

# WHO INFORMATION SERIES ON SCHOOL HEALTH

DOCUMENT ELEVEN

**Oral Health Promotion:**

**An Essential Element of  
a Health-Promoting School**



**World Health Organization  
Geneva, 2003**



***Education  
Development Center, Inc.***

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## FOREWORD

Investments in schools are intended to yield benefits to communities, nations and individuals. Such benefits include improved social and economic development, increased productivity and enhanced quality of life. In many parts of the world, such investments are not achieving their full potential, despite increased enrolments and hard work by committed teachers and administrators. This document describes how educational investments can be enhanced, by increasing the capacity of schools to promote health *as they do learning*.

Oral health is fundamental to general health and well being. In this document guidelines are given on how to assist school and community leaders to improve health and education of children and young people. The schools can provide a supportive environment for promoting oral health; school policies and education for health are imperative in the attainment of oral health and control of risk behaviours related to diet and nutrition, tobacco use and excessive alcohol consumption.

This document is part of a technical series on school health promotion prepared for WHO's Global School Health Initiative. WHO's Global School Health Initiative is a concerted effort by international organizations to help schools improve the health of students, staff, parents and community members. Education and health agencies are encouraged to use this document to strengthen oral health interventions as part of the Global School Health Initiative's goal: to help all schools become Health-Promoting Schools.

Although definitions will vary, depending on need and circumstance, a Health-Promoting School can be characterized as *a school constantly strengthening its capacity as a healthy setting for living, learning and working*.

The extent to which each nation's schools become Health-Promoting Schools will play a significant role in determining whether the next generation is educated and healthy.



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### **Health-Promoting School**

#### **A health-Promoting School:**

- Fosters health and learning with all measures at its disposal.
- Engages health and education officials, teachers, students, parents and community leaders in efforts to promote health.
- Strives to provide a healthy environment, school health education, and school health services along with school/community projects and outreach, health promotion programmes for staff, nutrition and food safety programmes, opportunities for physical education, and recreation and programmes for counselling, social support and mental health promotion.
- Implements policies, practices and other measures that respect an individual's self-esteem, provide multiple opportunities for success, and acknowledge good efforts and intentions as well as personal achievements.
- Strives to improve the health of school personnel, families and community members as well as students; and works with community leaders to help them understand how the community contributes to health and education.

## 1 INTRODUCTION

This document, part of the World Health Organization (WHO) Information Series on School Health, is intended to help people use health promotion strategies to improve oral health. Through oral health, the overall health, well being, education and development of children, families and communities are enhanced. Based on the recommendations of the Ottawa Charter for Health Promotion (Annex 1), it will help individuals and groups move towards a new approach in public health, one that creates on-going conditions conducive to health and well being, including oral health.

While the concepts and strategies in this document apply to all countries, some of the examples may be more relevant to some countries or some areas than others. It is important that local application of these strategies are responsive to local needs, taking into account the cultural variations and socio-economic circumstances.

### 1.1 Why did WHO prepare this document?

The WHO has prepared this document to help people take control over and improve their health, through promoting the conditions that allow all its members to attain health.

It provides information that will assist individuals and groups to:

- understand the nature of a Health-Promoting School;
- make a strong case for incorporating oral health promotion in schools as an integral part of school activities or curriculum;
- design, plan, implement and evaluate oral health promotion interventions as part of developing a Health-Promoting School.

### 1.2 Who should read this document?

This document has been prepared particularly to help those who are engaged in, and committed to, health promotion:

- Government policy-makers and decision-makers, programme planners and coordinators at local, district (provincial), regional and national levels;
- Members of non-governmental agencies and institutions responsible for planning and implementing the interventions described in this document, including programme staff and consultants of international health, education and development agencies who are interested in working with schools to promote health;
- Decision-makers / administrators in health and education sectors;
- Service providers of oral and medical health care, including the primary health care team, particularly dentists, dental auxiliaries and oral health educators; school nurses and community health workers;



- Community leaders, local residents, health care providers, social workers and members of organised groups who are interested in improving health, education and well being in schools and the community;
- Members of the school community, including teachers and their representative organisations, students, staff, volunteers, governors, parent groups, coaches, caretakers and school-based health workers.

### 1.3 What is oral health?

Oral health enables an individual to speak, eat and socialise without active disease, discomfort or embarrassment. Oral health is fundamental to general health and well being, significantly impacting on quality of life. It can affect general health conditions. Oral health means more than healthy teeth. The health of the gums, oral soft tissues, chewing muscles, the palate, tongue, lips and salivary glands are also significant.

### 1.4 Why is oral health important?

Poor oral health can have a detrimental effect on children's performance in school and their success in later life. Children who suffer from poor oral health are 12 times more likely to have more restricted-activity days including missing school than those who do not.<sup>1</sup> More than 50 million hours annually are lost from school due to oral diseases.<sup>2</sup> While tooth decay (dental caries) and gum disease (inflammatory periodontal disease) are among the most prevalent or widespread conditions in human populations, other conditions such as trauma of teeth and jaws, dental erosion, developmental enamel defects and oral cancer are also important. Premature loss of deciduous (milk) teeth may lead to malalignment of the permanent (adult) teeth, impacting on an individual's appearance. Importantly, tooth loss can affect children's nutritional intake and, consequently, their growth and development.

..... *"a 'silent epidemic' of dental and oral diseases burdens some population groups".*  
(American Surgeon General David Satcher, 2000)

Poor oral hygiene causes gum disease and, together with dietary sugars, dental decay. Both conditions may lead to pain, discomfort and tooth loss. Tooth loss, as a result of untreated dental disease and trauma, may have a profound impact on quality of life, as well as on growth and development.

While there has been improvement in oral health of children in the last few decades, tooth decay remains one of the most common childhood diseases, in both industrialised and developing countries. A substantial proportion of children in many developing countries are affected by tooth decay,<sup>3</sup> and most decay is left untreated due to limited access to oral health services. The occurrence of gum disease is high among older children and adolescents, with 50% to 100% of 12-years-old children having the signs of gum inflammation.<sup>3</sup> It is almost omnipresent among adults.

Dental trauma, which usually affects the upper front teeth, may result from accidents, sport-related injuries, violence, and epilepsy. Traumatized baby teeth may lead to tooth loss and, among other factors such as childhood illnesses, may affect the developing permanent teeth. It is therefore important to prevent dental trauma in children. A safe environment at home, in schools and in the community, including safer playgrounds and roads with well-organized traffic, can help minimize the risks.<sup>4</sup>

Dental erosion, a form of tooth wear that is linked to increased consumption of carbonated and fruit drinks, is becoming a problem in some countries,<sup>5</sup> although occasionally it may be due to repeated vomiting. In most cases, abnormal tooth wear results in a loss of normal enamel contour, but in severe cases the interior of the tooth may be affected. Other forms of tooth wear, attrition and abrasion, are related to tooth grinding habits, and abrasive dietary and inappropriate oral hygiene practices (e.g. brushing with a hard brush, abrasive toothpaste or other materials such as powder and charcoal).

Oral cancer is on the increase, becoming the 11<sup>th</sup> most common cancer in the world, with a 5-year survival rate of less than 50%.<sup>6</sup> The prevalence of oral cancer varies greatly between countries, with a particularly high incidence observed in the Indian subcontinent, Australia, France, South America and Sub-Saharan Africa. While 95% of the disease cases are diagnosed among adults aged over 40 years, risk behaviours (e.g. excessive alcohol and tobacco use) during childhood and adolescence could have a significant impact on the risk of cancer, as well as other leading cause of death and disability. Cigarette smoking and “spit or chewing” tobacco use among adolescents in the US has been increasing each year,<sup>7</sup> with 35% of those who use tobacco having tobacco-related oral lesions.<sup>8</sup> Other tobacco containing products that are marketed directly at children and adolescents include pan masala, bidis and ghutka.<sup>9</sup> With attractive packaging and flavours, they are often mistaken as sweets. Children who start consuming these products at an early age may therefore have an increased risk of oral cancer in later life. Health promotion should be targeted to reduce such risks.

Noma, a gangrenous necrosis of oro-facial tissues, is linked to malnutrition.<sup>10</sup> It is an extremely painful and devastating condition that affects a large number of children aged 3 to 16 years in Africa, Asia and Latin-America. If untreated, it can be life threatening, with a mortality rate between 70% and 90%.<sup>11</sup> Regrettably, there is a high social stigma attached to this condition, leading to most sufferers being hidden away and left to die.

There are also important links between oral health and general health. For example, gum disease is associated with general health conditions such as heart disease and diabetes. Similarly, those with complex health problems are sometimes at greater risk of oral diseases that, in turn, further complicate their overall health.<sup>12</sup> Some diseases of the mouth and oral lesions may be the first signs of some life threatening diseases, such as HIV/AIDS.

## 1.5 Why focus efforts through schools?

The school provides an ideal setting for promoting oral health. At the global level, approximately 80% of children attend primary schools and 60% complete at least four years of education, with wide variations between countries and gender. In some countries, more than 50% of children aged 7 to 14 years are out of school and less than 20% complete the first grade due to exploitation of child labour.<sup>13</sup> Nonetheless, schools remain an important setting, offering an efficient and effective way to reach over 1 billion children worldwide and, through them, families and community members.<sup>14</sup>



The school years cover a period that runs from childhood to adolescence. These are influential stages in people's lives when lifelong sustainable oral health related behaviours, as well as beliefs and attitudes, are being developed. Children are particularly receptive during this period and the earlier the habits are established, the longer lasting the impact. Moreover, the messages can be reinforced regularly throughout the school years. Children may also be equipped with personal skills that enable them to make healthy decisions, to adopt a healthy lifestyle and to deal with stressful situations such as violence and conflicts.

*“The National Program of Healthy Schools covers 2,000,000 students and 500,000 families. The achievements of the Program include the integral development of the students, greater knowledge of preventive measures, reduction of absenteeism, better academic performance, reduction of the indexes of infectious diseases in the students and their family members, reduction of the social risks (gangs, drug addiction, alcoholism and others), and greater intersectoral participation of the schoolchildren and of the community. There had been an impact on sanitation of the environment and in aspects of nutrition and vaccination”.*

(Ministry of Education and Ministry of Health, Guatemala).

Schools can provide a supportive environment for promoting oral health. For example, the provision of safe water and sanitation facilities is essential for toothbrushing activities in schools. If the school does not have such facilities, oral health promotion can trigger the installation of these basic facilities. A safe physical environment in the playgrounds, and indeed throughout the school, can help reduce the risk of dental trauma. With the appropriate policies and practices, vital actions can be taken in case of emergency. Such actions can save the traumatised tooth/teeth, avoiding tooth loss and associated problems in later life. School policies and practices on healthy diet that ensure healthy foods and drinks are provided in all areas, particularly policies on sugar intake, serve to promote healthy dietary behaviours from an early age. More importantly, schools may be the only place for children, who are at the highest risk of dental disease, to have access to oral health services. This is particularly true in many developing countries, compounded by a lack of dental personnel. With adequate training, school teachers can play an important role in oral health activities.

Schools can also provide an important network and channel to the local community. Health promotion activities can be targeted at the home and throughout the community by school personnel. Similarly, through the pupils, health promotion messages can be passed on to other members of the family. Schools can also take the lead role in advocating and lobbying for general as well as oral health. This school-home-community interaction is an important aspect of a Health-Promoting School.<sup>15</sup>

## 1.6 How will this document help people promote health?

This document is based on scientific information and research, but it is more than a technical document. It is designed to help address a broad range of factors that impact on oral health and help schools become Health-Promoting Schools. It will help individuals and groups to:

- **Create Healthy Public Policy.** This document provides information that can be used to argue for increased local, district and national support and resources for oral health

promotion in schools. It also forms a basis for justifying policies and decisions to increase such support.

- **Develop Supportive Environments.** This document suggests physical, psychological and social enhancements to schools and community environment to promote oral health and well being. It also outlines how students, parents, teachers, community leaders and others can help support such enhancements.
- **Strengthen Community Actions.** This document identifies actions that may be taken by schools and the community to promote oral health. It details ways in which schools can collaborate with the community to implement such actions and to strengthen school programmes. It provides argument and evidence that can be used for lobbying.
- **Develop Personal Skills.** This document identifies skills that children and young people need to develop and maintain to adopt healthy lifestyles and behaviour in order to reduce the risks of oral diseases. It also emphasises skills that others can develop to create conditions that are conducive to oral health through schools, families and the community.
- **Reorient Health Services.** This document outlines how health services and resources can be oriented toward outreach care and made more accessible to support effective oral health promotion within a Health-Promoting School setting.

## 1.7 How should this document be used?

Sections 2 and 3 can be used to argue for implementation strategies to promote oral health in schools, emphasising that oral health promotion should form part of general health promotion.

Section 4 helps create a strong basis for local action and for planning interventions that are relevant and responsive to needs and circumstances of the school and local community.

Section 5 highlights ways to integrate health promotion efforts into various components of a Health-Promoting School, while Section 6 provides examples of methods used in evaluating efforts to make oral health promotion an essential part of a Health-Promoting School.

For further details and specific guidance on planning, implementation and evaluation, this document can be used in conjunction with the WHO document *Local Action: Creating Health-Promoting Schools*.<sup>16</sup> *Local Action: Creating Health-Promoting Schools* provides practical guidance, tools and experience learned from Health-Promoting Schools around the world which provides a framework for addressing the needs of specific communities. It must be emphasised that each school must adapt the guidance/approach to take account of local circumstances.



## 2 ADVOCACY FOR PROMOTING ORAL HEALTH THROUGH SCHOOLS

The following arguments can be used to convince policy-makers, decision-makers, fund holders and others of the importance of promoting oral health through schools. They provide a rationale for why communities and schools both need, and will benefit from, integrated school oral health interventions and health promotion. They strongly support the importance of school-based oral health promotion and the need for increased investment in such programmes. Policy-makers and decision-makers can use these arguments to justify their decisions to increase support for such efforts.

### 2.1 Argument: Tooth decay and gum disease are pandemic diseases

Statistics show that oral disease affects almost everyone.<sup>3</sup> While there have been improvements in dental health over the past decades and many children today enjoy good oral health, many do not. There is not a single country that claims to be 'caries free'. Tooth decay is one of the most common chronic childhood diseases. For example, in the US it is 5 times more common than asthma and 7 times more common than hay fever.<sup>12</sup> In the Philippines, it has been reported that dental decay outranks the combined rates of other diseases in the country.<sup>17</sup> In the WHO South-East Asia and Eastern Mediterranean regions, dental decay is an important cause of disability.<sup>18</sup>

Statistics indicate that at least one in four 5- to 6-year-old children experience tooth decay, and this figure rises above 90% in some developing countries and countries with economies in transition.<sup>3</sup> There are variations across countries (Annex 2), and disparities between regions, provinces, districts, cities and areas. While there has been a significant decline in tooth decay in some developed countries during the past few decades, a large number of children worldwide are still suffering from the disease, much of which is active and untreated, leading to toothache and restricted activities. Such problems are particularly prevalent among children of deprived communities.

Similar to tooth decay, gum disease affects children in all countries and, in many countries, it is one of the most common diseases. The prevalence of gum disease in children is very high worldwide, with the majority of children being affected (Annex 3).<sup>19-24</sup> For example, 90% of 12-year-old children in Portugal<sup>21</sup> and 100% of 6- and 12-year-old children in Niger<sup>23</sup> have signs of gum disease that require treatment.

### 2.2 Argument: Incidence of other oral conditions is rising

Unintentional injury is one of the leading causes of death in the world, with 1 in 5 deaths among children under the age of 15 years.<sup>18</sup> In some developing countries, unintentional injuries account for 80% of all deaths in children. Sport and playground related injuries, as well as general and road traffic accidents, often affect the head, neck and mouth. These injuries have a significant impact on oral health. Throughout the world, the number of cases of head and face injuries is increasing in both urban and rural areas. With the increase in road traffic, poor lighting on the road and a lack of legislation regarding road safety, this is particularly significant in some developing countries.<sup>25</sup> The front teeth are most vulnerable. In some countries, over 50% of children have experienced oral trauma, with a quarter of cases being children under the age of 5

years.<sup>26</sup> According to the 1993 UK Child Dental Health Survey, 5% of 12-year-old children (45.7 per 1000) exhibit trauma to their front teeth.<sup>27</sup> The corresponding figure for Syria is 12%.<sup>28</sup> In the US, over 20% of children aged less than 15 years have been admitted to the emergency room sustaining head and face injuries.<sup>29</sup> While the most commonly sustained damage is fractures to tooth enamel, some injuries can lead to permanent tooth loss. The significance of intentional head and face injuries should not be overlooked. In addition to potential direct damage to the teeth and, possibly, other head and face structures, they may be signs of child abuse, a problem that could scar the child for life.

Defects and the colour of tooth enamel affect the appearance of teeth which, in turn, may have an impact on quality of life. The prevalence of enamel undesirable and defects is rising in some countries. Demarcated opacities (white marks on the teeth) are often found on the upper front teeth, while diffuse opacities or fluorosis (discolouration of the teeth) affect all the teeth generally. Some childhood systemic diseases and malnutrition during tooth formation could lead to hypoplasia (discolouration and structural damage to the teeth). In some countries, about 25-40% of children have opacities (demarcated or diffuse opacities) of the tooth enamel on one or more teeth.<sup>21,27,30</sup> In Malaysia, it has been reported that over 75% of 12-year-old children have some form of enamel defects and opacities, regardless of whether the area is fluoridated or not.<sup>31</sup> However, severe enamel defects are not common.

