



CORE

Public Health Functions for BC

**Model Core Program Paper:
Dental Public Health**

BC Health Authorities

**Population Health and Wellness
BC Ministry of Health**

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This Model Core Program Paper was prepared by a working group consisting of representatives of the BC Ministry of Health and BC's health authorities.

This paper is based upon a review of evidence and best practice, and as such may include practices that are not currently implemented throughout the public health system in BC. This is to be expected, as the purpose of the Core Public Health Functions process—consistent with the quality improvement approach widely adopted in private and public sector organizations across Canada—is to put in place a performance improvement process to move the public health system in BC towards evidence-based best practice. Where warranted, health authorities will develop public performance improvement plans with feasible performance targets and will develop and implement performance improvement strategies that move them towards best practice in the program component areas identified in this Model Program Paper.

This Model Program Paper should be read in conjunction with the accompanying review of evidence and best practice.

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TABLE OF CONTENTS

Executive Summary	i
1.0 Overview/Setting the Context.....	1
1.1 An Introduction to This Paper.....	2
1.2 Introduction to Dental Public Health	2
2.0 Scope and Authority for the Dental Public Health Program.....	5
2.1 Provincial/Federal Roles and Responsibilities.....	5
2.2 Health Authority Roles and Responsibilities.....	5
2.3 Legislation and Policy Direction	6
3.0 Principles.....	7
4.0 Goals and Objectives	7
5.0 Main Components and Supporting Evidence	8
5.1 Introduction.....	8
5.2 Dental Health Promotion	8
5.3 Prevention of Dental Diseases, with a Focus on Childhood Dental Diseases	9
5.4 Surveillance, Assessment and Evaluation of Dental Health.....	11
6.0 Best Practices for Delivering a Dental Public Health Program	12
7.0 Indicators, Benchmarks and Performance Targets	14
7.1 Introduction.....	14
7.2 Indicators for Dental Health Promotion.....	15
7.3 Indicators for Prevention of Dental Diseases with a Focus on Childhood Dental Diseases.....	15
7.4 Indicators for Overall Surveillance, Assessment and Evaluation of Dental Health	16
8.0 External Capacity and Support Requirements	18
8.1 Key Success Factors/System Strategies.....	18
8.2 Intersectoral Collaboration and Integration/Coordination.....	18
8.3 Assessing and Monitoring the Dental Public Health Program	18
9.0 Conclusion	20
References	21

List Of Tables

Table 1: Indicators for the Dental Health Promotion.....	15
Table 2: Indicators for Prevention of Dental Diseases.....	16
Table 3: Indicators for Surveillance, Assessment and Evaluation of Dental Health	16

Appendices

Appendix 1: The Evidence Base for a Model Core Program for Dental Public Health	24
Appendix 2: Program Schematic - Model Core Program for Dental Public Health.....	25

EXECUTIVE SUMMARY

This paper identifies the core elements that could be provided by the British Columbia health authorities in the delivery of dental public health programs. It is intended, as part of the BC Core Functions in Public Health initiative, to reflect evidence-based practice and continuous quality improvement.

A Working Group of representatives from the Ministry of Health and the health authorities worked together in the development of this paper. They agreed that the main program components should include:

- Dental health promotion.
- Prevention of dental diseases, with a focus on prevention of childhood dental diseases.
- Surveillance, assessment and evaluation of dental health status and dental health programs.

“Better” practices are identified based on evidence and the expertise of professionals working in the field. These include:

- Supporting dental skill-building workshops and providing education materials to health care professionals and care providers.
- Facilitating the education of families with young children in effective dental practices.
- Assessing dental health of young children and providing appropriate preventive care.
- Advocating for fluoridation of public water systems where appropriate.
- Community capacity-building to facilitate partnerships which will enhance dental health promotion and dental health programs.
- Encouraging healthy public policy through collaborative approaches and advocacy with other public health and community-based partners.
- Advocacy for access to dental health services for vulnerable populations such as adults in care, low income pregnant women and families and those with developmental disabilities.
- Conducting surveys and measuring trends in the status of dental health among school-entry children, aged 5-6 years.
- Establishing evaluation frameworks as a component of all dental health programs provided by a health authority.

Indicators and benchmarks for dental public health programs are presented for each of the program components to provide a basis for ongoing performance review, program evaluation and monitoring of dental health status and trends over time. The indicators which were considered the most significant in determining overall performance:

- Number of families with infants 18 months old, or younger, who have received dental education/counseling.
- Percentage of school-entry children in the health authority who are caries-free.

Key success factors highlight a range of strategies that ensure the successful implementation of effective dental health programs. These include: strong support from the board and management; allocation of sufficient resources; well-trained and competent staff; a well-developed information system capable of handling required data; and clear mechanisms of reporting and accountability.

Coordination and collaboration with other public health and community partners will be necessary in achieving successful dental health promotion and dental program outcomes. In this process, it will be important to integrate information on good dental practices into programs such as healthy eating, tobacco control, early childhood development, chronic disease prevention, injury prevention, and reproductive health.

1.0 OVERVIEW/SETTING THE CONTEXT

As demonstrated in recent Canadian reports, public health needs to be better structured and resourced, in order to improve the health of the population. The Framework for Core Functions in Public Health is a component of that renewal in British Columbia. It defines and describes the core public health activities of a comprehensive public health system. This policy framework was accepted in 2005 by the Ministry of Health and the health authorities.

Implementation of core functions will establish a performance improvement process for public health developed in collaboration between the Ministry of Health, the health authorities and the public health field. This process will result in greater consistency of public health services across the province, increased capacity and quality of public health services and improved health of the population. To ensure collaboration and feasibility of implementation, the oversight of the development of the performance improvement process is managed by a Provincial Steering Committee with membership representing all health authorities and the ministry.

