



BRUSHING UP ON ORAL HEALTH

NORTHWEST TERRITORIES 2014



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EXECUTIVE SUMMARY

Health Canada and the Public Health Agency of Canada have recently noted that, in the North, “Oral health outcomes are alarmingly poor.” Statistics confirm that First Nations and Inuit oral health status is two to three times worse than that of the general Canadian population.

Poor oral health negatively impacts the lives of children and youth in the Northwest Territories. These impacts extend into adulthood and consume system resources. However, by providing timely access to oral health care and preventing oral disease, great improvements can be made to the quality of life of children and youth, while helping to conserve government resources.

Arguably, oral disease represents a preventable burden, and is one that requires immediate attention. This represents a major challenge given that the Northwest Territories is a poorly resourced environment. Demand far exceeds scarce resources and there is a limited and ever-diminishing pool of oral health care providers. Nonetheless, while there is a significant need for timely, accessible treatment, leaders also recognize that a treatment approach is only a part of the solution. And, when developing programs for children and youth in the Northwest Territories, oral health must be conceived as general health, and requires the same approaches to disease prevention and health promotion.

This report outlines a vision for the Northwest Territories to restore oral health among children and youth through effective public policy, healthy choices, and evidence-based care. A critical and creative approach is presented to achieve this vision, recognizing that to reproduce the status quo, regardless of political, economic, and operational feasibility, is simply not enough. This new approach must be based in evidence and will require re-envisioning how oral health care is funded, delivered, planned and evaluated in the Territories. Regardless of how difficult these changes may be, there is confidence that, if adopted, major improvements can be achieved to the benefit of children and youth, their families, and their communities.

Re-envisioning the Funding Envelope

Can the Northwest Territories ‘do more with what it already has?’ We believe it can. This will require leadership, a focus on prevention and timely, accessible treatment, positioning oral health in terms of general health, and negotiating with funding sources to restructure how resources flow into the Territories.

Actions

1. Engage Federal authorities and re-envision the funding of oral health care within the Northwest Territories.
2. Create an ‘oral health’ funding envelope that funds all activities, including oral health contributions to relevant health and wellness programs.

Re-envisioning Service Delivery

Given the constant pressure and demand for care in the Northwest Territories, re-envisioning service delivery is complex but is essential. This should involve transitioning from a clinical approach to oral health programming to a public health approach providing timely, accessible care and which privileges prevention.

Actions

1. Transition from a clinical approach to oral health programming to a public health approach providing timely, accessible care and which privileges prevention.
2. Create consistent messaging for leadership about how oral health impacts general health, and that oral health is health.
3. Explore the fluoridation of all community water supplies and where this is not possible, explore salt and/or milk fluoridation.
4. Restructure programming along the lines of the common risk factor and integrated care approach, and dovetail oral health wherever possible into health and wellness programs.
5. Explore the screening, triaging, and provision of fluoride varnish by non-oral health providers.
6. Explore the use of oral health teams and new ways of remunerating oral health providers to incentivize evidence-based care.

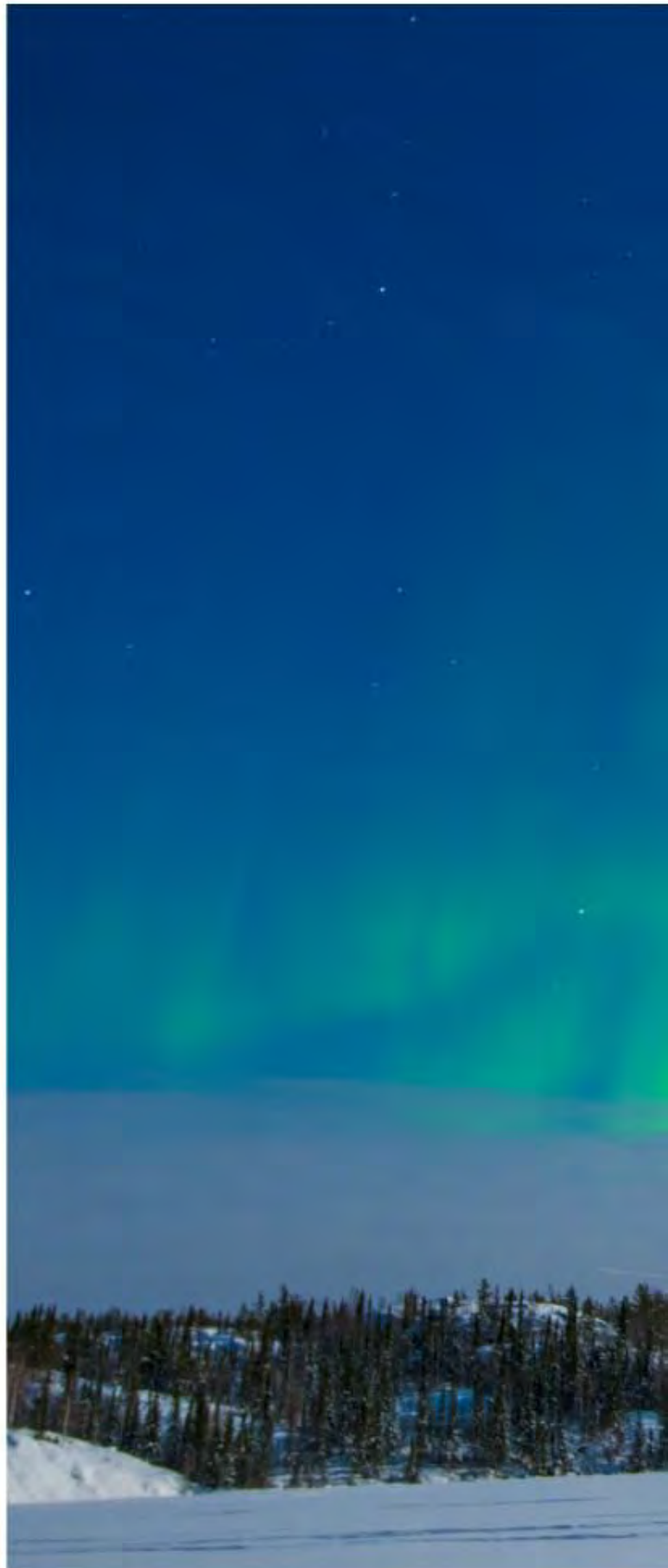
Re-Envisioning Program Planning and Evaluation

Re-envisioning funding and service delivery must be accompanied by a new approach to program planning and evaluation. All program planning must engage community leadership from the initial stages, as well as those involved in the programming, from administrators and providers to the clients. Similarly, evaluation of programming must evaluate outcomes that are relevant and meaningful to those that administer, provide, and receive the care.

Actions

1. Establish an Oral Health Director or Chief Oral Health Officer position for the Northwest Territories.
2. Develop clear program logic models that incorporate evidence and involve all key stakeholders at the initial stage.
3. Structure the evaluation of programming as part of the planning and implementation cycle, and measure outcomes that are relevant to communities, administrators, providers, and clients.

What is needed now are the ‘champions’ that can help steward the change that is needed. Recall that in much the same way that teeth can re-mineralize at the early stages of decay, so too can people in the Northwest Territories restore oral health with effective public policy, healthy choices, and evidence-based care.





INTRODUCTION & BACKGROUND

What is The Problem?

Health Canada and the Public Health Agency of Canada (2013) recently noted that, in the territories, “oral health outcomes are alarmingly poor.” First Nations and Inuit oral health status is two to three times worse than that of the general Canadian population.¹ Most would agree that First Nations and Inuit communities experience some of the highest oral disease burdens in the country, which in the Territories is further compounded by geographical isolation, and social and economic contexts that affect impacts dental treatment could make.

Nevertheless, in theory, oral disease represents a wholly preventable burden, and one that requires immediate attention. This represents a major challenge given that the Northwest Territories (“NWT”) is a poorly resourced environment. Demand exceeds scarce resources. It is also experiencing a limited and ever-diminishing pool of dental providers, and while many emphasize the significant need for treatment, leaders also recognize that a treatment approach is only a part of the solution. Moreover, there are limited policy and program levers available to Territorial authorities, particularly in the context of the fiduciary relationships between the federal government and First Nations, Inuit, and Métis populations.

Burden of Oral Disease in the Northwest Territories

The recent Canadian Health Measures Survey, First Nations Oral Health Survey, and Inuit Oral Health Survey, confirm the significant burden that oral disease places on communities in the Northwest Territories.² Unfortunately, no data is available for Métis communities, yet it is reasonable to assume that many of the same issues exist.

For example, as shown in Table 1, among First Nations and Inuit children aged 3-5 years that were surveyed, the great majority experienced tooth decay in their deciduous dentition (baby teeth), and had an average of seven to eight decayed, missing, or filled teeth (out of a potential 20), and, anywhere between a third to one-half of the decayed teeth remained untreated.

A similar situation is shown in Tables 2, 3, and 4, where among those First Nations and Inuit children and adolescents that were surveyed, almost all had experienced tooth decay in their deciduous and/or adult teeth, and approximately 20% of their decayed teeth remained untreated.

Importantly, when compared to other Canadian children of the same age, it is clear how much more significant and severe the situation actually is.

¹ Health Canada 2011, 2010; First Nations Information Governance Centre, 2011.

² Health Canada 2011, 2010; First Nations Information Governance Centre, 2011.

Table 1. Caries – Children Aged 3-5 Years ³

Indicator	First Nations	Inuit
Prevalence of decay	86%	85%
Mean dmft	7.62	8.22
Untreated caries: Prevalence	35%	49%
Untreated caries: Severity (d/dmft)	2.68	4.06

dmft / DMFT / (decayed, missing, or filled teeth). The lower case represents primary teeth, while the upper case represents permanent teeth.

Table 2. Caries – Children Aged 6-11 Years ³

Indicator		Canadian	First Nations	Inuit
Prevalence	dmft	48%	80%	71%
	DMFT	24%	67%	60%
	dmft + DMFT	57%	94%	93%
Severity (mean)	dmft	1.99	5.23	5.08
	DMFT	0.49	1.87	2.01
	dmft + DMFT	2.48	6.58	7.08

³ Health Canada. Report on the Findings of the Oral Health Component of the Canadian Health Measures Survey 2007-2009; Minister of Health, Government of Canada, 2010; Health Canada. Technical Report on the Inuit Oral Health Survey 2008-2009; Minister of Health, Government of Canada, 2011; First Nations Information Governance Centre. First Nations Oral Health Survey (FNQHS) 2009-2010 summary report, 2011.

⁴ Health Canada. Report on the Findings of the Oral Health Component of the Canadian Health Measures Survey 2007-2009; Minister of Health, Government of Canada, 2010; Health Canada. Technical Report on the Inuit Oral Health Survey 2008-2009; Minister of Health, Government of Canada, 2011; First Nations Information Governance Centre. First Nations Oral Health Survey (FNQHS) 2009-2010 summary report, 2011.

Table 3. Untreated Caries – Children Aged 6-11 Years ³

Indicator	Canadian	First Nations	Inuit
Average d	0.28	0.59	0.99
Average D	0.08	0.57	1.28
Average d + D	0.36	1.10	2.28

Table 4. Untreated Caries & Decay – Adolescents Aged 12-19 Years ⁵

Indicator	Canadian	First Nations	Inuit
Mean DMFT	2.49	6.15	9.49
Number of Untreated Decayed Teeth	0.37	1.41	3.61

⁵ Health Canada. Report on the Findings of the Oral Health Component of the Canadian Health Measures Survey 2007-2009; Minister of Health, Government of Canada, 2010; Health Canada. Technical Report on the Inuit Oral Health Survey 2008-2009; Minister of Health, Government of Canada, 2011; First Nations Information Governance Centre. First Nations Oral Health Survey (FNQHS) 2009-2010 summary report, 2011.

⁶ Health Canada. Report on the Findings of the Oral Health Component of the Canadian Health Measures Survey 2007-2009; Minister of Health, Government of Canada, 2010; Health Canada. Technical Report on the Inuit Oral Health Survey 2008-2009; Minister of Health, Government of Canada, 2011; First Nations Information Governance Centre. First Nations Oral Health Survey (FNQHS) 2009-2010 summary report, 2011.



Clinical levels of disease only highlight a portion of the story. When looking at self-reported outcomes, similar gaps are seen between First Nations and Inuit populations and their Canadian counterparts. Table 5 demonstrates lower levels of visiting a dentist, poorer levels of oral health, and higher levels of avoiding food because of pain. Interestingly, when compared to the national average, First Nations and Inuit populations reported fewer cost-barriers to dental care,

likely because of the coverage offered by the federal Non- Insured Health Benefits (NIHB) program. Nevertheless, in the Territories, when compounded by geographical isolation, where care is often not available, access is more than just an issue of affordability, and is dominated by issues of geographical access. This demonstrates the important point that, under current conditions, oral health care cannot alleviate all of oral health issues in territorial populations.

Table 5. Self-Reported Outcomes¹

Indicator	Canadians Aged 6-79 years	First Nations Aged 12-79 years	Inuit Aged 3 & over
Visiting a Dentist in the last year	74%	60%	50%
Oral Health is Good/Excellent	84%	50%	65%
Avoid food because of pain in mouth/teeth	12%	40%	30%
Oral pain in the last year	12%	33%	30%
Avoid visiting a Dentist because of cost	17%	6%	4%

¹ Health Canada. Report on the Findings of the Oral Health Component of the Canadian Health Measures Survey, 2007-2009. Minister of Health, Government of Canada, 2010. Health Canada. Technical Report on the Inuit Oral Health Survey 2008-2009. Minister of Health, Government of Canada, 2011. First Nations Information Governance Centre. First Nations Oral Health Survey (FNOHS) 2009-2010 summary report, 2011.