### **2.3 Argument: Many children, their parents and teachers have inadequate oral health knowledge and awareness.**

In many countries, a considerable number of children have limited knowledge of the causes and prevention of the most common oral disease.<sup>32-38</sup> Similarly, mothers' oral health knowledge is generally poor and schoolteachers' oral health knowledge, while better than that of the mothers', remains unsatisfactory.<sup>19,33-36</sup> It is evident that cultural beliefs play an important role in the perception of the causes of dental decay and gum disease. Only a small proportion of children, parents and schoolteachers is aware of the harmful effects of hidden sugars and sugary drinks.<sup>19,33-35,37</sup> Moreover, while many parents recognise the importance of toothbrushing in general, some do not know how to prevent tooth decay and gum disease and the role of fluoride in the prevention of dental decay is poorly understood. In many countries, less than half of mothers have received oral health advice from dentists.<sup>19,20,34,36,38</sup> While the harmful effect of smoking is generally acknowledged, other forms of tobacco use are not regarded as risk factors for oral cancer.<sup>39</sup> Many children are exposed to smoke because their parents smoke at home.<sup>40</sup> Improving the parents' awareness, attitudes and behaviour toward tobacco is therefore paramount.

### **2.4 Argument: Many children are not adopting practices that are essential to maintain good oral health**

As part of oral hygiene routine self-care, children should clean their teeth and gums every day with fluoridated toothpaste. However, in many countries the proportion of children who brush their teeth every day is still unsatisfactory.<sup>20,21,33,34,36,37</sup> A small proportion of children does not clean their teeth at all.<sup>32</sup> Some may not have access to a toothbrush.<sup>41</sup> The use of traditional cleaning aids such as 'Miswaki', a traditional chewing stick, is common in some communities.<sup>19,20,24,33,37,42</sup>

Furthermore, the availability, affordability and quality of fluoride toothpaste remain a major problem in developing countries.<sup>43,44</sup> Only a small proportion of children used fluoridated



toothpaste.<sup>32</sup> In some countries, toothpastes are considered as cosmetics with high taxation, leading to exorbitant retail prices that are out of reach of most families. The need for promoting affordable fluoride toothpaste is evident.

In several countries, many households do not have access to safe water for drinking, let alone for cleaning teeth. Given that schools may be the only place where children can carry out oral hygiene practices, it is therefore vital that sufficient safe water and sanitation facilities are provided in schools.

Healthy dietary behaviours are essential to growth and development and to maintain good oral health. The relationship between diet and oral disease is well established.<sup>45</sup> It is therefore essential to reduce the amount, and more importantly the frequency, of sugary foods, snacks and drinks (including carbonated drinks and fruit juices) in a well-balanced diet with sufficient fresh fruit and vegetables. However, a high proportion of schoolchildren aged 11 to 17 years consume sugary snacks daily, according to a recent international report on health behaviour in schoolchildren.<sup>46</sup> In many countries, over 50% of 15-year-old children drink at least one can of soft drink everyday.

In order to reduce the risk of oral cancer in later life, it is important to start at a very young age to have a balanced and healthy diet, to avoid using tobacco and consuming alcohol, to limit the exposure to the sun and to protect the lips from overexposure. Addressing these risk factors also helps prevent other oral diseases and general health conditions. However, in many countries, children and adolescents are increasingly developing a habit of tobacco use, in the form of cigarette smoking or smokeless tobacco.<sup>46-48</sup> In Greenland, over 50% of 15-year-old children smoke daily and 3 in 4 smokers in the region of the Americas start smoking during adolescence.<sup>46,49,50</sup> Over 50% of children as young as 8 years old have experienced chewing tobacco in some communities. In some cultures, children chew betel quid that contains tobacco and other carcinogens. The high sugar content in some chewing tobacco is also a cause for concern.<sup>12</sup>

Professional care is an important component for attaining and maintaining optimal oral health. However, a significant proportion of children have no access to dental care, particularly among children in developing countries.<sup>19,20,23,24,32-34,37,38</sup> A staggering number of children have not visited a dentist before starting school. In some countries, a significant proportion of school children has never visited the dentist (Annex 4). For example, in Tanzania, over 75% of 12-year-old children have never been to the dentist.<sup>19</sup> Consequently, few have preventive oral care. Many children go to see the dentist when in pain, an experience that may have a lasting effect through life and prove to be detrimental to oral health.

## **2.5 Argument: Early onset of oral diseases is reversible**

Most advanced oral diseases are irreversible. For example, once tooth decay in permanent teeth is established, it will last for a lifetime. Even when the decayed teeth have been restored, the fillings remain in the mouth for life and may need to be replaced from time to time. However, it must be emphasised that, with appropriate measures, early onset of gum disease and dental decay is reversible. In contrast, advanced or established lesions progressively become more serious and difficult to treat. Clearly, prevention is better than cure.

## 2.6 Argument: The consequences and costs of oral disease are significant

The oral health of children is a significant public health issue. Oral disease is one of the most costly diet- and behaviour-related diseases.<sup>12</sup> Childhood oral diseases, if untreated, can lead to irreversible damage, pain, disfigurement, more serious general health problems, lost school time, low self-esteem, poor quality of life and, in the case of noma, death. The delay in treatment not only results in aggravation of disease, but also costs of care are substantially escalated as a consequence.<sup>51</sup> Adverse dental experience during childhood may lead to dental phobia, impacting on attitudes to oral health and self-care as well as dental visiting behaviours for life. These could have further personal and treatment costs.

Oral diseases result in considerable costs. Dental services constitute about 5% to 10% of the total health expenditure in industrial countries each year, costing billions of dollars.<sup>12,52,53</sup> This poses a problem to many developing countries. The cost of dental treatment could easily exhaust the country's entire health budget, a budget that is already fully stretched or simply does not exist. The social and educational costs are also significant. For example, over 50 million school hours in learning are lost due to dental problems in the US. The interference with daily activities, sleeping pattern, quality of life and parents' work output is considerable.<sup>2,54</sup> Prevention, early diagnosis and timely treatment are therefore crucial in efforts to contain the costs of oral diseases.

Children with disabilities are at increased risk of oral diseases, infections, delayed tooth eruption, gum disease and enamel defects. The exposure to special diets, medications and therapies, compounded by difficulty in maintaining effective self-care practices and in accessing professional care, have a serious adverse effect on their oral health.

*"Although dental problems don't command the instant fears associated with low birth weight, fetal death, or cholera, they do have the consequences of wearing down the stamina of children and defeating their ambitions".*

(American Surgeon General David Satcher, 2000)

Costs of neglect are also high, in terms of financial, social and personal impacts. Advanced disease may necessitate more complex, costly and, possibly, more traumatic treatments, such as surgery, root canal therapy, extractions and treatment under general anaesthesia and hospitalisation.<sup>55</sup>

Playground related injuries, including injuries to head and face, among children aged 15 years or under cost the US government an estimated 1.2 billion dollars annually.<sup>12</sup> There are also indirect and intangible costs that should not be underestimated.

Poor oral health in childhood often continues into adulthood, impacting on economic productivity and quality of life. It has been reported that investment in oral disease prevention and health promotion decreases costs in health expenditure and is more cost-effective in the long-term.<sup>56</sup>

*"Oral disease is no laughing matter".*

(An English teacher at Saraburi Primary School in Saraburi Province, Thailand)



## **2.7 Argument: Poor oral health affects learning, general health and well being**

The experience of pain, endurance of dental abscesses, problems with eating and chewing, embarrassment about the discoloration, damage or shape of teeth can distract children from play and effective learning. Oral health affects general health. If left untreated even for a short period of time, oral diseases can have adverse consequences. Oral infection can kill. It has been considered a risk factor for a number of general health conditions. Systemic spread of germs can cause, or seriously worsen, infections throughout the body, particularly among individuals with suppressed immune systems, heart disease and diabetes. Studies have suggested that oral diseases (such as dental decay and gum disease) are associated with a variety of problems.<sup>55,57-59</sup> For example:

- failure to thrive;
- poor nutrition;
- speech impairments;
- psychological problems;
- cardiovascular disease;
- diabetes;
- cancer.

Furthermore, some common medications and therapies used to treat general health conditions can compromise the health of the mouth and oral functioning. In recent years, much research has demonstrated the impact of oral health on quality of life.<sup>60</sup> A number of oral health related quality of life measures have been developed to assess the functional, psychological, social and economic consequences. In general, poor oral health has a negative impact on quality of life, influencing eating abilities, personal confidence, mental health, social interaction, personal relationships, general health and well being and enjoyment in life. Low quality of life scores are also related to poor oral health status and reduced access to professional care.

Similarly, general health risk factors also affect oral health, such as excessive alcohol intake, smoking, tobacco use and poor dietary practices. The correlation between these lifestyle behaviours and increased risk of tooth decay, gum disease, oral infections, head and face defects, oral cancer and other oral conditions has been evidenced.<sup>12,61</sup> There is a need to adopt an integrated approach to address these important risk factors for both oral and general health. Promoting oral health provides a valuable opportunity to integrate oral health promotion into general health promotion. Such an approach is likely to be more efficient and effective than those programmes targeting a single disease or condition.

## **2.8 Argument: Poor oral health affects the growth, development and well being of children and has a significant impact on later life**

Nutrition plays a critical role in a number of oral diseases including dental decay, gum disease, toothwear and oral cancer.<sup>45</sup> Nutrition and oral health have a particularly intricate relationship. They form a vicious circle; poor oral health disrupts nutritional intake and poor nutrition affects the development of oral tissues including teeth, making them more susceptible to oral disease. Chronic deficiencies of some micronutrients, such as ascorbate, zinc and iron, may also impair the oral defence mechanisms.

Poor oral health is associated with stunted growth and compromised nutrition. Early childhood caries (ECC) could lead to failure to thrive.<sup>62</sup> ECC has been considered an indicator for

malnutrition, a condition that affects growth and development of children.<sup>63</sup> Mental development and, subsequently, learning abilities are compromised. In more severe cases, malnutrition can cause death. Nutritional deficiencies could also lead to many general health problems in later life such as cardiovascular diseases and poor pregnancy outcomes. In contrast, good oral health helps promote nutritional intake in children, enhancing their learning potential and school performance and enabling them to lead a more productive life.

## **2.9 Argument: Many oral conditions, diseases or disorders are preventable through school-based efforts**

Effective oral hygiene practices, good dietary behaviours and appropriate use of fluorides, together with sustainable, effective and accessible professional care, are keys to good oral health. The school provides an excellent setting for delivering oral health services for children. Individuals, families, community, schools, education authorities, healthcare providers and government departments should work collaboratively to reduce risk factors and to promote oral health, incorporating the guiding principles for health promotion:

- develop healthy public policies;
- create supportive environments;
- strengthen community actions,
- develop personal skills to improve knowledge, attitudes and behaviours;
- reorient health services to provide a sustainable, effective and accessible system.

## **2.10 Argument: Healthy behaviours and lifestyles developed at a young age are more sustainable**

Prevention is a critically important strategy for promoting good oral health among young people. Most risk behaviours and lifestyles stem from school-age years.<sup>46,49</sup> Equally, good habits that are developed at a young age are more sustainable.<sup>14,64</sup> Oral hygiene practices can easily be adopted and incorporated into daily routines such as eating and cooking. Hence, daily toothbrushing with fluoridated toothpaste is a habit that should be encouraged to become a norm early in life. Good dietary patterns should also be fostered at a young age, particularly in preventing children from acquiring a 'sweet tooth' that leads to a habit of eating too much sugar. Early dental visiting experience enables children to develop a good rapport and relationship with the dental team, so that preventive measures can be implemented before oral disease begins. Parents also play an important role in shaping the positive attitudes and influencing good oral health behaviours at home. With regular reinforcement and encouragement at home and in schools, these healthy behaviours are more likely to continue into adulthood, becoming life-long habits.

## **2.11 Argument: Oral health promotion can be integrated into general health promotion and into school curriculum and activities**

Oral health promotion activities can easily be integrated into school curriculum and activities, co-ordinated and delivered by school teachers or other school personnel. In Thailand, school teachers are responsible for oral health education, supervising toothbrushing drills after lunch and oral health screening and surveillance.<sup>65</sup> Many of these activities are also incorporated into general health promotion. For example, oral hygiene forms part of the personal hygiene and grooming programmes such as hair and hand washing. Dental trauma prevention is included in



injury prevention. Oral health surveillance is an integral part of growth and nutrition surveillance that takes place twice a year. Some schools also include oral health in family planning and sex education.

Oral health can also be featured in various grade levels throughout the school curriculum, with community projects and home-based activities that involve other members of the family.<sup>66</sup> Oral health-related topics and issues can be introduced in subjects such as science, chemistry, biology, language, arithmetic, social studies, arts and music.<sup>66,67</sup> Other general health promotion activities also have oral health significance such as healthy eating.<sup>68</sup>

School policies and practices that promote good nutrition, healthy behaviours and self-esteem, and discourage smoking, tobacco use, alcohol consumption and substance abuse are also relevant to oral health. Undoubtedly, the co-operation from schools and teachers is crucial to the development of an effective oral health promotion effort.<sup>69</sup>

*Open Wide and Trek Inside* is designed to teach young students [Grade 1-2] important life science concepts and engage them in appealing inquiry-based activities that stimulate their interest in science and scientific principles. By using the mouth and the oral environment as a 'laboratory', children integrate science concepts with basic information about the structure, function and importance of the mouth as an integral part of overall health.

(NIDCR and NIH Office of Science Education, US).

### 3 CONVINCING OTHERS THAT ORAL HEALTH PROMOTION IN SCHOOLS REALLY WORKS

This section provides information that can be used to convince policy-makers, decision-makers, fund holders and others of the effectiveness of interventions that promote oral health through schools. They also offer justifications for decisions to support such efforts. The following arguments strongly support the efficacy and effectiveness of oral health promotion programmes in schools.

#### 3.1 Argument: School is an efficient setting for oral health promotion

Schools are microcosms of the larger community. With existing structures and systems in place, schools provide excellent opportunities for integrating oral health into the curriculum that is acceptable, appropriate and effective.<sup>14,70,71</sup> Children are receptive to guidance and they are familiar with the learning environment and culture in school.<sup>14</sup> Schools can effectively inform and influence students' oral health knowledge, beliefs, attitudes and behaviour.

It is important to target children, particularly at kindergartens and primary schools. Pupils need to acquire knowledge and skills that facilitate a healthy lifestyle and help them cope with social and peer pressure. Children are empowered to take control over their own health early in their lives and are encouraged to develop positive attitudes toward preventive measures.

This is particularly crucial when they reach adolescence when they are challenged and exposed to risk factors such as tobacco and alcohol use and poor dietary practices. They become more mobile and travel independently in motor vehicles and bicycles, and engage more in sports and other high-risk activities that are more prone to craniofacial injuries. They may begin to experiment with sexual practices during this period, potentially subjecting themselves to infections that predispose to general and oral health problems.

School policies and physical environment are also imperative in the attainment of optimal health. Policies on diet, particularly in relation to sugars and carbonated drinks, are necessary to enable the canteen and tuck shops to promote healthy eating and sensible sugar intake. Many schools in Asia have implemented a daily supervised toothbrushing drill at lunchtime policy, according to a recent report.<sup>72</sup> A safe physical environment in schools, particularly in play areas, helps reduce craniofacial injuries. With appropriate dental trauma policies in place, timely actions can be taken in case of emergency to minimise permanent damage. Policies on bullying and violence between students, supported by education and empowerment, also help prevent intentional injuries.

The provision of safe water and sanitation, together with pollution free environments, is a prerequisite for health.<sup>73</sup> While access to safe water and sanitation facilities is a human right, about 1.1 billion people in the world have no access to safe drinking water and 2.4 billion lack basic sanitation facilities, most notably in Asian and African countries.<sup>74</sup> Without such facilities, health education and promotion are futile. More importantly, the school environment may be hazardous to children's health and well being. In contrast, by providing these facilities, schools are able to promote effective learning, to reinforce health messages and, particularly for oral health, to undertake health promotion activities.

