

Appendix 16: Dental disease: evidence review for newly arriving immigrants and refugees

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ABSTRACT

Background: Dental disease is the most prevalent disease among humans; dental caries affect virtually 100% of adults and 60%–90% of children. More than 90% of adults have gingivitis, and 5%–20% have periodontal disease. These preventable chronic diseases have important implications for health and quality of life. We conducted an evidence review for actions to be taken by primary care practitioners to optimize oral health for immigrant populations.

Methods: We systematically examined evidence on basic oral health screening and referral and approaches for dental pain and other dental disorders that included benefits and harms, applicability, clinical considerations and implementation issues. Quality of evidence was assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach.

Results: Dental disease is up to five times more prevalent in developing countries; however, certain populations within developed countries, including new immigrants, bear similar oral health burdens. Professional dental care is effective in prevention and reduction of common dental disease. Screening and dental referral by physicians can double the uptake of dental treatments. Nonsteroidal anti-inflammatory drugs provide the most effective analgesia for oral pain. Physicians are beginning to include oral health within their range of care.

Interpretation: Immigrants and refugees typically face higher rates of dental disease than do Canadian-born people. This review supports basic oral health screening in conjunction with referral to a dentist to address prevention and treatment of dental disease and supports prescription of nonsteroidal anti-inflammatory drugs for dental pain without systemic symptoms.

Competing interests: None declared.

Contributors: All of the authors contributed to the conception and refinements of the study design and the analysis and interpretation of the data. Mary McNally drafted the initial manuscript, and all of the other authors provided critical revisions. All of the authors approved the final manuscript submitted for publication.

Acknowledgements: We acknowledge the funding support of the Office of the Chief Dental Officer, Health Canada, and acknowledge Lynn Dunikowski for providing expert librarian support. Additionally, we would like to thank Ayesha Ratnayake, Ricardo Batista and Roo Deinstadt for their editing and formatting support.

Funding: The authors acknowledge the funding support of the Canadian Institutes of Health Research Institute of Health Services and Policy Research, the Champlain Local Health Integration Network, and the Calgary Refugee Program. The Public Health Agency of Canada (PHAC) contributed funding for the development and publication of reviews of the scientific evidence on select topics related to PHAC programs of work. The conclusions and recommendations made in the guidelines were independently developed by the Canadian Collaboration for Immigrant and Refugee Health. The views expressed in this report are the views of the authors and do not necessarily reflect those of PHAC and other funders.

The cases

Nanette is a six-year-old Filipino girl who has recently immigrated to Halifax with her parents and three siblings. She presents with her mother, a nurse, who reports that she has been refusing to eat for several weeks. Nanette does not have a fever or other signs of illness. Her mother initially thought her daughter's change in behaviour was related to her adjusting to the move and being exposed to unfamiliar food, but is now more concerned because Nanette has a very small stature and appears to have lost weight. Would she benefit from dental screening and referral?

Mihai is a 38-year-old skilled labourer who recently immigrated to Calgary from Romania and is temporarily living with his sister, who has been in Alberta for several years. He complains of severe mouth pain that is originating in the lower left side. With his sister as an interpreter, he reports that he is not experiencing fever. What evidence-informed actions could a primary care provider take?

Introduction

Many conditions affect oral health. The US Surgeon General describes poor oral health as a "silent epidemic" that greatly diminishes quality of life and restricts activities of school, work and daily living in many population groups.¹ The most common oral conditions are dental caries (cavities) and periodontal disease (bone loss around the teeth).^{1,2} Dental caries affect virtually 100% of adults and 60%–90% of children worldwide, and periodontal disease is found in 5%–20% of most adult populations.² Both are preventable chronic infectious diseases influenced by sociobehavioural, economic and environmental risk factors.¹⁻³

Caries and periodontal diseases are rarely associated with mortality although there is substantial risk for morbidity.¹ In addition to oral pain, infection, tooth loss and associated dysfunction, these chronic oral conditions are known to have a profound effect on general health and quality of life.^{1,4} Pain and disability associated with poor oral health can compromise one's ability to eat properly, affecting nutrition status and body weight of both children and older adults.⁵ Oral health problems are among the highest priority needs for health services among children in both the United States^{1,6} and Canada⁷ with higher risks associated with poverty, race or ethnicity.^{1,8}

A growing body of evidence suggests that physicians are willing to include oral health within their range of care⁹ and that they are increasingly being called upon to do so.^{10,11} Primary care physicians and nurses are typically

the first point of contact for refugees and immigrants, and possibly the only point of contact with the Canadian health care system during their settlement period. Accordingly, oral health should be included in early assessments. We conducted an evidence review to guide primary care practitioners in the early detection, prevention and treatment of common oral conditions for newly arriving immigrants. The Recommendations on screening for and treating oral conditions from the Canadian Collaboration for Immigrant and Refugee Health are found in Box 1.