In this regard, numerous factors influence oral health, chief among them being individual oral health behaviour, as well as simple clinical preventive modalities. As shown in Table 6, First Nations and Inuit populations report brushing and flossing their teeth less than the general Canadian population. Similarly though, they do not benefit from dental sealants (a well known and proven clinical preventive therapy) to

the extent that other Canadians do. This report will review the evidence surrounding community-level and clinical preventive therapies below, but it is important to note that it is in the application of these proven, and often cost-effective therapies, that many gains can be made in the oral health of territorial populations.

Table 6. Preventive Behaviours & Modalities^a

Indicator	Canadians Aged 6-79 years	First Nations Aged 12-79 years	Inuit Aged 3 & over
Brush at least twice a day	73%	55%	42%
Floss at least five times per week	28%	25%	36%
Sealants (Children Aged 6-11)	32% Mean 2.88	21% Mean 2.15	Too low to report
Sealants (Adolescents Aged 12-19)	51% Mean 3.51	27% Mean 3.06	Too low to report

^aHealth Canada. Report on the Findings of the Oral Health Component of the Canadian Health Measures Survey 2007-2009. Minister of Health, Government of Canada, 2010; Health Canada Technical Report on the Inuit Oral Health Survey 2008-2009 Minister of Health, Government of Canada, 2011; First Nations Information Governance Centre First Nations Oral Health Survey (FNOHS) 2009-2010 summary report, 2011



Impacts of Poor Oral Health and the Benefits of Oral Health Care

Descriptions have been provided with respect to the oral health and oral health care inequalities that exist among First Nations and Inuit populations, presumed to be present for Métis populations as well. It is therefore important to establish the impacts that these problems have on individuals and communities. Nonetheless, it is also important to review the potential benefits of providing timely access to oral health care, all of which are provided below.

In children, Jürgensen et al. (2009) showed that active dental caries and total dental caries experience is associated with toothache, missing school, and impairments to daily life activities (eating, smiling and sleeping). Blumenshine et al. (2008) demonstrated that children with both poor oral and general health are more than twice as likely as those without these problems to report poor school performance. Similarly, Jackson et al. (2011) showed that children with poor oral health are nearly three times more likely to miss school as a result of dental pain than those with good oral health.

Ultimately, these authors found that oral health status is associated with performance independent of any dental pain, meaning that as an end-point, pain is the extreme, with the threshold for impacts being much earlier when experiencing poor oral health.

Agou et al. (2008) showed that even malocclusion (ie. the way teeth and jaws bite together) has quality of life impacts on children, and more specifically, on children with low self-esteem. Using the same data, Locker (2007) demonstrated that the worse the quality of life impact, the greater the effect on children of lower socioeconomic status. Locker (2009) also later found that income inequalities in oral health related quality of life outcomes remained after accounting for differences in levels of oral disease. All of this implies that treating oral disease, especially among socioeconomically vulnerable populations, has the potential to decrease burdens such as time lost from school and improved learning in children, and move individuals towards better health and psychological gains.

The impacts of poor oral health and the benefits of access to timely oral health care also extend into adulthood. For example, in terms of productivity, McGrath et al. (2003) found that among those with dental infection, one in five reported that they had to take time off work or study because of these problems. Quiñonez et al. (2011) found that employed, low income Canadians who reported chronic painful aching in their mouths were more likely than those without such pain to have experienced a disability day (staying in bed, not working or engaging in normal activity).



Such issues are found to have systemic impacts as well. Governments and health care systems are affected by inefficient and ineffective allocation of resources when it comes to populations with poor oral health. Recent Canadian work has demonstrated the influence of poor access to oral health care on the health care system through the use of hospital emergency departments for dental conditions that are most effectively treated in regular oral health care settings.⁹ This is an allocation issue, and one that extends to the use of physician offices as well.¹⁰ Whatever the case may be, if hospitalization occurs, costs are extreme, and the pathway associated with this endpoint consumes societal resources not meant for oral health care which can be used for other illnesses best treated in hospital settings.

Importantly, the benefits of quality oral health care can start very early. In a study among Medicaid-enrolled children in the United States, those children who had their first preventive dental visit before they were two years old were more likely to have subsequent preventive visits.¹¹ They were less likely to have subsequent restorative or emergency visits compared to children who had their first preventive visit at the age of two or three years. The average dental-related costs for children who had received preventive care before two years of age were approximately one-half of the costs for children who had received their first preventive care at three to four years of age.

Locker (2001) also showed that dental treatment has a marked effect on self-perceived oral health. Following approximately 900 people over a three-year period, he found that those who reported their oral health as improving were far more likely to have made dental visits and received dental services. Other benefits of treatment included self-reported improvements in the ability to chew food, to maintain a nutritious diet, to socialize, to be free of pain and ultimately to function successfully in daily life.

It is clear that poor oral health negatively impacts the lives of children and youth in the Northwest Territories. These impacts can extend into adulthood, and consume system resources that are best used for other conditions. Most importantly, providing timely access to care, and better yet, preventing these conditions from the very beginning, has the potential to greatly improve the quality of life of these children and youth, and ultimately has the potential to conserve government resources over the long-term.

9 Quiñonez et al., 2009.

10 Quiñonez et al., 2011.

11 Savage et al., 2004.

Oral Health as General Health

At present, there is a significant amount of research being performed on the links between oral and general health, covering such relationships as those between periodontal (gum) disease and diabetes, gum disease and cardiovascular disease, gum disease and childbirth outcomes, and gum disease and pneumonia. The nature of many of these relationships remains to be clarified, although the evidence for causal relationships between gum disease and diabetic control, and between gum disease and aspiration pneumonia is strong.

For example, Yoneyama et al. (2002) showed that by providing oral care in long-term care settings, the risk of developing aspiration pneumonia is reduced. They found that patients receiving oral care had fewer febrile days than patients not receiving oral care, and that the removal of latent oral infections could reduce the incidence of lower respiratory tract infection. The findings of this single study have been confirmed by those of a systematic review on the benefits of routine oral care in the prevention of aspiration pneumonia.¹²

In another important domain, a 2010 Cochrane review assessed seven randomized controlled trials on the treatment of periodontal disease for glycemic control. It concluded that periodontal therapy in individuals with diabetes helped to improve glycemic control and the subsequent management of diabetes.¹³ It further recommended that periodontal therapy should be part of routine diabetes management.

In 2004, D’Aiuto et al. investigated the outcomes of periodontal therapy on changes in cardiovascular disease risk. A total of 94 participants with severe periodontal disease received non-surgical periodontal therapy, and results showed that participants who responded to periodontal treatment were four times more likely to reduce their cardiovascular risk category. Elter et al. (2006) also discovered a decrease in inflammatory biomarkers plus improved brachial artery blood flow after 22 patients with periodontal disease were treated with scaling and root planing and periodontal surgery.

Seinost et al. (2005) compared 30 individuals with severe periodontal disease with 31 healthy controls before and after non-surgical periodontal therapy interventions. Results showed that periodontitis patients with favourable clinical responses to therapy exhibited substantial improvements in flow-mediated dilation of the brachial artery and reductions in inflammatory biomarkers. Most recently, using survey data prospectively linked to administrative data, de Oliveira et al. (2010) reported that those who reported poor oral hygiene (never/rarely brushed their teeth) had 1. Fold increased risk of a cardiovascular disease event (heart attack or stroke).

Apart from this, poor oral health is also causally linked to chronic pain, poor nutrition, impaired learning, persistent infection, and is strongly associated with arthritis and dementia.¹⁴ People with poor oral health can suffer from reduced dignity, self-respect, employability and social connectedness, all of which have major health implications.¹⁵

In short, the case is so strong that there is really no reason to consider oral and general health separately: health is health.

This means that “oral health” is simply a phrase used by dental professionals to describe their domain of health care, just as psychiatrists use “mental health,” and other health professionals use similar phrases to demarcate their expertise. While this is legitimate in some contexts, it emphasizes an approach focused on domains of expertise rather than a complete approach to the understanding of health and illness. Fundamentally, however, the oral illnesses experienced by territorial populations are a manifestation of chronic exposure to a number of unhealthy factors – tobacco consumption, unhealthy diet, excessive alcohol consumption, the chronic stress of poverty and work insecurity, and challenging family and community environments. Ultimately, in developing programs for children and youth in the Northwest Territories, and from an aetiological perspective and hence in terms of prevention, oral health is general health and requires the same approaches.

¹² van der Maarel-Wierink et al., 2012.

¹³ Simpson et al., 2010.

¹⁴ Josphipura and Dietrich, 2009; Michalowicz et al., 2006; Nicolau et al., 2003; Noble et al., 2009; Sheiham, 2006.

¹⁵ Benyamini et al., 2004; Bedos et al., 2009; Watt, 2007.



Table 7. Decomposition of Factors Explaining the Concentration of Oral Health Outcomes in Adults in Poverty Living in Canada ^{1a}

	Socioeconomic Status	Access to Oral Health Care	Oral Health Behaviours	Total Inequality^{1a}
	% contribution	% contribution	% contribution	Concentration Index
Decayed teeth	32% ^b	45.1%	4.1%	-0.248
Missing teeth	51.4%	18.4%	4.1%	-0.158
Oral pain	49.6%	38.2%	5.3%	-0.131
Filled teeth	37.3%	12.6%	6.4%	0.069

^{1a} Inequality (The Concentration Index) is adjusted for age, sex, racial background, country of birth.

^b The percentage figure in each cell indicates the extent to which socioeconomic, access and behavioural factors contribute towards the total inequality in that disease or health indicator. Percentages in a row do not summate to 100%, indicating that they explain less than 100% of inequalities. The rest of inequalities are due to other factors contributing to the inequality that were not measured and addressed in the analyses.

^{1b} Analyses of Canadian Health Measures Survey data.

Geographical, Social and Economic Context

As shown in Table 5, above, when compared to the national average, First Nations and Inuit populations reported fewer cost-barriers to dental care. Again, this is likely because of the coverage offered by the federal NIHB program. Yet, as also mentioned, when compounded by geographical isolation, access is more than just an issue of affordability, and is more likely dominated by issues of geographical access. This demonstrates that unique and creative opportunities will need to be explored in order to provide care in the isolated regions of the Northwest Territories. These opportunities will be reviewed below, but for now, it is once again important to stress that dental care alone cannot alleviate all oral health issues in territorial populations.

In this regard, another important consideration to understand is that social and economic contexts often trump dental treatment in terms of its ability to alleviate existing oral disease burdens. An explanation of this is found in Table 7, below, which demonstrates the factors that explain the concentration of oral health outcomes in Canadian adults.

The Concentration Index is used, which is a way to measure, or quantify, the gap between the ‘rich and poor’ in terms of such things as decayed, missing, or filled teeth. A negative value indicates that the outcomes concentrate in the poor, while a positive value indicates that they concentrate in the rich. What is important to observe is that in decayed teeth, for example, only 4.1% of the gap between the rich and poor is explained by oral health behaviours like brushing and flossing. This means that for governments focused on decreasing inequalities, investments made to improve access to oral health care and factors that improve socioeconomic status may be more effective than those made with respect to oral health education. This point cannot be made strongly enough, as it is common for policy and program stakeholders to call for improvements in personal health behaviours, often through efforts in oral health education and nutrition. Yet, again, if appreciable differences are to be made, improving the social and economic conditions of communities in the Northwest Territories will support significant improvements in the oral health of children and youth over the long-term.



Aboriginal Oral Health and Oral Health Care in Context

Why is the oral health of Aboriginal people so poor in comparison to the general Canadian population? Why do they report less visits to the dentist within the last year, yet do not report cost as a barrier as often as the general population? To some extent, the answers are relatively straightforward: the determinants of oral health and disease and oral health care utilization among Aboriginal people are the same as for any group experiencing the effects of poverty and social marginalization. Additionally, many Aboriginal groups live in isolated areas, thus oral health care is not readily available, yet if it is available, and if they are eligible, they are insured for oral health care through the federal NIHB program, the NWT Métis Health Benefit Program, or through employment supplementary health benefit programs.