Schools, a well-established system, have the potential to reach a large group of people efficiently. Schools are more widely distributed even in rural areas of developing countries than health centres and clinics.<sup>75</sup> This is particularly relevant to community-based preventive programmes for dental decay such as milk and water fluoridation schemes.<sup>76,77</sup> On the other hand, special attention can be given to students who are more susceptible to, or at a higher risk of, oral disease. Working collaboratively with the health services, dental treatment and preventive oral health measures can be made available in the school, a cost-effective approach with minimum disruption to learning and school activities.<sup>71</sup> Children are encouraged to develop a good relationship with the dental team and a positive attitude towards regular dental attendance. The school dental clinic also provides important physical facilities for baseline assessment, monitoring, research and evaluation.<sup>71,78</sup>

Furthermore, schools are often seen as a place for oral health knowledge and information by parents and the local community.<sup>54</sup> This lay referral system for obtaining information is common in many countries and teachers play an important role in this process.<sup>79</sup> It is therefore imperative that teachers and school staff are equipped with adequate oral health knowledge and skills. Schools form the heart of the community, a means for social networking for parents through local events and meetings. The schools can capitalise this school-home-community interaction to address common concerns, to form a united force to lobby for water fluoridation and healthy environments in the community where they live, work and learn.<sup>15</sup>

### **3.2 Argument: School-based oral health promotion programmes are effective**

School environments have a significant impact on sustainable healthy behaviours, a key success factor for Health-Promoting Schools.<sup>80</sup> Initiatives that target improving environments in schools for children are largely cost-effective.<sup>18</sup> However, without supportive environments, optimal oral health for children cannot be realised.<sup>69</sup>

A review of Health-Promoting Schools supports the claim that a well designed and implemented programme which links the curriculum with other health promotion in school and the community is likely to produce health gains.<sup>81</sup> Provided that the intervention is substantial, over several years, and relevant to children's development, school health promotion is effective in improving knowledge, developing skills and promoting healthy behaviours. With supportive environment and adequate capacity building for staff, the programme is likely to be sustainable. The findings are in line with those reported by a WHO Expert Committee<sup>82</sup> and other studies.<sup>83</sup>

There is considerable evidence to support the effectiveness of well-conducted school-based oral health promotion interventions worldwide. In the region of the Americas, the US Surgeon General Report documents that most school-based or community-wide oral health preventive interventions are beneficial and cost-effective.<sup>12</sup> Most school-based or school-linked fluoride and fissure sealant programmes are effective, particularly for children with high risk of dental decay. Tobacco use prevention and control programmes, as part of the school curriculum, are highly effective in influencing behaviour change.<sup>84</sup> Along with the community-based and media-based activities, school-based programmes are effective in preventing or delaying smoking onset in 20% to 40% of adolescents.<sup>85</sup> Similar findings have been reported in other countries in the PAHO-AMRO region, where school-based preventive programmes are effective in improving oral healthy knowledge and behaviour.<sup>86</sup> Schools that adopt and implement the principles of a Health-Promoting School ('supportive schools') have a lower proportion of children with tooth decay (64%) and dental trauma (11%), compared with 'non-supportive schools' (66% and 17% respectively); the more comprehensive the curriculum, the better the oral health outcomes and less inequalities in oral health within the school.<sup>87</sup>

In the European region, a comprehensive school-based oral health promotion programme has been in place for decades in some countries.<sup>88</sup> Working closely with schools, the Danish Municipal Dental Health Service provides comprehensive oral health care to children and adolescents in school, with strong emphasis on prevention and health education to students, school staff and parents.<sup>71</sup> Long-term epidemiological data show that dental knowledge, attitudes and behaviour have improved over time, as has children's oral health status.<sup>88,89</sup> With improved dental knowledge and attitudes, parents are more involved in caring for their children's oral health. The findings agree with an earlier curriculum-based oral health education programme in England.<sup>90</sup>

There are a number of school-based oral health promotion initiatives undertaken in Ireland, including the *Mighty Mouth* programme, Den TV and, while not exclusively about oral health, the Nutrition Education At Primary School and Social Personal and Health Education programmes.<sup>91</sup> The programmes adopt the ethos of a Health-Promoting School and show promise. Children's oral health related knowledge, attitudes and behaviour, most notably healthy food choices, have improved.<sup>69,92</sup>

In Central and Eastern Europe, school oral health programmes were established but brought to a halt during health systems transition. The effect of a school-based oral health promotion programme is more apparent in Hungary. A nation-wide programme was introduced in 1986 but ceased to exist in the mid-1990s during the health care reform. The oral health of children has improved after the introduction of the programme but deteriorated since the programme has stopped, according to national studies carried out in 1985, 1991 and 1996.<sup>93</sup>

*"The city of Erfurt, the capital of Thuringia with about 200,000 inhabitants, is involved in the project "Healthy Cities" since 1991 with the common target to cope with social and health inequalities. During the nineties major changes have occurred in the demographic situation (decrease of inhabitants 15%) and in the social life of Erfurt (increase in unemployment 18% and need for social security 3.5%). A special aim of the city project beside others is the improvement of oral health among children with high caries [tooth decay] risk. Since the implementation of the caries risk strategy the percentage of caries free subjects in kindergartens increased from 22% (1998) to 28% (2001) and in primary schools from 57 % to 66%. In Erfurt the percentage of children with high caries risk amounted to approximately 20%. Since 2001 special intensive preventive programmes have been implemented in selected kindergartens and primary schools where the percentages of children with caries risk is higher than on average. These programmes focus on comprehensive preventive care in terms of fluoride application, dental health education and tooth brushing exercises. The preliminary results showed a slight decrease of caries prevalence, combined with an increase of caries free subjects. It could be concluded that the city-project with focusing on environmental, and social criteria together with intensive dental preventive care will lead to a better oral health and health behaviour in the future".*

(Prof. Borutta, WHO CC for Prevention of Oral Diseases, Erfurt, Germany).

In the Western Pacific region, an oral health education programme has been undertaken in Wuhan, China, based on the concept of Health-Promoting Schools with a special emphasis on healthy environments and capacity building.<sup>94</sup> The curriculum involves a regular classroom teaching programme on general health as well as oral health, with a daily toothbrushing



exercise supervised by teachers. At the end of three years, oral health knowledge, attitudes and behaviour of children have improved, as has gingival health. Impact on teachers and parents is evident.

A study in Indonesia investigates the long-term effect of a school-based oral health education programme.<sup>95</sup> While there is a significantly better oral health knowledge in the test group, toothbrushing behaviour, oral hygiene status and other oral health behaviours are found to be similar to those of the control group.

An oral health promotion effectiveness review in Australia shows that the use of a settings approach in promoting oral health can potentially lead to oral health benefits, with Health-Promoting Schools being most promising.<sup>96</sup> The importance of supportive school environments is emphasised.<sup>26</sup> A number of studies with this approach have proved to be effective. Evidence suggests that interventions that are incorporated into school curricula, part of other health promotion activities and needs-driven are most successful. Programmes targeting parents, preschool children, schoolchildren and adolescents have made an impact on knowledge, healthy behaviour and, in some cases, health gains. Similar findings have been reported in New Zealand.<sup>97</sup> Well-designed school-based initiatives that aim at improving knowledge and social competence are generally effective. In addition, the school dental service is a valuable means of promoting health and equity.

In Cambodia, oral health promotion activities form part of the school curriculum, including general and oral health education, daily toothbrushing drills and a weekly fluoride rinse programme. Some activities are led by student leaders, supervised by teachers. As a result of the programme, significant improvements in oral health knowledge and good practices among children have been reported, particularly in those schools that are more co-operative.<sup>98</sup>

Similar findings have been reported in the South-east Asia region. In India, oral health education has been integrated into the school curriculum, aiming to provide dental knowledge and to empower children to take control over their own health. Oral health is featured in other subjects, including language, arts, arithmetic, sciences, social studies and music.<sup>78</sup> Compared with the control groups, the test groups showed a significant improvement in knowledge and oral hygiene.

In the African region, oral Health Promoting Schools have been implemented in Madagascar.<sup>75</sup> The initiative has been shown to be effective in improving dental health status and in influencing oral health knowledge and behaviour, compared with the control group. Parents are very supportive of the programme. Consequently, the levels of family support in oral care have also increased. However, training and professional development for staff, compounded by staff shortage, remain the key constraints. In South Africa, a 7-year school-based preventive programme results in a significantly lower prevalence (37%) and experience (DMFS 1.94) of tooth decay, compared with those who did not receive the programme (prevalence 62%; DMFS 6.12).<sup>99</sup>

Similarly, in the region of the Eastern Mediterranean, a 9-year school-based oral health programme in Kuwait also shows an improvement in oral health in children.<sup>100</sup> The programme includes bi-weekly supervised toothbrushing with fluoridated toothpaste and regular fluoride mouthrinse, fissure sealant and restorative dental treatment provided in schools, oral health education delivered by teachers and regularly oral health education programmes for parents and teachers.

### 3.3 Argument: We know what works well and what can be done to improve programmes that do not work well

Kay and Locker published an oral health promotion review in 1997,<sup>101</sup> claiming that while teaching parents about cleaning their children's teeth has proved to be effective, school-based programmes have little impact on tooth decay or gum disease. However, among other shortcomings, further examination of the studies included in the review shows that there are fundamental differences between interventions that are effective and those that are not. School-based interventions are effective when there are long-term sustainable support and commitment from the family, school, professionals and government, results that are supported by a recent UK study<sup>102</sup> and findings in China<sup>94</sup> and Madagascar.<sup>75</sup>

Interventions that adopt the Health-Promoting School approach are generally successful.<sup>82</sup> Effectiveness of school health education is associated with the amount of classroom or curricular time devoted to the programme, the extent to which the programme is supported and the commitment of teachers and students.<sup>14</sup> However, the concept and application of a Health-promotion School, or even health promotion, may not be well understood by dental service providers.<sup>103</sup> In order to fully integrate oral health promotion activities in the school curriculum, training and professional development for teachers are imperative.<sup>94</sup> A comprehensive programme of professional development for teachers improves their skills in, and commitment to, sustaining oral health promotion innovations. Strategies that fit in with wider school and community initiatives are more sustainable. Working in partnership with parents and the local community enhances health gain and the impact of the programmes.<sup>81,91</sup>

*“Additional effects of ‘Schools for Health’ include converting children, adolescents and young adults into leaders and promoters of change on behalf of their communities health”.*

(Health Promoting Schools Network in Cuba).

While not all school-based programmes have encompassed all the components of a Health-Promoting School, it is encouraging that some schools have already made a sterling effort in incorporating oral health promotion activities in the school curriculum. It is necessary to build on the good work and achievements, broadening the efforts to maximise the full potential of a Health-Promoting School.

### 3.4 Argument: Integrated school-based oral health promotion programmes are cost effective, leading to sustainable cost savings

The cost-effectiveness of school-based programmes in enhancing the health and development of school-age children has been well established.<sup>82</sup> The cost-effectiveness ratios are likely to improve when employing an integrated approach that addresses a number of health and educational problems. While the true benefits of school-based health promotion interventions may be difficult to ascertain in money terms, they have significant potential for cost savings. In general, the cost per capita of community preventive programmes is lower than that of treatment services.<sup>12</sup>



A multifaceted school oral health programme, complemented by water fluoridation, has led to a significant improvement in dental health, with a substantial cost savings.<sup>14</sup> The proportion of children with no experience of dental decay has increased from 0% to 34%. In countries without fluoridated water, school-based oral health programmes, combined with the use of fluoridated toothpaste, are also cost-effective. The findings are supported by a more recent report in Vietnam.<sup>56</sup> Since the implementation of the nationwide school oral health programme, the oral hygiene and oral health of schoolchildren have improved, leading to a significant saving of 3.5 million US dollars.

### 3.5 Argument: School-based oral health promotion intervention can benefit the entire community

Oral health promotion can trigger the installation of safe water supply and sanitation facilities in schools; this in turn may lead to a demand for similar facilities from the community.<sup>104</sup> Parents and community members who are involved in the Health-Promoting School Initiative are aware of the important benefits of these facilities. The training and experience gained in working with others and in gathering resources can prove invaluable in lobbying for better environments at home and in the community. The school, parents and community members can support each other in the process.

Children have an important role to play in oral health promotion. Health-Promoting Schools empower children to take control over their health and become an active and responsible citizen in society. They are encouraged to impart their knowledge to benefit other members of the family and society. This ‘spread of effect’ of oral health promotion has been documented.<sup>105</sup> Children may have a strong influence on their family and community.

*“In China, since we have the one-child policy, the position of the child in the family power structure has changed dramatically. Children now have more power and influence in the family. If the family is an empire, the child is the king. He [or she] can persuade the parents to do certain things, stop smoking for example”.*

(Prof. Zhuan, Wuhan University, China).

### 3.6 Argument: Teachers are very supportive of the initiatives

According to the results of a number of surveys, teachers are willing to teach oral health education as part of their routine school activities.<sup>19,20,34,35,37,38</sup> Teachers are acutely aware of the poor oral health conditions of their pupils and are willing to take a more active role in oral health promotion in schools. Some, for example in Thailand, consider it is their duty to help children maintain good oral health.

*“We are very happy to do it [oral health promotion activities in school] because we suffered from toothache as children and it was horrible. So we are very keen to help the children not to have the same suffering”.*

(An English teacher at Saraburi Primary School in Saraburi Province, Thailand)

In Tanzania, teachers in primary schools integrate oral health promotion activities in the school curriculum. However, schoolteachers may not have the necessary oral health knowledge and skills to carry out oral health promotion tasks effectively.<sup>106</sup> Many would like to have more training in this area. Consequently, some are reluctant to teach oral health. In contrast, teachers in many other countries (e.g. Zanzibar,<sup>20</sup> China,<sup>34</sup> Poland,<sup>35</sup> Romania,<sup>37</sup> Kuwait,<sup>38</sup> Thailand<sup>65</sup> and Cambodia<sup>98</sup>) feel strongly about children's oral health and are happy to play a part in oral health education. The willingness of schoolteachers in this role is evident.



## 4 PLANNING THE INTERVENTIONS

Oral health can be an effective entry point for building a school's capacity to plan and implement a wide range of strategies and interventions in health promotion. It is important that oral health is considered a priority for both education and health. Once oral health is recognised as a key area, the next step is to plan the interventions, identifying the strategies that have the most influence on oral and general health, education and development. In order to maximise the impact, it is necessary to integrate the oral health interventions with other health promotion activities. Interventions should empower students, parents, teachers and community members to make healthy decisions, practise healthy behaviours and create conditions and school environments conducive to health.

This section describes the key steps to consider in planning oral health promotion as an essential element of a Health-Promoting School.

- Establishing or involving a School Health Team and a Community Advisory Committee;
- Conducting a situational analysis;
- Obtaining political, parental and community commitments;
- Establishing supportive school health policies;
- Setting goals and objectives.

### 4.1 School and community involvement in planning

Health-Promoting Schools involve members of the school and community in planning programmes that respond to their needs and that can be maintained and sustained with available resources and commitments. It is essential to work with the Parent/Teacher Association (PTA), where appropriate. However, experiences worldwide have shown that two important groups may be very helpful in creating a Health-Promoting School, namely a School Health Team and Community Advisory Committee.

#### 4.1.1 School Health Team

A School Health Team is a designated group of people who are committed to work together to promote the health of all people who are working and learning at school. Depending on local circumstances, it should comprise a balance of representatives, including students, parents, school governors, teachers and school staff, members of teachers' representative organisations, PTA representatives, administrators, food service providers and health care providers.

Ideally, the School Health Team should have between 8 and 14 members. While it may not be possible to recruit all representatives in some schools, it is recommended that the Team should always include the school principal, at least one teacher and one parent, a health care provider and students.

The Team is responsible for the management, co-ordination and monitoring of health promotion policies and action plans and for establishing links with district education personnel, local health officials and provincial or national network or ministry-level staff. It also provides leadership, communication and support to school staff and community members and arranges training where necessary. If a school does not have a School Health Team, oral health promotion can

provide a useful impetus for its formation, a model on which other health promoting activities may be based.

Given that schools should implement programmes that are responsive to local needs, it is important that students, parents, school governors and school staff including teachers and management are consulted from the outset. Active participation provides a sense of ownership, a vital element of successful programmes. Each member has a valuable contribution to make. For example:

- Young people can help develop initiatives that are responsive to their specific needs and concerns;
- Parents and school governors can help address issues and barriers in a culturally acceptable and appropriate manner;
- Teachers and other school staff can help ensure that programmes are developed with consideration to their existing knowledge, skills and abilities, as well as training needs. Given the availability of resources and local circumstances, their input is crucial for ensuring that strategies and interventions are practical, realistic and achievable.

The School Health Team should be given time, resources, authority and support to lead and oversee health promotion activities in school. Each member or a sub-group of members, while working with the whole of the School Health Team, can have designated special responsibility for a given task. For example, an Oral Health Sub-Committee may be formed to address oral health and related issues.

#### **4.1.2 Community Advisory Committee**

The Community Advisory Committee consists of members or leaders in the wider community who are best able to advise and provide support to the school. They understand the key oral health related issues affecting the community and school, have access to resources that can contribute to health promotion and have a significant influence on creating a supportive environment for oral health. Committee members foster good relationships between the school and the community at large, strengthening the impact of oral health promotion interventions.

Working closely with the School Health Team, the Community Advisory Committee can help:

- advocate the development of a Health-Promoting School with leaders, staff and members of their own organisations and agencies;
- outreach to all parts of the community, lobbying for support;
- encourage other community groups to become involved in oral health issues and interventions, strengthening community participation;
- identify and obtain resources for projects and activities;
- help assess oral health problems and opportunities that affect the community.

The Community Advisory Committee should include men and women with a wide range of expertise and skills who are:

- interested in, and committed to, oral health and health promotion in general;
- knowledgeable about the community;
- influential in the community or district;
- capable of mobilising support and connections;



- representative of the local community in terms of geographical, social, economic, cultural and religious composition.

Potential partners include families, youth, health service providers and representatives of trade unions, women's groups, early childhood education, local government, arts and crafts societies, banking, sanitation/public works, law enforcement, local businesses, transportation, NGOs, charities and development organisations. The ideal size of the committee is between 10 and 15 members.

Certainly, it is beneficial to work with existing groups and organisations that are already established. If such a committee already exists, it is essential to find out whether oral health issues have been addressed adequately and to identify ways to work with the committee more effectively to promote oral health. If such a committee does not exist, oral health promotion provides a good opportunity to establish one. In some communities, it may not be possible to form two separate groups for the School Health Team and Community Advisory Committee. A single group comprising the School Health Team and selected community representatives may be considered.

## **4.2 Situation analysis**

To support the development of an effective oral health promotion effort, policy- and decision-makers and other interested groups should consider conducting a situation analysis, a process that involves the collection and analysis of relevant information from a variety of sources. The School Health Team and Community Advisory Committee can start the local planning process by conducting a situation analysis.

### **4.2.1 Purpose of conducting a situation analysis**

The aim of the situation analysis is to assess the needs, resources and conditions that are relevant to the planning and development of a Health-Promoting School. A good situation analysis is essential as it provides:

- the policy- and decision-makers with evidence to support their strategies, particularly in relation to resource allocation;
- information on current oral health status, risk factors, barriers, availability of resources including manpower, and existing services and activities;
- accurate up-to-date information that can be used for discussion, justification, planning and setting priorities for action;
- baseline data for monitoring and evaluation of oral health promotion interventions.

### **4.2.2 Information needed**

Prior to the planning and implementation of any oral health promotion interventions, it is important to assess the current oral health status and key oral health problems of the local or school population, compared with those of the districts, regions and country. The data should include the prevalence and severity of the problems.

It is imperative to identify the physical and social factors that protect children and adolescents from oral diseases and related risk behaviours. Data regarding oral health beliefs, values, awareness, knowledge, attitudes and behaviours can help planners understand both positive and negative influences on oral health. This information is crucial to the design, planning and implementation of oral health promotion programmes, so that the most relevant factors or barriers can be targeted effectively.