What are core programs? They are long-term programs representing public health services that health authorities provide in a renewed and modern public health system. Core programs are organized to improve health; they can be assessed ultimately in terms of improved health and well-being and/or reductions in disease, disability and injury. In total 21 programs have been identified as “core programs”, of which dental public health is but one. Many of the programs are interconnected and thus require collaboration and coordination between them.

In a “model core program paper”, each program will have clear goals, measurable objectives and an evidentiary base that shows it can improve people’s health and prevent disease disability, and/or injury. Programs will be supported through the identification of best practices and national and international benchmarks (where such benchmarks exist). Each paper will be informed by: an evidence paper; other key documents related to the program area; and by key expert input obtained through a working group with representatives from each health authority and the Ministry of Health.

The Provincial Steering Committee has indicated that an approved model core program paper constitutes a model of good practice, while recognizing it will need to be modified to meet local context and needs. The performance measures identified are appropriate indicators of program performance that could be used in a performance improvement plan. The model core program paper is a resource to health authorities that they can use to develop their core program through a performance improvement planning process. While health authorities must deliver all core programs, how each is provided is the responsibility of the health authority, as are the performance improvement targets they set for themselves.

It is envisioned that the performance improvement process will be implemented over several years. During that time the process will contribute to and benefit from related initiatives in public health infrastructure, health information and surveillance systems, workforce competence assessment and development and research and evaluation at the regional, provincial and national levels. Over time these improvement processes and related activities will improve the quality and

strengthen the capacity of public health programs, and this in turn will contribute to improving the health of the population.

1.1 An Introduction to This Paper

This model core program paper for dental public health builds on the work of other important documents. In March 2005, the Ministry of Health released a document entitled *A Framework for Core Functions in Public Health*. This document was prepared in consultation with representatives of health authorities and experts in the field of public health. It identifies the core programs that must be provided by health authorities, including food safety, and the public health strategies that can be used to implement these core programs. It provides an overall framework for the development of this document.

In addition, the paper entitled *Evidence Paper: Dental Public Health* (Ministry of Health 2006) provides important program and technical information. It identifies research studies on the effectiveness of a range of interventions to improve dental public health. *An Overview of Dental Public Health Promotion and Disease Prevention Programs for Early Childhood* (Bassett and Harwood 2005) provides an environmental scan.

A Working Group for Dental Public Health, formed of experts in dental health from the Ministry of Health and the health authorities, was formed in February 2006. The group provided guidance and direction in the development of the model core program paper during meetings in February and April 2006, as well as through telephone and e-mail discussions.

1.2 Introduction to Dental Public Health

Dental health has a significant impact on general health and the well-being of the population. Dental health is defined as the health of the teeth and gums including diseases such as caries and periodontal disease.

Although there have been significant decreases in the extent of tooth decay in the last 30 years, there continues to be high levels of tooth decay among those with low socio-economic backgrounds, people with disabilities, aboriginal people, the elderly and new immigrants from less affluent countries. Because of its impact on health, and the inequities in access to regular preventive and restorative dental care, dental public health is a core function of public health.

A summary of the general status of dental health in British Columbia/Canada is provided below (some surveys are limited in their coverage, i.e., the BC Adult Dental Health Survey considers only those who present at a dental office):

- The rate of visible decay among Kindergarten children has increased in the past decade, as 68 per cent were caries-free in 1993, compared to 59 per cent in 2002 (Ministry of Health 2003).
- Hospitalization rates for Aboriginal children aged 0–4 years, for dental procedures, was 68 per 1,000, ten times higher than the rate for other children (6.7 per 1,000), in 1997 (Provincial Health Officer 1997).

- There have been improvements in the dental health of the 16–25 age group; those who were caries-free increased from 3.9 per cent in 1986, to 13.4 per cent in 2001. This trend was also evident, to a lesser extent, in all other age groups (College of Dental Surgeons of British Columbia 2001).
- There has been a rise in the level of periodontal disease among adults of all ages (33 per cent had moderate pockets and 13.3 per cent had deep pockets in 1996; by 2001 this had increased to 38.3 per cent with moderate pockets and 15.4 per cent with deep pockets (College of Dental Surgeons of British Columbia 2001).
- Eighty-four per cent of BC adults rated their dental health as “excellent”, “very good” or “good” (Statistics Canada 2003).
- Sixty-one per cent of Canadians reported having dental insurance in 2003, up from 53 per cent in 1996/1997 (Statistics Canada 2003).
- Only 29 per cent of Canadian seniors were insured in 2003; fewer than half (46 per cent) had consulted a dentist within the past year (Statistics Canada 2003).
- Twenty-six per cent of Canadians reported in 2003 that they did not seek dental care because of cost.
- In BC, less than 40 per cent of people eligible for government support for dental treatment accessed treatment in 2004/2005 (the total includes those eligible only for emergency treatment).
- In 2004, the total cost of public and private dental services in Canada was estimated to be \$9.3 billion, or \$290 per person (Canadian Institute for Health Information 2005). Public expenditures were estimated to be less than 5 per cent of overall dental care spending.

Caries and periodontal disease are the two primary dental diseases of concern. Caries is an infectious and transmissible disease which young children often acquire through a primary caregiver before age 3. Studies indicate that the frequency of infant infection increases when the mother has high levels of the bacteria *Streptococcus mutans* (*S. mutans*) that causes caries (Berkovitz 2003). Research also suggests that the bacteria are transmitted between siblings and in daycare settings (Berkovitz 2003). Diet also plays a key role in the acquisition of *S. mutans*. Frequent consumption of sugars and fermentable carbohydrates, including those found in juice and infant formula, encourage the growth of the bacteria. Inappropriate use of nursing bottles and sippy cups, and frequent daytime snacking can enhance the exposure to sugars and increase the risk of caries for young children.

