Brighter Smiles

Service Learning, Inter-professional Collaboration and Health Promotion in a First Nations Community

Rosamund L. Harrison, DMD, MS¹

Andrew J. MacNab, MB, MD²

Damian J. Duffy²

David H.J. Benton, BComm, LLB³

ABSTRACT

Objective: The goal of Brighter Smiles was to improve children's dental health in a remote First Nations community in British Columbia in the context of a service-learning experience for pediatrics residents.

Setting and Participants: The provincial Ministry of Health had competitive funds available for collaborations between remote communities and medical educators. Hartley Bay (Gitga'at), a tribe of the Tsimshian Nation, responded by declaring children's dental health to be a primary health concern. This northern community has an on-reserve population fluctuating around 200 people and is accessible only by air or water.

Intervention: A convenience sample of children had a baseline dental exam; parents also completed a questionnaire about dental health behaviours. Only 31% (4/13) of pre-kindergarten and 8% (2/26) of kindergarten to Grade 12 children had no dental caries. Planning of the Brighter Smiles intervention involved community leaders, teachers, parents, Elders, health care staff, pediatrics residents, and dental and medical faculty from the University of British Columbia (UBC). Brighter Smiles includes school-based brush-ins, fluoride programs, classroom presentations, and regular visits by UBC pediatrics residents to Hartley Bay to provide well-child care that includes age-appropriate dental counselling to parents at the clinic visits.

Outcomes: An early success indicator was a significantly increased proportion of dental service provider's time scheduled for preventive maintenance services rather than dental rehabilitation (restorations and extractions).

Conclusions: The goal of providing a service-learning experience for trainee pediatricians in a remote community has been achieved. In addition, early indicators demonstrate improvements in child oral health.

MeSH terms: Rural health services; education, medical, graduate; health promotion; oral health; ethnic groups

La traduction du résumé se trouve à la fin de l'article.

1. Department of Oral Health Sciences, University of British Columbia Faculty of Dentistry, Vancouver, BC

2. Department of Paediatrics, University of British Columbia Faculty of Medicine

3. Village of Hartley Bay

Correspondence: Rosamund Harrison, Department of Oral Health Sciences, UBC, 2199 Wesbrook Mall, Vancouver, BC V6T 1Z3, Tel: 604-822-2094, Fax: 604-822-3562, E-mail: rosha@interchange.ubc.ca

Acknowledgements: We thank Robert Robinson, Community Health Representative for Hartley Bay, and Mary Lou Walker, community dental hygienist, for their participation in and dedication to Brighter Smiles.

Disclaimer: The results and conclusions are solely those of the authors and not necessarily those of First Nations Inuit Health Branch, Health Canada, or the Ministry of Health of the province of British Columbia.

Financial support: Ministry of Health, Special Populations Initiative and Northern Health - Aboriginal Health Initiatives Program British Columbia

First Nations groups in Canada have made significant progress on many important issues, including self-government and land claims, but the health of their people continues to lag behind that of other Canadians. Nowhere is this imbalance more evident than in the area of dental health. Although steady reduction in the prevalence of dental decay in older children has been reported,¹ the extent and severity of dental caries in young Aboriginal children remains alarming.²⁻⁶ In addition, malocclusion is a widespread and consistent oral finding in First Nations youth.⁷ Costly treatment programs alone will never be able to take care of the existing oral health problems. However, culturally-appropriate, community-based oral health promotion initiatives may lead to measurable improvements in oral health.^{8,9} Indeed, First Nations themselves have requested improved access to preventive dental services.¹⁰

Rural settings, including First Nations communities, continue to be underserved by physicians and medical specialists. Developing greater empathy for the needs of an underserved population is more likely to occur if medical trainees have experience working with "special populations" during their training programs.¹¹ In 2001, the B.C. Ministry of Health, in collaboration with the University of British Columbia (UBC) Faculty of Medicine, launched the Special Populations Initiative, a program to support teaching and research initiatives that address the care of populations whose health status and/or access to services is at greater risk or measurably lower than that of the general population. As a direct result of this funding opportunity and in response to a need expressed by the community of Hartley Bay, a First Nations village in British Columbia, the Brighter Smiles program was developed.