In order to build on good work that is already in place and to avoid duplication of efforts, it is necessary to consider existing oral health related activities that are organised by the school, local community, school health service and other health care providers. It is essential to consider the school physical and psychosocial environment, organisational structure, curriculum, health-related policies and practice and relationship with the wider community. For example, good sanitation facilities with safe water are essential for toothbrushing and other oral hygiene activities to be carried out and for maintaining infection control. If the school does not have adequate facilities, the initiative provides a good opportunity for the school to improve these facilities, thereby not only improving hygiene conditions for oral health but also general health. Finally, an evaluation of available resources determines the level of manpower, financial investment and services that are required to develop and sustain a Health-Promoting School.

In short, the information needed includes:

- Current health and oral health status of children and adolescents;
- Behaviours and other key factors related oral health and disease;
- Oral health beliefs, knowledge, attitudes and behaviours;
- Other socio-environmental factors that impact on oral health;
- Existing programmes and activities in school and the local community, as well as those delivered by the health service providers;
- Available resources in school and the community;
- School physical and psychosocial environment, organisational structure, curriculum, health-related policies and practice, school-home-community interaction;
- Physical, cultural, social, political and economic factors that support or hinder the development of good oral health practices.

Table 4.1 provides some examples of basic questions that can be used for a situation analysis, together with suggestions of methods of data collection. It must be emphasised that they are only suggestions and the list is not exhaustive. Local applications must take into account local circumstances and availability of resources.



**Table 4.1.** Basic questions for a situation analysis and corresponding methods of data collection.

Basic questions	Source of data
What are the major health problems affecting the well being of students in school?	Review school health statistics (if kept), school nurses' records, clinic or hospital records, local and district health authorities data. Conduct qualitative interviews or focus group discussions to explore the issues and the views of school staff and students.
What is the oral health status of children in the school? How does it compare with that of the local community and nation?	Review existing data from routine survey from health authority or, if data not available, conduct a sample survey.
What are the prevalence and severity of the major oral conditions?	Review existing data from routine survey from health authority or, if data not available, conduct a sample survey.
What are the consequences of oral disease (e.g. number of school days lost and impact on quality of life)? What is the significance of these on children's health and well being, educational and personal development?	School records; Questionnaire surveys; Qualitative interviews; focus group discussions; Parents and teachers' meetings; or Governors' meetings; etc.
What are the oral health beliefs, knowledge, attitudes and behaviours of students, parents, school staff and, if applicable, other school-related service providers?	Observations; focus group discussions; sample surveys.
Are there any other factors that impact on children's oral health?	Sample surveys and focus group discussions.
Is the school physical and psychosocial environment conducive to oral health and general health? Does the school provide food/lunch/drinks to children during school hours?	Checklists for Health & Safety, facilities including sanitation and safe water, school organisational structure, etc; focus group discussions with students and staff.
Does the school incorporate oral health education in the curriculum and, if so, to what extent?	Review of curriculum; structured questionnaires or checklist, interview with students, parents and staff.
Are there any oral health related policies and practices? (e.g. policies on diet, sugar, vending machines, bullying, injuries, emergency procedures, HIV/AIDS, tobacco, etc.)	Observations; structured questionnaires or checklist; types and quality of food and drinks in the canteen, tuck shops and vending machines.
Are there any existing oral health or general health promotion activities in place? Who are responsible for delivering these programmes?	Review school records and timetable; questionnaire surveys to headteacher and school staff.
Does the school have the resources and facilities to support oral health activities? What kind of resources and capacities exist on the community level?	Questionnaires to headteacher and school staff. Sample survey of community members; focus group discussion with community leaders.
Are school teachers/school health staff prepared for oral health promotion / education?	Sample surveys.
Is there a school health service? If yes, what types of services and activities does it provide?	Data from health authorities; a checklist of services available in the school and the types and frequency of activities. School health records regarding referrals.
Is there health promotion for school staff?	Existing programme on policy.
Is there any school-home-community interaction and, if yes, to what extent?	School records; observations; questionnaires to students, school staff, parents and local organisations to assess their attitudes and involvement.
Are there any other factors that support or hinder the school to improve oral health?	Re-analyse of quantitative and qualitative data collected and identify if there are any other emerging factors or further research needed.

### 4.2.3 Data sources

It is more efficient to use readily available existing data than to undertake a new survey. However, caution must be exercised when using existing data. The quality of data must be carefully examined since data are often collected for other purposes than planning Health-Promoting Schools. It is also important to collaborate with health, education and other government departments and community organisations effectively to avoid duplication of efforts. For example, results of lifestyle and general health risk behaviour assessments and other health related surveys might also be relevant to oral health. When conducting new assessments, it is important to use simple but validated methods and instruments that are appropriate to the investigations.

## 4.3 Commitment and policies

Commitment and support of relevant government departments, particularly the health and education authorities, are imperative. The success of oral health promotion interventions also depends on the dedication and involvement of students, parents, teachers and community and business organisations. Responsibility must be shared between students, family, school, health professionals, government and the community.

### 4.3.1 Political commitment

National and local policies, guidelines and support from ministries of health, education and food and agriculture are essential to the implementation of Health-Promoting Schools to promote oral health. These include public endorsement of the need for oral health promotion in schools with a designated responsible officer, financial support for school oral health promotion initiatives and the provision of training, equipment and materials to help the school develop, implement and sustain an oral health initiative.

Schools can help foster healthy public policies. Policies that are useful in promoting oral health include:

- oral health education within the school curriculum;
- oral hygiene;
- sugar and healthy eating policies including canteen, tuck shops, vending machines;
- violence and bullying;
- trauma and emergency care;
- fluorides (e.g. milk or water fluoridation, affordable toothpaste and mouthrinse);
- safe water and sanitation;
- infection control;
- safe environment;
- HIV/AIDS;
- Exercise;
- smoking and tobacco use;
- alcohol;
- substance abuse.

### 4.3.2 Community commitment

The development and maintenance of oral health interventions as part of a Health-Promoting School are influenced by the level of support from the local community. It is crucial that parents and community members are consulted in the design, planning, delivery, content and evaluation of school oral health promotion initiatives from the outset. Community participation is particularly important to ensure the issues are addressed adequately and effectively, creating a sense of community ownership. More importantly, such involvement maximises the potential of expertise, facilities and resources that are available. Community group meetings, PTAs, formal presentations, open houses, civic clubs and religious centres are useful for promoting and encouraging community participation.

Community commitment is evidenced by:

- public acknowledgement of the importance of oral health by community leaders and other relevant organisations;
- establishing a designated committee for coordinating community oral health promotion interventions;
- involving local businesses for social, financial and/or technical support;
- channelling local resources for oral health promotion interventions;
- actively participating in community oral health programmes;
- coordinating oral health interventions with other activities in the community;
- the use of media.

### 4.3.3 Supportive school policies / practices

Supportive school policies are essential components of a Health-Promoting School. Policies should be brief and simple documents that provide a supportive framework, detailing the rationale, objectives and guidelines for the development, implementation and evaluation of oral health promotion activities in schools, made available. If preferred, a single policy document that covers all elements, areas and activities of a Health-Promoting School can be developed. Alternatively, a number of specific or individual policies can be generated, for example in relation to the school environment, behaviour/lifestyle and curriculum. Nonetheless, they should take into account local factors and resources and, more importantly, incorporate input from students, parents, teachers, administrators and all relevant members of the school community. They should also consider the key oral health issues and concerns, reflecting the needs, priorities and cultural preferences of the school and local community.

Collaboration and coordination between health, education and food and agricultural departments of the government and between the school and the community are crucial in planning policy. Coherent policies and legislation across sectors are needed to avoid contradictory and unacceptable policies. They should be reviewed and evaluated regularly, ensuring that all components of a Health-Promoting School are addressed. Policies regarding a Health-Promoting School environment, health education and training for teachers are particularly important for oral health promotion. For example, school policies should make healthy eating the easier choice and ensure that sanitation and safe water are adequately provided in school.

The following guidelines could be included in the formulation of an oral health policy:

- Teachers, parents, students and all other relevant school personnel are involved in the planning, development and review process;
- The School Health Team and Community Advisory Committee meet periodically to review development and maintain coordination between the school and community;
- The school curriculum includes oral health in the school health education programme and as an integral part of other relevant subject areas, such as personal development, maths, biology, chemistry and social science;
- Teachers and other school staff receive systematic and ongoing training in oral health and prevention of oral diseases;
- The school canteen, cafeterias, snack bars, tuck shops and vending machines serve nutritious foods and drinks that are conducive to good oral health. School canteen staff and food providers are educated about diet and oral health;
- If feasible and appropriate, the school considers school-based public health preventive interventions such as water and milk fluoridation;
- The school ensures that sufficient facilities are available for oral health activities in school and the premises are adequately safe to prevent craniofacial trauma;
- The school ensures that there is appropriate accident prevention policy and practice in school;
- In case of emergency, clear protocol is provided to ensure vital actions are taken without delay;
- The school monitors oral health related injuries, sickness and absenteeism;
- Working with the school health services, the school assesses the oral health status of students regularly and ensures that students have access to oral health care services. Teachers are trained to undertake certain screening and assessment procedures;
- The school plays a key role in advocating and lobbying for water fluoridation in areas of poor dental health and for the availability of affordable fluoride toothpaste;
- School health services offer screening and treatment for oral disease and work collaboratively with the school staff, parents and the community to promote oral health;
- Parents are educated about the value of good oral health and essential oral health practices at home. They are encouraged to take an active role in school committees and participate in oral health activities and programmes in school and the community.

Milk, an essential component of children's diet, can be added with fluoride and used in school-based preventive programmes. Fluoridated milk is distributed by teachers daily in schools or day care centres.

*"Mmm! It is good to drink milk..... A mug of milk a day keeps tooth decay away".*

(Children from a Day Centre in Beijing, China).

(Extracted from WHO CAPP).



#### 4.3.4 Teachers and school staff

Teachers and school staff play a fundamental role in carrying out day-to-day oral health promotion activities and interventions. It is important to engage them early in the design and planning stages. A staff meeting is a useful forum for stimulating their interest.

Ideas for discussion include:

- How oral health promotion can help teachers achieve learning and teaching objectives;
- Information and data that support the need for oral health promotion;
- The roles teachers play – as role models, facilitators and partners of parents and community members;
- How the involvement of teachers and school staff is crucial for success;
- Plans for training and support;
- How teachers and school staff can benefit from oral health promotion efforts;
- Their needs and concerns.

Incentives should be given to teachers and school staff to encourage participation. Examples of these include time release, continued professional development points, qualifications and free materials.

*“It was proven that it was possible to develop an oral health preventive field programme in shanty towns where food was the no 1 priority. Success on school-based programmes depended on teacher participation. .... The challenge was to keep the trained teachers in these villages as they were constantly being transferred from deprived zones to better places.”*

(An oral health preventive programme for schoolchildren in Argentina.)

(Extracted from WHO CAPP).

#### 4.3.5 Parental support and commitment

Parents influence their children’s oral health directly by providing a home environment that is conducive to oral health. Through primary socialisation, they convey norms and serve as role models. Their input in monitoring children’s oral hygiene practices and dietary behaviours at home is paramount. Given that parents play a key role in promoting sustainable healthy oral health behaviours at home, their involvement and commitment are essential. Parents and other significant family members should be educated about the importance of oral health, consequences of oral diseases and preventive oral health practices. They should be encouraged to take an active role in their children’s oral health, reinforcing and complementing school efforts to promote good oral health behaviours and conditions that reduce the risk of oral diseases. Parental support can be mobilised through PTA, school governors and, if necessary, special meetings at school.

## 4.4 Goals and objectives

Based on the information gathered in the situation analysis, an action plan should be developed. Goals and objectives are critical to the action plan, guiding the direction, monitoring the development and evaluating achievements of oral health promotion interventions. The School Health Team, in collaboration with the Community Advisory Committee, is primarily responsible for this task.

### 4.4.1 Goals

The goals provide a focus for action and should describe, in broad terms, what the programme will achieve. The goals of oral health promotion in a Health-Promoting School should include, but not be limited to, the following aims:

- To provide a physical, organisational and psychosocial school environment that is conducive to oral health of students, teachers and school staff, as well as families and the community;
- To reduce the risk factors associated with oral health;
- To improve oral health knowledge and attitudes;
- To develop skills and behaviours for good oral health.

The goals are then broken into specific outcome and process objectives so that it is clear what needs to be done, when and why. Objectives are explicit targets to be met in order to achieve the goals. They should be specific, measurable, achievable and appropriate but challenging, realistic and be set within a specified and reasonable time frame. It may be useful to divide the objectives into short-term, intermediate and long-term objectives, depending on local circumstances and the nature of the problems.

### 4.4.2 Outcomes

Outcomes aim to define in tangible and measurable terms what is to be achieved through the interventions. They help evaluate the impact and achievements of a Health-Promoting School. Children's health status, learning achievements, health-related behaviours, quality of the school environment and school health programme implementation are useful indicators,<sup>82,107</sup> as are beliefs, attitudes and the impact on quality of life and on society.

Hence, the outcomes of an oral health orientated Health-Promoting School can include improvement in oral health status, knowledge, beliefs, attitudes, behaviours and conditions that are related to health and oral health. They can be divided into interim and ultimate outcomes.

Examples of ultimate outcomes:

- By ..... (date) ....., the proportion of students with dental decay to be reduced by .... % over baseline;
  - .... % of 5- / 6-year-old children should have no experience of tooth decay and to have no more than .... decayed, missing and filled primary teeth (dmft);
  - .... % of 12-year-old children should have no experience of tooth decay and to have no more than .... decayed, missing and filled secondary teeth (DMFT);



- .... % of 15-year-old children should have no experience of tooth decay and to have no more than .... decayed, missing and filled secondary teeth (DMFT);
- By ..... (date) ....., the proportion of students with healthy periodontal conditions to be increased by ....% over baseline;
  - the mean number of sextants/sites with healthy periodontal conditions to be increased by ....%;
  - the mean number of sextants/sites with gingival bleeding to be reduced by .... %;
  - the mean number of sextants/sites with calculus to be reduced by .... %;
  - the mean number of sextants/sites with periodontal pockets to be reduced by ...%;
- By ..... (date) ....., the proportion of students with dental erosion to be reduced by .... % over baseline;
- By ..... (date) ....., the number of incidents of craniofacial injuries to be reduced by .... % over baseline;
- By ..... (date) ....., the quality of life (e.g. free of pain and discomfort) of children to be improved by ...% over baseline;
- By ..... (date) ....., the number of school days lost per year due to toothache or oral health related problems to be reduced by .... % over baseline.

Examples of interim outcomes:

- By ..... (date) ....., all students should report brushing their teeth at least once a day;
- By ..... (date) ....., the proportion of students and families who are able to use fluoride toothpaste to be increased by .... % over baseline;
- By ..... (date) ....., the number of times of daily consumption of sugary foods and drinks to be reduced by .... % over baseline;
- By ..... (date) ....., the frequency of tobacco use to be reduced by .... % over baseline;
- By ..... (date) ....., all students to have an annual dental check-up;
- By ..... (date) ....., oral health related knowledge and attitudes of students to be increased by .... % over baseline;
- By ..... (date) ....., oral health related knowledge and attitudes of parents to be increased by .... % over baseline;
- By ..... (date) ....., oral health related knowledge and attitudes of teachers to be increased by .... % over baseline;
- By ..... (date) ....., the proportion of students who has access to oral health care to be increased by .... % over baseline;

#### 4.4.3 Process

It is crucial to gain insight into the processes involved in programme implementation and the social and environmental context.<sup>108</sup> The processes describe what will be changed or implemented to achieve the desired outcomes.

Examples of process objectives:

- By ..... (date) ....., the number of Health-Promoting Schools in the (district / county / nation) which have implemented oral health interventions will have increased by ...% or from (number) to (number);
- By ..... (date) ....., the School Health Team and Community Advisory Committee will have been established;

- By ..... (date) ....., policies related to oral health will be identified and put forward for consideration and approval;
- By ..... (date) ....., all key teachers and school staff will have received training in oral health and oral health promotion;
- By ..... (date) ....., oral health will have been incorporated into the school curriculum and activities as appropriate and coherent;
- By ..... (date) ....., all key teachers will have used the oral health promotion materials in their teaching;
- By ..... (date) ....., the proportion of teachers who are involved in oral health promotion will have increased by ...% over baseline;
- By ..... (date) ....., the amount of oral health related classroom activities will have increased by ...% over baseline;
- By ..... (date) ....., the proportion of teachers who have carried out classroom activities in oral health promotion will have increased by ...% over baseline;
- By ..... (date) ....., the school will have sufficient sanitation and safe water;
- By ..... (date) ....., essential food policies will have been considered and approved, such as:
  - school canteen, cafeterias, snack bars and tuck shops serve nutritious foods and drinks;
  - vending machines only sell foods or drinks that are conducive to oral health;
  - No Sugar Policy;
  - No Smoking or Smokeless Tobacco Policy;
  - No Alcohol Policy;
- By ..... (date) ....., oral health information materials will have been made available to students, staff and parents;
- By ..... (date) ....., a series of extra-curricular activities on oral health will have been made available to students, staff and parents;
- By ..... (date) ....., at least ... % of students will have implemented and participated in at least (number) of school/community oral health projects;
- By ..... (date) ....., at least ... % of teachers and school staff will have implemented and participated in at least (number) school/community oral health projects;
- By ..... (date) ....., at least ... % of parents and community members will have implemented and participated in at least (number) school/community oral health projects;
- By ..... (date) ....., the number of oral health meetings or seminars offered to parents will have increased by ..... % over baseline;
- By ..... (date) ....., all parents will have been informed about oral health promotion related activities in schools;
- By ..... (date) ....., all students will have been screened for oral diseases;
- By ..... (date) ....., all parents will have been informed about the children's oral health;
- By ..... (date) ....., oral health services will have been available in the school.