Periodontal disease encompasses a cluster of diseases that result in inflammatory responses and chronic destruction of the tissues that surround and support the teeth. Gingivitis—inflammation of the gum tissue—is reversible, while periodontitis—inflammation and destruction of the underlying supporting tissues—is irreversible. Bacteria have a primary role in the initiation of periodontal disease; however, there are other factors which influence its onset and rate of progression. Cigarette smoking is a strong predictor in some studies (but not all). Other risk factors for the progression of periodontal disease include diabetes, excessive alcohol

consumption, stress and some genetic factors such as Downs Syndrome. Periodontal disease is the major cause of tooth loss in adults.

Researchers have examined the relationship between dental health and a number of diseases. It will be important to monitor the research in this area to clarify and confirm the findings. The conclusions of some studies are noted below:

- Diabetes appears to have a significant association with periodontal disease. One study found that people with severe periodontal disease were found to be 6 times more likely to have poor glycaemic control (Simpson, Needleman, and Moles 2005).
- Heart disease is linked to periodontal disease and tooth loss. The evidence suggests that periodontal disease and tooth loss may be independent risk factors for cardiovascular disease (CVD). People with periodontal disease have a 1.04 to 2.8-fold greater risk of incurring CVD than persons without periodontal disease (Lux and Lavigne 2004).
- Respiratory diseases are moderately associated with microbes found frequently in the mouth. A recent literature review by Lux and Lavigne (2004) found an association between oral health/periodontal disease and respiratory diseases, including pneumonia.
- Pre-term/low birth weight babies are associated with maternal infections. Between 30 to 50 per cent of pre-term births are thought to result from maternal infections (Crowther et al. 2005). Mothers with severe periodontal disease have up to a seven-fold increase in the risk of delivering a pre-term, low birth weight baby (Jeffcoat et al. 2001).

Research strongly supports the appropriate use of fluoride for dental caries prevention (Centers for Disease Control and Prevention 2001). In Canada, fluoride has been added to some water systems and to toothpaste. In British Columbia approximately 3.6 per cent of the population has access to fluoridated water (Provincial Fluoridated Communities 2006). In comparison, 78 per cent of water systems in Alberta are fluoridated and in the USA over 60 per cent of the population on public water systems have fluoridated water (Provincial Health Officer 2001).

The evidence is inconclusive with respect to the effectiveness of parental education. However, research does indicate that intensive education and support programs for mothers of young children in low-socioeconomic areas are effective (Berkowitz 2003).

There is a need for effective dental health programs to work closely with related health fields. Linkages and partnerships with key programs are necessary to support and integrate dental health strategies into a range of public health programs including: reproductive health, early childhood development, healthy living, healthy eating, tobacco control, chronic disease management and injury prevention. Health authorities should consider establishing multidisciplinary coordinating mechanisms between these programs to increase the potential reach and influence of dental public health measures. Similarly, dental programs will need to establish partnerships with community agencies and other external stakeholders to facilitate community-based dental health promotion initiatives.

2.0 SCOPE AND AUTHORITY FOR THE DENTAL PUBLIC HEALTH PROGRAM

2.1 Provincial/Federal Roles and Responsibilities

The Ministry of Health has three main roles and responsibilities:

- Providing overall stewardship of the health system in BC, including conducting strategic interventions with health authorities to ensure the continuation of the delivery of efficient, appropriate, equitable and effective health services to British Columbians.
- Working with health authorities to provide accountability to government, the public and the recipients of health services.
- Providing resources to health authorities to allow them to deliver health-related services to British Columbians.

More specifically, in the area of dental public health, the following provincial-level functions are carried out by the Ministry of Health:

- Advising the Minister of Health on provincial dental health issues and policies.
- Coordinating and providing leadership around provincial policy and evaluation of province-wide dental public health initiatives.
- Providing advice to assist health authorities with respect to strategies to enhance the effectiveness of dental health programs.

Other provincial authorities that link to dental health services include: Ministry of Education, Ministry of Children and Family Development, Ministry of Employment and Income Assistance, and the Ministry of Environment (which oversees water fluoridation). Federal government authorities include the Office of the Chief Dental Officer, Public Health Agency, Health Canada, and dental treatment services provided by the First Nations and Inuit Health Branch, Health Canada.

2.2 Health Authority Roles and Responsibilities

The role of health authorities is to identify and assess the health needs in the region; to deliver health services (excluding physician services, BC PharmaCare, and services provided by private practitioners such as dentists) to British Columbians in an efficient, appropriate, equitable and effective manner; and to monitor and evaluate the services which they provide.

The *Framework for Core Functions in Public Health* adopted by the Ministry of Health defines the public health function of health authority as primordial (upstream), primary and early secondary prevention (screening). As a result, the dental public health core program is focused on these areas; treatment is not considered to be a core public health function. However, health authorities may decide to assist people to access dental care or may support selected treatment

services for selected clients.¹ Advocacy for access to dental treatment for vulnerable populations is recognized as a best practice. Advocacy should be undertaken if screening (i.e. case finding) programs are provided by the Health Authority and especially where these programs reveal significant inequities to access for vulnerable populations.

Health authorities are responsible for:

- Dental health promotion.
- Prevention of dental diseases, with a focus on prevention of childhood dental disease.
- Surveillance, assessment and evaluation of dental health status and dental health programs.