Box 1: Recommendations on dental disease from the Canadian Collaboration for Immigrant and Refugee Health

Screen for dental pain (asking, "Do you have any problems or pain with your mouth, teeth or dentures"). Treat dental pain with nonsteroidal anti-inflammatory drugs and refer patients to a dentist.

Screen for obvious dental caries and oral disease in children and adults (examine mouth with penlight and tongue depressor). Refer patients with obvious dental disease to a dentist or oral health specialist.

Basis of recommendation

- **Balance of benefits and harms:** Screening and treating dental pain led to a significant decrease in pain and swelling (number needed to treat [NNT] 34, 95% confidence interval [CI] not estimable). Screening and referring patients for treatment of dental disease led to a significant decrease in dental caries (NNT 2.9, 95% CI 2.1–3.4). Given the higher prevalence of dental caries in new immigrants (adolescents: 23% v. 3.5% of Canadian-born), the number needed to screen and NNT for net benefits is expected to be lower despite potential issues affecting access to care. Harms for pain control were minimal and included adverse events from short-term nonsteroidal anti-inflammatory drugs. Harms for referral included patient-borne costs and discomfort or anxiety.
- **Quality of evidence:** Moderate
- **Values and preferences:** The Guideline Committee attributed more value to reducing dental pain and less value to the small risk of adverse gastrointestinal effects with nonsteroidal anti-inflammatory drug therapy. For referrals, the Guideline Committee attributed more value to reducing oral health disparities in immigrant communities and less value to burden of screening and potential costs of dental care for patients.

Methods

We used the 14-step method developed by the Canadian Collaboration for Immigrant and Refugee Health.¹² We constructed a clinician summary table to highlight the epidemiology of oral disease within this population, population-specific clinical considerations and potential key clinical actions (Appendix 4). We developed a logic model to define the clinical preventive action (intervention), outcomes, and key questions.

We assessed evidence and guidelines on primary care screening, on dental health education, and on referral and management of acute pain and infection for both the general population and immigrants and refugees. To determine the applicability of guidelines and findings, our search was complemented by examining population-specific considerations that included baseline risk, morbidity associated with oral conditions, genetic and cultural factors, and adherence variation related to barriers and access to dental care.

Search strategy for systematic reviews, guidelines and population-specific literature

In consultation with a librarian, we identified appropriate search terms and relevant systematic reviews (including those that might be contained in guideline documents) from electronic databases to assess evidence on primary care screening, dental health education, referral, and management of acute pain and infection. The following databases were searched (1996–2007): MEDLINE, PubMed, Healthstar, Cochrane Database Systematic Reviews, ACP Journal Club, DARE, EMBASE, CINAHL. Consultation with an expert in dental clinical guidelines resulted in a search using additional databases: National Guideline Clearinghouse (www.guideline.gov); Scottish Intercollegiate Guidelines Network (www.sign.ac.uk); Canadian Dental Association (www.cda-adc.ca); and National Institute for Health and Clinical Excellence (www.nice.org.uk). In addition, the Centre for Evidence-Based Dentistry website (www.cebd.org) was reviewed for lists of systematic reviews and guidelines. The search was limited to English-language articles.

All citations as well as relevant manuscripts were reviewed independently by two team members to determine whether they met our criteria for population, intervention, comparison and outcomes. Disagreements were resolved by discussion and consensus. All studies meeting the inclusion criteria underwent validity assessment and data extraction. Using the full text of selected publications, at least two reviewers assessed the quality of each paper according to predefined criteria

using the National Institute for Health and Clinical Evidence critical appraisal tool for systematic reviews to assess systematicity (the review must apply a consistent and comprehensive approach), transparency, quality of methods, and relevance. Guidelines were assessed using the Appraisal of Guidelines for Research and Evaluation (AGREE) tool (www.AGREEtrust.org).