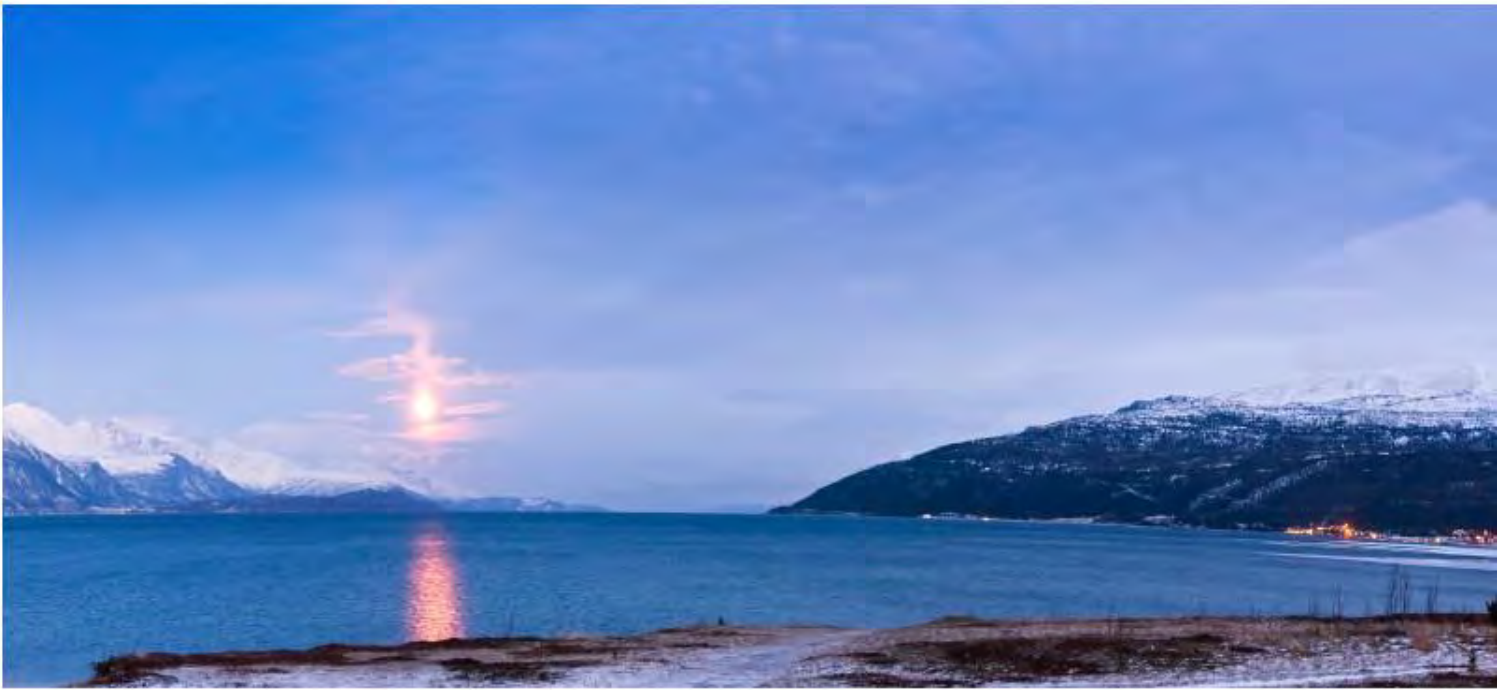
Nevertheless, unlike all other Canadian populations, in terms of their history, there are specific and unique challenges associated with being an eligible Aboriginal individual when it comes to accessing health services, including oral health care. To understand this, it is important to consider the history of the NIHB program and Aboriginal health services policy in Canada. In this regard, the Auditor General of Canada (1993) described the NIHB program as ‘evolving gradually.’ More importantly, she described them in a very specific governance and political context:

“The provincial and territorial governments are primarily responsible for the delivery of health care [in Canada]. Some provinces have included [Aboriginal populations] in programs [but] others have not. [These] governments consider that the federal government should accept full responsibility for

[Aboriginal populations]. The federal government considers that all residents of a province are entitled to provincial health services, including [Aboriginal populations]. It maintains that [its] provision of health services to [Aboriginal populations] is based on policy and not on treaty or other legal obligations. Most [Aboriginal groups] generally consider that all necessary health services must be provided to them under Aboriginal and treaty rights [and] represent a fiduciary obligation owed by the [federal] Crown.”

In short, since the 1970s, the Federal Government’s policy is to provide the NIHB program relative to the significant need of eligible Aboriginal populations, and more recently, as a payer of last resort,’ meaning that if any other private or public insurance is present, that insurance must carry the bulk of the expenditure.

By the 1990s though, with significant cost overruns, the Federal Government ushered in the ‘envelope environment,’ where freedoms to structure programming were introduced as a response to Aboriginal pressures for self-determination and self-government, yet where eligibility criteria became more stringent, and where no new money could flow beyond a fixed financial ceiling. This made it difficult for territorial governments, as programs were significantly challenged in the face of such controls. NIHB services were often made available to all community members in the territories, irrespective of their eligibility at the federal level. Further, costs were naturally inflationary, as they were driven by factors such as geographic isolation, high medical need, and a very young population.



Another of the defining factors associated with territorial experience with the NIHB program is the program's structure. For example, the use of private sector firms for everything from service delivery to claims processing speaks to the complex nature of the NIHB program. The program remains with gaps in the definitions of its purpose, expected results and outcomes. So not only is the program caught up in debates about Aboriginal rights and jurisdictional responsibilities, there also remains a general confusion as to what exactly the program is accomplishing:

“So whereas a health program might have objectives defined in terms of improving health status, a health insurance plan would have as its objective to provide coverage, up to pre-determined limits, for specified medically required services and products. The auditors found that, in practice, the program is managed more as an insurance plan [...] [al] though the premiums, deductibles and co-payment provisions commonly found in health insurance plans are absent in this program.”¹⁷

¹⁷ Auditor General of Canada, 1993.

¹⁸ Quiñonez and Lavoie, 2009.

The consequences of this for a sustainable dental care program in the Northwest Territories is imminent, similarly expressed succinctly, as follows:

“Look, [NIHB] is one of the only programs that you fund. You bill it but you fund as well, so the more you bill the more you fund. And insurance companies aren't like that. Insurance companies will levy a premium if they haven't got enough money, they'll up the premium so everyone pays more the next year anyway. That's the message we have to get through, that's a hard message to get through because [stakeholders] don't want to hear it.”¹⁸

In short, it appears that the NIHB service and policy environment is immediately met by the challenges of federal cost-containment measures, where the major impetus for programmatic success is diametrically opposed to the goals of the program's many service providers, their activities within private health markets, and the territorial effort to expand access to care. Any program aimed at improving the oral health of children and youth in the Northwest Territories will have to take this political history into consideration, as no discussion on funding, organizing, or rethinking models of service delivery can be had without its influence.

Models of Care

Visiting Dentist, Dental Teams and Hospital Care

Oral health care delivery in the Northwest Territories has generally been organized around contracted itinerant visits made by dentists and dental teams. The historical service delivery model involves a dentist and dental assistant, often paid on a fee for service basis by the NIHB program, but on occasion on a salary or sessional basis, sometimes working in conjunction with a visiting or resident salaried dental therapist. They provide care over a short time period and over long hours, in community health centres or school dental clinics. In unique situations, salaried or fee for service denturists and dental hygienists have become involved, either as part of a separate visit, or as part of the activities of the dentist and dental assistant, or very rarely, as part of the activities of the visiting or resident dental therapist. Whatever the case may be, care is rarely organized from the perspective of triaging (assessing risk and need prior to the dental visit in order to maximize treatment benefit – to be reviewed below).

In other cases, nurse practitioners, physicians, and community health workers are also involved, specifically with organizing care in regional hospitals for those children and youth requiring operating room care.

Ultimately though, it is this overall approach to service delivery that needs to be re-envisioned under current fiscal and human resource constraints, and in order to maximize the prevention of oral diseases, minimize their health burden and costs, and maximize the quality of life of children and youth and their communities.

Resident Dental Therapists

An important historical service delivery model involves the resident dental therapist. In Canada, the dental therapist was the first allied dental practitioner used en masse to attempt an alternative mode of oral health care financing and delivery for targeted groups. Beginning in 1971, and extending out of recommendations from the 1964 Royal Commission on Health Services, the Federal and Territorial Governments, and two Provincial Governments, namely, Saskatchewan and Manitoba, came to recruit, train, and employ this practitioner. Trained at the community college level, dental therapists delivered individual and community-based prevention, and provided treatment for children and some emergency care to adults.



Dental therapists came to experience great success with federal and territorial authorities, and with the Saskatchewan Dental Health Plan and the Manitoba Children's Dental Program. Their effectiveness was well documented over the 1970s and 1980s, putting to rest professional criticisms on productivity and quality. For example, taking into account training, employment costs, and the annual value of services provided by dental therapists, one dental therapy position would pay for itself, at minimum, in 2.2 years. In fact, a cohort of four consecutive graduating classes paid for themselves in 3.5 years. Further, when compared to dentists in the same region, dental therapists were shown to have significantly higher mean quality level scores across basic restorative services, and when controlling for complexity, quality continued to favour the dental therapist. Finally, from 1974 to 1980, the Saskatchewan Dental Health Plan was credited with controlling dental caries amongst the province's youth by reducing its incidence approximately 25%.¹⁹

Yet, by the mid to late 1980s, due to the increasing fiscal concerns of governments, public financing for oral health care was in significant decline. In this environment, private professional challenges took hold, particularly with conservative governments in power at the federal level and in Saskatchewan and Manitoba. As a result, dental therapists began to experience unstable work environments. More recently, Saskatchewan dentists have begun to hire dental therapists in their private practices, which has resulted in a general exodus of dental therapists from territorial and federal programs. Further, with the recent closing of the only dental therapy training program in Canada, dental therapy numbers have significantly waned from their original numbers.

¹⁹ Quiñonez and Locker, 2008.



Canadian Models

Dental service delivery models in Canada are quite limited.²⁰ The dominant and most prevalent treatment model is the private practice, fee for service model, led by a specialist or generalist dentist, employing dental assistants and dental hygienists. There exist independently practicing denturists and dental hygienists, also on a fee for service basis, but these are small relative to the complement of private dental clinics. Importantly, some specialists and generalists practice in hospital and public clinic settings, but this is also minor compared to the dominant model. So, while there are a few salaried and sessional providers, again, most service delivery is structured on a fee for service basis.

Public subsidies for oral health care are also structured on the dominant model; meaning public funds are distributed in terms of insurance schemes aimed at treatment services. In this regard, most publicly financed dental care programs function as insurance schemes, much like the NIHB program, where treatment is delivered in private dental clinics on a fee for service basis, with the individual responsible for seeking out care. There are very few government owned, public clinics, whether in a community or school-based setting, and even fewer clinics associated with the non-governmental community health sector.

Across the provinces, these public insurance schemes vary based on eligibility, age, and cost sharing arrangements. They can be universal for certain age groups, such as in Québec (less than 10 years of age), Newfoundland and Labrador (less

than 12 years of age), Nova Scotia (less than 10 years of age), and Prince Edward Island (3 to 16 years of age). They can be targeted to children based on parents who are covered by social assistance programs, which is present in all Canadian provinces. They can be targeted based on age and need, such as Ontario's Children In Need of Treatment Program, which targets children and youth less than 17 years of age who require care and whose family reports a financial barrier to care. Targeted subsidies are also present for children and youth with disabilities, for those who are wards of the state, and for those requiring surgical-dental services delivered in hospitals.

Cost-sharing arrangements can also be present. This can involve the funders, such as in the coordination of dental benefits if a provincial and federal program covers a child simultaneously. This can also involve patients in terms of registration fees, or co-payments based on the total amount of care received or for specific services.

In terms of prevention, most provinces have public dental care programs that target prenatal and postnatal mothers, as well as at-risk children and youth. This often involves screenings and the delivery of oral health education and evidence-based preventive therapies (eg. fluoride varnish). These activities generally take place in community clinics or in schools.

²⁰ Quiñonez et al., 2007.



International Models

In terms of treatment models, the international context is surprisingly similar to Canada. Differences centre on workforce mix, the public share of total dental care expenditure, and payment mechanisms. In northern European countries, for example, dentists deliver most of the care, and there is a robust, salaried public dental service organized through community clinics for children. In New Zealand and Australia, salaried dental therapists and dental nurses deliver a significant amount of care to children, mostly through school-based clinics. International models will again be revisited when discussing how preventive services can be delivered.

Dental Therapy Models

The use of dental therapists began in New Zealand in 1921. Globally, it is reported that 54 countries use dental therapists, often in school-based programs, most of which are part of the British Commonwealth. The most recent activity around dental therapists is their use in the United States. In the United States, the Alaska Native Tribal Health Consortium introduced dental therapists in 2005. In 2009, the state of Minnesota authorized the training and practice of dental therapy, with the first dental therapists entering practice in 2011. Training generally involves a two to four year curriculum either at the college level or in partnership with a university. Most countries focus care in the public sector and for school children, although some adult care is provided in some countries, as well as in private settings. Dental therapist's scope of practice is similar in most countries and includes basic services, whether preventive or treatment oriented. Extensive reviews internationally suggest that dental therapists provide safe, technically competent and effective care for the populations they are trained to treat, and improve access to care.²¹

School-based Models

School-based models provide a unique opportunity to deliver care, as the service population is in one place during well-established hours. There are various models that can be employed, and they essentially vary based on whether dentists and/or dental therapists and/or dental hygienists are employed, and whether the programs are integrated into larger health and social services programs. Here again, there is a choice between paying providers on a salaried, sessional, or fee for service basis, and/or structuring care within larger health and wellness programs.

Alaska Dental Health Aide Model

The Dental Health Aide (DHA) Initiative was introduced under the federally sanctioned Community Health Aide Program in Alaska.²² These oral health team members work with Tribal Health Organization contracted dentists and hygienists to provide education, prevention and basic restorative services in a culturally appropriate manner. The DHA Initiative introduced four oral health provider types: the Primary Dental Health Aide, the Expanded Function Dental Health Aide, the Dental Health Aide Hygienist and the Dental Health Aide Therapist. The scope of practice between the four DHA providers varies along with the required training and education. DHAs are certified, not licensed, providers. Recertification occurs every two years and requires the completion of 24 hours of continuing education and continual competency evaluation. Dentists provide general supervision either in person, by telephone or through telehealth technology.

21 Nash et al., 2012.

22 Nash et al., 2012.

DHAs provide evidence-based preventive and treatment services that can improve access to care and help address existing oral health inequalities.