The global service learning goal of Brighter Smiles was to provide a learning and service experience for UBC pediatric medical residents in a remote First Nations community. The other goal was to design and implement a program to improve the oral health of the community's children. The purpose of this paper is to explain the development and implementation of Brighter Smiles and also to describe some early indicators of the program's success.

SETTING, PARTICIPANTS AND INTERVENTION

Setting

Hartley Bay (Gitga'at), part of the Tsimshian Nation, is a First Nations village located on Douglas Channel, 135 km south of Prince Rupert, BC. About 200 people are resident in Hartley Bay. Transportation in and out of the village is by boat or float plane. The community is built around a network of boardwalks and all movement is on foot, or by all-terrain vehicles or water transport.

Prior to Brighter Smiles, regular pediatric services were not available in the community. A First Nations Inuit Health Branch (FNIHB) dental therapist provided intermittent dental treatment services. Community-wide or school-based dental prevention programs did not exist. Hartley Bay was similar to other First Nations' villages: the community was quite inaccessible, the population was relatively young, and health services were inconsistent.

Participants

After initial correspondence with Hartley Bay community members who identified children's dental health as an issue of concern, members of the Brighter Smiles "team" from UBC travelled to Hartley Bay to meet with community representatives including the elected and hereditary Band chiefs, the Band Council, village Elders, the school principal and teachers, the Health Director, and the community health representative (CHR). These initial meetings were followed up with another visit to Hartley Bay that also involved the FNIHB dental therapist with responsibility for Hartley Bay, the regional FNIHB Dental Director, and a provincial Ministry of Health community dental hygienist.

At both of these site visits to Hartley Bay, dental examinations were completed on a convenience sample of children. One calibrated examiner and a recorder conducted the dental exams. Results of the screening examinations are shown in Table I. In addition, a larger sample of parents of pre-kindergarten children to Grade 12 youth completed 12-item pre-tested questionnaires that explored their child's current dental health behaviours. Selected results are in Table II.

TABLE I

Dental Health Status of Sample of Hartley Bay Children (N=39) Prior to Brighter Smiles

Pre-Kindergarten children (N=13)	
Age in years, mean (SD)	3.7 (1.2)
dmfs*: mean (SD)	9.9 (12.1)
Proportion of children caries-free	4/13 (31%)
Kindergarten to Grade 12 children (N=26)	
Age in years, mean (SD)	10.0 (2.9)
DMFS†: mean (SD)	5.7 (6.2)
Proportion of children caries-free	2/26 (8%)

* dmfs = mean number of decayed, missing and filled primary tooth surfaces per child

† DMFS = number of decayed, missing and filled permanent tooth surfaces per child

TABLE II

Dental Health Behaviours of Hartley Bay Children (N=74) Prior to Brighter Smiles

	Proportion (%) of children
Pre-Kindergarten children (N=16)	
Age in years, mean (SD)	2.5 (1.7)
Teeth brushed daily with toothpaste by adult	5/14 (35.7%)
Never had sleep-time bottle	5/15 (33.3%)
Never carried a snacking bottle* during the day	7/15 (46.5%)
Kindergarten to Grade 12 children (N=58)	
Age in years, mean (SD)	12.4 (3.3)
Teeth brushed daily with toothpaste	55/58 (94.8%)
Visits dentist only when in pain	11/57 (19.2%)
Eats candy less than 3 times weekly	5/57 (8.7%)
Drinks pop less than 3 times weekly	11/58 (18.9%)

* Snacking bottle is a bottle containing anything but water that the child carries around and drinks from throughout the day

TABLE III

Example of Age-appropriate Oral Health Anticipatory Guidance Questions for Parents of Children 6-24 Months of Age*

1. For child's mother only: Have you had a visit to the dentist in the past year? Do you brush your own teeth at least twice a day with toothpaste?
2. Look to see if child has teeth. Demonstrate to parent how to look at child's teeth. Do you brush your child's teeth twice a day with a baby toothbrush and toothpaste?
3. Do you let your child lie down, sit, or walk around with a bottle or sippy cup containing something other than water? When are you planning to start switching from bottle to regular cup?
4. Have you made an appointment for your child to see the dental therapist or your family dentist?

