< <a href="http://www.oralmentalhealth.com.au/">http://www.oralmentalhealth.com.au/</a> >
Making decisions about interventions—A guide for evidence-informed policy and practice	< <a href="http://www.health.vic.gov.au/healthpromotion/evidence_evaluation/cdp_tools.htm">http://www.health.vic.gov.au/healthpromotion/evidence_evaluation/cdp_tools.htm</a> >
National Maternal and Child Oral Health Resource Center. Oral Health Resource Bulletin	< <a href="http://www.mchoralhealth.org">http://www.mchoralhealth.org</a> >
NHS Evidence—Oral health	< <a href="http://www.evidence.nhs.uk/search?q=Oral+Health+Promotion">http://www.evidence.nhs.uk/search?q=Oral+Health+Promotion</a> >
NSW Government Health Publications and Resources	< <a href="http://www.health.nsw.gov.au/cohs/resources.asp">http://www.health.nsw.gov.au/cohs/resources.asp</a> >
Office of Science Education. National Institute for Dental and Cranial Health. <i>Open Wide and Track Inside</i>	< <a href="http://science.education.nih.gov/supplements/nih2/oral-health/default.htm">http://science.education.nih.gov/supplements/nih2/oral-health/default.htm</a> >
Oral Health Promotion Clearinghouse	< <a href="http://www.adelaide.edu.au/oral-health-promotion/">http://www.adelaide.edu.au/oral-health-promotion/</a> >
QUIT	< <a href="http://www.quit.org.au/">http://www.quit.org.au/</a> >
Romp and Chomp	< <a href="http://www.goforyourlife.vic.gov.au/hav/articles.nsf/pracpages/Romp_and_Chomp?Open">http://www.goforyourlife.vic.gov.au/hav/articles.nsf/pracpages/Romp_and_Chomp?Open</a> >
Smoking Cessation Project	< <a href="http://www.sadental.sa.gov.au/desktopdefault.aspx?tabid=197">http://www.sadental.sa.gov.au/desktopdefault.aspx?tabid=197</a> >
The University of Adelaide. Dental Practice Education Research Unit. <i>Patient pamphlets</i>	< <a href="http://www.arcpoh.adelaide.edu.au/dperu/caries/pamphlets/">http://www.arcpoh.adelaide.edu.au/dperu/caries/pamphlets/</a> >

Title	Location
Victorian Aboriginal Nutrition & Physical Activity Strategy –Closing the nutrition and physical activity gap in Victoria	< <a href="http://www.vaccho.org.au/vcwp/wp-content/uploads/2011/03/VANPHS.pdf">http://www.vaccho.org.au/vcwp/wp-content/uploads/2011/03/VANPHS.pdf</a> >
Victorian Government Health Information Evidence and evaluation tools	< <a href="http://www.health.vic.gov.au/healthpromotion/evidence_evaluation/cdp_tools.htm">http://www.health.vic.gov.au/healthpromotion/evidence_evaluation/cdp_tools.htm</a> >
Victorian Integrated Health Promotion approach	< <a href="http://www.health.vic.gov.au/healthpromotion/evidence_res/integrated.htm">http://www.health.vic.gov.au/healthpromotion/evidence_res/integrated.htm</a> >
What is integrated health promotion (IHP)?	< <a href="http://www.health.vic.gov.au/healthpromotion/what_is/integrated.htm">http://www.health.vic.gov.au/healthpromotion/what_is/integrated.htm</a> >

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