A search to identify new primary studies related to dental screening and to assess promising interventions identified in the previous search was conducted to include all studies after the date of the initial search. The review process required that we revisit key clinical preventive actions and the logic model in light of the evidence. Our initial search revealed a dearth of direct evidence demonstrating that referral to a dentist by primary care practitioners provides clinical benefit. The expert panel concluded that referral to a dentist was vital to reducing morbidity related to oral disease. Therefore, we examined indirect evidence through an additional focused literature search to determine whether prevention interventions and treatment of dental disease by dentists leads to improved clinical outcomes. A comprehensive search of all dental prevention and management approaches was beyond the scope of this review. Therefore, justification for dental referral arising from the Scottish Intercollegiate Guidelines Network 47 (SIGN)¹³ provided a basis for this focused search. According to this guideline (Appendix 2), dental caries is effectively prevented and managed with as early a referral as possible. A search to update evidence on these and other preventive and treatment approaches was conducted (July 2008) using the following databases: PubMed, Cochrane Database Systemic Reviews, Centre for Evidence-based Dentistry, and the National Guideline Clearinghouse.

Using the same databases as the initial search, a separate targeted literature search was conducted to identify population-specific concerns, categorized as baseline risk or prevalence, risk of clinically important outcomes, genetic and cultural factors (e.g., preferences, values, knowledge) and adherence variation (including at the level of primary care practitioners or patients). Experts on the team supplemented these articles through hand searches of the *Journal of Dental Research*, *Community Dentistry and Epidemiology*, *British Dental Journal* and *Journal of the Canadian Dental Association* (January 2008). An updating search, focusing on randomized controlled trials and systematic reviews during the period January 1, 2008–January 1, 2010, was conducted to determine whether any recent publications would change the position of the recommendation.

Synthesis of evidence and values

Manuscripts were included if they were related to screening, dental health education, dental referral, and treatment of dental pain and infection by primary care practitioners. In the absence of systematic reviews or guidelines, randomized controlled trials and prospective studies were included. Titles related to “tooth migration” as well as education “of” (as opposed to “by”) primary care clinicians were excluded. We compiled the evidence from systematic reviews and pertinent clinical trials using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) summary of findings tables,¹⁴ which assess both relative and absolute effects of interventions (Box 2). We appraised the quality of evidence for each outcome using the GRADE quality-assessment tool, which assesses study limitations, directness, precision, consistency and publication bias across all studies. In the synthesis of data on clinical considerations, we reported implementation issues. Finally, we identified gaps in the evidence.

Results

Our search found no systematic reviews or evidence-based guidelines related to prevention or management of common oral conditions by primary care practitioners specific to immigrants and refugees. When we expanded the search to include the general population, we identified 1605 titles. The initial selection produced thirty-five relevant manuscripts; three high-quality systematic reviews¹⁵⁻¹⁷ met the inclusion criteria. The focused searches resulted in two additional systematic reviews^{18,19} and five relevant evidence-based, consensus-driven guidelines (Appendix 2). The search update provided one relevant manuscript²⁰ not included in the development of the guidelines. The focused search for preventive and restorative interventions to provide indirect evidence for dental referral yielded 10 high-quality systematic reviews.²¹⁻³⁰ A total of fifty-three full-text articles were assessed for eligibility (Appendix 1).

The databases searched to obtain information on population-specific clinical considerations for immigrants and refugees identified 931 titles and a total of 326 titles and abstracts were assessed for relevance by two reviewers. Fifty-six articles addressing the key extrapolation questions and issues (e.g., prevalence, burden of disease, disease risk, access to care, language and cultural barriers) were selected for detailed review.

Appendix 3 summarizes results from the AGREE instrument for guidelines. The Guidelines Committee considered screening tests and dental referral and management of dental pain to be clinical actions that

were most feasible and applicable for primary care practitioners.

What is the burden of oral disease in immigrants and refugees?

Dental disease is more prevalent in developing countries,² yet certain vulnerable populations within developed countries (including new immigrants and refugees) bear similar oral health burdens.^{1,2,8} Although no representative data profile the oral health status of newly arriving immigrants and refugees to Canada, several studies demonstrate a higher prevalence of disease³¹⁻³³ and limited awareness or use of professional and preventive dental care.^{34,35} Immigrants arriving from many developing countries can also be expected to have had little exposure to basic preventive or restorative care.²

An Ontario study comparing dental caries in adolescent children born within and outside Canada was identified.³³ Immigrant subjects were five times more likely to have dental caries than children born in Canada. Of those children arriving in Canada within the previous two years, 22.9% required restorative dental care compared with only 3.5% of those born in Canada. Although levels of disease decreased relative to length of time in Canada, immigrant adolescents continued to be at a disadvantage for dental caries, gingivitis and level of oral hygiene when compared with their Canadian counterparts. These findings were consistent with an earlier study³¹ where a cohort of disadvantaged adolescents (including immigrants) demonstrated higher rates of moderate to severe gingival inflammation and untreated dental decay. Extensive early childhood caries has also been found in Canadian Vietnamese preschool children.³² Similar patterns are reported for families migrating to other developed countries that are recipients of immigrants and refugees including multiple European countries,³⁶⁻⁴⁴ Australia^{45,46} and the US.⁴⁷⁻⁵²