* Complete set of age-appropriate anticipatory guidance questions with rationale available from corresponding author

TABLE IV

Brighter Smiles Team Activities in Hartley Bay 2002 to 2004

	2002*	2003	2004	Total
Visits to Hartley Bay by UBC team	2	9	7	18
Number of pediatrics residents visiting Hartley Bay	4	18	13	35
Number of specialist pediatricians attending with residents	2	9	7	18
Child-patient visits at health clinic with pediatrics residents	24	131	140	295
Classroom presentations by residents	2	8	5	15
Presentations by Brighter Smiles team to community†	3	11	1	15

* Only two visits in 2002 as program began near year's end

† Examples include in-service presentations to health clinic staff on cancer, to caregivers on nutrition education, and to school staff about oral hygiene practices

Intervention

The program was designed to fulfill the overall service-learning goal for pediatric trainees and, at the same time, to include an oral health promotion component. Program planning combined the wisdom of community members, especially the Elders, with results of the dental screening, evidence from the literature, and previous

experience by team members, especially those from the Faculty of Dentistry who had extensive background in community-based oral health promotion.^{4,9}

Funding was available from the project grant for regular visits to Hartley Bay by UBC pediatrics residents accompanied by an attending specialist pediatrician. These visits, occurring about every two months,

TABLE V

Comparison of Time Units Needed to Complete Dental Treatment for Children in Hartley Bay and in "Comparison Community": 2001 and 2004

	2001 (N=34)	Hartley Bay 2004 (N=49)	Chi-square; p-value	2001 (N=49)	"Comparison community" 2004 (N=71)	Chi-square; p-value
Time units for						
Restorations*	137	68	20.0; p≤0.001	181	137	6.6; p≤0.025
Extractions of primary teeth	35	14	6.96; p≤0.01	34	44	1.7; p≤0.2
Preventive therapy†	288	301	12.5; p≤0.001	355	368	2.1; p≤0.2
All treatment‡	474	418		598	580	

* Amalgam and composite resin "fillings" and stainless steel crowns

† Cleaning, fluoride treatment, fissure sealants, and preventive resins

‡ All examinations and treatment plans by one standardized FNIHB dentist-examiner

provided ongoing high-quality pediatric care. The key elements of the Brighter Smiles community oral health program (<http://www.knowledgenetwork.ca/brightersmiles/>) were the following:

1. School-based daily "brush-ins" in which children, supervised by teachers or nursing station staff, brushed their teeth daily with fluoride toothpaste.
2. Weekly fluoride rinses for youth 9 years of age and older or tri-annual fluoride varnish applications for children under 9 years of age. Incentives for participation in brush-ins and fluoride programs were weekly cash draws for older children and small prizes for the younger children.
3. Dental health issues integrated into age-appropriate anticipatory guidance provided by pediatrics residents at health clinic visits. Examples of the oral health messages given at a specific well-child visit are in Table III.
4. Classroom presentations given by visiting residents emphasizing oral health topics, but also other issues, for example, nutrition, tobacco use, and medical careers.

Pediatric residency training programs generally include limited learning opportunities about oral health, despite the fact that dental decay is a common child health concern.¹² In order to prepare trainees for their rotation to Hartley Bay, each resident was required to spend at least a day with a member of the B.C. Children's hospital dental staff in either the dental operating room or in the dental outpatient clinic. In addition, dental health topics are part of regularly scheduled academic half-days. Extensive resource materials are also available in the Hartley Bay clinic.

The community-based activities are managed and supervised by the communi-

ty's Health Director and his staff. Expert support is provided by a community dental hygienist who visits the community twice a year to review each child's oral hygiene. The hygienist also helps to problem-solve any concerns related to the fluoride programs.

OUTCOMES

Process measures

Initial funding for Brighter Smiles was for a two-year period, which included time for project development. Brighter Smiles has since been "promoted" to program status by the Special Populations Initiative and receives ongoing funding. Table IV enumerates the pediatrics residents' visits to Hartley Bay over the first two-plus years of the project. Participation in the school brush-in and fluoride program is usually 100% of eligible children.