The Primary Dental Health Aide has two levels of certification. Level I are able to provide fluoride varnish application, nutritional counselling, and oral hygiene instruction. Level II receive additional training in sealants, atraumatic restorative treatment, dental cleanings, dental radiology and/or dental assisting. Each course is two weeks in length.

The Expanded Function Dental Health Aide can be broken down into two types and has two levels. Level I can be trained in basic restorative function and/or dental cleanings. The basic restorative function curriculum focuses on placing amalgam, composite and glass ionomer restorations in Class I, II, III and V cavity preparations. The dental prophylaxis course focuses on providing a supra-gingival cleaning. Level II is trained in advanced restorative care. This curriculum focuses on placing complex restorations.

The Dental Health Aide Hygienist was developed since hygienists working in Alaska were not allowed to administer local anaesthesia unless a dentist was physically present. Becoming a certified Dental Health Aide Hygienist allows a licensed hygienist to provide local anesthesia without a dentist being present.

The Dental Health Aide Therapist requires the most education of all the DHAs. Students complete two years of post-high school education. The training is similar to international dental therapy models, and this DHA is the only one able to develop treatment plans for patient care. A goal of this DHA is to get providers who will stay for long periods of time in underserved communities, thus improving continuity of care. Initially, three cohorts of students were sent to New Zealand for their two-year educational program. However, changes in the New Zealand program, funding limitations, and the desire to provide education closer to home led to the successful effort to establish a training program in mainland United States. Local training for the other DHAs is available in Alaska.

Integrated Service Delivery Models

The need for an integrated system of health and social services has been well recognized for some time. Such a service delivery model would offer a full range of services through the complete integration of primary, secondary and tertiary levels. This would also involve some level of integration from the point of view of funding strategies, provider engagement, remuneration, and delivery, as well as system supports such as administrative processes and health information and technology. With that said, in terms of how oral health care can fit into such a model, while it seems reasonable, logical and arguably necessary, there is actually scant evidence on

the effectiveness of such an approach.

To begin, the involvement of other health and social service providers in oral health care is likely beneficial from the point of view of the common risk factor approach.²³ The clustering of risk factors for chronic diseases frequently occurs in the same individuals. For example, individuals who smoke are more likely to eat a diet high in fats and sugars, and low in fibre, polyunsaturated fatty acids, fruit and nutrient rich foods, and are more likely to drink alcohol than non-smokers. These are all contributing factors to oral disease as well as several other chronic illnesses, and this clustering of unhealthy behaviours suggests that preventive approaches should be directed at clusters of risk factors common to a number of diseases and the social structures which influence an individual's health. Nevertheless, in Canada, the integration of oral health (and oral health care) into the health care sphere has been slow if not absent. In the United States, the factors influencing inadequate, poorly integrated oral health services in primary care have been noted to include: private and third-party insurance for these services; inadequate public funding; workforce capacity constraints for underserved populations; and a historical belief that oral health is secondary to overall health status.²⁴

Little research has also been conducted on assessing the benefits and health outcomes of patients cared for through collaborative team approaches.²⁵ Only one study on integrated primary dental and medical care was found, and it showed that it can increase the amount of care patients receive, avoid discrepancies in patient information and reduce the need for secondary referrals.²⁶ However, taking a step back, a systematic review reported that there were no studies on the accuracy of primary care providers in identifying children aged zero to five years at elevated risk for future dental caries.²⁷ However, three studies found that after two to five hours of training, physicians and nurses were able to perform oral screenings with a similar accuracy to that of dentists, and suitable for the purposes of referral for a complete evaluation by a dentist.²⁸ It is important to note that school-based screening and treatment programs also offer advantages for innovative, integrated approaches to improving the oral health of children. For example, delivering services in a location where children are grouped together and regularly attend (eg. day care and schools) may remove many of the barriers faced by low-income children and their parents.²⁹

23 Sheiham and Watt, 2000.

24 Grantmakers in Health, 2008.

25 Nowjack-Raymer, 1995.

26 Haughney, 1998.

27 Bader et al., 2004.

28 Beltran et al., 1997; Pierce et al., 2002; Serwint et al., 1993.

29 Bagramian, 1979; Bailit et al., 2008.



Dental Treatment and Prevention

The way that oral health care is structured in the Northwest Territories affects what can be achieved to improve the oral health of the population over the short- and long-term. How funds flow through different contribution agreements and how they dovetail with federal programming, including the NIHB program, fixes into place certain approaches to territorial programming. By thinking of dental treatment (and often prevention) as predominantly fitting around the NIHB program, an almost myopic approach has been taken where improving oral health equates to clinical services. This overemphasizes treatment, which is very costly, and underemphasizes evidence-based prevention.

As mentioned, oral health treatment cannot single-handedly solve the challenges facing the Northwest Territories in terms of the significant burden of oral disease experienced within its population. This approach is likely the least cost-effective. For example, a recent Canadian Institute of Health Information (2013) report found that the Northwest Territories has the second highest rate of operating room use for early childhood caries, behind Nunavut. It is the leading cause of operating room care for children aged 1-5 years in the territories, and represents an inefficient use of public resources, as many of these children continue to experience oral disease throughout their childhood and adolescence, with some even returning for repeat care. The direct costs to the territorial health care system (ie. hospital costs) are also significant, as are the indirect costs to the population (ie. travel time and loss of productivity). The hospital costs alone, irrespective of treatment (dentist) and time costs have been reported as \$1,379 per case.

Limited Financial and Human Resources

In terms of oral health care, the Northwest Territories is a low resourced environment given the significant demand for care. Under its own and federal government pressures to contain costs, scarcity will be the defining environment for the foreseeable future, and planning any oral health care system will need to position this as the foremost consideration. In short, 'more will need to be done with less.' Couple with that the ever diminishing pool of dental therapists and the difficulties in securing other oral health care providers, the Northwest Territories will have to be creative in its future approaches to the delivery of oral health care.

Limited Policy and Program Levers

The ability of the Northwest Territories to work within the structures established by the Federal Government creates another sort of scarcity. This presents itself in the form of a limited capacity to influence the policies and programs that are directly mandated by federal authority. It is arguable that there is little opportunity for the Northwest Territories to secure more resources for existing programs, to change NIHB policies, or to lobby federal authorities for more resources for its own unique approaches to territorial challenges. Nevertheless, it is our opinion that leaders can flesh out this opportunity, and that there may actually be enough resources within the system to do so. As we will argue, if current resources are used appropriately and creatively, the Northwest Territories can in fact 'do more with less.'



CURRENT ENVIRONMENT

Where Does the Northwest Territories Stand Today?

Governance

The governance model that structures the financing, organization, and delivery of oral health care (prevention and treatment services) in the Northwest Territories is complex. It involves the Department of Health and Social Services (DHSS), eight Health and Social Service Authorities (HSSAs), other territorial government departments, and the Federal Government through First Nations and Inuit Health (FNIH) and the NIHB program.

The Minister of Health and Social Services is responsible for ensuring that the public system provides and manages services according to government legislation, national and territorial standards and public priorities. The HSSAs plan, develop, deliver, evaluate and report on the programs and services that support their populations, and are responsible for the day-to-day management and administration of these program and services. They create their own strategic plans that are in line with the overall system plan set by the DHSS, who secures funding, develops legislation, sets policies and standards, and also undertakes monitoring and evaluation.

For oral health care services, each regional HSSA is responsible for prevention of dental diseases, with a focus on prevention of childhood dental disease; as well as surveillance, assessment and evaluation of oral health status and oral health care programs. To the extent that all of these activities are undertaken remains to be determined. Most activities focus on dental therapy, where it is available, and on the coordination of dental team visits. It is here that the federal role becomes significant from the point of view of financing and organization.

FNIH, through the NIHB program, covers the cost of medically-necessary dental benefits for registered First Nations and Inuit people. It provides contracts for dentists to provide services in the three territories on a fee-for-service or a per-diem basis. In the Northwest Territories, these contracts are administered through the DHSS. As was described to us, FNIH oversees NIHB,

who determines eligibility for First Nations, and Inuit. The GNWT provides for Métis, Health Benefits which is administered by Alberta Blue Cross and eligibility is the same as NIHB. NIHB makes a contribution to the DHSS for medical, drug, eye, oral health day surgery, of which a minor portion is applied to travel for oral health providers. Payment of providers operates like a billing system, and NIHB reimburses the DHSS for expended funds. Repair of any dental equipment within the territories is not covered by NIHB, and the costs of day surgery involve contributions from NIHB, the DHSS, and Health Canada.

It is clear from this description that the governance model that surrounds oral health care in the Northwest Territories is arguably too complex if the goal is to provide a unified and integrated approach to improving the oral health of children and youth. Moreover, this repeats the historical misstep of viewing oral health care as an insurance benefit that is modelled under a billing system, and not as a health care program dovetailing into and supporting the activities of other health and wellness programs. This has implications for leadership and how it conceptualizes oral health care. In other words, it is unclear who leads, the lines of authority for financing and organization of the system are not always clear, and people may not venture beyond the traditional, cost maximizing treatment model. This in turn ultimately affects the roles and responsibilities of all parties involved, which again, are not always clear.

This has further implications for any robust change management and for the sustainability of programming, as is evidenced by the slow decay of dental therapy programming in the territories. To be sure, training occurred outside of the territory, was financed in part by federal and territorial authority, with the hope that trainees would return to the territories. On the ground, since oral health visits essentially run as a billing program, communication and coordination of care between dental therapists and dentists was not always in place. It seems reasonable that some effort needs to be made to consider how oral health care is governed, which may facilitate changes to the financing, organization, and delivery of any program which aims to improve the oral health of children and youth in the Northwest Territories.



Standards

The DHSS is responsible for setting policies and standards, with the HSSAs having some freedom in terms of how administrative and management procedures are to be carried out. That said, we observed a lack of clarity with respect to protocols or decision supports as to how oral health care is organized and delivered in the regions that we visited. While eligibility criteria and travel protocols are strong, this again reflects how oral health care is conceived, namely as a billing process that ultimately deals with the medical travel associated with the significant disease burden present, and not as a public health program aimed at the prevention of disease.

Also, while regional variation and approaches are expected and should be supported relative to the uniqueness of different HSSAs, there appears to be a lack of standardization. This runs the risk of decreasing the ability to deliver high quality care in a timely and consistent fashion. For example, in what circumstances should children and youth receive certain types of care, and not others? Who should be triaged, and for what services? On what basis are resources allocated and oral health care rationed between and within HSSAs? What about between individuals? These are important questions, and ones that require clarity for a unified, integrated program aimed at improving the oral health of children and youth in the Northwest Territories.

Access

Demographics and geography play a fundamental role in the future of any territorial oral health care system. The Northwest Territories covers 1,171,918 square kilometers, and is populated by approximately 40,000 people living in 33 communities.

The population has grown by 32% since 1981, and is much younger than the rest of Canada. People living in the Territories come from many backgrounds: 48% are Aboriginal – 28% are Dené, 11% Inuit or Inuvialuit, 9% are Métis – and 52% are non-Aboriginal. By region, Aboriginal groups dominate: 69% in the South Slave region, 92% in the Inuvialuit Settlement Region, 70% in the Gwich'in Settlement Area, 71% in the Sahtu Settlement Area, 21% in the North Slave region, and 78% in the Deh Cho region. Self-government plays a substantial role, with the Inuvialuit Settlement Region and the Gwich'in and Sahtu Settlement Areas defined in the Inuvialuit, Gwich'in and Sahtu land claim agreements. The North Slave, Deh Cho and South Slave regions are administrative districts of the Territorial Government and may not correspond to claim settlement areas.³⁰

This demography, physical, social and cultural geography have important implications for access to care, with respect to: affordability (Do the provider's charges relate to the client's ability to pay for services?); availability (Does the provider have the requisite resources, such as personnel and technology, to meet the needs of the client?); accessibility (How easily can the client physically reach the provider's location?); accommodation (Is the provider's operation organized in ways that meet the constraints and needs of the client?); and acceptability (Is the client comfortable with the characteristics of the provider, and vice versa?). Each of these questions is highly relevant in the context of the Territories. For example, while affordability is not always a central issue, many services are simply not available, geographically inaccessible, or are provided in service delivery environments that do not always accommodate the social

³⁰ Government of the Northwest Territories, 2012.

and cultural realities of Territorial groups, and/or are simply not acceptable to them. Ultimately, some focus needs to be made on the provision of timely, appropriate, and culturally safe care for the development of any Territorial oral health care system.

Finally, given the geographical realities of trying to deliver comprehensive, portable, high quality oral health care in an effective manner, information and communication technology offers an important solution. The best example of this is telehealth,³¹ which is defined as “the use of information and communications technology to deliver health and healthcare services and information over large and small distances.”³¹ Telehealth has the potential to alleviate some of the health and health delivery problems associated with unequal access to care. The clinical efficacy and cost-effectiveness of telehealth has been demonstrated for some but not all applications, and for oral health care, its opportunities are significant, yet also limited. They are significant from the point of view of clinical assessment, diagnosis, and triaging, and for the teaching of non-dental providers’ techniques such that they can play an important role in oral health care delivery, specifically in prevention. However, it is limited as, in the end, a toothache cannot be solved through telehealth and a clinical encounter is ultimately necessary. Nevertheless, there is great potential with telehealth to address some of the issues of access identified above for a unified, integrated program aimed at improving the oral health of children and youth in the Northwest Territories.