2.3 Legislation and Policy Direction

The legislative and policy direction for the dental public health program is derived from:

- The following acts: *Health Act*, *Continuing Care Act*, *Dentists Act* and *Health Professions Act*.
- BC Employment and Assistance Manual, and interministry protocols with the Ministry of Education.
- *A Framework for Core Functions in Public Health* (March 2005).
- The Performance Agreements currently in place with each health authority;
- The strategic directions of the Ministry of Health.
- The rolling *Health Service Redesign Plans* for each health authority.

¹ As dental health is privately funded, there are a number of marginalized, at-risk populations who are challenged to access dental care. It is recognized that some health authorities do provide limited dental treatment services. However, treatment is not a public health function as defined in the core functions framework.

3.0 PRINCIPLES

There are a number of principles that can be used to guide the policies and plans for a dental public health program. These principles include:

- Population-based health promotion, for long-term reduction of dental disease.
- Early childhood priority.
- Targeted focus on high-risk groups (including aboriginal children, at-risk pregnant women, seniors, people with disabilities, people in care, and so on).
- Participatory and interdisciplinary, involving communities, stakeholders and health professionals in planning, delivery and evaluation.
- Reasonable equity and consistency in delivering services from one part of a health authority to another.
- Evidence-based.
- A culture of continuous quality improvement.

4.0 GOALS AND OBJECTIVES

The overall goal of the dental public health program is to substantially reduce preventable chronic dental diseases and promote the highest possible level of dental health for all citizens in British Columbia. The objectives are:

- To improve the dental health of the population, through dental health promotion.
- To prevent dental diseases, especially through childhood interventions.
- To provide surveillance and monitoring of dental health, particularly among children.

5.0 MAIN COMPONENTS AND SUPPORTING EVIDENCE

5.1 Introduction

The three major program components for dental public health are:

- Dental health promotion.
- Prevention of dental diseases, with a focus on prevention of childhood dental diseases.
- Surveillance, assessment and evaluation of dental health status and dental health programs.

5.2 Dental Health Promotion

Health promotion is a strategy identified within the *Framework for Core Functions in Public Health*. Drawing from key health promotion strategies, the research evidence, professional opinion, and accepted practices in other jurisdictions, dental health promotion is proposed as a key component. The Ottawa Charter for Health Promotion provides a framework for ensuring effective health promotion through: building healthy public policy; creating supportive environments; developing personal skills; strengthening community action; and reorienting health services. Health authority strategies include:

- Developing healthy public policy through:
 - Advocating for fluoridation of public water systems where appropriate.
 - Collaborative approaches and advocacy focused on healthy food policies, food actions plans, tobacco control initiatives, injury prevention policies and chronic disease prevention.
- Creating supportive environments through:
 - Supporting dental skill-building workshops and providing educational materials for health and family care professionals, post-secondary students in allied fields, preschool and child care workers, and care providers for vulnerable populations such as adults in care, low-income pregnant women and families and those with developmental disabilities.
 - Encouraging the integration of dental training into the education, standards and accreditation process for allied health professionals, particularly continuing care providers.
- Developing personal skills through:
 - Educating parents in effective dental practices through collaborative approaches between dental public health and other public health programs.
 - Providing information resources on dental health practices including targeted resources and initiatives for at-risk groups.

- Strengthening community action by:
 - Establishing partnerships with community health and social service programs/agencies to promote dental health as one component of healthy lifestyles initiatives and chronic disease prevention.
 - Community capacity-building among local organizations to advocate for improved access to dental services/programs.²
- Reorienting health services through:
 - Greater emphasis on health promotion and prevention strategies for high-risk groups.
 - Greater integration of dental services into the health system.

The US Centers for Disease Control and Prevention (2001) note that “water fluoridation and use of fluoride dentifrice are the most efficient and cost-effective ways to prevent dental caries.” The Cochrane systematic reviews estimate a 14 per cent reduction in caries through fluoridation of water, with the effect greater in primary teeth, and an estimated benefit of 24 per cent for fluoride toothpaste (Watt 2005). Fluoride toothpastes, mouth rinses and gels appear to have a similar degree of effectiveness for the prevention of dental caries in children (Marinho et al. 2003).

With respect to educating parents, intensive education and support for mothers of young children in low-socioeconomic areas has been shown to be effective in reducing childhood caries by 30–50 per cent (Kowash et al. 2004). There is no evidence that school-based education programs have any long-term effect on plaque levels, but educating parents about plaque control in their young children is effective (Kay and Locker 1998). Furthermore, reinforcing or repeated sessions were shown to be more effective if given one-to-one, and individualized to meet the parent’s needs (Public Health Division, Department of Human Services 2000). Also, it is recognized that training allied health professionals is an effective way to support dental public health.

Because of the link between periodontal disease and other factors such as diabetes, cigarette smoking, excessive alcohol consumption and stress, the World Health Organization recommends integration of oral disease prevention within the prevention programs for non-communicable chronic disease (Petersen and Ogawa 2005).

5.3 Prevention of Dental Diseases, with a Focus on Childhood Dental Diseases

Health authorities should place a priority on childhood prevention to ensure long-term reduction in dental caries. It is recognized that prevention, from a population health perspective, has wide-

² Health authorities have a role in advocating for healthy public policy as described in *A Framework for Core Functions in Public Health*. Public health leaders at the local level have a role on behalf of the public to provide advice to their communities in matters of public health, to report on the health of their communities and to play a leadership role in initiatives that address the determinants of health in their communities.

ranging considerations including societal and environmental factors that should be considered in the development of strategies. Prevention measures could include:

- Identifying families at risk for having children with dental caries, to identify needs and provide an opportunity for one-to-one parent education and other supportive strategies to reduce risk.
- Assessing dental risk (ranging from surveying to screening) of young children.
- Applying fluoride varnish, as appropriate.
- Applying sealants, as possible (as they require a clinical setting, this may not be readily available in all areas through dental public health).
- Collaborating in social marketing campaigns targeted to improving children's dental practices.
- Partnering with schools, child care centres, community groups and other stakeholders who work with children, to raise awareness and develop action plans for promoting effective childhood dental practices.