It must be emphasised that the above lists are only suggestions. Each school must generate its own activities based on achieving their goals and objectives.



## 5 INTEGRATING ORAL HEALTH PROMOTION WITHIN VARIOUS COMPONENTS OF A SCHOOL HEALTH PROGRAMME

A Health-Promoting School strives to use the school's full organisational capacity to improve the health of students, school staff, families and community members. Such a school offers many opportunities to promote oral health as an integral part of health and well being. Oral health promotion interventions can be used as an entry point for the development and enhancement of policies, planning groups and various components that serve as a framework for Health-Promoting Schools. Comprehensive school programmes should include:<sup>14</sup>

- Healthy school environment;
- School health education;
- School health services;
- Nutrition and food services;
- Physical education and sport;
- Mental health and well being;
- Health promotion for school staff;
- School and community relationships and collaboration.

The effectiveness of interventions integrated into each of the components is determined by how they are supported by people, policies and trained staff. The effectiveness is also influenced by the extent to which interventions in each of these components integrate and complement with other health promotion efforts.

Not all schools will have the resources to incorporate oral health into all components at the same time. Each school has to establish its own priorities. A Health-Promoting School enables all parties concerned - students, parents, teachers and school staff, and community members – to work together to set the priorities and to decide how and the extent to which the components should be addressed. It may be more important, if not more feasible technically and financially, to start with small changes than to address all components simultaneously. Each school needs to assess what is realistically achievable, progressively building on strategies that work to maximise the full potential of a Health-Promoting School.

### 5.1 Healthy school environment

School environment determines the effectiveness and sustainability of oral health promotion interventions. Supportive school environment enables students and school staff to develop their physical, mental and social potential, enhancing the relationships between members of the school community. Supportive environment encourages healthy lifestyles and behaviours that are conducive to oral health, making healthier choice the easier choice. In a Health-Promoting School, much emphasis is placed on the supportive school environment, both physical and psychosocial. The physical and psychosocial school environments should be coherent with, and supportive of, each other.

#### 5.1.1 Physical environment

The physical environment includes the location and surroundings of the school, school grounds, buildings, classrooms, eating facilities and other structural features. The condition of the

physical environment and policies regarding its use can have a significant impact on oral health directly as well as indirectly through lifestyles and oral health behaviours. The school should be located in a safe environment, away from busy roads, dangerous industrial sites and polluted areas. The cleanliness of the premises, sufficient provision of rubbish disposal, safe water, hygienic sanitary facilities and structurally safe and well designed school buildings and playgrounds are only the basics, but without which other developments cannot be progressed. The physical environment of the local community in which the school is situated may also form part of the school environment. The following examples of oral health-related aspects of a healthy physical environment, supported by appropriate healthy policies, can be considered.

- **Safe water and sanitation:** The provision of clean and safe water, sufficient sanitary facilities and adequate waste collection and disposal is essential to good health and well being. These facilities are also fundamental to good oral health. They are essential to oral health promotion activities such as toothbrushing drills at lunchtime. Good sanitation and waste disposal facilities reduce the risk of infection. In some developing countries, many households may not have safe and clean water supply and sanitation; the school may be the only place where children can clean their teeth. If the school has not already been equipped with these basic facilities, oral health promotion can be used as an impetus for the school to install them.
- **Healthy dietary practices:** A healthy environment supports the adoption of healthy lifestyles. With the canteens, tuck shops and vending machines providing healthy foods and drinks, supported by healthy policies, the practice of healthy oral health behaviours is more sustainable. Promoting good dietary behaviours also reinforces other health messages in school, such as healthy nutrition, healthy heart and cancer prevention.
- **Health supportive environment:** A pleasant school environment with spacious and comfortable surroundings enhances physical, mental and social health and promotes healthy behaviours. Apart from policies governing vending machines, tuck shops and canteens, a no smoking or smokeless tobacco policy is critical to good oral health, most notably for periodontal health and oral cancer prevention. Creating a tobacco-free school requires the full support and commitment from everyone concerned. Safe school interior structures, buildings and playgrounds reduce the risk of dental trauma. With appropriate dental first aid and trauma policies, vital actions can be taken to avoid permanent tooth loss, if accidents occur.
- **Outside vendors:** Surroundings outside the school premises also need to be conducive to health, in order to avoid sending conflicting messages to students. It may be necessary to educate, if not impose restrictions on, food vendors and kiosk traders in or near the school premises to offer nutritious foods and drinks that are conducive to oral health. The sale of sweets, soft drinks and tobacco containing products to students in the vicinity of school should be prohibited.

### 5.1.2 Psychosocial environment

The psychosocial environment refers to the social and psychological conditions that underpin health and education potential of the school community. The school culture and organisational structure influence the psychosocial environment. Stress can inflate interpersonal conflicts and violent behaviours and can lead to smoking, excessive alcohol consumption and the use of comfort foods that are high in sugar, factors that increase the risk of oral disease. This is particularly relevant in today's societies with prevailing social and family problems where stress



can affect all ages. A supportive social culture helps ameliorate the stress experienced by students and staff; which in turn improves their oral health.

In a Health-Promoting School, the psychosocial environment includes the following aspects:

- **Support:** The psychosocial environment should support health promoting perceptions and behaviours of members of the school community. It should be coherent with other health promotion messages. The support of students, school staff and community members to each other helps build confidence and develops coping strategies in maintaining good oral health behaviours.
- **Teachers as role models:** As role models and mentors, teachers have the responsibility to set a good example and to encourage students to adopt a sustainable healthy lifestyle for good oral health. This may prompt teachers to make an extra effort to maintain good oral health, with a nice smile.
- **Peer reinforcement:** When applied appropriately, peer pressure can be beneficial. It can provide positive reinforcement among students that healthy teeth are more socially desirable, emphasising the importance of good oral health; and negatively reinforce tobacco use, sugary foods and drinks with or without alcohol which are considered detrimental to oral health. Positive peer support promotes understanding and good interpersonal relationships, preventing conflicts and violent behaviours that lead to craniofacial injuries.

Formal support can be obtained through school counselling and guidance service and support groups. Community support is also essential to effective oral health promotion programmes. Such support promotes good relationship between students, family, school and the community, facilitating environmental improvements and behaviour change.

## 5.2 School health education

Children's social, personal and life experiences and interaction at home, in school and the society have a significant impact on their oral health and health development in general. The primary goals of school oral health education are to help children develop personal lifelong skills, raise health consciousness, improve understanding and healthy attitudes, to promote healthy behaviours, and thereby to reduce risks of oral disease. School health education can be provided in school as a specific subject or as an integral part of other subjects. It can also be included in extracurricular activities. Ideally, it encompasses a series of planned sequential courses of instruction from primary through secondary school levels, addressing the underlying physical, psychological, cultural and social determinants of oral health, in the context of good general health and well being.

School health education focuses on:

- important behaviours and conditions that promote oral health or that reduce risk of oral disease;
- skills needed to negotiate and practise those behaviours or to address those conditions both personally and collectively;
- knowledge, attitudes, beliefs and values related to those behaviours and conditions
- learning experiences that allow students to model and practise skills;
- personal development;
- responsibility at home and in the society.

In a Health-Promoting School, depending on socio-cultural conditions and resources, oral health promotion should target:

- maintaining good oral hygiene with daily toothbrushing drills supervised by teachers;
- the use of fluoride, including affordable fluoride toothpaste and fluoride rinsing programmes;
- promoting good nutrition;
- reducing the consumption and frequency of sugary snacks and drinks;
- promoting the consumption of fruit and vegetables;
- promoting water or milk fluoridation;
- promoting regular dental check-ups and care;
- preventing or reducing tobacco use, alcohol consumption and substance abuse;
- preventing accidents, violence and anti-social behaviours;
- taking a wider responsibility at home and in the society.

In a Health-Promoting School, oral health education should be regularly reinforced at home and further developed in school at key educational stages throughout the children's school career. Table 5.1 outlines some examples of an oral health education curriculum for primary schoolchildren<sup>109</sup> within a Health-Promoting School framework. The programme has been proven to be practical and acceptable across cultures / countries. The manual is available in 13 different languages and shows promise.

**Table 5.1.** Oral health education curriculum for primary schoolchildren (6-9 years old).

**Topics covered:**

- The teeth and their functions
- Dental plaque and tooth decay
- Sugar and dental health
- Personal care of the teeth and gums
- Fluoride
- Nutrition
- Dental visits
- A story: The tooth that disappeared

**Educational goals:** *Children should be able to:*

Behaviour	<ul style="list-style-type: none"> <li>• practise proper oral hygiene care</li> <li>• restrict the amount and frequency of sugar intake</li> <li>• adopt a regular check-up routine</li> </ul>
Knowledge	<ul style="list-style-type: none"> <li>• name the basic functions of the teeth</li> <li>• explain why each function is important</li> <li>• give details of the two sets of teeth</li> <li>• describe the number and the importance of primary teeth</li> <li>• explain why primary teeth are shed and replaced by permanent teeth</li> <li>• identify which permanent tooth erupts first and its importance</li> <li>• name healthy and unhealthy foods related to teeth</li> <li>• describe how and when to remove plaque</li> <li>• define dental plaque</li> <li>• describe the role of plaque and sugar in oral health</li> </ul>
Attitude and values	<ul style="list-style-type: none"> <li>• appreciate the importance of teeth and oral functioning</li> <li>• demonstrate a positive attitude towards oral health</li> <li>• demonstrate a positive attitude towards the dental team</li> </ul>



Oral health education should be combined with efforts addressing other health issues, such as tobacco use, violence and bullying, healthy nutrition, reproductive health, heart disease and obesity, enabling learning experiences to be strengthened. Similarly, oral health education can be complemented in curricular areas other than health (Table 5.2). Different countries may incorporate oral health in different subjects according to varying systems and circumstances. Some of the activities may produce useful data that can be used for monitoring and evaluation purposes and for the development of further interventions. However, each school must consider the local conditions, social and economic circumstances.

*“Artistic oral health corners were created in the classrooms and oral health was taught during [arts] lessons”.*

(The ‘Smiling Schools’ project in Namibia).

Curricula for oral health and other health-related issues may be available through governmental and nongovernmental agencies and organisations, universities or teachers’ unions. However, teachers and students are encouraged to produce culturally acceptable and socially appropriate materials that are specific to the local situation.

**Table 5.2.** Examples of ways in which oral health can be integrated into other subject areas in the curriculum.

Subjects	Examples of oral health topics or activities
Science Biology Chemistry Food science Nutrition Water	<ul style="list-style-type: none"> <li>• the body, mouth and teeth</li> <li>• body hygiene and oral hygiene</li> <li>• diseases of the mouth, body and mind</li> <li>• food and the body, mouth and teeth</li> <li>• nutrition and food choice</li> <li>• tobacco, alcohol and oral health</li> <li>• laboratory experiments of the effect of food and drinks on teeth</li> <li>• germs</li> <li>• fluoride</li> <li>• chemical equations</li> </ul>
Sociology Social Sciences Human Sciences Humanities Personal development and lifestyles	<ul style="list-style-type: none"> <li>• the family, society</li> <li>• race, culture and ethnicity</li> <li>• health care system</li> <li>• health &amp; social care</li> <li>• the dental team and other health care professionals</li> <li>• costs of health care</li> <li>• disease burdens and the society</li> <li>• lifestyles and health</li> <li>• interpersonal relationships</li> <li>• conflict management</li> <li>• bullying and anti-social behaviour</li> <li>• accident prevention</li> <li>• responsibility at home and in the society</li> <li>• care for others</li> <li>• role playing</li> <li>• conducting simple investigations and surveys (classroom- or school-based)</li> </ul>
Mathematics	<ul style="list-style-type: none"> <li>• counting the number of teeth</li> <li>• using the clock to demonstrate sugar attacks</li> <li>• collecting health and social statistics at home, in school and the local community</li> <li>• presenting results using graphs</li> <li>• oral health statistics of the family, school and society</li> <li>• charting growth and development including tooth eruption</li> </ul>
Language	<ul style="list-style-type: none"> <li>• story writing</li> <li>• poem about oral health</li> </ul>
IT & Computer Studies	<ul style="list-style-type: none"> <li>• searching oral health information</li> <li>• presenting findings</li> </ul>
Arts and Crafts	<ul style="list-style-type: none"> <li>• designing visual aids</li> <li>• drawing and painting</li> <li>• making costumes and games</li> <li>• exhibitions in school and the community</li> </ul>
Music Drama	<ul style="list-style-type: none"> <li>• role playing</li> <li>• oral health songs</li> </ul>
Sport Science Physical Education	<ul style="list-style-type: none"> <li>• sport safety</li> <li>• use of mouth guards</li> <li>• first aid</li> <li>• substance abuse</li> <li>• awareness of performance enhancing drinks on teeth</li> </ul>



### 5.2.1 Educational methods and materials for health education

A good educational programme utilises a variety of learning and teaching methods, including lectures, seminars, practical experiments, discussions, group work, problem-solving exercises, debates and role-play with appropriate and stimulating visual aids (Table 5.3). Self-directed learning encourages students to take responsibility for their learning. A diversity of instructional strategies is essential to effective curricular development. However, the learning and teaching strategies and materials employed must be appropriate and acceptable to the target students, taking into account the learning objectives and resources available. They should also aim to promote active involvement and reinforcement.

**Table 5.3.** Examples of learning and teaching strategies for oral health education.

#### Methods to convey knowledge

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Lectures</li> <li>• Stories</li> <li>• Programmed instruction</li> <li>• Computer-aided instruction</li> <li>• Group work</li> </ul> | <ul style="list-style-type: none"> <li>• Seminars</li> <li>• Peer teaching (e.g. senior students to junior students, adolescents to primary schoolchildren)</li> <li>• Symposia</li> </ul> |
|---|--|

#### Methods to influence attitudes

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Open discussions</li> <li>• Student-led seminars</li> <li>• Student-based teaching</li> <li>• Research and inquiries</li> <li>• Field trip to community resources</li> <li>• Role-play</li> <li>• Group work</li> </ul> | <ul style="list-style-type: none"> <li>• Problem-solving exercises</li> <li>• Debates</li> <li>• Games</li> <li>• Experiments</li> <li>• Interactive learning</li> </ul> |
|--|--|

#### Methods to develop skills

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Practical exercises</li> <li>• Demonstration</li> <li>• Small group teaching</li> <li>• Simulations</li> <li>• Research and investigation</li> <li>• Project work</li> </ul> | <ul style="list-style-type: none"> <li>• Role-play</li> <li>• Computer-aided practices</li> <li>• Behaviour modification</li> <li>• Making models</li> <li>• Experimentation</li> <li>• Case studies</li> </ul> |
|---|---|

While some methods are more suitable for conveying knowledge, others are designed to promote skills and attitudes. For example, lectures are more efficient in providing knowledge to large number of students but they are less effective in teaching skills or in influencing beliefs or attitudes. Discussions, debates and problem-solving exercises may be more useful in challenging perceptions and myths. Practical sessions, such as laboratory experiments and toothbrushing exercises, are more effective in building skills. Many countries have developed toothbrushing exercises, supervised and instructed by teachers or school health staff.

### 5.2.2 Training teachers and other personnel

While teachers are crucial to the implementation of school oral health education, they do not necessarily possess adequate knowledge and skills to enable them to deliver the programmes effectively.<sup>35,106,110</sup> With adequate training, they can significantly improve the development and

implementation of the programme.<sup>14</sup> In addition to various learning and teaching strategies, teachers should also be trained in the use of health curriculum as well as in oral health and health promotion. Learning how to work with health professionals collaboratively facilitates a smooth running of the programme.<sup>91</sup> Training can be provided at the pre-service teacher training colleges and, more importantly, as part of the on-going in-service/on-the-job training and professional development. Project or school-based training should also be given.

Effective teacher training builds commitment, understanding, skills and attitudes that enable a teacher to develop and deliver curricula competently and confidently. A complete training programme should encompass four broad goals:<sup>14</sup>

1. to develop positive attitudes toward, and commitment to, a comprehensive approach to school health;
2. to increase the understanding of principles of behaviour change that are essential to health education;
3. to improve teaching skills using a variety of learning and teaching methods;
4. to equip teachers with skills to deal with sensitive issues and students with special needs.

Successful teaching training:

- addresses key issues identified by teachers themselves;
- takes place as close as possible to the teacher's own working environment;
- covers theories, demonstration, practice, feedback and peer-review in the classroom;
- has support of both colleagues and the school;
- provides participants with a sense of ownership;
- draws on adult learning theories;
- takes place over a sufficient period of time;
- provides opportunities for reflection and feedback;
- involves a conscious commitment on the part of the teacher;
- builds skills;
- involves groups of teachers rather than individuals.

In a Health-Promoting School, oral health education should be an important part of school health education and incorporated across a number of curricular areas, as relevant. Teachers in all disciplines should be encouraged to include oral health in their teaching programmes and activities. They should be inspired to make the curriculum exciting and stimulating for students to acquire good oral health knowledge and behaviours and to make healthy decisions. When teaching a practical skill such as toothbrushing technique, it is necessary for the teachers to learn, and be competent on brushing their own teeth effectively first. This is particularly important as teachers are often considered as role models by students. Guidelines for teachers in monitoring and supervising toothbrushing drills should be developed.

Given the competing demands in an already fully packed curriculum, some teachers may be too inundated with other curricular activities. In order to promote oral health education in the curriculum, it is imperative for the government and health professionals to provide sustainable support, in terms of technical assistance, funding and/or learning materials.<sup>83</sup> Such a support makes it easier for teachers to consider oral health education in their teaching programmes.