Resources

The human and financial resource challenges facing the Northwest Territories have already been reviewed. Again, there are a limited number of dental therapists working in the Territories, and no new avenues by which to replenish capacity. It is also difficult to attract dentists and other oral health care personnel given the geographic isolation. Nevertheless, as reviewed below, there are opportunities to more effectively use existing Territorial personnel, while also involving non-dental personnel to become involved in child and youth programming.

Financially, demand clearly outstrips supply. Yet, with a refocusing of funds, it may be possible to shift the current treatment model to a preventive, more public health oriented model that has the potential to reduce the significant prevalence, incidence, and burden of oral disease within the Territories. Scarcity is the ‘name of the game,’ and governments have identified a time of austerity for the near-term. If this is the case, perhaps it is time that the Northwest Territories try to do ‘more with less,’ and we believe this can be achieved with a public health, evidence-based approach to the financing, organization, and delivery of oral health care for children and youth within the Territories.

Supporting Front-line Implementation

The Northwest Territories is essentially a decentralized service delivery environment. In this context, significant attention must

be placed on supporting the front-line implementation of high quality and predictable care. In this regard, attention must also be placed on organizational practices, some of which were highlighted as part of a discussion on the issue of standards. Change management in this context is also a key consideration, as HSSAs may be differentially influenced by external and internal (central government) pressures, both of which provide learning opportunities for the different HSSAs relative to their counterpart’s solutions and best practices in response to change, and/or their failures in response to change. Standards, data, and information systems play a crucial role in this regard, the latter of which is discussed below.

Again, front-line implementation becomes particularly important in a decentralized system, especially in one where HSSAs assume so much of the responsibility when it comes to planning, evaluating, and reporting on programs. To illustrate this, a simple question may be asked: Where does oral health fit in the territorial Chronic Disease Management Strategy? Indeed, oral disease is a chronic disease, and one that has important implications for general health and social well-being. Is oral health part of the integrated approach that the Northwest Territories is developing? Is oral health a consideration in efforts to engage with local authorities around the front-line implementation of the territorial Chronic Disease Management Strategy? What about its role in the development of interdisciplinary teams? What about monitoring and reporting? Are oral health and oral health care services part of programming logic and its process and outcome measurement? Ultimately, it is problematic for a Territory-wide oral health care program for children and youth to be sustainable if it remains separate from larger health and health care considerations.

Capacity Development

The Northwest Territories has long-recognized that staffing issues, such as high turnover, locums, and casual staff, make training and retraining of staff challenging, costly and time consuming. There is a clear need to develop local human resources, such that care in the different communities is delivered by the community members themselves. Depending on external expertise and external sources of providers is not ideal, and is inefficient for the development of a culturally competent and sustainable health care system. Some attention can be placed on this in relation to oral health care by supporting individuals who are interested in pursuing this line of work, whether dentists, dental therapists, dental hygienists and so on. This will be discussed below, but it is important to note that this type of capacity development begins very early on, in some cases at the high school level.

There is also a clear need to develop the capacity of front-line staff to engage in integrated care, and in disease management approaches such as those being taken in the Chronic Disease Management Strategy. If oral health is to be considered part of general health, then all staff, from health and social services providers to managers and directors, must understand the

³¹ Ho and Jarvis-Selinger, 2006.



importance of oral health throughout the life course, and its integral role in health and social well-being. Training of these groups can occur with the use of telehealth, and there is good evidence that only a few hours of training can make significant changes to how people view oral health, and how they engage oral health care within their regular work.

Capacity building for the DHSS is also important, and this can occur in relation to the creation of a dental director position for the Northwest Territories. This will be discussed below as well, but much of the capacity development needed centrally and regionally can be supported through such an individual. They can also provide the expertise needed for disease surveillance, and for planning, implementation, monitoring and evaluation of evidence-based oral health care programming for children and youth in the Northwest Territories.

Information Systems

Across Canada, electronic medical records have become central to the movement to modernize our health care systems. Having timely access to health information is important for both the provider and patient, and allows the former to better coordinate and assure safe care, and the latter potentially more control over their own care. That said, providing this level of information requires significant technology as well as the legislative structures that ensure privacy while allowing for the appropriate and timely sharing of this information. While beyond the scope of this report, any information system that is designed will ideally understand the importance of including oral disease as a chronic disease that has impacts for all aspects of the care provided to individuals within the Northwest Territories. Through engagement with dental public health expertise, the DHSS can help define the important oral health and oral health care data elements that could be included in such a system.

Evaluation

Having evidence on the effectiveness of interventions and treatments is paramount. In today's environment, arguing for why more resources are needed, or how to best use existing resources, demands evidence. Nonetheless, apart from historical analyses concerning dental therapy practice, no data or robust evaluations were found to prove or disprove any of the aspects of Territorial programming. In fact, overall, evaluations of dentistry in Canada are scant.³² Moreover, while using public claims data for quality control purposes has developed (eg. provider profiling), such data remains considerably underutilized for administrative and research purposes, and is often kept within the remit of federal authority. It stands to reason that it is important to know what the longevity of treatments is; who and how many receive repeat care, and whether public programs actually result in decreases in disease. Unfortunately, we simply do not know.

The implications are clear. Without organized and comparable data at any level, the Territories cannot conduct programming on a rational, efficient and goal-oriented basis. It is fundamental that with the introduction of any new programming, some level of evaluation must be incorporated from the beginning. We argue that by developing a focus on evidence, supported by the collection of good data through an organized information system, issues in human resources management, resource allocation, and program evaluation could be met directly and with purpose. With this focus, 'all would potentially fall into place' in the development and running of a program aimed at improving the oral health of children and youth in the Northwest Territories.

³² Quiñonez et al., 2007.

Northwest Territories

Health and Social Services Authorities

★ ADMINISTRATIVE CENTRES

- 1 Beaufort-Delta HSS Authority
- 2 Sahtu HSS Authority
- 3 Dehcho HSS Authority
- 4 Tłı̄chǫ Community Services Agency
- 5 Yellowknife HSS Authority
- 6 Stanton Territorial Health Authority
- 7 Hay River HSS Authority
- 8 Fort Smith HSS Authority



RECOMMENDATIONS

What is the vision for the future?

In much the same way that teeth can re-mineralize at the early stages of decay, so too can people in the Northwest Territories restore oral health with effective public policy, healthy choices, and evidence-based care. To achieve this vision, we present recommendations in the form of goals, evidence, and strategies by which to improve the oral health of children and youth in the Northwest Territories.

Broad Goals

To improve the oral health of children and youth in the Northwest Territories, we propose that the Northwest Territories adopt three broad goals:

1. Create one unified and integrated program for all children and youth within the territories.
2. Create a health promoting and preventive culture around oral health.
3. Reduce resource consumption for oral health and associated conditions.

Specific goals

More specifically, if these broad goals are operationalized, the following can potentially be achieved:

1. Reduce disease burden (ie. Prevalence and severity of dental caries) among children age 0-6 years by one-half in 10 years.
2. Reduce disease burden among children age 7-11 years by one-third in 10 years.
3. Reduce disease burden among adolescents 12-16 years by one-fifth in 10 years.
4. Reduce the number of children receiving general anaesthetic care by one-fifth in 10 years.

These specific goals establish a benchmark for any of the programs and policies that the Northwest Territories might choose to implement as it tries to improve the oral health of children and youth.

How Can This Vision Be Achieved?

We believe that a critical and radical approach is needed to achieve the health that children and youth in the Northwest Territories require. Reproducing the status quo, regardless of its political, economic, and operational feasibility is simply not enough to achieve any appreciable benefits to the oral health of Territorial residents. This approach must be based in evidence, and will depend upon the courage and ingenuity of Territorial leaders, as it will require them to re-envision how oral health care is funded, delivered, planned and evaluated in the Territories. Regardless of how difficult these changes may be, we are confident that, if adopted, major changes can be achieved to the benefit of children, their families, and their communities.

Evidence-Based Interventions and Best Practices

Historically, the way in which oral health care has been provided in the Northwest Territories has not succeeded in achieving optimal oral health for the population. Moreover, much of the care itself has not been based on evidence. What do we mean by this? Firstly, depending on oral health care to improve the population's oral health is a common error. Significant evidence exists demonstrating that clinical services alone cannot achieve substantial improvements in health at the population level. 33 If these improvements are sought, then a public health approach must be adopted. To be sure, thinking that fillings and root canals will improve the oral health of children and youth is to think that aspirin and orange juice can stop the spread of flu. In these cases, only symptoms are being addressed; whereas what is needed is prevention. Secondly, depending on a few providers to deliver care is like trying to build a house with only a plumber. The plumber can only see part of the problem and provide only part of the solution. To build a house, one needs a number of professionals and a myriad of tools. So, what does the evidence tell us about improving the health of populations, or more specifically, the health of children and youth? A summary table has been provided below of the evidence on various preventive interventions (see Table 10). Importantly, we have provided cost-effectiveness estimates where available.

In addition, the following explanations are provided pre-emptively in order to better understand the terminology used throughout this section of the report and in Table 10:

Level of Certainty – categorized as high, moderate, or low and refers to the probability that the assessment of an intervention is correct. For some, the rating is based on the assessment of an expert panel that considered: the consistency of the research results; the magnitude of the observed effect; the bias of individual studies; the number of studies included; gaps in the chain of evidence; and the applicability of the findings to the population of interest.

Risk Difference (RD) – also known as “effect size” is a measure of the effect of a treatment. It is the absolute difference in the event rate between two comparison groups. A risk difference of zero indicates no difference between the comparison groups. By calculating the 95% confidence interval (CI) for various treatments, the effects of the treatments can be more easily compared.

Odds Ratio (OR) – also known as “effect size” is a measure of the effect of a treatment. It is the ratio of the effect of the intervention to that of the control. By calculating the 95% confidence interval (CI) for various treatments, the effects of the treatments can be more easily compared.

Standardized Mean Difference (SMD) – also known as “effect size” is a measure of the effect of a treatment. It is the difference in means divided by the standard deviation (SD). Since the SMD measures the number of SDs between means, the value does not depend on a measurement scale, making it a useful metric when outcomes are measured on different scales. By calculating the 95% confidence interval (CI) for various treatments, the effects of the treatments can be more easily compared. The magnitude of the SMD is often interpreted as follows: small, SMD = 0.2; medium, SMD = 0.5; And large, SMD = 0.8.

Prevented Fraction (PF) – the proportion of outcome that could be avoided if it were possible to expose everyone to the preventive factor. In the context of this report, the prevented fraction indicates the caries arrest or prevention in the experimental group, namely the group receiving the therapeutic agent, relative to the control group; a higher PF is better. PF may be expressed as a decimal or as a percentage.

Number Needed to Treat (NNT) – the number of people who must be treated to lead to one positive outcome that can be attributed to the treatment. The advantage of the NNT is its straightforward interpretation. Ideally, the NNT would be one, as this would indicate that everyone would benefit from the therapy. If not one, then a smaller NNT is better. For example, when the NNT = 2, for every two people who are treated, one will have a positive outcome that can be attributed to the treatment therapy. However, if the NNT is 10, then ten people must receive treatment before seeing one that will have a positive response that can be credited to the agent in question. The NNT is greater than one for effective therapies and is a negative value when a treatment is harmful. In the

context of preventive therapies for dental caries, the NNT indicates the number of people who need to be treated to prevent the development of one additional decayed surface. Benefit-harm assessment also known as “net benefit rating”; considers the product’s benefit versus potential harm as assessed by an expert panel based on the literature. The three possible options for the benefit-harm assessment are: the benefits clearly outweigh the harms; the benefits and harms are closely balanced or there is uncertainty in the estimate of the balance; and the harms clearly outweigh the benefits.

Strength of clinical rating – considers the benefit-harm assessment and the level of certainty of the evidence. Table 8, below, adapted from the American Dental Association Center for Evidence-Based Dentistry, illustrates how the level of certainty of evidence and the benefit-harm assessment are used to arrive at the strength of clinical rating. Table 9, below, provides a definition of the six possible recommendation strengths, namely: strong, in favour, weak, expert opinion for, expert opinion against, and against. This indicates whether the therapy or intervention should be used or not based on the evidence available.



Table 8. Level of Certainty VS. Benefit Rating to Arrive at Strength of Clinical Rating ³⁴

Level of Certainty	Net Benefit Rating		
	Benefits Outweigh Potential Harms	Benefits Balanced with Potential Harms	No Benefit or Potential Harms Outweigh Benefits
High	Strong	In Favour	Against
Moderate	In favour	Weak	Against
Low	Expert Opinion For or Expert Opinion Against		

Table 9. Definitions for the Strengths of Recommendation ³⁵

Recommendation Strength	Definition
Strong	Evidence strongly supports providing this intervention
In Favour	Evidence favours providing this intervention
Weak	Evidence suggests implementing this intervention after alternatives have been considered.
Expert Opinion For	Evidence is lacking; the level of certainty is low. Expert Opinion guides this recommendation
Expert Opinion Against	Evidence is lacking; the level of certainty is low. Expert Opinion suggests not implementing this intervention
Against	Evidence suggests not implementing this intervention or discontinuing ineffective procedures

³⁴ Adapted from the USPSTF system; taken from ADA Center for Evidence-Based Dentistry, <http://ebd.ada.org/>.

³⁵ Adapted from the USPSTF system; taken from ADA Center for Evidence-Based Dentistry, <http://ebd.ada.org/>.