Prevention of cariogenic feeding behaviours (the use of nursing bottles, sippy cups, frequent feeding during sleep and frequent daytime snacking) plus daily tooth brushing with fluoride toothpaste have been shown to reduce the incidence of dental caries (Berkowitz 2003). One-to-one counseling of Vietnamese mothers at immunizations clinics in Vancouver Coastal Health Authority revealed that children whose mothers received at least two counseling sessions had significantly reduced tooth decay—the average number of surfaces affected by decay was reduced to 2.6 in 2001, down from 9.5 in 1995 (Harrison and Wong 2003). The effectiveness of the British Columbia intervention with parents of 12-month-olds has not been well evaluated. A pilot study conducted in Interior Health does provide support for interventions with parents (Gulliford 2006).

Low-income children who have their first preventive dental visit by age one are less likely to have subsequent restorative or emergency room visits, and their average dental related costs are almost 40 per cent lower over a five-year period than children who receive their first preventative visit after age one (Children's Dental Health Project 2005).

A Cochrane review of a number of studies estimated that fluoride varnishes reduced the caries rate in young people and adolescents by 46 per cent (Marinho et al. 2003). Another Cochrane review found, after 12 months, that sealants reduced caries incidence by 86 per cent depending on the baseline caries rate, whereas the 4-year caries reduction is 57 per cent (Watt 2005). A US Children's Dental Health Project report noted that "sealants... reduce associated treatment costs, especially among high-risk children, where sealants applied to permanent molars have been shown to avert tooth decay over an average of 5-7 years" (Children's Dental Health Project 2005).

Oral Health Action Teams in Glasgow Scotland adopted health promotion initiatives, using interventions such as breakfast clubs, fruit distribution, milk-tokens, free fluoride toothpaste and

facilitated brushing of teeth at preschool and arts and crafts activities—positive results were evident after two years (Blair et al. 2004).

5.4 Surveillance, Assessment and Evaluation of Dental Health

Surveillance and monitoring is necessary to clarify the dental status of British Columbians as well as to identify the needs and priorities of at-risk populations. Accordingly, health authorities should be actively involved in:

- Conducting surveys, and measuring trends in the status of dental health among school-entry children, aged 5-6 years.
- Analyzing dental health data and trends from information available from other sources, such as the Adult Dental Health Survey conducted by the BC Dental Association, Ministry of Health hospitalization data and Canadian health surveys.
- Collaborating with other health professionals in gathering relevant information and identifying needs.
- Establishing an evaluation framework as one component of all dental health programs provided by a health authority.

6.0 BEST PRACTICES FOR DELIVERING A DENTAL PUBLIC HEALTH PROGRAM

There is often no one “best practice” which is generally agreed upon, however, there are practices that may have been successful in other settings and should be considered by health authorities. The terms “promising practices” or “better practices” are often preferred to reflect the evolving and developmental nature of performance improvement. As part of this review, “best” or “promising” practices from other provinces have been considered.

Some best practices and the related research evidence have already been identified in the previous section outlining program components for a dental health program. In summary, those which appear to have effective outcomes are as follows:

- Supporting dental skill-building workshops and providing education materials to health care professionals and care providers.
- Educating, through collaborative measures, families of young children in effective dental practices, particularly parents at risk for having children with dental caries.
- Assessing dental health of young children and providing appropriate preventive care.
- Advocating for fluoridation of public water systems where appropriate.
- Conducting surveys, and measuring trends in the status of dental health among school-entry children, aged 5-6 years.
- Community capacity-building to facilitate partnerships which will enhance dental health promotion and dental health programs.
- Encouraging healthy public policy through collaborative approaches and advocacy with public health and community-based partners.
- Establishing evaluation frameworks as a component of all dental health programs provided by a health authority.

Other more specific “best” practices which have been documented as effective, or which are “promising” practices according to consistent agreement among experts, include the following:

- The use of a research-validated caries-risk assessment tool for infants and children (clinical conditions, environmental characteristics and general health conditions are used to categorize risk and plan prevention interventions) (Watt 2005; American Academy of Pediatric Dentistry 2002).
- The use of counseling techniques such as “motivational interviewing” (this technique has demonstrated positive clinical outcomes in terms of reduced caries) (Weinstein and Harrison 2004).
- Involvement of community dental health educators from specific cultural groups to assist in promoting dental health to those groups (lay health educators from the specific cultural

groups have shown improved oral health outcomes for early childhood caries) (Brodeur et al. 2004 as cited in Federal, Provincial and Territorial Dental Directors 2005).