Few general population studies controlled for immigrant status. One American study demonstrated higher rates of dental caries among refugee children, with the highest rate observed among children from Eastern Europe. These children were 9.4 times more likely to have untreated dental caries than white Americans.⁶ Epidemiologic information from the World Health Organization shows that development of caries is on the rise in developing countries in Africa and Asia. The increased consumption of refined sugar coupled with inadequate exposure to topical fluorides available in toothpastes and professionally applied fluoride products available in developed nations contribute to high rates of disease.²

Does screening for dental disease decrease morbidity from common oral diseases?

Screening

Intermediate benefits for screening and referral include improved health of gums and teeth and reduced morbidity. Overall, the indirect evidence in support of screening and referral was assessed by the GRADE method as moderate quality (Table 1). Potential harms include discomfort and anxiety associated with dental interventions and identification of a condition without assurances that care is accessible or affordable. Access barriers for those at the greatest risk are attributed to financial, language and cultural barriers.¹ However, these risks could not be quantified as indicated for the GRADE process.

The US Task Force on Preventive Services guideline⁵³ (Appendix 2) does not recommend or warn against routine screening by primary care clinicians. However, a systematic review¹⁵ and a randomized controlled trial subsequent to the systematic review²⁰ provide evidence that physicians can screen preschool children for dental caries with a high degree of accuracy. Scottish Intercollegiate Guidelines Network^{13,54} (Appendix 2) cite low-level evidence to support dental referral. Our adjunct search on the efficacy of dental intervention provides additional evidence to support referral to a dentist.

Relative benefits and harms of treatment

The most relevant benefit for screening and referral is the reduction of morbidity through prevention and management of dental disease²⁸ (Table 1). Potential harms include cost to patients to access dental care and adverse reaction to treatment. The management of underlying causes of dental pain by dentists is effective,^{17-55,56} supporting the importance of dental referral for obvious dental disease.²⁶⁻²⁸ Nonsteroidal anti-inflammatory drugs manage oral pain effectively (Table 2).¹⁷ Antibiotics should be prescribed only in the presence of concomitant systemic symptoms, such as lymphadenopathy, fever, and associated cellulitis.⁵⁷ Single-dose studies showed no difference in short-term adverse effects between oral ibuprofen and placebo.^{58,59} In patients given nonsteroidal anti-inflammatory drugs over longer periods, adverse reactions included abdominal pain, diarrhea, edema, dry mouth, rash, dizziness, headache and fatigue. These are generally considered to be mild to moderately severe.⁶⁰

Clinical considerations

Are immigrants screened for oral health?

All immigrants to Canada undergo an immigration medical examination, but screening for oral health is limited to a single assessment of whether ear, nose, throat, mouth and teeth are normal or abnormal. There is no referral mechanism if problems are identified during the clinical examination. Because primary care practitioners are likely the first point of contact with the Canadian health care system for new immigrants and refugees, screening and referral for dental needs is central to initiating and facilitating appropriate care.

What are potential implementation issues?

Psychological obstacles: Experiential influences (fear of dentists, history of inadequate care and patients' embarrassment over oral condition) are likely hindrances for people who require professional dental care. However, when a nondentist refers on the basis of an oral health screening, people are twice as likely to go to the dentist.¹⁵ Introduction of physician guidelines emphasizing a protocol for dental clinic referrals and the use of nonsteroidal anti-inflammatory drugs for patients with odontalgia has been shown to reduce visits to the emergency department.⁶¹ Referrals should not be limited to a passive or verbal recommendation by a physician. Rather, an active referral (e.g., specific clinics identified, a patient information notice) is warranted.⁶¹

Cultural and socioeconomic considerations: Health of a population has long been recognized as strongly linked to social and economic determinants of health. For example, in the United Kingdom, oral health is compromised as a result of the cost of treatment, economic deprivation, difficulties meeting basic needs, lack of education on oral health and lack of dentists.⁶² In Quebec, Bedos and coworkers^{34,63} have demonstrated important links to socioeconomic status and access to care. Lower income and immigrant status are both associated with fewer visits for preventive dental care, and immigrants endure longer waits before initiating dental treatment when needed.³⁴ Language barriers have been well documented as reducing access to services and quality of care provided to people from non-English-speaking backgrounds in the US⁶⁴ and Australia.^{65,66}