Table 10. Evidence on Preventive Therapies

Part 1

Treatment Measure	Level of Certainty	Benefit	Benefit RD [%] or SMD or OR	PF	NNT	Adverse Events or Harms	Benefit-Harm Assessment (Net Benefit Rating)	Strength of Clinical Rating
Community Water Fluoridation MAC 0.7ppm - 1.5ppm Tooth Type / Age								
All / All	High	Yes	15.5% [10.7, 20.2]	0.15 - 0.50	6	Likelihood of Harm is Low	Benefits Outweigh Potential Harms	in Favour
Primary / All	High	Yes	11.4% [6.5, 16.3]	-	9	Likelihood of Harm is Low	Benefits Outweigh Potential Harms	in Favour
Permanent / All	High	Yes	19.1% [11.4, 26.7]	-	5	Likelihood of Harm is Low	Benefits Outweigh Potential Harms	in Favour
Primary / 5 Years	High	Yes	13.2% [6.8, 20.0]	-	8	Likelihood of Harm is Low	Benefits Outweigh Potential Harms	in Favour
Primary / 8 Years	High	Yes	7.2% [-3.6, 18.0]	-	14	Likelihood of Harm is Low	Benefits Outweigh Potential Harms	in Favour
Permanent / 8 Years	High	Yes	35.6% [22.4, 48.8]	-	3	Likelihood of Harm is Low	Benefits Outweigh Potential Harms	in Favour
Permanent / 12 Years	High	Yes	13.1% [0.8, 25.5]	-	8	Likelihood of Harm is Low	Benefits Outweigh Potential Harms	in Favour
Permanent / 14-15 Years	High	Yes	8.8% [0.7, 16.9]	-	11	Likelihood of Harm is Low	Benefits Outweigh Potential Harms	in Favour
Salt Fluoridation MAC Variable Tooth Type / Age								
All / 6-15 Years	Moderate	Yes	-	0.18 - 0.40	-	Likelihood of Harm is Low	Benefits Outweigh Potential Harms	in Favour
Milk Fluoridation MAC Variable Tooth Type / Age								
Primary / All	Low	Yes	-	0.31 - 0.76	-	Likelihood of Harm is Low	Benefits Outweigh Potential Harms	in Favour
Pit & Fissure Sealants Tooth Type / Age								
First Permanent Molars / Children & Adolescents	High	Yes	0.12 [0.07, 0.19]	0.57 - 0.86	2-23	None	Benefits Outweigh Potential Harms	in Favour

Table 10. Evidence on Preventive Therapies

Part 2

Treatment Measure	Level of Certainty	Benefit	Benefit RD [%] or SMD or OR	PF	NNT	Adverse Events or Harms	Benefit-Harm Assessment (Net Benefit Rating)	Strength of Clinical Rating
Atraumatic Restorative Treatment / Interim Stabilization Therapy								
Tooth Type / Age								
Primary / Children	Low	Yes	-	-	-	Likelihood of Harm is Low	Benefits Outweigh Potential Harms	Expert Opinion for Use
Oral Health Education Provision of Health Information / School-based toothbrushing Campaigns / Dietary interventions to reduce dental caries / Mass Media Campaigns	High	No	-	-	-	Likelihood of Harm is Low May Increase Inequalities	No Benefit	Against
Fluoride Varnish								
2.26% Fluoride								
Primary / Children < 6 Years	Moderate	Yes	-0.19 [-0.31, -0.08]	0.22	4	Little if Swallowed None Otherwise	Benefits Outweigh Potential Harms	In Favour
Permanent / Children ≥ 6 Years	Moderate	Yes	-0.38 [-0.53, -0.24]	0.36	3	None	Benefits Outweigh Potential Harms	In Favour
Permanent / Adults - Coronal	No Certainty (No Studies)	Unknown	-	-	-	None	Benefits Outweigh Potential Harms ⁴	Expert Opinion for Use
Permanent / Adults - Root	Low	Yes	-0.67 [-1.14-0.20]	0.58	2	None ³	Benefits Outweigh Potential Harms	Expert Opinion for Use
Fluoride Varnish								
0.1% Fluoride								
Primary / Children < 6 Years	Moderate	No	-	-	-	Little if Swallowed None Otherwise	No Benefit	Against
Permanent / Children ≥ 6 Years	Low	No	-	-	-	None	No Benefit	Expert Opinion for Use
Permanent / Adults - Coronal	No Certainty (No Studies)	Unknown	-	-	-	None	No Benefit	Expert Opinion for Use
Permanent / Adults - Root	No Certainty (No Studies)	Unknown	-	-	-	None	Unknown	Expert Opinion for Use

Table 10. Evidence on Preventive Therapies

Part 3

Treatment Measure	Level of Certainty	Benefit	Benefit RD [%] or SMD or OR	PF	NNT	Adverse Events or Harms	Benefit-Harm Assessment (Net Benefit Rating)	Strength of Clinical Rating
Fluoride Gel (Acidulated Phosphate Fluoride - APF)								
1.23% Fluoride								
Primary / Children < 6 Years	Low	Yes	-1.51 [-0.79, -1.23]	-	-	Potential for harm if swallowed	Potential harms could outweigh benefits	Expert Opinion Against Use
Permanent / Children ≥ 6 Years	Moderate	Yes	-0.25 [-0.33, -0.16]	0.27	4	None	Benefits outweigh potential harms	In Favour
Permanent / Adults - Coronal	No Certainty (No Studies)	Unknown	-	-	-	None	Benefits outweigh potential harms	Expert Opinion for Use
Permanent / Adults - Root	Low	Yes	-0.22 [-0.44, 0]	0.24	4 ²	None	Benefits outweigh potential harms	Expert Opinion for Use
Prescription Strength Home-Use Fluoride Mouthrinses								
0.09% Fluoride								
Primary / Children < 6 Years	No Certainty (No Studies)	Unknown	-	-	-	Potential for harm if swallowed	Potential harms may outweigh unknown benefits	Expert Opinion Against Use
Permanent / Children ≥ 6 Years	Moderate	Yes	-0.26 [-0.40, -0.13]	0.27	4	None	Benefits outweigh potential harms	In Favour
Permanent / Adults - Coronal	No Certainty (No Studies)	Unknown	-	-	-	None	Benefits outweigh potential harms	Expert Opinion for Use
Permanent / Adults - Root	Low	Yes	-0.54 [-1.01, -0.08]	0.48	2	None ³	Benefits outweigh potential harms	Expert Opinion for Use
Fluoride Foam								
1.23% Acidulated Phosphate Fluoride (APF)								
Primary / Children < 6 Years	Low	Yes	-1.26 [-1.50, -1.02]	-	-	Potential for harm if swallowed	Potential harms may outweigh benefits	Expert Opinion Against Use
Permanent / Children ≥ 6 Years	Low	No	-	-	-	None	No Benefit	Expert Opinion Against Use
Permanent / Adults - Coronal	No Certainty (No Studies)	Unknown	-	-	-	None	No Benefit	Expert Opinion for Use
Permanent / Adults - Root	No Certainty (No Studies)	Unknown	-	-	-	None	Unknown	Unable to make Recommendation

Table 10. Evidence on Preventive Therapies									Part 4
Treatment Measure	Level of Certainty	Benefit	Benefit RD [%] or SMD or OR	PF	NNT	Adverse Events or Harms	Benefit-Harm Assessment (Net Benefit Rating)	Strength of Clinical Rating	
Over-the-Counter Toothpaste 1000-1100 ppm of Fluoride									
Primary & Permanent Teeth All Age Groups	High	Yes	-	0.24	-	None ³	Benefits Outweigh Potential Harms	Strong	
Xylitol Syrup 3 x 2.67g Dose									
Children / 5-16 Years	Low	Yes	-	0.50	10	May cause GI effects (loose stool) esp large doses	Benefits Outweigh Potential Harms	In Favour	
Xylitol Syrup 2 x 4.0g Dose									
Children / 5-16 Years	Low	Yes	-	0.70	4	May cause GI effects (loose stool) esp large doses	Benefits Outweigh Potential Harms	In Favour	
Xylitol Syrup Any Dose									
Children < 2 Years	There is insufficient evidence that xylitol syrup prevents caries in children under 2 years of age.								
Xylitol Chewing Gum Dose - 4.3 - 9.0g / Day ; Frequency of Daily Use 3-5 x / Day									
	Moderate	Yes	-	0.59	-	None ³ ; May cause diarrhea if 4-5x amt needed for caries prevention is consumed	Benefits Outweigh Potential Harms	In Favour	
Silver Diamine Fluoride Dose - 38% Solution ; Approximately a drop for each quadrant, delivered with a brush and rinsed off afterward; one-two application (s) / yr									
Primary Teeth	Moderate	Yes	-	-	1.0 (arr est) 0.9 (prev'n)	Likelihood of harm seems low; not yet approved by FDA; used in other countries	Unknown; benefits likely a Potential Harms	Unable to make recommendation not yet approved	
Permanent Teeth	Moderate	Yes	-	-	10 (arr est) 1.4 (prev'n)	Likelihood of harm seems low; not yet approved by FDA; used in other countries	Unknown; benefits likely a Potential Harms	Unable to make recommendation not yet approved	

Fluorides

Community Water Fluoridation

It has been almost 70 years since community water fluoridation was started in Canada and there has been over 80 years of research into the effects of fluoride in drinking water. Research is continuing to add to the over 3,000 studies that have been published in recognized peer-reviewed professional journals. Scientists and researchers in many different countries have reviewed and analyzed these studies and concluded that the evidence confirms that community water fluoridation is safe, effective, ethical, legal, reduces health inequalities, and is the most cost-effective public health measure for reducing tooth decay in all populations.

Since 1997, there have been 18 major reviews of water fluoridation and the effect of fluorides conducted in Europe, the United Kingdom, Ireland, Australia, the United States and Canada.³⁶ In Canada, most recently, Health Canada (2010) released the “Guidelines for Canadian Drinking Water Quality: Guideline Technical Document —Fluoride,” and the Government of Canada (2008) its “Joint Government Response to Environmental Petition Number 221: Petition to Discontinue Water Fluoridation.” In addition, the Institut National de Santé Publique du Québec released its report, “Water fluoridation: An analysis of the health benefits and risks.”³⁷ The major conclusions from all of these reviews and reports are:

- Water fluoridation is safe. Credible scientific research finds no evidence of increased risk of cancer, bone disease, I.Q. deficits, thyroid suppression, kidney disease, nor diseases of the immune or reproductive systems and genetic or neurological or developmental or any other health effects.
- Water fluoridation is effective in preventing tooth decay even when other sources of fluoride, eg. toothpastes, or topical fluorides, are used.
- The only adverse effect linked to community water fluoridation, at the recommended level, is the possibility of dental fluorosis (which in its mildest form consists of fine white filamentous striations across the crowns of teeth) if inadvertent ingestion of other fluoride sources (fluoridated toothpaste, fluoride supplements) is not controlled.
- Water fluoridation benefits all residents served by community water supplies, regardless of their age, sex, culture, social or economic status or educational level.
- Credible scientific research finds no evidence that adding fluoride to the drinking water has negative environmental impacts.

If implemented in territorial communities, one would expect to see a 15% to 50% reduction in dental caries within the population over time.³⁸ The average lifetime cost per person to fluoridate a community is less than the cost of one dental filling. For most municipalities, every \$1 invested in water fluoridation saves \$38 in dental treatment costs. Reduction in costs of restorative care due to averted disease has exceeded the cost of water fluoridation in communities of any size. Systematic reviews have demonstrated that despite varying costs of implementation and maintenance, community water fluoridation is cost saving (ie. saves money from a societal perspective and also reduces caries). Research has also shown that children in communities without fluoridated water are three times more likely than children in fluoridated communities to receive dental treatment in a hospital operating room and the cost of dental treatment is approximately twice as high.

Salt Fluoridation

The Northwest Territories faces some barriers to the addition of fluoride into water supplies. Community capacity, technical requirements, and public opinion may not allow the implementation of this intervention in all municipalities. Yet another option is fluoridated salt, which can be sold alongside a non-fluoridated alternative. Some argue that when most salt for human consumption is fluoridated, the effectiveness of salt fluoridation approximates that of water fluoridation. The first studies of the effects on the incidence and prevalence of dental caries of fluoride added to alimentary salt were carried out from around 1965 to 1985 in Colombia, Hungary and Switzerland, with similar results to those observed after the introduction of water fluoridation. Fluoridated salt reaches the consumer through several channels, including domestic salt, meals at schools, large kitchens, and in bread. In Colombia, Costa Rica, Jamaica, and the Canton of Vaud in Switzerland, most, if not all, of these channels are used; in France and Germany the focus is on fluoridating domestic salt. Jamaica provides another interesting example, because virtually all salt destined for human consumption on the island has been fluoridated since 1987.

The concentrations of fluoride in salt used around the world range from 90 mg/kg to 350 mg/kg, although later studies have suggested an optimal concentration of 250 mg/kg. One important concern regarding the promotion of fluoridated salt is that it is unacceptable and contradictory to public health messages that encourage the reduction of consumption of salt for hypertension. However, in France, Switzerland and elsewhere, populations are not encouraged

36 Government of Canada, 2008; Health Canada, 2010; McDonagh et al., 2007; National Health and Medical Research Council Australia, 2007.