- Facilitate oral health instruction, and promote access to treatment for periodontal disease, for women at risk for preterm births.³
- A health promotion approach focusing on multiple strategies, targeted to high-risk groups (a health promotion strategy is supported widely in oral health documents from the United Kingdom (Scottish Executive 2004), the United States (US Department of Health and Human Services 2000) and Canada (Federal, Provincial and Territorial Dental Directors 2005). Initiatives could include:
 - Healthy nutrition and safe comforting practices for babies.
 - The use of dental floss, a toothbrush, self-applied fluoride, and so on.
 - Reduction in frequent consumption of fermentable carbohydrates (such as sugary snacks and beverages).
 - Use of mouth-guards, helmets and other protective devices to reduce the incidence of oral trauma.
 - Collaboration with tobacco control programs to increase knowledge and skills in preventing oral problems.
 - Culturally appropriate awareness initiatives, in partnership with Aboriginal people, and people from other cultures, to increase the capacity to enhance dental health.
- Use of a “common risk factor” approach in targeting prevention programs for high-risk populations. For example, Aboriginal preschool children in Sioux Lookout, Ontario experienced both reduced tooth decay and reduced risk of obesity in a program that was targeted to improve both oral health and nutrition (Lawrence et al. 2004).

³ Because of the association between periodontal disease and adverse birth outcomes, Toronto Public Health is recommending teeth cleaning and oral health instruction for at-risk pregnant women.

7.0 INDICATORS, BENCHMARKS AND PERFORMANCE TARGETS

7.1 Introduction

This section presents a number of key indicators or performance measures for a dental health program. It may be that some of the suggested benchmarks can apply across the province, while other benchmarks may need to be modified to account for key variables such as the geographic size, population density of the health authority, and cultural issues. Once there is a set of agreed upon benchmarks, health authorities can use the indicators, benchmarks and performance targets to monitor their own performance and to address any gaps which may exist between the indicators for their regions and the agreed upon benchmarks. It is anticipated that the Ministry of Health will work with health authorities to, over time, develop a greater consensus on key indicators and benchmarks for the dental health program. As well, one or two key performance indicators may be selected to represent overall functioning of the dental health program in the Performance Agreements between the Ministry of Health and health authorities.

It should be noted that, as per the draft Public Health Logic Model, one can develop indicators related to the inputs, activities, outputs and outcomes (immediate, intermediate or final) of the dental health program. Thus, it is not necessary to only have outcome related indicators and benchmarks. Furthermore, it should also be noted that indicators need to be understood within a broader context. For example, a low per capita cost for a dental health program could reflect on the efficiency and effectiveness of the program, or it may reflect a program which is under-resourced. In general, it is best to consider a number of indicators, taken together, before formulating a view about a given dental health program. Indicators and benchmarks work best as flags to indicate a variance from accepted norms and standards. Further investigation is usually required to determine the causes of any given variance from such norms or standards.

It is also important to define what one means by the terms *indicators*, *benchmarks* and *performance targets*. An indicator is a numerical representation of something which is seen to constitute an important reflection of some aspect of a given program or service. Indicators also need to be standardized in some manner so that they can be compared across different organizational entities such as health regions. Benchmarks are essentially also numerical representations. However, they are representations on which there is a consensus, or acceptance, that the representation is reflective of “best” or “better” practices for delivering the service, and thus they represent performance targets or objectives. Benchmarks are determined by: reviewing the literature; reviewing the best practice experience in other jurisdictions; or by determining “consensus” opinion of leading experts and practitioners in the field. Performance targets, on the other hand, are locally determined targets which represent a realistic and achievable improvement in performance for a local health authority.

When no provincial benchmarks are available for a certain program indicator, then it is reasonable for a health authority to determine its own performance target. A health authority could determine its performance target by assessing its current (and perhaps historical) level of performance and then, based on a consideration of local factors (e.g. capacity, resources, new technology, staff training and so on), it could establish a realistic performance target. This performance target would be consistent with the goal of performance improvement but would be

“doable” within a reasonable period of time. Initially, performance targets will be set by health authorities for a number of indicators. However, over time and particularly if consistent data collection methods and definitions are applied, it would be realistic for health authorities to share information related to their performance targets and then develop a consensus with other health authorities to determine a provincial benchmark for these indicators. In other words, locally developed performance targets, over time, could lead to development of additional provincial benchmarks.

7.2 Indicators for Dental Health Promotion

The following table presents some potential indicators, and the definitions of these indicators. In some cases, benchmarks are currently not available but may be determined over time between the Ministry of Health and the health authorities.

Table 1: Indicators for the Dental Health Promotion

Indicator	Definition/Description	Benchmark
1.1 Formal health authority health promotion strategies.	A dental health promotion plan has been: <ul style="list-style-type: none"> • developed (yes/no) • fully implemented (yes/no) • evaluated (yes/no) 	Yes Yes Yes
1.2 Level of knowledge about effective dental practices.	Percentage of the public indicating a moderate or high knowledge about dental practices (from a regularly conducted survey). ⁱ	Benchmark not available
1.3 Level of dental education for allied health professionals.	Number of allied health professionals who have received dental education. ⁱⁱ	Benchmark not available
1.4 Proportion of the health authority population that has access to fluoridated water systems.	Percentage of the health authority population that has access to fluoridated water. ⁱⁱⁱ	Benchmark not available. ^{iv}

- i No data currently available: a survey instrument would be necessary to establish baseline data and health authorities will need to determine reasonable performance targets to increase public knowledge over time.
- ii Data not available: health authorities will need to establish a data collection process and baseline information.
- iii Data available from the Ministry of Environment.
- iv In BC, 3.6 per cent of the population has access to fluoridated water, 78 per cent in Alberta, and over 60 per cent in the United States.

7.3 Indicators for Prevention of Dental Diseases with a Focus on Childhood Dental Diseases

The following table provides some potential indicators on the prevention of dental disease in children. However, it is fully appreciated that there are many factors which contribute to childhood dental disease and its prevention, which are outside the influence of the health authorities. Indicator 2.3 is generally outside the direct influence of the health authorities.