Indicators of success

A follow-up dental health survey is planned as part of program evaluation after Brighter Smiles has been in place for a few more years, but, in the interim, other indicators of the project's success are available. On an annual basis, the provincial FNIHB dentist, using a standardized protocol, examines and "treatment plans" all on-reserve First Nations children in the province. Selected treatment needs of children before and about 18 months after Brighter Smiles was fully implemented, are compared in Table V. Treatment needs for a similarly-sized, neighbouring First Nations community over the same time period is provided for comparison (Table V). In addition, in her six visits to the community, the consultant dental hygienist has informally reported noticeable improvement in oral hygiene in the majority of children.

DISCUSSION

Since Brighter Smiles began, all pediatrics residents in the UBC program have had a rotation to Hartley Bay. The urban hospital where the residents do the majority of their training provides extensive experience in managing severely medically-compromised children, but scant experience in the primary care of "healthy" children. As a result of Brighter Smiles, pediatrics residents now receive essential experience in a primary care setting. Of even more importance is that the setting includes children with whom they normally have limited interaction, namely rural, Aboriginal children and youth. Evidence suggests that medical specialists are more likely to treat patients who are normally disadvantaged in our medical system if there has been exposure to them during their training.¹¹ Ongoing project evaluation will include follow-up on the resident's practice profiles after completion of their training.

In addition, the children of Hartley Bay have had the benefit of the expertise of pediatricians-in-training accompanied by attending specialists in pediatric medicine. Together they have offered the community an exceptional level of child health care. In addition, the entire community benefits from on-site physicians to help triage medical emergencies.

A further positive outcome has been that trainee pediatricians received enhanced education about oral health, for example, the basics of examining a child's mouth. They are now aware of the physician's role in improving child oral health.¹³ Certainly, since young children more commonly see a physician than a dentist and given that there will never be enough dental professionals to treat existing dental disease, physicians can play a strategic role in resolving the public health disaster of dental caries in First Nations children.¹²

Early indicators of the effect of Brighter Smiles on oral health are represented by results of the FNIHB dentist's yearly oral examinations. A positive trend is the significant increase in the proportion of the dental therapist's planned "service time" scheduled for preventive maintenance services, rather than restorative and surgical services (Table V). Such a change was not observed in the comparison community. Another noteworthy trend in Hartley Bay, not observed in the comparison community, was a significant reduction in the proportion of therapist's time scheduled for extraction of primary teeth.

Brighter Smiles has contributed to community capacity-building. Residents of the community such as the Health Director and the CHR have mastered new skills ranging from organizing school-based prevention programs to managing the behaviour of preschool children well enough to allow repeated applications of fluoride varnish. Monies applied for and successfully received by the community from other agencies have provided supplemental funding. Furthermore, Hartley Bay residents now view research as something other than being "guinea pigs" in an experiment;¹⁴ research can be a creative means of addressing their community's health care needs.

Some caution is required before extrapolating this experience to other First Nations communities. The small population and compact nature of Hartley Bay combined with committed "key players" fostered efficient implementation of the program. These characteristics are rare in remote, First Nations communities where the population is often widely scattered over a vast geographic area. The diverse and abundant health challenges of First Nations communities in combination with over-burdened human resources may also mean that, while important, dental health is not a major priority.

For researchers to respond effectively to a community's health issues, the community must articulate their concerns and the researchers must respond appropriately. The collaboration between UBC and Hartley Bay was expedited when the community identified that children's dental health was a concern. Unfortunately, such

shared decision-making does not always take place.

However, despite these cautions, many of the lessons learned in Hartley Bay are applicable to other communities. Indeed, a nearby community has requested a program similar to Brighter Smiles and pediatric residents have already extended their rotations to include this community.

REFERENCES

1. Harrison RL, Davis DW. Caries experience of Native children of British Columbia, Canada, 1980-1988. *Community Dent Oral Epidemiol* 1993;21(2):102-7.
2. Albert RJ, Cantin RY, Cross HG, Castaldi CR. Nursing caries in the Inuit children of the Keewatin. *J Can Dent Assoc* 1988;54(10):751-58.
3. O'Sullivan DM, Douglass JM, Champany R, Eberling S, Tetrev S, Tinanoff N. Dental caries prevalence and treatment among Navajo preschool children. *J Public Health Dent* 1994;54(3):139-44.
4. Harrison R, White L. A community-based approach to infant and child oral health promotion in a British Columbia First Nations community. *Can J Community Dent* 1997;12:7-14.
5. Peressini S, Leake JL, Mayhall JT, Maar M, Trudeau R. Prevalence of early childhood caries among First Nations children, District of Manitoulin, Ontario. *Int J Paediatr Dent* 2004;14(2):101-10.
6. Lawrence HP, Romanetz M, Rutherford L, Cappel L, Binguis D, Rogers JB. Oral health of