While language and economic barriers are relevant for new immigrants and refugees, our search revealed a dearth of meaningful evidence showing other potential influences on implementing clinical preventive actions for oral health. In order for new immigrants and refugees to better navigate and maximize the benefits of a

Table 1: Summary of findings for using sealant to prevent carious lesions

Patient or population: Children and adolescents (aged 6–19 yr) with carious lesions on permanent teeth
 Setting: Dental clinics in Brazil, United States, Canada, Zimbabwe
 Intervention: Sealants
 Comparison: No sealant
 Source: Griffin SO, Oong E, Kohn W, et al.; CDC Dental Sealant Systematic Review Work Group, et al. The effectiveness of sealants in managing caries lesions. *J Dent Res* 2008;87:169-74.

Outcomes	Absolute effect		Relative effect (95% CI)	No. of participants (studies)	GRADE quality of evidence	Comments (95% CI)
	Risk for control group	Difference with sealants (95% CI)				
Progressing lesions	Medium-risk population		RR 0.27 (0.01–0.38)	200 (4)	High	NNT 2.9 (2.1–3.4)
	480 per 1000	350 less per 1000 (345 less to 168 less per 1000)				

Note: CI = confidence interval; GRADE = Grading of Recommendations Assessment, Development and Evaluation; NNT = number needed to treat; RR = risk ratio.

Table 2: Summary of findings on nonsteroidal anti-inflammatory drugs for oral pain: treatment for pain and swelling of dental origin with analgesics

Patient or population: Adults
 Setting: Dental offices and hospitals in United States, United Kingdom
 Intervention: Nonsteroidal anti-inflammatory drugs
 Comparison: Placebo
 Source: Sutherland SE, Matthews DC. Emergency management of acute apical periodontitis in the permanent dentition: a systematic review of the literature. *J Can Dent Assoc* 2003; 69:160a–160l

Outcomes	Absolute effect		Relative effect (95% CI)	No. of participants (studies)	GRADE quality of evidence	Comments (95% CI)
	Risk for control group	Difference with nonsteroidal anti-inflammatory drugs(95% CI)				
Mean pain relief (100-mm visual analog scale) at 24 h	NA		Weighted mean difference = 22.7 (-36.2 to -9.21)	619 (6)	High	NNT 34 (CI not estimable) Patients with pain (without localized swelling) of dental origin and no systemic symptoms (fever, lymphadenopathy)

Note: CI = confidence interval; GRADE = Grading of Recommendations Assessment, Development and Evaluation; NA = not applicable.

complex health system such as ours, a greater understanding of cultural needs, experiences of discrimination, differences in living conditions, and related behaviours, attitudes and values toward oral health care is required.

Financial coverage of dental care: In Canada, Woodward and coworkers⁶⁷ suggest a link between the immigrant and refugee population and the socioeconomic need for dental care. The correlation between higher disease rates and socioeconomic need results in continued risk for oral disease for many who migrate to Canada. During the settlement period, Convention refugees, refugee claimants, and other protected people are eligible to apply for the Interim Federal Health Program to cover some costs associated with dental care. The eligibility period varies depending on refugee status. Dental screening as early as possible in the settlement period could allow refugees to take full advantage of the federal health program. Details of services covered, the application process and a handbook for health care providers are available through the Citizenship and Immigration Canada website (www.cic.gc.ca).

Most dental services in Canada are delivered by the private sector on a fee-for-service basis and are not covered under public medical care programs. Various provincial and territorial programs cover the cost of dental services for specific groups, mostly children. These programs are different in each province, so it is necessary to obtain specific information within relevant geographic areas. In addition to the provincial public dental programs, there are low-cost or no-cost clinics in several of the larger cities. Information on many of these programs and clinics is available from the website of the Federal, Provincial and Territorial Dental Working Group (www.fptdwc.ca) and the Canadian Association of Public Health Dentistry (www.caphd-acsdpc.org).