### 5.2.3 Student participation

Students play an essential role in the implementation of school oral health programmes. Among many other ways, oral health education can be delivered using peer teaching, a strategy that employs students themselves to act as positive role models and educators for other students. Studies have shown that the peer teaching method is effective in promoting healthy behaviours.<sup>111-113</sup> For oral health education, peer leaders can help monitor other students' oral hygiene and develop self-care capacity in oral health. However, peer leaders must be properly trained to ensure that they have adequate knowledge and skills to support other students and activities. Students may be encouraged to take the initiative to help develop innovative oral health education materials that are used by other students and members of the community. Participating in community work fosters valuable links with the wider community, helping them fulfil their role in the community. As part of the project work, students can be actively involved in collecting data for evaluation purposes, information that can prove invaluable to the school.

*“The staff decided that participation in the Calderdale Healthy School Initiative would build the foundations of a healthy school that would last well into the next century, ..... pupils’ self-evaluation evidences early success. Self-esteem is already increasing – demonstrated in pupils’ personal targets”*

(Ash Green Primary in Mixenden, Halifax, England).

### 5.3 School health services

School oral health services, part of the school health services, help screen, prevent, control and monitor oral diseases and conditions, as well as maintain good oral health. They play an important role in oral and general health promotion, supporting the efforts made by the school, teachers and students (e.g. providing training and expertise and supplying oral health materials). In Health-Promoting Schools, the oral health team works collaboratively with the primary health care team to provide accessible oral health services primarily to students. To avoid duplication of efforts, they should be coordinated with other services and activities in school and the community.

Models for providing school oral health services vary immensely between, as well as within, developed and developing countries. While there are comprehensive on-site oral health facilities in schools in some countries (e.g. Denmark), many schools may not be able to provide access to any facilities. Depending on the level of resources available, school oral health services may be provided by the dental team (dentists and/or dental auxiliary staff) or the school health team and school nurses who have had appropriate dental training. Where resources are stretched, teachers and school staff can be trained to undertake oral health surveillance and first aid duties. However, the role of nurses, health workers, teachers and community workers in relation to the school oral health programme must be carefully monitored and evaluated.

The types and levels of the school oral health services provided are determined by the oral health status of the school population, needs and demand of students, parents, school staff, the community, the local and national health care system and resources (including trained dental staff) available. School oral health services may include screening, diagnosis, needs assessment, clinical preventive oral care and treatment of oral disease, regular monitoring and,

for more complicated conditions, and/or referral to other dental or medical specialists and secondary care. In some developing countries, the provision of emergency care, dental extraction, restorative treatment with atraumatic restorative technique may prove very important.

*“In the Philippines, the Department of Health in collaboration with the Department of Education and other non-governmental organizations is in the process of developing a school health promotion program using the healthy setting approach. Minimum standard requirements for a healthy school have been identified and set as basis for certification and the provision of incentives/awards. Oral health is part of the standard. This is to encourage members of the community to work together and promote good health and nutrition of school children”.*

(Ministry of Health, the Philippines).

### **5.3.1 Screening**

Screening of teeth and mouth enables early detection, and timely interventions towards oral diseases and conditions, leading to substantial cost savings. It plays an important role in the planning and provision of school oral health services as well as health services. Appropriate and effective efforts can be targeted at those who are at risk or in need. Signs of some general health conditions can be identified through oral health screening, such as malnutrition and diabetes.

Oral health screening is not necessarily performed by dentists or dental auxiliaries. It can be effectively carried out by trained school health nurses, school teachers, or community workers. It can be incorporated into routine general health screening, surveillance programmes or other activities in schools. Oral health screening can form part of the oral and general health education and self care programmes in the school curriculum. Children are receptive to health promotion messages when they are actively involved in the activities that are highly relevant to them, promoting oral health in the context of good general health.<sup>91</sup>

### **5.3.2 Dental examination, treatment and monitoring**

Based on the screening results, students who are in need of care should be referred to the dental team for detailed examination, treatment and follow-up monitoring. Ideally, all school children should, resource permitting, be offered a regular dental check-up. Undoubtedly, in some countries, the school oral health services may not be able to provide all necessary care to all children. However, the role of the school oral and health services remain significant in the promotion of oral health and general well being.

The school oral health services also provide useful facilities for clinical data collection, part of an oral health information system. Such information can prove invaluable to the school in relation to the planning, development and evaluation of the Health-Promoting School.



*"Clinics were installed in the schools with support from the principals and teachers and children were given treatment [dental treatment] during school hours. .... the community responded to the programme [a school-based oral health programme] positively.."*

(An oral health programme for schoolchildren in Kuwait)

### 5.3.3 Referral

For the services that cannot be offered in school, the school oral health services can provide referrals to other school services, such as counselling and other general health issues and to local health services, specialist care and other community agencies, as appropriate. Such collaborative working improves communication and promotes partnership between oral health and medical teams, school and the community.

*"The gift of this program [a programme that employs dental screening] is that it creates opportunities for doctors and dentists to talk to each other about how poor oral health impacts a child's overall wellness and then work together to generate positive and preventive solutions,"*

(Marty Lieberman, Puget Sound Neighborhood Health Centers, USA.)

## 5.4 Nutrition and food services

Diet, nutrition and oral health are intricately linked. Micronutrient deficiency, a condition that is common among school-age children in developing countries, and poor dietary practices increase the risk of oral disease. Healthy nutrition interventions with supportive policies are therefore an integral part of a Health-Promoting School that aims to promote oral health. As part of oral health promotion, schools can enforce healthy snacks or no sugar policies to support healthy eating behaviours, provide nutritious meals and, where necessary, micronutrient supplements. Oral health activities can be included in the assessment and monitoring of nutritional status such as a school height census. While school food services are often managed by the public or private sectors through the ministry of education, it is important for schools, teachers, students and school oral health services to collaborate closely with them to support healthy eating initiatives in schools.

## 5.5 Physical exercise and leisure activities

Physical exercise, sport and leisure activities help maintain physical and mental fitness, a fundamental prerequisite to health and well being. Evidence suggests that physical and mental wellness improves academic performance.<sup>114</sup> Exercise and leisure activities are an important part of stress management. However, there are oral health implications. Sports and physical activities inflate the risk of head and face injuries. Studies have shown that some sport drinks

with high acidity that are popular among adolescents can lead to dental erosion.<sup>45</sup> The use of mouth guards should be encouraged in high-risk contact sports to protect teeth.<sup>12</sup>

## **5.6 Mental health and well being**

A Health-Promoting School also promotes the mental health and well being of students and school staff, enabling them to fulfil their physical, social and psychological potential. Poor facial and/or dental appearance may have a negative impact on mental health and well being. Stress, bullying and violence can lead to the consumption of sugary snacks and alcohol, smoking and violent behaviours, which have serious oral health implications. These issues should be addressed by health promotion, with supportive policies. Students and school staff should be equipped with knowledge and skills that help them prevent and, if unavoidable, deal with interpersonal conflicts; cope with stress, peer pressure and other social forces; and develop self-esteem and confidence. Counselling and support services for students and staff should be available.

## **5.7 Health promotion for school staff**

A Health-Promoting School places a special emphasis on staff welfare and working conditions, applying the principles and strategies of health promotion to the workplace. Employees and their families along with the organisational, managerial and environmental characteristics of the school are considered.<sup>14</sup>

Healthy working conditions and good management and organisational structure can help reduce the stress levels experienced by staff members. Well-designed and health-orientated classrooms, offices, staff rooms, cooking and dining facilities can be a starting point. Health promoting facilities including those designed for exercise and relaxation are imperative. Staff morale and workload must be carefully monitored to avoid the risk of burnout. Oral health education materials together with other health messages should be prominent throughout the school including staff rooms. A tobacco-free school, if feasible and supported by staff, is one of the most effective strategies for providing smoke-free working environment. However, support services that help the staff members deal with stress, give up smoking or tobacco use or lose weight should be available.

As part of in-service training, a tailored-made oral health promotion programme that aims at providing knowledge and influencing attitudes and behaviours should be available regularly, helping staff members acquire and sustain healthy lifestyles. Teachers and school staff are encouraged to identify essential policies and practices and to work with the School Health Team, parents and the local community collaboratively to promote oral health and general well being in school and the community.

## **5.8 School and community relationships and collaboration**

The community is a critical component of a Health-Promoting School. Community members should feel that the school is approachable and receptive to their contribution and, more importantly, that they are valued. A Health-Promoting School provides a valuable link between the school, parents and the community, promoting joint working to support the development and



implementation of oral health promotion initiatives. Family and community members can be involved in the following ways:

- Taking part in the planning and decision making process, such as taking part in the School Health Team and Community Advisory Committee;
- Participating in school-led oral health activities at school and in the community, such as Oral Health Day, exhibitions and health fairs;
- Providing support and resources, in terms of skills, expertise, materials and funding;
- Advocating oral health including lobbying for healthy environment and water fluoridation.

*“Healthy communities go hand in hand with healthy schools since they help to establish communities..... It is better to do the things that make us feel better if we get support from those around us”.*

(Health Promoting Schools network in Canada).

### **5.8.1 Collaboration with parents and families**

A Health-Promoting School collaborates with parents and families to ensure oral health promotion efforts are reinforced at home. Parents are important role models that help shape children’s development and influence their lifestyles. Parents are responsible for providing packed lunches and, in many developing countries, toothbrushes for their children to use in schools. It is important that these foods, drinks and oral hygiene aids are conducive to oral and general health. Schools can serve as a focal point, providing essential training and health education materials for parents and families. Parents are educated about their own oral health as well as caring for other members of the family. Educational programmes are most effective when parents and families meet together and support each other at regular meetings in schools. Good communication between school oral health services and parents is of paramount importance.

Equally, students are encouraged to impart the knowledge and skills that are beneficial to other family members. For those who do not attend schools, outreach programmes that involve using parents and family members as facilitators can help promote oral health to these families and entice them to be part of the school community.

### **5.8.2 Collaboration with the community**

Community collaboration can strengthen interventions to promote better oral health. Successful partnership builds on trust, respect, effective communication, shared mission and resource coordination. The school and community partners can benefit from each other. There may be a wide range of organisations and local businesses with which collaboration can be fostered. For example, food traders, manufacturers and businesses, water companies, commercial organisations and toothpaste manufacturers and retailers should be encouraged to:

- promote healthy eating, foods and drinks that are low in sugar, salt and fat;
- offer financial support for oral health promotion programmes and campaigns; advice on healthy lifestyle, relevant visits to their stores and, where appropriate, oral health advice;

- supply water with optimal level of fluoride;
- provide healthy choices;
- provide clear and accurate labelling of foods, drinks and healthcare products;
- provide and promote the sale of affordable toothpaste with fluoride as well as good quality toothbrushes;
- provide educational materials for school oral health programmes.

### **5.8.3 Involving the media**

The mass media can be used effectively to promote oral health. Information can be distributed efficiently through mass media. For example, a television programme that involves using popular icons or idols can be employed to promote oral health messages.<sup>92</sup> Undoubtedly, such a high profile campaign can raise awareness. However, these campaigns can be costly and supplementary activities are needed to promote awareness, knowledge gain and behaviour change. Nonetheless, the media may be educated and encouraged to stop targeting children and adolescents in advertising products that may increase the risk of oral disease, e.g. smoking and smokeless tobacco, sugary foods and drinks.



## 6 EVALUATION

Evaluation is a powerful tool that can be used to inform and strengthen school health programmes. The primary aims of evaluations are to determine the extent to which the programme is being implemented as planned, to assess the outcomes, impact and effectiveness of the programme and, if any aspects have not worked well, to identify the key lessons learned.

Evaluation enables schools to:

- provide information to policy-makers, sponsors, planners, administrators, parents/families, the community and all programme participants;
- provide feedback to those involved in project planning and development;
- monitor progress and, if necessary, to make improvements and timely modifications;
- reward the efforts of schools, students, teachers, parents and the community;
- document the experience gained from the project for future reference and to share with others;
- encourage other communities to establish Health-Promoting Schools by demonstrating the outcomes and benefits.

Evaluation must be well thought-out from the outset and remain ongoing throughout the programme. An evaluation plan and monitoring mechanism should be established.

### 6.1 Types of evaluation

Process and outcome evaluation are the two main types of evaluation that are most relevant to evaluating school health initiatives.

**Process evaluation** assesses what and how well the interventions, planned or not planned, have been implemented, to whom and when. It provides information about progress towards programme objectives, identifies factors that facilitate or hinder the implementation and, if necessary, informs the adjustments required. Process evaluation also monitors feedback from students, teachers, the community and other participants.

Process evaluation is particularly important when resources are limited to ensure that the intended programme is effectively implemented before attempting outcome evaluation. However, both process and outcome evaluation, ideally with a comparison group who do not received the intervention, should be undertaken and they should be made practical for all countries, regardless of economic status.

**Outcome evaluation** measures the outcomes of the programme, detailing to what extent the programme objectives have been achieved. Outcome measures can ascertain the benefits and effectiveness of school health promotion programmes and highlight the need for further intervention. With evidence, schools can convince policy-makers, sponsors and other key players to invest resources, and to become involved, in Health-Promoting School initiatives.

## 6.2 What to evaluate

Short-term evaluation focuses on improving the school environment such as the provision of healthy foods and drinks, sufficient sanitation and safe water, so that oral health promotion activities can be undertaken. The targets for policy development in order to address all key components of a Health-Promoting School can be included. Evaluation in relation to the implementation of activities, such as classroom oral health education and exposure to fluoride, could be considered here. Intermediate evaluation comprises improvement in oral health knowledge, attitudes and, possibly, behaviours and changes in lifestyles.

Long-term evaluation relates to the implementation and sustainability of a Health-Promoting School and its relationship with the wider community and Health-Promoting Schools network. Clinical outcomes can be considered at this stage. By the end of this period, the interventions have been sustained and the project schools have contributed their experience to other schools in the locality, establishing a network of Health-Promoting Schools.

A number of data collection methods can be employed for evaluation. Both qualitative and quantitative approaches are valuable, including questionnaire surveys, interviews, focus group discussions, school records, examinations, academic performance, clinical examination, observations and indicators of the level of community participation. The methods used for evaluation should reflect the goals and objectives set previously. Table 6.1 outlines some examples of questions used for evaluation.

Sometimes, health promotion interventions are considered to have failed despite the fact that the programme in question may be clearly deficient.<sup>115</sup> The design, quality of implementation and methodology of evaluation are therefore crucial. There are a number of designs for evaluation with varying strengths and scientific merits, including experimental, quasi-experimental, community trials and time-series studies. Undoubtedly, some methods are not appropriate for oral health promotion interventions. In order to ensure the evaluation has the highest possible levels of evidence-based support, appropriate evaluation strategies should be employed.

*“Young people’s views on health, which were holistic and emphasised interpersonal relations, were not widely known to other stakeholders and programmes should therefore consult them systematically”.*

*“If schools are healthy, I’d want to come to school.”* (A primary school pupil).

*“If people enjoyed things, they would learn a lot more.”* (A secondary school pupil).

*“There are not bullies in a healthy school.”* (A secondary school pupil).

*“[In a healthy school students will have] blossomed as a person.”*  
(A secondary school pupil).

*“Being involved in decisions that are made. If there are new things happening in the school, being asked what we think about them.”* (A secondary school pupil).

(Extracted from a report on healthy schools in England).<sup>116</sup>



**Table 6.1.** Examples of questions used for evaluation.

<b>Components</b>	<b>Examples of possible questions</b>
Policy	<ul style="list-style-type: none"> <li>• Does the school have policies that relate to oral health?</li> <li>• Is/are the policy or policies implemented and enforced as written?</li> <li>• Are resources and responsible people designated to support oral health promotion interventions?</li> <li>• What do the students, teachers and parents think of the policy or policies?</li> <li>• Are students, parents, school staff and members of the community involved in the planning, development and implementation of policies?</li> </ul>
Goals & objectives	<ul style="list-style-type: none"> <li>• Are goals and objectives well defined and do they establish the criteria against which to assess interventions and outcomes?</li> <li>• Are the objectives specific, measurable and realistic?</li> <li>• Do they cover all areas of importance?</li> </ul>
School health service	<ul style="list-style-type: none"> <li>• What types and extent of oral health services are provided?</li> <li>• Are the school and students satisfied with the services provided?</li> <li>• How well and to what extent do the school dental services work with their collaborators?</li> </ul>
School health education	<ul style="list-style-type: none"> <li>• How well is oral health integrated into the school curriculum?</li> <li>• Are all learning activities implemented as planned?</li> <li>• Are these activities aimed at promoting oral health and healthy behaviours and, if so, to what extent?</li> <li>• Is training provided to staff, as planned?</li> <li>• What do teachers and others think of the curriculum? Do they feel comfortable and competent implementing the curriculum?</li> </ul>
Healthy school environment	<ul style="list-style-type: none"> <li>• To what extent are healthy food choices offered in the canteens, tuck shops and vending machines, etc?</li> <li>• Are there adequate facilities to support oral health activities?</li> <li>• Does the school environment comply with health and safety requirements?</li> <li>• To what extent is the school environment conducive to oral health?</li> <li>• What do the students and school staff think of the school environment?</li> </ul>
Health promotion for school staff	<ul style="list-style-type: none"> <li>• Are there oral health promotion programmes for staff?</li> <li>• If yes, what do the staff members think of them?</li> <li>• Have they been effective?</li> </ul>
School and community relationships and collaboration	<ul style="list-style-type: none"> <li>• To what extent is the community involved in oral health promotion interventions?</li> <li>• Does the school provide any oral health training courses for parents and members of the community? If so, have they been effective in promoting oral health at home?</li> <li>• What do parents and the community think of the oral health promotion efforts?</li> </ul>
Nutrition & food services	<ul style="list-style-type: none"> <li>• How well is oral health integrated into the nutrition interventions in the school and the community?</li> <li>• Are the food service providers aware of their role in promoting oral health?</li> </ul>
Physical education & leisure activities	<ul style="list-style-type: none"> <li>• Are physical education programmes and oral health promotion adequately coordinated?</li> <li>• Are oral health issues considered in these programmes?</li> </ul>
Mental health & well being	<ul style="list-style-type: none"> <li>• Are the issues of mental health and wellness adequately addressed in the school?</li> <li>• Are there any counselling services and support available?</li> <li>• Are oral health issues considered in promoting mental health and well being?</li> <li>• What do the students and school staff think of the services provided?</li> </ul>

### **6.3 Results dissemination**

The results of the evaluation must be disseminated to all parties involved, including the policy-makers and sponsors. The information should be readily understood by those to whom it is directed. The report should include recommendations for future initiatives and inform policy development. Evaluation results can be used to initiate discussion, debate and proposals for further project development as well as to secure funding and support for oral health promotion in schools in the future. The achievements and efforts made by the participants should be acknowledged.