Table 2: Indicators for Prevention of Dental Diseases

Indicator	Definition/Description	Benchmark
2.1 Prevention programs for preschool children.	a) Number of families with infants 18 months old, or younger, who have received dental education/counseling. ⁱ b) Number of preschool children, aged 1-5 years, who have received a complete series of fluoride varnish. ⁱ	Benchmarks not available. ⁱⁱ Benchmark not available. ⁱⁱ
2.2 Proportion of school-entry children receiving dental visual survey/assessment.	Percentage of school-entry children in the health authority, aged 5-6 years, who have been surveyed/assessed.	85% ⁱⁱⁱ
2.3 Level of dental health in health authority school-entry children.	Percentage of school-entry children in the health authority who ^{iv} : <ul style="list-style-type: none"> • are caries-free (no visible decay). • have unmet dental treatment needs. 	60% ^v Less than 20% ^{vi}

- i Where health authorities have data on the total number of families, and preschool children in their region, they may be able to use percentage of families (a), and percentage of preschool children (b), to provide a more meaningful indicator. Data gathered by the Dental Health Program.
- ii Health authorities will need to examine current levels (data gathered by the Dental Health Program) to establish baseline data and future performance targets.
- iii 85 per cent has been discussed by the Ministry of Health and health authorities as a reasonable benchmark.
- iv Data gathered by the Dental Health Program.
- v 60 per cent caries-free is being discussed as a Canadian standard. However, it will be necessary for health authorities to establish the current level, or baseline, of caries-free children, and then to establish appropriate performance measures to achieve the benchmark, or to increase the benchmark (if it has already been achieved).
- vi Less than 20 per cent is recommended by the F/P/T Dental Directors as an appropriate benchmark. However, baseline data will be required to establish the current health authority rate and identify appropriate health authority targets.

7.4 Indicators for Overall Surveillance, Assessment and Evaluation of Dental Health

The following are potential indicators related to the overall surveillance and assessment of dental health status and dental health programs in British Columbia. Information on these factors will provide health authorities with the ability to monitor overall dental health of the population over time, and to identify any usual patterns. It is recognized that many of the indicators are outside the direct influence of the dental programs. Nevertheless, it is important to be informed about dental issues and problems and to provide information which will support dental health planning and program development.

Table 3: Indicators for Surveillance, Assessment and Evaluation of Dental Health

Indicator	Definition/Description	Benchmark
3.1 Overall dental health status of the health authority population.	Percentage of people over 12 years old, residing in the health authority, who ⁱ : a) visit the dentist once a year. b) rate their oral health as “excellent”, “very good”, or “good”. c) have dental insurance. d) did not seek dental care because of cost.	For monitoring purposes.

Core Public Health Functions for BC: Model Core Program Paper
Dental Public Health

Indicator	Definition/Description	Benchmark
3.2 Prevalence of dental procedures requiring general anaesthesia for young children.	Number of children, up to 14 years old, who have had general anaesthesia for dental treatment, in the past year. ⁱⁱ	For monitoring purposes

- i Data available from the biannual Canadian Community Health Survey (Note: these are optional questions that health authorities can choose to have included in the Survey); health authorities will need to document current levels as a baseline for comparing differences over time.
- ii Data available from BC hospitalization records; health authorities will need to document current levels as a baseline for comparing differences over time. This is a broad measure that should be examined closely for relevant information.

Other information that could be collected which would be of interest to health authorities includes: a) prevalence of diabetes in the health authority; b) prevalence of oral cancer in the health authority; c) prevalence of cardiovascular disease in the health authority; and d) prevalence of respiratory disease in the health authority.

Health authorities may use the indicators to identify their “gaps” in service by analyzing their current level of performance (reflected by the indicators), and then determining their performance targets in light of the benchmarks (where these are available) and their specific priorities, available resources and anticipated demands. A ‘gap analysis’ phase is planned following completion of the model core program paper.

This document has identified a number of indicators for consideration by the health authorities. Experts in the field have identified several indicators as the most significant to consider in assessing the overall performance of a dental public health program:

- Number of families with infants 18 months old, or younger, who have received dental education/counseling.
- Percentage of school-entry children in the health authority who are caries-free (no visible decay).

8.0 EXTERNAL CAPACITY AND SUPPORT REQUIREMENTS

8.1 Key Success Factors/System Strategies

The above sections outlined the main components and best practices that health authorities could include in their dental health programs. However, it must be emphasized that successful implementation of an effective dental public health program will also depend on having in place overall system strategies / key success factors. These include:

- Strong support from the board and management of the health authorities regarding the importance of the dental health program in their region and the role it plays in protecting the health of the population.
- Allocation by the health authorities of sufficient resources to meet the priority needs identified in their health improvement plan.
- Well-trained and competent staff with the necessary policies and tools to carry out their work efficiently.
- An information system which provides staff with the support they need, the public with access to dental information, and management with the information it needs to drive good policy and decisions.
- Clear mechanisms of reporting and accountability to the health authority and external bodies.

8.2 Intersectoral Collaboration and Integration/Coordination

Intersectoral collaboration was recognized by the expert group to be important and health authorities are encouraged to take this approach in dental public health. It is important to recognize that an effective dental program can only be implemented with strong collaboration and support from other key groups, including other public health professionals such as public health nurses, infant/child and youth health workers, and social workers. As well, it is important that dental health be integrated into a number of program areas such as nutrition education, diabetes education, chronic disease prevention, tobacco control, Home and Community Care, senior's programs, Pregnancy Outreach Programs, women's centres, childcare programs and programs operated by the Ministry of Child and Family programs. At the federal level, it is important to collaborate with Health Canada and Indian and Northern Affairs Canada in enhancing services to Aboriginal peoples. On the local and regional levels, the important linkages are with school boards, and local service agencies providing support to low income children and families, the homeless, teen parents and other at-risk populations.