- Aboriginal preschool children in Northern Ontario. *Probe* 2004;38(4):172-90.
7. Harrison RL, Davis DW. Dental malocclusion in native children of British Columbia, Canada. *Community Dent Oral Epidemiol* 1996;24(3):217-21.
 8. Bruerd B, Jones C. Preventing baby bottle tooth decay: Eight-year results. *Public Health Rep* 1996;111(1):63-65.
 9. Harrison RL, Wong T. An oral health promotion program for an urban minority population of preschool children. *Community Dent Oral Epidemiol* 2003;31(5):392-99.
 10. Wien F, McIntyre L. (First Nations and Inuit Health Survey National Steering Committee). Health and dental services for Aboriginal people, Chapter 7. 1997.
 11. Weitzman CC, Freudigman K, Schonfeld DJ, Leventhal JM. Care to underserved children: Residents' attitudes and experiences. *Pediatrics* 2000;106(5):1022-27.
 12. Lewis CW, Grossman DC, Domoto PK, Deyo RA. The role of the pediatrician in the oral health of children: A national survey. *Pediatrics* 2000;106(6):E84.
 13. Mouradian WE, Schaad DC, Kim S, Leggott PJ, Domoto PS, Maier R, et al. Addressing disparities in children's oral health: A dental-medical partnership to train family practice residents. *J Dent Educ* 2003;67(8):886-95.
 14. Haley L. First Nations community commits to better health. *The Medical Post* 2004 January 20;2.

Received: January 21, 2005

Revisions requested: March 29, 2005 and August 4, 2005

Revised mss: May 24, 2005 and August 5, 2005

Accepted: August 24, 2005

RÉSUMÉ

Objectif : Le projet *Brighter Smiles* visait à améliorer la santé dentaire des enfants d'une communauté éloignée des Premières nations, en Colombie-Britannique, dans le contexte d'une expérience d'apprentissage des services à l'intention des médecins résidents en pédiatrie.

Lieu et participants : Le ministère provincial de la Santé disposait de fonds concurrentiels pour des mesures de collaboration entre des communautés éloignées et des professeurs en médecine. La Bande indienne de Hartley Bay (Gitga'at), une tribu de la nation tsimshiane, a répondu à l'appel en déclarant que la santé dentaire des enfants était l'une de ses principales préoccupations en matière de santé. Cette communauté nordique a une population d'environ 200 personnes vivant dans une réserve et n'est accessible que par avion et par bateau.

Intervention : On a administré un premier examen dentaire à un échantillon de commodité composé d'enfants; les parents ont aussi répondu à un questionnaire sur les habitudes de santé dentaire de leurs enfants. Seulement 31 % (4/13) des enfants qui ne fréquentaient pas encore la maternelle et 8 % (2/26) des enfants de la maternelle à la 12^e année n'avaient aucune carie dentaire. Pour planifier le projet, on a fait appel à des dirigeants communautaires, des enseignants, des parents, des aînés, du personnel médical, des médecins résidents en pédiatrie et des membres des facultés de médecine et de soins dentaires de l'Université de la Colombie-Britannique (UBC). Le projet comportait des séances de brossage des dents en milieu scolaire, des programmes de fluorure, des présentations en salle de classe et des visites périodiques à Hartley Bay par des médecins résidents en pédiatrie de UBC pour offrir des services de consultation pédiatrique, y compris des conseils dentaires aux parents adaptés à l'âge de l'enfant.

Résultats : L'un des premiers indicateurs de réussite du projet a été la proportion significativement accrue du temps des dispensateurs de soins dentaires réservé aux services d'entretien préventif plutôt qu'à la réhabilitation orale (restaurations et extractions).

Conclusions : L'objectif d'offrir aux stagiaires en pédiatrie une expérience d'apprentissage des services dans une communauté éloignée a été atteint. De plus, des indicateurs précoces montrent que la santé bucco-dentaire des enfants s'est améliorée.