37 Levy et al., 2007.

38 Jones et al., 2005.

to consume more salt to improve their dental health; rather, the passive effect of fluoridated salt is accepted. In other words, people do not need to change their usual behaviour to benefit. Indeed, reduced consumption of salt could and should be encouraged and, where this is successful, the concentration of fluoride in salt could simply be increased appropriately.³⁹

Milk fluoridation

The fluoridation of milk is another example of an attempt to provide the benefits of fluoride. The potential of milk as an alternative vehicle for fluoride was first reported in Switzerland, but further programs have been implemented in Scotland and Hungary. Various channels have been used, including programs distributing milk in kindergartens and schools, and powdered milk and milk-cereal distributed as part of the National Complementary Feeding Program in Chile. In all of these studies, it is emphasized that it is important to start the program in early childhood to ensure an optimal effect on the deciduous teeth, and to maintain the consumption of milk for at least 180 days per year. Interesting initiatives such as sending milk home from school on a Friday evening for consumption over the weekend have been reported in Beijing, where milk consumption has been maintained for more than 300 days per year

Topical Fluorides

There are different kinds of topical fluorides, and all are reviewed in detail in Table 10. The most beneficial for caries prevention appears to be 2.26% fluoride varnish when applied at least twice a year in the following cases:

- Primary teeth of children aged 6 months to 8 years (moderate certainty);
- Permanent teeth of children aged 5 to 15 years (moderate certainty); and
- For the prevention of root caries in adults (low certainty).

Application of varnish takes significantly less time to apply compared to other topical fluoride applications (see Table 10). For children 3-6 years of age, the cost per varnish application, including labour, is substantially less than other topical fluoride applications (eg. \$3.43 for varnish compared to \$4.43 for foam).

Other topical fluorides include fluoride gels, fluoride rinses, fluoride foam, and over-the-counter fluoridated toothpaste. Importantly, all of these topical fluorides appear to have effects above and beyond the effects of community water fluoridation, especially when they are targeted to high-risk groups.

³⁹ Jones et al., 2005.

⁴⁰ Rosenblatt et al., 2009.

Silver Diamine Fluoride

A unique topical agent is 38% silver diamine fluoride (AgF). Numerous *in vitro* and *in vivo* studies have examined the potential benefit of silver diamine fluoride in the prevention of dental caries. The results suggest that silver diamine fluoride inhibits the growth of streptococcus mutans, the metabolic activity of dental plaque, and the progression of carious lesions. It is believed that this anti-cariogenic action ensues because the silver-based preparation inhibits biofilm formation on the surface of the tooth, and the presence of a biofilm is necessary for both initiation and progression of dental caries. Although studies have recognized that the topical application of silver diamine fluoride does have an anti-cariogenic effect, it can blacken caries lesions, which could potentially create an aesthetic concern.

Some have described this therapy as the “silver-bullet” of caries prevention.⁴⁰ There is a benefit on primary and permanent teeth in children 0-18 years of age. It is more effective than fluoride varnish alone at arresting active caries and preventing new caries. It is equally as safe as fluoride varnish, yet it is unclear whether it is approved as a topical therapy in Canada. Nevertheless, its potential benefit is of such significance that it merits exploration in any Territorial program aimed at improving the oral health of children and youth.

Clinical Preventive and Treatment Therapies

Pit and Fissure Sealants

Sealing children’s first permanent molars can prevent disease and save money by delaying or avoiding invasive treatment and the destructive cycle of caries. Research shows that a risk-based approach to sealing children’s permanent molars is more cost-effective than sealing all molars or sealing none. A significant reduction in the cost of dental treatment can be achieved by sealing only high-caries risk individuals. Children who do not receive sealants are more likely to obtain subsequent restorative care and cost more money to the health care system. Expenditure savings from sealants have been found within two years of application for children with two or more prior caries-related restorations.⁴¹

Xylitol Compounds

Xylitol is a five-carbon sugar that is found naturally in low concentrations in many fruits and vegetables, although for industrial production it is extracted from hardwoods and corncobs. Unlike xylitol, six-carbon sugars are fermented in the mouth and act as an energy source for streptococcus mutans.

⁴¹ Kallestal et al., 2003.

Xylitol, however, is non-fermentable and thus cannot be converted into acid by bacteria in the mouth. Without a food source for the streptococcus mutans, they will starve. Xylitol interferes with bacterial growth and reproduction and works as an anti-cariogenic agent. Its effectiveness is dependent on daily consumption at a minimum frequency. The vehicles of xylitol include syrup and chewing gum (see Table 10); both provide anti caries benefit.⁴²

Atraumatic Restorative Treatment / Interim Stabilization Therapy

Atraumatic restorative treatment (ART), or Interim stabilization therapy (IST) provides a unique opportunity for the Northwest Territories. It is a simple method to treat dental caries in situations where traditional cavity preparations may not be possible or feasible. The technique was developed in low-resourced environments, and has been proven as an effective treatment option in terms of ease, patient acceptance, and restoration longevity.⁴³ It involves the removal of soft, demineralized tissue followed by the restoration of the tooth with fluoride-releasing glass ionomer. The procedure does not require electricity, running water, or anesthesia. The Pan-American Health Organization (1999) provides that it has demonstrated the cost-effectiveness and longevity of ART compared to amalgam restorations in three Latin American countries over three years, yet no data was reported. Most agree that it should be considered as an alternative treatment to conventional techniques, in carious primary teeth. Its greatest success is seen with Class I cavities in primary teeth. Importantly ART/IST is being used by Health Canada's Children's Oral Health Initiative (COHI) in Nunavut, and its effectiveness has been confirmed by the Health Technology Inquiry Service of the Canadian Agency for Drugs and Technologies in Health (2008).

Oral health education

There is ample evidence demonstrating that oral health education, as traditionally practiced, has a limited impact on the improvement of oral health.⁴⁴ Short-term improvements in oral health knowledge can be achieved, but effects on behaviour and clinical outcomes are limited. Provision of health information alone does not produce long-term behavior changes. Furthermore, there is no evidence on the effectiveness of dietary interventions to reduce dental caries; and mass media campaigns are largely ineffective at promoting either knowledge or behaviour change, and may actually widen gaps between the rich and poor. There is also no evidence on the cost-effectiveness of oral health education.

It is important to understand that oral health education interventions must be conducted, but from the point of view of 'due diligence,' not from the perspective of evidence. It is something that must happen, but it cannot happen alone. For example, a recent study that assessed a preventive program for preschool children which entailed nutrition counselling, tooth brushing training, and provision of free fluoride tablets and fluoride toothpaste, found that the program demonstrated an overall net cost, with the potential of a net gain when maximal outcomes (highest reductions in dental decay) were experienced. Nonetheless, the authors readily noted that any preventive effect was most likely associated with the fluoride interventions, and not health education, and that costs were driven upwards with the use of the health education modalities.

Integrated Care and Community Engagement

As previously reviewed, the need for an integrated system of health and social services has been well recognized for some time. Such a service delivery model would offer a full range of services through the complete integration of primary, secondary and tertiary levels. This would also involve some level of integration of funding strategies, provider engagement, remuneration and delivery, as well as system supports such as administrative processes and health information and technology. This is one of the ways that the Chronic Disease Management Strategy has been positioned. Nevertheless, it remains unclear how oral health care will fit into this model, but it can. While there is scant evidence on the effectiveness of such an integrated approach in terms of oral health outcomes, it should be explored.

Integrated care is that much more fundamental in the Northwest Territories, as the population experiences numerous risk factors that cluster in individuals, and that are common to a number of chronic diseases. The key concept underlying integration is the common risk factor approach, which promotes general health by managing a small number of risk factors, which may then have a major impact on a large number of diseases at a lower cost, and greater efficiency and effectiveness than disease specific approaches. Oral disease is chronic disease, and shares common risk factors such as tobacco use, diet, excessive alcohol consumption, stress, poor hygiene, diets rich in saturated fatty acids, sugars and diets low in polyunsaturates, fiber, and vitamins A, C, and E.

Moreover, with few providers, there is opportunity in the Northwest Territories for other non-dental providers to become engaged in the delivery of evidence-based preventive therapies. Primary care physicians and other child healthcare providers can play an important role in preventing dental caries particularly for very young children.

⁴² Rethman et al., 2011.

⁴³ World Health Organization, 1998.

⁴⁴ Brown, 1994; Kay and Locker, 1997, 1996; Schou and Locker, 1994; Watt, 2005; Wennhall et al., 2010.

These allied public health groups usually see children prior to their first dental visit, providing an opportunity for implementing early-stage, preventive interventions by professionals.

A systematic review on the role of physicians in preventing dental caries in preschool children was identified in our literature search strategy. The objectives of the review were to provide the U.S. Preventive Services Task Force with recommendations on the effectiveness of five possible physician interventions in the prevention of dental caries: (1) screening and risk assessment, (2) referral, (3) provision of dietary supplemental fluoride, (4) application of fluoride varnish, and (5) counselling. The review found that evidence for the effectiveness of screening, referral, and counselling was poor due to the limited numbers of high-quality studies. However, they found fair evidence for the effectiveness of fluoride supplementation and varnish application performed in primary care practice.

Importantly, primary care clinicians, family medicine residents and physicians, paediatricians, nutritionists, midwives, and dental hygienists have also been surveyed about of their knowledge, attitudes, and beliefs on different aspects of preventive dental care in children, such as the importance of caries-preventive measures and advice, referral practices and barriers, dental screening techniques, fluoride prescribing practices, childhood bottle weaning, previous oral health education, and diet-related topics. These studies found that they are well prepared to increase their confidence in identifying and appropriately referring children (based on the risk status of a child) if adequately trained. For example, research shows that with training in infant oral health (even as short as a two hour training session), the pediatric primary care provider achieves an adequate level of accuracy in identifying children with cavitated carious lesions and can perform appropriate dental referral. One study also provides good evidence that parents can be satisfied with the quality of preventive dental care offered by non-dental primary care providers for their children.⁴⁵

Another important example in this area is the involvement of primary health care providers in screening, triaging, and fluoride varnish therapy in the State of North Carolina. The State introduced innovative models of financing and delivering integrated oral health care services and has demonstrated significant returns.⁴⁶ First, food security programming has introduced oral health education and dental referrals for low-income families and their children. Importantly, when compared to those children that do not receive the services, those that went to a dentist went more often and ended up consuming less costly dental care over time.

The intervention also reduced the amount of children's general anaesthesia care. The second program involves the financing of oral health education, screening and referral, and fluoride varnish applications by physician- and nurse-aides in public and private practices. A strong evaluation program has demonstrated similar results, confirming impacts on oral health care utilisation and consumption over time. Such evidence is undeniable, and as a result was partly adopted by Health Canada's COHI program. Whether there is an appetite for approaches like these in the Northwest Territories is unknown, yet ultimately, if we are to responsibly meet public need in what appears to be a situation of worsening inequality and resource limitations, it is this type of creative approach that must be considered so as to gain the most benefits for children and youth.

It could be, for example, that when a child is seen in their well-baby or well child visits in a community health centre or nursing station, that they are screened for tooth decay, triaged for severity for the next dental visit or for operating room care. The caregiver could be provided nutritional and oral health advice, and a non-dental provider could provide fluoride varnish. This does not need to be the physician or nurse either. With training, almost anyone can arguably learn how to screen and apply fluoride varnish, and engage in effective oral disease prevention and oral health promotion. It is also important to note that fluoride varnish is a non-regulated act, limiting the legal issues relevant to this approach.

Finally, in the territorial environment, engagement with community leaders will be fundamental in any oral health program. Engaging with community leaders can provide the early buy-in that is necessary for programmatic success. It can also shape the nature of the program itself such that the approaches are culturally relevant and appropriate. In many of our focus groups and meetings in the Northwest Territories, this message was delivered consistently: any program must understand the particular needs of the various groups and cultures involved, and will need to involve them at all stages, from planning and implementation to evaluation. Most felt that community leaders, inclusive of youth and elders, are important and valuable partners in any program aimed at improving the oral health of children and youth in the territory.

⁴⁵ Beltran et al., 1997; Pierce et al., 2002; Serwint et al., 1993).

⁴⁶ Lee et al., 2004; Rozier et al., 2007.

Inuit Oral Health Action Plan

Before moving to our specific recommendations and approaches to improving the oral health of children and youth in the Northwest Territories, reviewing the Inuit Oral Health Action Plan (Inuit Tapiriit Kanatami, 2013) is necessary. It sets a backdrop for many of our recommendations and approaches, and provides another example of Northern efforts to improve oral health in a socially and economically marginalized population.

Strengthen leadership: The Inuit Oral Health Action Plan recognized the need to find new ways to engage with existing stakeholders to find creative solutions to the epidemic of oral disease currently burdening northern communities. Collaboration was identified as being key, but more importantly, rethinking historical approaches was considered essential. It was argued that this could empower collective decision-making, and could mobilize the resources needed for improving oral health outcomes. Indeed, new approaches require strong leadership.

Link oral health to overall health: Oral health is integral to overall health. In fact, oral health is health; they are not different. With the increasing knowledge that we have about how oral health influences general health, creating a stronger conceptual link between the two can be the first step in integrating oral health into broader health policy and health care programming. In short, oral health must be included in all public health initiatives.

Increase prevention: The Inuit Oral Health Action plan recognized that most of the funding aimed at children and youth in northern Canada focus on treatment services. If any change is to be achieved, prevention must become the focus of decision makers. Historical approaches to treatment will continue and everyone needs some level of dental care, but not at the cost of evidence-based prevention, which has consistently shown a far greater impact on the oral health of populations. Starting in the prenatal years, involving schools, promoting and facilitating healthy food choices, delivering sealants, fluoride varnish, ART/IST, and promoting early visits to oral health care providers, can be very effective in the short- and long-term.