8.3 Assessing and Monitoring the Dental Public Health Program

It will be important for health authorities to review their existing information and monitoring systems with respect to integrating and coordinating the measurement and monitoring of performance indicators. It may be necessary to: establish new policies and procedures for some activities to ensure that the necessary records are kept; and plan regular survey or sampling

projects, either individually or in partnership with other health authorities, to assess performance on certain indicators. For example, the level of knowledge about effective dental practices among the public will likely only be available through conducting a survey to gather baseline data, and repeating the survey at a later date to determine any differences over time. Such surveys may be conducted by each region or developed as a joint project.

9.0 CONCLUSION

In addition to outlining the core elements required for a dental public health program, a very important objective of this paper is to support the goal of performance improvement by the health authorities. It is recognized that health authorities will need to consider their capacity, and their current and future environments, when developing these plans and strategies. However, by setting benchmarks and performance targets, and developing plans and strategies to achieve these targets, each health authority will be taking concrete steps towards improvement of their dental public health program.

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**APPENDIX 1: THE EVIDENCE BASE FOR A MODEL CORE PROGRAM
FOR DENTAL PUBLIC HEALTH**

Dental health has been identified as a core program for public health services in British Columbia.

Oral health is essential to the health and well-being of the population and because of its impact on health, the prevention of oral diseases is a core function of public health. Worldwide, there have been overall improvements in the oral health of people living in developed countries over the past 30 years, but inequities have emerged as lower income and socially disadvantaged groups experience disproportionately high levels of oral disease (Petersen 2003). Oral health pertains to the health of the whole mouth, whereas dental health refers to the health of the teeth and gums, with the common diseases of concern in British Columbia being caries and periodontal diseases.

The review of evidence of effective intervention strategies in public health settings found that much of the research has been of poor quality. Interventions that clearly contribute to caries prevention include fluoridation, the use of topical fluorides, and the use of sealants. Early recognition of those who are at risk for dental diseases is essential as dental diseases are usually progressive and cumulative. Recent research literature focuses on a health promotion approach with multiple integrated strategies for the prevention of both caries and periodontal diseases. The impact of poor oral health is seen throughout the body, and strategies that address the common risk factors for chronic diseases will positively affect oral health.

APPENDIX 2: PROGRAM SCHEMATIC - MODEL CORE PROGRAM FOR DENTAL PUBLIC HEALTH

Objective: To substantially reduce preventable chronic dental diseases and promote the highest possible level of dental health for all citizens in British Columbia.

Main Components	Implementation Objectives (Best Practices)	Outputs	Linking Constructs	Short-term Outcomes	Long-term Outcomes
Dental Health Promotion	<ul style="list-style-type: none"> Developing healthy public policy through: <ul style="list-style-type: none"> Advocacy for fluoridation of public water systems. Collaborative approaches and advocacy regarding healthy food policies, food action plans, tobacco control, injury prevention and chronic disease prevention. Create supportive environments: <ul style="list-style-type: none"> Support dental skill-building workshops and provide educational materials for health and family care professionals. Encourage the integration of dental training into the education, standards and accreditation process for allied health professionals. Develop personal skills: <ul style="list-style-type: none"> Educate parents in effective dental practices through collaborative approaches. Provide public information resources on dental health practices. Strengthen community action: <ul style="list-style-type: none"> Establish partnerships with community health and social service programs/ agencies to promote dental health as one component of healthy lifestyles initiatives and chronic disease prevention. Community capacity-building among local organizations to facilitate the development of dental services/programs. 	<ul style="list-style-type: none"> Advocacy for dental policies and fluoridated water. Number of dental skill-building workshops provided to health and family care professionals. Number of educational resources provided to individuals and groups. Partnerships with other public health programs and community agencies. 	<ul style="list-style-type: none"> Increased input into policy decision-making processes and actions plans. Improved public knowledge about good dental practices. Increased knowledge and support from allied health professionals. Strengthened community partnerships for dental health promotion. 	<ul style="list-style-type: none"> Enhanced dental health for low-income, at-risk populations. Increased ability to integrate dental health information into daily dental practices. Increased dental health education/support/promotion through partner programs and agencies. 	Reduced incidence of dental caries and periodontal disease
Prevention of Dental Diseases	<ul style="list-style-type: none"> Identify families at risk for having children with dental caries to identify needs and provide one-to-one parent education. Assess dental risk (ranging from surveying to screening) of young children. Apply fluoride varnish, and sealants, as appropriate. Collaborate in social marketing campaigns targeted to improving children's dental practices. Partner with schools, child care centres, community groups and other stakeholders to raise awareness and develop action plans for promoting effective childhood dental practices. 	<ul style="list-style-type: none"> Number of school-entry children who have been assessed. Number of children receiving a complete series of fluoride varnishes. Number of school-entry children who are caries-free, or need treatment. 	<ul style="list-style-type: none"> Increased level of parent education and preventive services for children. Increased awareness about effective child dental practices. 	<ul style="list-style-type: none"> Reduced level of dental caries among children 	Improved population health.
Surveillance, Assessment and Evaluation	<ul style="list-style-type: none"> Conduct surveys and measure trends over time among school-entry children. Analyze dental health data and trends from information available from other sources. Establish an evaluation framework as one component of all dental health programs. 	<ul style="list-style-type: none"> Number of program reviews/evaluations. Number of chronic diseases associated with dental health. 	<ul style="list-style-type: none"> Improved analysis of early childhood dental health and dental programs 	<ul style="list-style-type: none"> Increased ability to take corrective action and improve effectiveness 	