In the absence of comprehensive dental services for disparate populations, physicians' involvement in oral health care is increasing. Through its Paediatric Oral Health Section, the Canadian Paediatric Society advocates for optimal oral health for infants, children and adolescents and is developing relevant education and training for physicians. In the US, Medicaid has developed a program for physicians to promote regular dental screenings and appropriate treatment for poor children.⁹ The application of fluoride varnish by primary care practitioners shows great promise as an effective clinical preventive measure and is being increasingly supported through appropriate public funding. In the US, Medicaid-funded programs exist for numerous

states⁶⁸ and in Canada, high-risk First Nations communities are also benefiting from the application of fluoride varnish by nondental health care providers.⁶⁹

Other recommendations

The Canadian Collaboration for Clinical Practice Guidelines in Dentistry (2003a guideline)⁵⁷ (Appendix 2), suggests the most efficacious methods to reduce tooth pain with or without localized swelling when dental therapy cannot be started immediately is to recommend nonsteroidal anti-inflammatory drugs if not contraindicated (grade A). The Canadian Collaboration for Clinical Practice Guidelines in Dentistry (2003b guideline)⁷⁰ (Appendix 2) provides a grade A recommendation that antibiotic therapy is not indicated if pain is accompanied by localized swelling of dental origin. A subsequent systematic review provides additional evidence to support this recommendation.⁷¹ Other guideline development groups have reported moderate- to high-quality evidence to support recommendations for the application of fluoride varnish to teeth of children at high risk for caries and the recommendation that teeth be brushed twice daily with toothpaste containing 1000 ppm fluoride.^{13,54}

The cases revisited

Nanette's mother is able to assess and rule out other systemic symptoms. Nanette's refusal to eat, especially in the absence of other symptoms, suggests that dental screening would be appropriate. Because there are very high rates of refined sugar intake and dental caries in the Philippines, it is very likely she has dental caries. Symptoms are often limited to localized irritation of teeth when exposed to hot, cold, or sweet foods and drinks. A quick visual examination and identification of carious lesions provides evidence of dental conditions that can be addressed with a referral to a dentist. It also can alert the practitioner to examine Nanette's siblings, to recommend fluoridated toothpaste twice daily for the family, to assist with dental referrals, and to provide relevant information about local or federal dental programs.

Mihai likely had limited opportunity for dental care in his country of origin. The location of his pain suggests a need for dental screening along with screening for other systemic symptoms. Mihai may or may not have a tooth cavitation associated with the lower left side. The pain is localized, and, in the absence of lymphadenopathy, cellulitis and exudate, Mihai would benefit from taking nonsteroidal anti-inflammatory drugs and being referred to a dentist to further examine the underlying etiology.

He could have fillings in teeth (evidence of previous dental caries), or he could have a periodontal abscess that could not be diagnosed without radiographs and more specific tooth examination.

Conclusion and research needs

Screening and referral to a dentist can decrease morbidity associated with dental disease. Uncomplicated dental pain is most appropriately managed with nonsteroidal anti-inflammatory drugs. There is also evidence to demonstrate that physicians are willing to include oral health within their purview of care by supporting these activities. Research priorities include evaluating the oral health status and the experiences of new immigrants and refugees and gaining a better understanding of the efficacy and costs associated with oral health screening. More research is needed to determine the effect of screening, risk assessment and other promising preventive interventions by primary care practitioners.

Key points

- Dental pain can be reduced if physicians ask whether patients have problems with their mouth, teeth, or dentures.
- Migrants arriving from countries with limited dental care and where diets are high in sugar are at the highest risk for disease.
- Screening and referral for dental disease can facilitate treatment and prevention of dental disease. Patients are twice as likely to go for dental treatment when actively examined and referred by a physician.
- Nonsteroidal anti-inflammatory drugs can be used effectively to treat dental pain.
- Tooth brushing twice daily with fluoridated toothpaste is effective in reducing risk for dental decay.

Box 2: Grading of Recommendations Assessment, Development and Evaluation Working Group grades of evidence (www.gradeworkinggroup.org)

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and could change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

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Clinical preventive guidelines for newly arrived immigrants and refugees

This document provides the review details for the CMAJ CCIRH Dental Disease paper. The series was developed by the Canadian Collaboration for Immigrant and Refugee Health and published at www.cmaj.ca.