Improve treatment: With current practices and funding levels, treatment cannot respond to the overwhelming need experienced in Northern communities. Much of the disease remains untreated, and timely care is not the norm. Again, by engaging in clinical therapies where there is evidence (eg. sealants, ART/IST), and by engaging non-dental providers and opportunities in telehealth, some level of stabilization can be achieved such that the immediate burden of oral disease is controlled.

Engage and mobilize parents and caregivers: These groups are key partners in improving the oral health of children and youth. Community-developed educational and promotional materials will be more relevant to community members. Also, education opportunities for Northerners such that they become the oral health workforce of the future must be explored.

Engage and mobilize adolescents: In order for adolescents to make healthful decisions means involving them in the solutions. Social marketing campaigns and use of social media platforms can be a way to engage this important segment of the territorial population.

Increase the number of Aboriginal oral health service providers: Again, education opportunities for northerners such that they become the oral health workforce must be explored. With the closing of the National School of Dental Therapy, attention must be placed on partnerships with universities and other educational institutions to provide opportunities for education in the oral health professions. Programs like COHI also provide an opportunity for individuals to become involved in the oral health care solutions of their communities.

Improve use and access to nutritional foods: As above, oral health is linked to general health. Similarly, it is linked to healthy food. The promotion of healthy food choices can do a lot to improve health, including oral health. Reducing the consumption of soda and other high sugar drinks and foods will reduce one of the important risk factors in oral disease. Nevertheless, affordable food choices need to be secured. It should not be a fact of living in the North that soda costs less than milk and candy less than fruit.

In building on the Inuit Oral Health Action Plan, we now offer our recommendations and approaches to improving the oral health of children and youth in the Northwest Territories.

Re-envisioning Funding Envelope

Can the Northwest Territories ‘do more with what it already has?’ We believe so, but this will take leadership, a focus on prevention, positioning oral health in terms of general health, and negotiation with federal authorities in partnership with Aboriginal leadership in order to re-structure how funding flows into the Territories. Moreover, continuing what happens now is not a viable option.

We recommend re-envisioning the existing funding envelope, and creating a new ‘oral health’ funding envelope with existing treatment and preventive dollars. This new funding envelope can be used to make ‘oral health’ contributions within relevant health and wellness programs. This will facilitate the restructuring of current

programming along the lines of the common risk factor and integrated care approaches, and provides a way to use existing funds in new ways.

By having the ability to better use what has historically been spent, a more rational approach to the use of funds is possible. It could be, for example, that a single day can be taken off existing dental days, maybe even a single trip, and that money can be reinvested into evidence-based prevention. In particular, we envision efforts to fluoridate community water supplies, or to train providers to engage in screening and evidence-based prevention (eg. fluoride varnish), such as in the federal COHI program. We believe that this rerouting of funding could alleviate the burden of oral disease, such that more funds would become available over time for new preventive approaches, since historical expenditures would be maintained.

Actions

1. Engage federal authorities with Aboriginal leadership and re-envision the funding of dental care within the Northwest Territories.
2. Create an 'oral health' funding envelope that funds all activities, including 'oral health' contributions to relevant health and wellness programs.

Re-envisioning Service Delivery

It may be difficult to re-envision how service delivery is conducted in the Northwest Territories given the constant pressure and demand for care, but it must happen. What do we mean by this? As above, leadership must transition its thinking; here, from a clinical approach to oral health programming to a public health approach that privileges prevention.

Water, salt, and/or milk fluoridation, integrated care using non-oral health providers to screen, triage, and deliver proven and cost-effective oral health therapies such as fluoride varnish, along with other evidence-based oral health therapies are essential. Engaging youth, elders, and caregivers and other community leadership such as school representatives from the very beginning to find culturally relevant and appropriate care is essential. Engaging the common risk factor approach and the idea of health promoting schools, and finding ways for oral health to dovetail and structure into existing and new territorial programming, such as the Chronic Disease Management Strategy, are essential. This approach will position oral health in the context of general health, and will make it less of an insurance benefit provided through a billing system, and more of a health issue associated with public health programming.

In terms of the need for clinical care, a new approach is needed here as well. While dental days will remain for the foreseeable future, using dental teams made up of dentists, dental hygienists, dental therapists, dental assistants and community health aides instead of just dentists and dental assistants is an option to consider. These teams could travel to a community, see those children and youth who have been screened and triaged beforehand by other community health care providers, and each can provide the treatment and preventive care that is most appropriate for their scope of practice. Also, instead of paying on a fee for service basis, which incentivizes over-treatment and treatment based on what is covered in fee schedules, payment could be based on a per diem rate, but competitively structured with incentives such that under-treatment does not occur, and the provision of evidence-based care does. Incentives in this case could include setting treatment targets, and with the proper evaluation, could include bonuses if the oral health of communities improves.

Actions

1. Transition from a clinical approach to oral health programming to a public health approach that privileges prevention.
2. Create consistent messaging for leadership about how oral health impacts general health, and that oral health is health.
3. Explore the fluoridation of all community water supplies, and where this is not possible, explore salt and/or milk fluoridation.
4. Restructure programming along the lines of the common risk factor and integrated care approach, and dovetail oral health wherever possible into health and wellness programs.
5. Explore the screening, triaging, and provision of fluoride varnish by non-dental providers.
6. Explore the use of oral health teams and new ways of remunerating dental providers to incentivize evidence-based care.

Re-envisioning Program Planning and Evaluation

Re-envisioning funding and service delivery must be accompanied by a new approach to program planning and evaluation. As mentioned, all program planning must engage community leadership from the very beginning, as well as those involved in the programming, from administrators and providers to the clients. Similarly, evaluation of programming must evaluate outcomes that are relevant and meaningful to those that administer, provide, and receive the care.

One potential criticism of our recommendations and approach is that they are broad and sweeping, but it is this type of radical and critical strategy that is needed if the oral health of children and youth in the Northwest Territories is to improve.

In order to steward this type of change, we are also recommending that a dental director or chief oral health officer position be established within the territory. The federal government established such a position in 2004/05, as did Nunavut and Nova Scotia in 2012/13. Increasingly, jurisdictions across the country are recognizing that leadership and change management in oral health care requires the stewardship of someone who is a specialist in dental public health, or who has significant experience in the public oral health care sector. Such an individual can help manage the implementation of all the recommendations identified in this report. These include issues of governance, the creation of policy, standards, and clinical guidelines, improving access to care, effectively allocating resources, supporting front-line implementation of evidence-based care, building capacity through training of non-oral health providers, developing and advising on information systems and their relevance to oral health and oral health care, and in effective planning of evidence-based programming and its timely evaluation.

Actions

1. Establish an oral health director or chief oral health officer position for the Northwest Territories.
2. Develop clear program logic models that incorporate evidence and that involve all key stakeholders from the beginning.
3. Structure the evaluation of programming into the planning and implementation cycle, and measure outcomes that are relevant to communities, administrators, providers, and clients.

Demonstration Projects

Given our recommendations, there are numerous strategies that can be established with the aim to improve the oral health of children and youth in the Northwest Territories. Apart from exploring water, salt, or milk fluoridation as a first priority, we are recommending that the Territories begin with service delivery demonstration projects, much like the one currently occurring in Nunavut in partnership with the federal COHI program. These demonstration projects should target children 0-6 years of age, children 7-11 years of age, and Children and youth 12-16 years of age. In the demonstration project in Nunavut, for example, community development is at the core of the strategy, as is the use of oral health and non-oral health providers delivering evidence-based care (ie. fluoride varnish, ART/ IST).

Other opportunities are also available given the age stratification that we are proposing. For example, for children 0-6 years of age, coupling with existing pre- and post-natal interventions is possible, as is the delivery of preventive therapies in well baby and well child visits. For children 7-11 years of age, a health promoting school approach could be taken, where the school becomes the focus of oral disease prevention and oral health promotion interventions. For Children and youth 12-16 years of age, this can then be coupled with social media-based oral health promotion, and to succession planning by identifying high achieving youth and developing their interest in a career in oral health care. As recommended, all demonstration projects should be planned and implemented in partnership with stakeholders, and supported through adequate policy and funding support, as well as a strong evaluation program in order to identify areas of success, failure, and best practice.

CONCLUSIONS

In closing, we believe the Northwest Territories has the ‘burning platform’ to make significant improvements to oral health. Most people recognize the significant burden that poor oral health places on the children and youth of the Northwest Territories. Most people recognize the significant burden this places on the health care system, and the significant resources that are unnecessarily consumed for what is essentially a completely preventable condition. We have helped plant the seeds for what a ‘business case’ might look like for the integration of oral health within the health care system, and for

new approaches to the delivery of oral health care within the Territories. What is needed now are the ‘champions’ that can help steward the change that is needed in order to improve the oral health of children and youth within the Northwest Territories. Remember that in much the same way that teeth can re-mineralize at the early stages of decay, so too can people in the Northwest Territories restore oral health with effective public policy, healthy choices, and evidence-based care.

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Appendix A. Methodology

Our team has endeavored to develop an evidence based oral health strategy and action plan that complements a service delivery model – which can altogether provide the most appropriate and cost effective access to oral health services, particularly for children 16 years of age and under.

In doing so, we conducted targeted literature reviews privileging research with strong study designs and comparable populations, systematic reviews, and meta-analyses. We also searched the grey literature for best practices, reviewed historical reports to help ground our recommendations and to provide continuity of concepts, and conducted a jurisdictional review in Canada and internationally.

A working group was also assembled to assist in the gathering of information and was of great assistance in our efforts. Using this information, we inventoried the current service delivery environment and the oral health infrastructure, in part by traveling to communities in each of the regions while conducting research and analysis, as well as interviews with key stakeholders. This included consideration of relevant program costs and funding streams, systemic features, and legislation and policies.

Appendix B. Findings from Focus Groups and Key Stakeholder Interviews

Upon discussing oral health in Northwest Territories with key stakeholders, we recognized the following:

- Oral health may not always be a priority for people when dealing with other pressing issues, however, dental illness leads to further health issues.
- Availability of toothbrushes and other dental supplies for free distribution in communities is considered necessary.
- Community members could be involved in the promotion, scheduling, and follow-up of dental team visits to mobilize community awareness and participation.
- Community Health Representatives (CHRs) have access to children and mothers around birth and beyond and can play an integral role in oral health care delivery, particularly health promotion and disease prevention.
- It is important to find positive role models who can become community champions for oral health.
- Little Teeth Are a Big Deal received significant positive feedback as a health promotion and disease prevention program.
- There were mixed views on whether reaching children requires directing messages at their parents or the children themselves.
- Overall the approach to oral health care needs to be proactive rather than reactive and needs to focus on prevention as opposed to curative care.
- There is a need for policy and legislative change regarding food to make the right choices the easiest choices.
- Stress related to poverty can ultimately undermine oral health.
- There is a need for centralized leadership or a final voice for the Northwest Territories to address implementation, management, and address future concerns or inquiries.
- You cannot address oral health issues without recognizing issues relating to poverty, mental health, substance abuse etc.
- There is a need to dovetail dental programs into other health related programs such as perinatal classes and well child visits.
- Teachers and schools play an instrumental role in the oral health of children and their parents.

GNWT Phase-out of Sterilization in Health Centres

Medical sterilizers and dental sterilizers are used for very different objectives even if the goal with both is the same. Operating medical sterilizers requires thorough training. This role can be challenging due to the variety of materials involved, including rubber, plastic, liquid, metal, and organic waste. There are also numerous types of medical sterilizers available, each with its own unique operating procedures, and specifications. For example, sterilizers in hospitals can occupy an entire room.

On the other hand, operating a dental sterilizer is considerably different from operating a medical sterilizer. Instruments in dentistry are generally small metal items. Although small, these instruments are expensive and thus impractical to be discarded after only a single use.

The most widely used sterilizers in dentistry are portable, table-top, steam sterilizers. These sterilizers are designed for small items, such as hypodermic syringes, needles and dental instruments. The ability of the sterilizer to reach physical parameters necessary to achieve sterilization should be measured using mechanical, chemical, and biological indicators. For example, steam sterilizers usually include a temperature indicator which can be monitored. Typically, a marker is affixed to the outside of a sterilization bag, which enables monitoring of time and/or temperature parameters.

Positive test results (ie. sterilization failure) are rare and can be attributed to operator error. For example, non-adherence to manufacturer instructions, inadequate steam delivery, or equipment malfunctions.

Nonetheless, dentists and dental therapists receive detailed training on sterilization methods, principles, infection control, hand hygiene and standard precautions. Furthermore, dental therapists work under the supervision of a dentist as required by law.

Since dental professionals are well versed in the sterilization of dental instruments and due to the frequency of utilization, it would be impractical and very costly to transport items to a central sterilization centre. Moreover, in the dental environment, most instruments are not disposable.

As such, it is recommended to sterilize surgical instruments separately from other instruments and to monitor the sterility with biological indicators. These instruments shall only be reused when sterilization is complete and a negative indicator has been confirmed. In addition, the sterilizer should be located in separate room from the operatory in order to reduce the risk of cross-contamination. To further minimize any potential risk, we also recommend that all dental equipment and/or supplies available on a “single-use” basis be utilized wherever possible instead of “multi-use” options. These recommendations ensure that sterilization is conducted in a safe and practical manner, under proper supervision, and using the requisite expertise.

BRUSHING UP ON ORAL HEALTH NORTHWEST TERRITORIES 2014



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“In much the same way that teeth can remineralize at the early stages of decay, so too can people in the Northwest Territories restore oral health with