There should be effective channels of communication between the ministries of health and education, local health and education authorities, schools, communities, teachers and students. Strategies and policies that facilitate this process should be developed. Again, schools can be used as a focal point for dissemination of results, particularly to students, school staff, parents, families and community members.

## **ANNEX 1. Ottawa Charter for Health Promotion (1986)**

Health Promotion is the process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical, mental and social well being, an individual or group must be able to identify and to realize aspirations, to satisfy needs and to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities. Therefore, health promotion is not just the responsibility of the health sector, but goes beyond healthy lifestyles to well being.

### **PREREQUISITES FOR HEALTH**

The fundamental conditions and resources for health are:

- Peace
- A stable ecosystem
- Shelter
- Sustainable resources
- Education
- Social justice
- Food
- Equity
- Income

Improvement in health requires a secure foundation in these basic prerequisites.

### **ADVOCATE**

Good health is a major resource for social, economic and personal development and important dimension of quality of life. Political, economic, social, cultural, environmental, behavioural and biological factors can all favour health or be harmful to it. Health promotion action aims at making these conditions favourable through advocacy for health.

### **ENABLE**

Health promotion focuses on achieving equity in health. Health promotion action aims at reducing differences in current health status and ensuring equal opportunities and resources to enable all people to achieve their fullest health potential. This includes a secure foundation in a supportive environment, access to information, life skills and opportunities for making healthy choices. People cannot achieve their fullest health potential unless they are able to take control of those things which determine their health. This must apply equality to women and men.

### **MEDIATE**

The prerequisites and prospects for health cannot be ensured by the health sector alone. More importantly, health promotion demands coordinated action by all concerned: by governments, by health and other social and economic sectors, by nongovernmental and voluntary organization, by local authorities, by industry and by the media. People in all walks of life are involved as individuals, families and communities. Professional and social groups and health personnel have a major responsibility to mediate between differing interests in society for the pursuit of health.

Health promotion strategies and programmes should be adapted to the local needs and possibilities of individual countries and regions to take into account the differing social, cultural and economic systems.

### **HEALTH PROMOTION ACTION MEANS:**

#### **Building healthy public policy**

Health promotion goes beyond health care. It puts health on the agenda of policy makers in all sectors and at all levels, directing them to be aware of the health consequences of their decisions and to accept their responsibilities for health.

Health promotion policy combines diverse but complementary approaches, including legislation, fiscal measures, taxation and organizational change. It is coordinated action that leads to health, income and social policies that foster greater equity. Joint action contributes to ensuring safer and healthier goods and services, healthier public services, and cleaner and more enjoyable environments.

Health promotion policy requires the identification of obstacles to the adoption of healthy public policies in non-health sectors, and ways of removing them. The aim must be to make the healthier choice the easier choice for policy makers as well.

### **Create supportive environments**

Our societies are complex and interrelated. Health cannot be separated from other goals. The inextricable links between people and their environment constitutes the basis for a socio-ecological approach to health. The overall guiding principles for the world, nations, regions and communities alike is the need to encourage reciprocal maintenance – to take care of each other, our communities and our natural environment. The conservation of natural resources throughout the world should be emphasized as a global responsibility.

Changing patterns of life, work and leisure have a significant impact on health. Work and leisure should be a source of health for people. The way society organizes work should help create a healthy society. Health promotion generates living and working conditions that are safe, stimulating, satisfying and enjoyable.

Systematic assessment of the health impact of a rapidly changing environment – particularly in areas of technology, work, energy production and urbanisation – is essential and must be followed by action to ensure positive benefit to the health of the public. The protection of the natural and built environments and the conservation of natural resources must be addressed in any health promotion strategy.

### **Strengthen community action**

Health promotion works through concrete and effective community action in setting priorities, making decisions, planning strategies and implementing them to achieve better health. At the heart of this process is the empowerment of communities – their ownership and control of their own endeavours and destinies.

Community development draws on existing human and material resources in the community to enhance self-help and social support, and to develop flexible systems for strengthening public participation in and direction of health matters. This requires full and continuous access to information, learning opportunities for health, as well as funding support.

### **Develop personal skills**

Health promotion supports personal and social development through providing information, education for health and enhancing life skills. By so doing, it increases the options available to people to exercise more control over their own health and over their environments, and to make choices conducive to health.

Enabling people to learn, throughout life, to prepare themselves for all of its stages and to cope with chronic illness and injuries is essential. This has to be facilitated in school, home, work and community settings. Action is required through educational, professional, commercial and voluntary bodies, and within the institutes themselves.

### **Reorient health services**

The responsibility for health promotion in health services is shared among individuals, community groups, health professional, health service institutions and governments. They must work together towards a health care system which contributes to the pursuit of health.

The role of the health sector must move increasingly in a health promotion direction, beyond its responsibility for providing clinical and curative services. Health services need to embrace an expanded



mandate that is sensitive and respects cultural needs. This mandate should support the needs of individuals and communities for a healthier life, and open channels between the health sector and broader social, political, economic and physical environmental components.

Reorienting health services also requires stronger attention to health research as well as changes in professional education and training. This must lead to a change of attitude and organization of health services that refocuses on the total needs of the individual as a whole person.

### **MOVING TO THE FUTURE**

Health is created and lived by people within the settings of their everyday life: where they learn, work, play and love. Health is created by caring for oneself and others, by being able to take decisions and have control over one's life circumstances, and by ensuring that the society one lives in creates conditions that allow the attainment of health by all its members.

Caring, holism and ecology are essential issues in developing strategies for health promotion. Therefore, those involved should take as a guiding principle that, in each phase of planning implementation and evaluation of health promotion activities, women and men should become equal partners.

### **COMMITMENT TO HEALTH PROMOTION**

The participants in this Conference pledge:

- to move into the arena of healthy public policy, and to advocate a clear political commitment to health and equity in all sectors;
- to counteract the pressures towards harmful products, resource depletion, unhealthy living conditions and environments, and bad nutrition; and to focus attention on public health issues such as pollution, occupational hazards, housing and settlements;
- to respond to the health gap within and between societies, and to tackle the inequities in health produced by the rules and practices of these societies;
- to acknowledge people as the main health resource; to support and enable them to keep themselves, their families and their friends healthy through financial and other means; and to accept the community as the essential voice in matters of its health, living conditions and well being;
- to reorient health services and their resources towards the promotion of health, and to share power with other sectors, other disciplines and , most importantly, with people themselves;
- to recognize health and its maintenance as a major social investment and challenge, and to address the overall ecological issue of our ways of living.

The Conference urges all concerned to join them in their commitment to a strong public health alliance.

### **CALL FOR INTERNATIONAL ACTION**

The Conference calls on the World Health Organization and other international organizations to advocate the promotion of health in all appropriate forums and to support countries in setting up strategies and programmes for health promotion.

The Conference is firmly convinced that if people in all walks of life, nongovernmental and voluntary organizations, governments, the World Health Organization and all other bodies concerned join forces in introducing strategies for health promotion, in line with the moral and social values that form the basis of this CHARTER, Health For All by the year 2000 will become a reality.

### **CHARTER ADOPTED AT AN INTERNATIONAL CONFERENCE ON HEALTH PROMOTION**

The move towards a new public health  
November 17-21, 1986, Ottawa, Ontario, Canada

## ANNEX 2. Percentage of 5-/6- and 12-year-old children affected by tooth decay; examples from each of the WHO regions.

Country	5- or *6-year-olds			12-year-olds		
	Yr surveyed	% decay	dmft	Yr surveyed	% decay	DMFT
<b>AFRO</b>						
Madagascar <sup>117</sup>	*1993	85	4.9	1993	75	3.1
Niger <sup>23</sup>	*1997	56	2.1	1997	58	1.3
Tanzania <sup>19</sup> (Mainland)	* 2000-01	53	1.5	2000-01	21	0.4
<b>EMRO</b>						
Kuwait <sup>118</sup>	*1993	91	6.2	1993	79	2.6
Saudi Arabia <sup>33</sup>	*1995	87	6.4	1995	83	2.9
<b>EURO</b>						
Denmark <sup>119</sup>	2002	30	1.6	2002	40	0.9
Poland <sup>35</sup>	*2000	88	NR	2000	88	3.8
Portugal <sup>21</sup>	*1999	47	2.1	1999	53	1.5
<b>PAHO</b>						
Canada	1998-99 <sup>120</sup>	39	1.8	**1994 <sup>121</sup>	47	1.5
Mexico <sup>122</sup>	NR	NR	NR	1997	72	2.5
<b>SEARO</b>						
Nepal <sup>123</sup>	***1999-2000	67	3.3	****1999-2000	41	1.1
Thailand <sup>124</sup>	***2000-01	87	6.0	2000-01	57	1.6
<b>WPRO</b>						
Australia <sup>125</sup>	1998	37	1.4	1998	37	0.8
China <sup>22</sup>	1995-96	77	4.5	1995-96	46	1.0

dmft/DMFT: mean number of decayed, missing and filled teeth;

NR: not recorded;

\* 6-year-olds;

\*\* 13-year-olds;

\*\*\* 5-6-year-olds;

\*\*\*\* 12-13-year-olds.



### ANNEX 3. Percentage of children who have signs of gum disease, examples from each of the WHO regions.

Country	Yr surveyed	12-year-olds %	Others (age) %
<b>AFRO</b>			
Niger <sup>23</sup>	1997	100	100 (6 yrs)
Madagascar <sup>117</sup>	1993	95	87 (6 yrs)
Zanzibar <sup>20</sup>	1996	98	97 (6 yrs)
Tanzania <sup>19</sup> (Mainland)	2000-01	78	76 (6 yrs)
<b>EMRO</b>			
Recent systematic data not available.			
<b>EURO</b>			
Portugal <sup>21</sup>	1999	96	-
UK <sup>27</sup>	1993	-	58 (8 yrs)
<b>PAHO</b>			
USA <sup>126</sup>	1990	-	80 (12-13 yrs)
<b>SEARO</b>			
Thailand <sup>24</sup>	1997	90	-
<b>WPRO</b>			
China <sup>22</sup>	1995-96	52	-
Cambodia <sup>98</sup>	1990-91	80	-
Malaysia <sup>31</sup>	1998	6	67 (16 yrs)

**ANNEX 4. Percentage of children in selected countries who have never been to the dentist and who brush their teeth twice a day.**

Country	Yr surveyed	6-year-olds	12-year-olds
<b>Never been to dentist (%)</b>			
Tanzania <sup>19</sup>	2000-01	82	76
Zanzibar <sup>20</sup>	1996	-	*65
Saudi Arabia <sup>33</sup>	1995	20	10
Portugal <sup>21</sup>	1999	58	13
Poland <sup>35</sup>	1999	-	*8
Romania <sup>37</sup>	1993	**31	-
Thailand <sup>24</sup>	1997	-	34
China <sup>34</sup>	1995	58	47
<b>Brush teeth twice a day (%)</b>			
Tanzania <sup>19</sup>	2000-01	50	46
Zanzibar <sup>20</sup>	1996	-	*28
Saudi Arabia <sup>33</sup>	1995	43	44
Portugal <sup>21</sup>	1999	31	56
Poland <sup>35</sup>	1999	62	65
Romania <sup>37</sup>	1993	**37	-
USA <sup>126</sup>	1990	-	52
Thailand <sup>24</sup>	1997	-	76
China <sup>34</sup>	1995	22	22

\*6- and 12-yr-olds combined;

\*\* 7-year-olds.



## REFERENCES

1. US General Accounting Offices. *Oral health: Dental Disease Is a Chronic Problem Among Low-Income Populations*. Report to Congressional Requesters. Washington, 2000.
2. Gift HC, Reisine ST, Larach DC. The social impact of dental problems and visits. *Am J Public Health* 1992; 82:1663-68.
3. World Health Organization. *Global Oral Health Data Bank*. Geneva: WHO, 2001.
4. World Health Organization. *Healthy Environment for Children. Initiating an Alliance for Action*. Geneva: WHO, 2002.
5. Gregory JR, Lowe S, Bates CJ, Prentice A, Smithers G, Clarker PC. *National Diet and Nutrition Survey: Young People Aged 4 to 18 Years. Volume 1: Report of the Diet and Nutrition Survey*. London: HMSO, 2000.
6. Bernard W S, Kleihues P. (eds) *World Cancer Report*. Lyon : IARC Press, 2003.
7. Centres for Disease Control and Prevention. Tobacco use among high school students – United States, 1997. *MMWR Morb Mortal Wkly Rep* 1998; 47: 229-33.
8. Tomar SL, Winn DM, Swango PA, Giovino GA, Kleinman DV. Oral mucosal smokeless tobacco lesions among adolescents in the United States. *J Dent Res* 1997; 76(6): 1277-86.
9. The WHO Tobacco Free Initiative. <http://www.who.int/tobacco>. Geneva: WHO. Accessed Oct 2003.
10. World Health Organization. *Noma Today: a Public Health Problem?* Report of an expert consultation. Geneva: WHO, 1998.
11. Noma, the face of poverty. [http://www.who.int/ncd/noma/noma\\_facepoverty.htm](http://www.who.int/ncd/noma/noma_facepoverty.htm). Geneva: WHO. Last updated 10 Dec 2002. Accessed Sept 2003.
12. U.S. Department of Health and Human Services. *Oral Health in America: A Report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institute of Health, 2000.
13. *Brazil Report: Priorities and Major School Health Promotion Efforts in 1998-1999*. WHO PAHO Health Promoting Schools website <http://165.158.1.110/english/hpp/>. Washington, D.C.: WHO PAHO, 1999. Accessed April 2003.
14. World Health Organization. *The Status of School Health*. Report of the School Health Working Group and the WHO Expert Committee on Comprehensive School Health Education and Promotion. Geneva: WHO, 1996.
15. Booth ML, Samdal O. Health-promoting schools in Australia: models and measurement. *Aust NZ J Public Health* 1997; 21: 365-70.
16. World Health Organization. *Local Action: Creating Health-Promoting Schools*. The WHO Information Series on School Health. Geneva: WHO, 2000.
17. Araojo JR. Philippines Country Report: School oral health promotion programme. In *The 2<sup>nd</sup> Asian Conference of Oral Health Promotion for School Children. Prospectus for Our Future Generation*. Ayutthaya, Thailand, February 2003. pp103-110. Bangkok: Thammasat University, 2003.
18. World Health Organization. *The World Health Report: 2002: Reducing Risks, Promoting Healthy Life*. Geneva: WHO, 2002.
19. Petersen PE, Nyandindi U, Kikwilu E, Mabelya L, Lembariti BS, Poulsen VJ. *Oral Health Status and Oral Health Behaviour of School Children, Teachers and Adults in Tanzania*. Technical Report. Geneva: WHO, 2002.
20. Petersen PE, Mzee MO. Oral health profile of schoolchildren, mothers and schoolteachers in Zanzibar. *Community Dent Health* 1998; 15: 256-62.
21. Mexia de Almeida C, Petersen PE, André SJ, Toscano A. Changing oral health status of 6- and 12-year-old schoolchildren in Portugal. *Community Dent Health* 2003; 20: 211-216.
22. Wang HY, Petersen PE, Bian JY, Zhang BX. The second national survey of oral health status of children and adults in China. *Int Dent J* 2002; 52: 283-90.
23. Petersen PE, Kaka M. Oral health status of children and adults in the Republic of Niger, Africa. *Int Dent J* 1999; 49: 159-64.
24. Petersen PE, Hoerup N, Poonviset N, Prommajan J, Watanapa A. Oral health status and oral health behaviour of urban and rural schoolchildren in Southern Thailand. *Int Dent J* 2001; 51: 95-102.
25. World Health Organization. *Shape the future of Life, Shape Healthy Environment for Children*. World Health Day 2003. Geneva: WHO, 2003. WHO/SDE/WHO/03.01.
26. Department of Human Services. *Promoting Oral Health 2000-2004: Strategic Directions and Framework for Action*. Melbourne: Department of Human Services, 1999.