Appendix 1: Figure 1

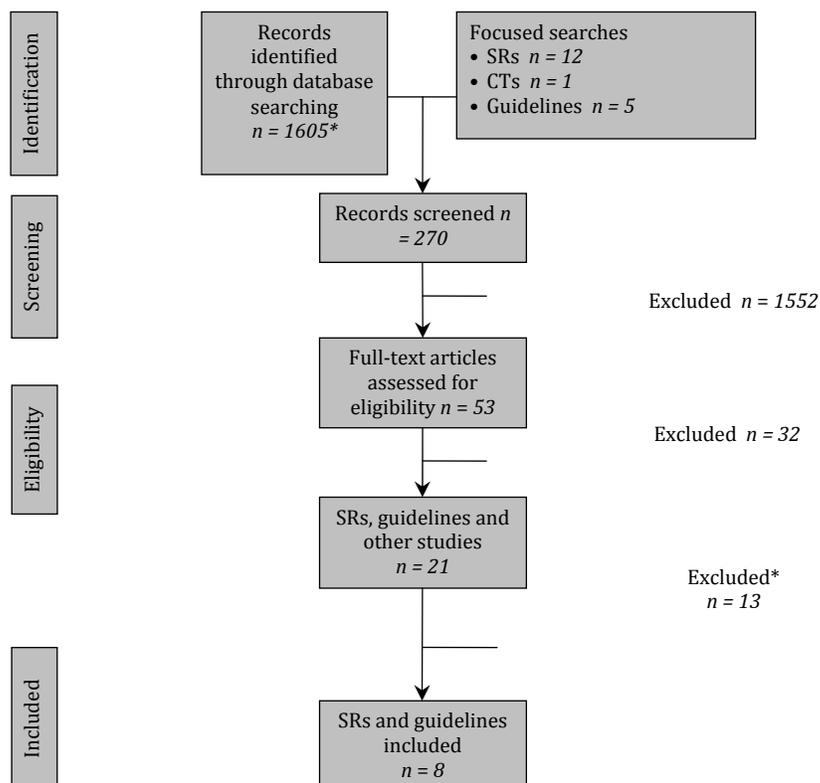


Figure 1: Search and selection of data on screening for oral conditions. CT = clinical trial, SR = systematic review. *Includes some duplication among databases. †Low quality or lack of national sample, availability of more recent data or lack of relevance to immigrant health status.

Appendix 2: Summary of Recommendations

Guideline/Year	Number & type of study	Participants	Intervention	Findings
United States Task Force on Preventive Services, 2004 ⁴⁷ Physician interventions to prevent and manage dental caries in preschool children	Based on 1 Systematic Review (SR), 2 case studies (poor quality) of screening accuracy. 1 case study of risk assessment	Pediatric practices	Screening and risk assessment by PCP	Evidence insufficient to recommend for or against routine screening or risk assessment of preschool children by primary care clinicians for prevention of dental disease.
Scottish Intercollegiate Guideline Network 47, 2000 (Updated 2005) ¹² Prevention of dental decay in high risk children	Not Applicable	Children aged 6-16	Dental referral	General Practitioners should actively encourage high caries risk children to attend for dental care. Very low level evidence based on expert opinion
	Based on 1 Systematic Reviews: 7 Randomized Controlled Trials (n=363)	Children age 6-16	Fluoridated toothpaste	Children should brush their teeth twice a day using toothpaste containing at least 1000 ppm fluoride, they should spit the toothpaste out and should not rinse out with water. In children up to seven years of age the use of only a smear or small pea-sized quantity of toothpaste. Recommendation Level A
	Based on 3 Systematic Reviews	Children age 6-16	Fluoride varnish	Should be applied every four to six months to teeth of high caries risk children. Recommendation Level B
Scottish Intercollegiate Guideline Network 83, 2005 Prevention of dental decay in high risk children ⁴⁹	Cohort studies	Pre-school children	Dental referral	Caries should be diagnosed as early as possible to allow referral for dental care. Indirect evidence
	Based on 2 Systematic Reviews	Pre-school children	Fluoridated toothpaste	Community or home based oral health promotion interventions should use fluoride containing agents such as fluoridated toothpaste. Recommendation Level A Toothpaste containing 1000ppmF ± 10% should be used by pre-school children. Recommendation Level A Children should be encouraged to spit out excess toothpaste and not rinse with water post-brushing. Recommendation Level A
	Based on 2 Systematic Reviews	Pre-school children	Fluoride varnish	Should be applied to the dentition at least twice yearly for pre-school children assessed as being at increased risk of caries. Recommendation Level B
Canadian Collaboration for Clinical Practice Guidelines in Dentistry 2003a ⁵³ Determine most efficacious methods to reduce tooth pain without swelling	Based on 2 SR: 3 placebo controlled double blind randomized control trials (Randomized Controlled Trials (n=204)	Pain associated with a tooth, in the absence of swelling	Analgesia	In the event that dental therapy cannot be started immediately, nonsteroidal anti-inflammatory drugs [if not contra-indicated] should be prescribed. Grade A
	Based on SR: 2 double blind placebo controlled Randomized Controlled Trials (n=71)	Pain associated with a tooth, in the absence of swelling	Antibiotics	Antibiotic therapy is not indicated for this condition. Grade B
Canadian Collaboration for Clinical Practice Guidelines in Dentistry 2003b ⁶⁶ Determine most efficacious methods to reduce tooth pain with swelling	Based on 2 Systematic Reviews	Localized swelling of dental origin with or without pain	Analgesia	In presence of pain, when immediate drainage or referral to dentist is not possible, nonsteroidal anti-inflammatory drugs should be recommended until infection adequately drained. Grade B
		Swelling of dental origin with systemic complications (fever, lymphadenopath, cellulites), diffuse swelling or a patient with with medical implications	Antibiotics	Antibiotic therapy is not indicated in otherwise healthy patients nor when the abscess is localized. They provide no additional benefit over drainage of the tooth or gum. However, antibiotic therapy may be indicated when drainage cannot be achieved. Grade A Antibiotics should be prescribed along with referral to a dentist. There is no evidence to recommend one antibiotic over another. Grade A