27. O'Brien M. *Children's Dental Health in the United Kingdom 1993*. London: HMSO, 1994.
28. Marcenés W, al Beirut N, Tayfour D, Issa S. Epidemiology of traumatic injuries to the permanent incisors of 9-12-year-old schoolchildren in Damascus, Syria. *Endod Dent Traumatol* 1999; 15: 117-23.
29. Dental, Oral and Craniofacial Data Resource Centre. *Oral Health U.S., 2002*. Bethesda, Maryland: The National Institute of Health, 2002.
30. Attin T, Mbiydzemo FN, Villard I, Kielbassa AM, Hellwig E. Dental status of schoolchildren from a rural community in Cameroon. *SADJ* 1999; 54: 145-48.
31. Jaafar N. Malaysian Country Report on oral health promotion program. In *The 2<sup>nd</sup> Asian Conference of Oral Health Promotion for School Children. Prospectus for Our Future Generation*. Ayutthaya, Thailand, February 2003. pp93-102. Bangkok: Thammasat University, 2003.
32. Zhu L, Petersen PE, Wang HY, Bian JY, Zhang BX. Oral Health knowledge, attitudes and behaviour of children and adolescents in China. *Int Dent J* 2003; 53: 289-98.
33. Al-Tamimi, Petersen PE. Oral health situation of schoolchildren, mothers and schoolteachers in Saudi Arabia. *Int Dent J* 1998; 48: 180-86.
34. Petersen PE, Zhou E. Dental caries and oral health behaviour situation of children, mothers and schoolteachers in Wuhan, People's Republic of China. *Int Dent J* 1998; 48: 210-16.
35. Wierzbicka M, Petersen PE, Szatko F, Dybizbanska E, Kalo I. Changing oral health status and oral health behaviour of schoolchildren in Poland. *Community Dent Health* 2002; 19: 243-50.
36. Rajab LD, Petersen PE, Bakaeen G, Hamdan MA. Oral health behaviour of schoolchildren and parents in Jordan. *Int J Paediatr Dent* 2002; 12: 168-76.
37. Petersen PE, Danila I, Samoila A. Oral health behaviour, knowledge, and attitudes of children, mothers and schoolteachers in Romania in 1993. *Acta Odontol Scand* 1995; 53: 363-68.
38. Petersen PE, Hadi R, Al-Zaabi FS, Hussein JM, Behbehani JM, Skougaard MR, Vigild M. Dental knowledge, attitudes and behaviour among Kuwaiti mothers and school teachers. *J Pedod* 1990; 14: 158-64.
39. Shetty KV, Johnson NW. Knowledge, attitudes and beliefs of adult South Asians living in London regarding risk factors and signs for oral cancer. *Community Dent Health*, 1999; 16: 227-31.
40. World Health Organization. *Tobacco and the Rights of the Child*. Geneva: WHO, 2001.
41. Mishra P. Nepal Country Report: School oral health promotion programme. In *The 2<sup>nd</sup> Asian Conference of Oral Health Promotion for School Children. Prospectus for Our Future Generation*. Ayutthaya, Thailand, February 2003. pp25-38. Bangkok: Thammasat University, 2003.
42. Vigild M, Petersen PE, Hadi R. Oral health behaviour of 12-year-old children in Kuwait. *Int J Paediatr Dent* 1999; 9: 23-29.
43. van Palenstein Helderman W, Mikx F. Priorities in oral health in non-EME countries. *Int Dent J*, 2002; 52: 30-34.
44. Adyatmaka A, Sutopo U, Carlsson P, Bratthall D, Pakhomov P. *School-based Primary Preventive Programme for Children. Affordable toothpaste as a component in primary oral health care. Experiences from a field trial in Kalimantan Barat, Indonesia*. Geneva: WHO, 1998.
45. World Health Organization. *Diet, Nutrition and the Prevention of Chronic Diseases*. WHO Technical Report Series 916. Geneva: WHO, 2003.
46. Currie C, Hurrelmann K, Settertobulte W, Smith R, Todd J. (eds). *Health and Health Behaviour among Young People*. WHO Policy Series: Health policy for children and adolescents Issue 1, International Report. Copenhagen: WHO Regional Office for Europe, 2000.
47. World Health Organization. *Smokeless Tobacco Control: A Report of a WHO Study Group*. Geneva: WHO, 1988.
48. World Health Organization. "Growing up without tobacco". *World No-Tobacco Day 1998*. Press Release. Geneva: WHO, 1998.
49. Centres for Disease Control and Prevention. Guidelines for school health programs to prevent tobacco use and addiction. *MMWR Morb Mortal Wkly Rep* 1994; 43 (RR-2): 1-18.
50. World Health Organization. The Tobacco Epidemic in Latin America. Fact Sheet No 196. Geneva: WHO, 1998.
51. Retna Kumari N. Assessment of dental treatment required and analysis of cost in the management of dental caries among semiurban primary school children of Kerala. *J Indian Soc Pedod Prev Dent* 2000; 18(1): 28-37.
52. Australian Institute of Health and Welfare. *Australia's Health 1998: the Sixth Biennial Report of the Australian Institute of Health and Welfare*. Canberra: AIHW, 1998.



53. Sheiham A. Dietary effects on dental diseases. *Public Health Nutr* 2001; 4: 569-91.
54. Gilbert L, Rudolph MJ, Moosa A. Social characteristics and oral health behaviour of families in Riverlea. *J Dent Assoc S Afr* 1989; 44: 461-63.
55. Mouradian WE, Wehr E, Crall JJ. Disparities in children's oral health and access to dental care. *JAMA* 2000; 284(20): 2625-31.
56. Truong VT. Vietnam Country Report: School oral health promotion program. In *The 2<sup>nd</sup> Asian Conference of Oral Health Promotion for School Children. Prospectus for Our Future Generation*. pp133-138. Bangkok: Thammasat University, 2003.
57. Firatli E. The relationship between clinical periodontal status and insulin-dependent diabetes mellitus. Results after 5 years. *J Periodontol* 1997; 68: 136-40.
58. Hung HC, Willett W, Merchant A, Rosner BA, Ascherio A, Joshipura KJ. Oral health and peripheral arterial disease. *Circulation* 2003; 107: 1152-57.
59. Morrison HI, Ellison LF, Taylor GW. Periodontal disease and risk of fatal coronary heart and cerebrovascular diseases. *J Cardiovasc Risk* 1999; 6: 7-11.
60. Slade GD, Strauss RP, Atchison KA, Kressin NR, Locker D, Reisine ST. Conference summary: assessing oral health outcomes – measuring health status and quality of life. *Community Dent Health* 1998; 15: 3-7.
61. Sheiham A, Watt RG. The Common Risk Factor Approach: a rational basis for promoting oral health. *Community Dent Oral Epidemiol* 2000; 28: 399-406.
62. Acs G, Lodolini G, Kaminsky S, Cisneros GJ. Effect of nursing caries on body weight in a pediatric population. *Pediatr Dent* 1992; 14: 302-5.
63. Davies GN. Early childhood caries – a synopsis. *Community Dent Oral Epidemiol* 1998; 26: 106-16.
64. Cariño KMG, Shinada K, Kawaguchi Y. Early Childhood caries in northern Philippines. *Community Dent Oral Epidemiol* 2003; 31: 81-89.
65. Eungpoonsawat W. *Oral Health Care Delivery Models for Schoolchildren in Southern Thailand – A Health Systems Analysis Approach*. PhD Thesis. Copenhagen: University of Copenhagen, 2002.
66. Siegel SM. *Advances and Progress in Oral Health through Oral Care Education*. Pennsylvania: Professional Audience Communications, 1998.
67. Craft M. Natural Nashers: a programme of dental health education for adolescents in schools. *Int Dent J* 1984; 34: 204-13.
68. Friel S, Kelleher C, Campbell P, Nolan G. Evaluation of the Nutrition Education at Primary School (NEAPS) programme. *Public Health Nutr* 1999; 2: 549-55.
69. Honkala E. Oral health promotion with children and adolescents. In Shou L, Blinkhorn A (eds). *Oral Health Promotion*. Oxford: Oxford University Press, 1993.
70. U.S. Department of Health and Human Services. *Healthy People 2010: Understanding and Improving Health*. 2nd ed. Volume I and II. Washington, DC: U.S. Government Printing Office, November 2000.
71. Petersen PE, Torres AM. Preventive oral health care and health promotion provided for children and adolescents by the Municipal Dental Health Service in Denmark. *Int J Paediatr Dent* 1999; 9: 81-91.
72. *The 2<sup>nd</sup> Asian Conference of Oral Health Promotion for School Children. Prospectus for Our Future Generation*. Ayutthaya, Thailand, February 2003. pp25-38. Bangkok: Thammasat University, 2003.
73. World Health Organization. *Healthy Environments for Children. Initiating an Alliance for Action*. Geneva: WHO, 2002.
74. World Health Organization. *Shape Healthy Environments for Children. Shape the Future of Life*. Geneva: WHO, 2003.
75. Razanamihaja N, Petersen PE. School based oral health programmes in Madagascar. In Blegvad L, Ringsted F. (eds). *Report from the Workshop on Health Care Systems in Africa: Patterns and Perspectives*. Proceedings from the University of Copenhagen, North-South Initiative Workshop, April 27-29. Copenhagen: The ENRECA Health Network, 1998.
76. Stephen KW, Bánóczy J, Pakhomov GN. (eds). *Milk Fluoridation for the Prevention of Dental Caries*. Geneva: WHO and Borrow Dental Milk Foundation, 1996.
77. Centres for Disease Control and Prevention. Fluoridation of drinking water to prevent dental caries. *MMWR Morb Mortal Wkly Rep* 1999; 48: 933-40.
78. Kapadia H, Stallard RE, Volpe AR, Rustogi, Butler M. Evaluation of a curriculum for dental health in 3<sup>rd</sup> grade school children in Mumbai, India. *J Indian Soc Pedod Prev Dent* 1999; 17: 65-68.

79. Hunsrisakhun J. *The Psycho-social Support by Significant Others in Promotion of Oral Health Behaviour among Primary School Children in Southern Thailand*. PhD thesis. Copenhagen: University of Copenhagen, 2003.
80. McLellan L, Rissel C, Donnelly N, Bauman A. Health behaviour and the school environment in New South Wales, Australia. *Soc Sci Med* 1999; 49: 611-19.
81. St Leger LH: The opportunities and effectiveness of the health promoting primary school in improving child health – a review of the claims and evidence. *Health Educ Res* 1999; 14: 51-69.
82. World Health Organization. *Research to Improve Implementation and Effectiveness of School Health Programmes*. Report of the School Working Group and the WHO Expert Committee on Comprehensive School Health Education and Promotion. Geneva: WHO, 1996.
83. Denman S, Moon A, Parsons C, Stears D. *The Health Promoting School. Policy, Research and Practice*. London: Routledge Falmer, 2002.
84. Centres for Disease Control and Prevention. Trends in cigarette smoking among high school students – United States, 1991-2001. *MMWR Morb Mortal Wkly Rep* 2002; 51: 409-12.
85. US Dept of Health and Human Services. *Reducing Tobacco Use: A Report of the Surgeon General*. Atlanta, Georgia: US Dept of Health and Human Services, Centres for Disease Control and Prevention, National Centre for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2000.
86. Buischi YA, Axelsson P, Oliveira LB, Mayer MP, Gyermo P. Effect of two preventive programs on oral health knowledge and habits among Brazilian schoolchildren. *Community Dent Oral Epidemiol* 1994; 22: 41-46.
87. Moyses ST, Moyses SJ, Watt RG, Sheiham A. Associations between health promoting schools' policies and indicators of oral health in Brazil. *Health Promot Int* 2003; 18: 209-18.
88. Petersen PE. Effectiveness of oral health care – some Danish experiences. *Proc Finn Dent Soc* 1992; 88: 12-23.
89. Petersen PE. Oral health behaviour of 6-year-old Danish children. *Acta Odontol Scand* 1992; 50: 57-64.
90. Craft M, Croucher R, Dickinson J. Preventive dental health in adolescents: short and long term pupil response to trials of an integrated curriculum package. *Community Dent Oral Epidemiol* 1981; 9: 199-206.
91. Dental Health Foundation, Ireland. *Oral Health in Disadvantaged Schools in the Eastern Region*. Dublin: Dental Health Foundation, Ireland, 2001.
92. Friel S, Hope A, Kelleher C, Comer S, Sadlier D. Impact evaluation of an oral health intervention amongst primary school children in Ireland. *Health Promot Internation* 2002; 17: 119-26.
93. Szöke J, Petersen PE. Evidence for dental caries decline among children in an East European Country (Hungary). *Community Dent Oral Epidemiol* 2000; 28: 155-60.
94. Petersen PE, Peng B, Tai B, Bian Z, Fan M. Effect of a school-based oral health education programme in Wuhan City, Peoples Republic of China. *Int Dent J* 2003; 53: 289-298.
95. Hartono SW, Lambri SE, van Palestein Helderma WH. Effectiveness of primary school-based oral health education in West Java, Indonesia. *Int Dent J* 2002; 52: 137-43.
96. Department of Human Services. *Evidence-Based Health Promotion. Resources for planning. No. 1 – Oral Health*. Melbourne, Victoria: Public Health Division, Department of Human Services; 2000.
97. The Ministry of Health. *Child Health Programme Review*. Wellington, New Zealand: Ministry of Health, 1998.
98. Teng O. Cambodia Country Report: School oral health program. In *The 2<sup>nd</sup> Asian Conference of Oral Health Promotion for School Children. Prospectus for Our Future Generation*. Ayutthaya, Thailand, February 2003. pp117-122. Bangkok: Thammasat University, 2003.
99. Laloo R, Solanki GS. An evaluation of a school-based comprehensive public oral health care programme. *Community Dent Health* 1994; 11: 152-55.
100. Vigild m, Skougaard M, Rabab H, Halling C. An oral health programme for schoolchildren in Kuwait 1986-97. *Community Dent Health* 1999; 16: 102-6.
101. Kay E, Locker D. *Effectiveness of Oral Health Promotion: A Review*. London: Health Education Authority, 1997.
102. Pine CM, McGoldrick PM, Burnside G, Curnow MM, Chesters RK, Nicholson J, Huntington E. An intervention to establish regular toothbrushing: understanding parents' beliefs and motivating children. *Int Dent J* 2000; 50: 312-23.



103. Chen CJ, Jallaludin RLR. Knowledge and perception of oral health promoting in schools among dental nurses in Sarawak, Malaysia. *Asia Pac J Public Health* 2000; 12: 12-16.
104. UNESCO, UNICSF, WHO, the World Bank. *Focusing Resources on Effective School Health: a FRESH Start to Enhancing the Quality and Equity of Education*. World Education Forum 2000, Final Report. Geneva: UNESCO, UNICSF, WHO and the World Bank, 2000.
105. Croucher R, Rodgers AI, Humpherson WA, Vruich L. The "spread of effect" of a school based dental health project. *Community Dent Oral Epidemiol* 1985; 13: 205-7.
106. Nyandinidi U, Palin-Palkas T, Milen A, Robison V, Kombe N, Mwakasgule S. Participation, willingness and abilities of school-teachers in oral health education in Tanzania. *Community Dent Health* 1994; 11: 101-4.
107. St Leger L. Developing indicators to enhance school health. *Health Educ Res* 2000; 15: 719-28.
108. Macdonald G, Veen C, Tones BK. Evidence for success in health promotion: suggestions for improvement. *Health Educ Res* 1996; 11: 367-76.
109. Petersen PE, Christensen LB. *Oral Health Promotion: Health Promoting Schools Project*. Copenhagen: WHO Regional Office for Europe, 1995.
110. Nyandindi US. School health education in Tanzania. In Blegvad L, Ringsted F. (eds). *Report from the Workshop on Health Care Systems in Africa: Patterns and Perspectives*. Proceedings from the University of Copenhagen, North-South Initiative Workshop, April 27-29. Copenhagen: The ENRECA Health Network, 1998.
111. Mellanby AR, Reesa JB, Tripp JH. Peer-led and adult-led school health education: a critical review of available comparative research. *Health Educ Res* 2000; 15: 533-45.
112. Szilagyi T. Peer education of tobacco issues in Hungarian communities of Roma and socially disadvantaged children. *Cent Eur J Public Health* 2002; 10: 117-20.
113. Perry CL, Komro KA, Veblen-Mortenson S, Bosma LM, Farbakhsh K, Munson KA, Stigler MH, Lytle LA. A randomized controlled trial of the middle and junior high school D.A.R.E. and D.A.R.E. Plus Programs. *Arch Pediatr Adolesc Med* 2003; 157: 178-84.
114. Konu A, Rimpelä M. Well-being in schools: a conceptual model. *Health Promot Internation* 2002; 17: 79- 87.
115. Tones BK. The health promoting schools: some reflections on evaluation. *Health Educ Res* 1996; 11: i-viii.
116. Rivers K, Aggleton P, Chase E, Downie A, Mulvihill C, Sinkler P, Tyrer P, Warwick I. *Setting the Standard: Research linked to the development of The National Healthy School Standard (NHSS)*. London: Department of Health and Department for Education and Employment, 2000.
117. Petersen PE, Razanamihaja N. Oral health status of children and adults in Madagascar. *Int Dent J* 1996; 46: 41-47.
118. Vigild M. Dental caries and dental fluorosis among 4-, 6-, 12- and 15-year-old children in kindergartens and public schools in Kuwait. *Community Dent Health* 1996; 13: 47-50.
119. Danish National Board of Health. *Oral Health Statistics on Children and Adolescents in Denmark, 2002*. Copenhagen: Ministry of Health, 2003.
120. Brodeur JM, Olivier M, Benigeri M, Bedos C, Williams S. Étude 1998-1999 sur la santé buccodentaire des élèves québécois de 5-6 ans et de 7-8 ans. Ministère de la Santé et des Services Sociaux, Québec, 2001.
121. Lawrence HP, Leake JL. The US Surgeon General's report on Oral Health in America: A Canadian Perspective. *J Can Dent Assoc* 2001; 67: 1-9.
122. Irigoyen ME, Sánchez-Hinojosa G. Changes in dental caries prevalence in 12-year-old students in the State of Mexico after 9 years of salt fluoridation. *Caries Res* 2000; 34: 303-7.
123. Yee R, McDonald N. Caries experience of 5-6-year-old and 12-13-year-old schoolchildren in central and western Nepal. *Int Dent J* 2002; 453-60.
124. Ministry of Health. *The 5<sup>th</sup> Thailand Nation Oral Health Survey, 2000-2001*. Bangkok: Ministry of Health, 2003.
125. Armfield JM, Roberts-Thomson KF, Spencer AJ. *The Child Dental Health Survey, Australia, 1998*. AIHW Cat No. DEN 88. Adelaide: The University of Adelaide (AIHW Dental Statistics and Research Unit Series No 24), 2001.
126. Chen M, Andersen RM, Barmes DE, Leclercq M-H, Lyttle CS. *Comparing Oral Health Care Systems. A Second International Collaborative Study*. Geneva: WHO, 1997.