Appendix 3: Summary of appraisals with the Appraisal of Guidelines for Research and Evaluation appraisal instrument for Guidelines

Author	Type of Document	Scope & Purpose	Stakeholder Involvement	Rigour Development	Clarity & Presentation	Applicability	Editorial Independence
United States Task Force on Preventive Services 2004 ⁴⁷	Consensus derived, SR based	12/12	4/16	18/28	12/16	0/12	8/8
Scottish Intercollegiate Guidelines Network 2000 (2005 update) ¹²	Consensus derived, SR based	12/12	8/16	26/28	16/16	10/12	8/8
Scottish Intercollegiate Guidelines Network 2005 ⁴⁹	Consensus derived, SR based	12/12	10/16	28/28	16/16	11/12	8/8
Canadian Collaboration for Clinical Practice Guidelines in Dentistry 2003a ⁵³	Consensus derived, SR based	12/12	8/16	26/28	16/16	8/12	8/8
Canadian Collaboration for Clinical Practice Guidelines in Dentistry 2003b ⁶⁶	Consensus derived, SR based	12/12	8/16	26/28	16/16	8/12	8/8

Appendix 4: Dental Disease Evidence Based Clinician Summary Table

Screen for dental pain (asking, 'Do you have any problems or pain with your mouth, teeth or dentures') to reduce pain. Treat dental pain with nonsteroidal anti-inflammatory drugs and refer to dentist.

Screen for obvious dental caries and oral disease in children and adults (mouth exam with penlight and tongue depressor) to reduce oral-related morbidity. Refer obvious dental disease to dentist or oral health specialist.

Prevalence: Immigrant adolescent children were five times more likely to have dental caries than children born in Canada. Of those children arriving to Canada within the previous two years, 22.9% required restorative dental care for carries compared to only 3.5% of those born in Canada.

Burden: Although levels of oral disease in immigrants decreased relative to length of time in Canada, immigrant adolescents continued to be at a disadvantage for dental caries, gingivitis and level of oral hygiene when compared to their Canadian counterparts.

Access to Care: Language barriers reduce access to services and quality of care. Experiential influences (fear of dentists, history of inadequate care, embarrassment of oral condition) are likely hindrances for individuals who require professional dental care. Financial barriers decrease access to dental care.

Risk Factors for Dental Disease: Immigrants arriving from countries with limited dental care and where diets are high in sugar are at the highest risk for disease.

Screening Test: Examine the using a tongue depressor to determine swelling, bleeding gums, loose teeth, broken teeth/holes in teeth, odour, mouth ulcers and sores.

Treatment: Screening and referral to a dentist can decrease morbidity associated with dental disease. Uncomplicated dental pain is most appropriately managed with non-steroidal anti-inflammatory drugs.

Special Considerations:

- Patients are twice as likely to go for dental treatment with an active physician referral. Dental screening as early as possible in the settlement period may allow refugees to take advantage of the interim federal health program.
- Administering fluoride varnish or referring for application of varnish, as well as preventive twice-daily tooth brushing with fluoride toothpaste, improves oral health.
- Antibiotics are not indicated for dental pain, except in cases of lymphadenopathy, cellulitis, and fever. Referral to a dental professional is important to address underlying cause of pain. The most efficacious method to reduce tooth pain with or without localized swelling when dental therapy cannot be started immediately is to recommend non-steroidal anti-inflammatory drugs.