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Oral Health Status of Immigrant and Refugee Children in North America: A Scoping Review

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Abstract

Objectives: The aim of this scoping review was to assess the oral health status of the children of refugees and immigrants ("newcomers"); the barriers to appropriate oral health care and use of dental services; and clinical and behavioural interventions for this population in North America.

Methods: Explicit inclusion and exclusion criteria were used in searching electronic databases to identify North American studies between 2007 and 2014 that reported oral health status, behaviours and environment of children of newcomers. Additional studies from 1995–2008 were found in a recently published review. Pertinent data from all selected studies were summarized.

Results: Overall, 32 relevant North American studies were identified. In general, children of newcomers exhibit poorer oral health compared with their non-newcomer counterparts. This population faces language, cultural and financial barriers that, consequently, limit their access to and use of dental services. Intervention programs, such as educational courses and counseling, targeting newcomer parents or their children are helpful in improving the oral health status of this population.

Conclusions: Children of newcomers are suffering from poor oral health and face several barriers to use of dental care services. The disparity in dental caries between children of newcomers and their counterparts can be reduced by improving their parents' literacy in the official language(s) and educating parents regarding good oral health practices. An appropriate oral health policy remains crucial for marginalized populations in general and newcomer children in particular.

Dental caries is a major children's oral health concern in Canada: among 6–19-year-olds, the prevalence is approximately 60% and the mean number of affected teeth is 2.5.[1,2] Children suffering from pain caused by dental problems are more likely to perform poorly at school, as they may be inattentive or miss classes.[3] They may be more prone to functional and cognitive problems (e.g., speech impairment, learning and eating problems)[4] or psychological issues arising from poor self-image in a social setting.[3] In particular, disadvantaged children, such as most refugee and immigrant ("newcomer") children, appear to be at higher risk for dental diseases.[5] This has implications for countries, such as Canada, where immigrants represent 20.6% (6 775 800) of the total population and immigrant children under 14 years of age represent 19.2% of the recent immigrant population.[6]

Dental diseases are among the most costly diseases to treat in Canada, as they affect the general economy through lost work and lost school days.[7] Such diseases are disproportionately concentrated among newcomer children.[6] This might be a result of untreated oral diseases in their home country as well as various barriers to appropriate oral health they face when they arrive in a new country.[8] Cutbacks in public dental funding have imposed more financial pressures on low-income families, especially those with no or limited dental insurance.[9] Inadequate access to care for newcomer populations is common, as many are challenged by barriers of culture and language, along with a lack of financial resources.[6]

Promoting the oral health status of newcomer children in North America requires timely knowledge about the underlying factors affecting their access to oral health care. Updated information would assist us in identifying the issues and in developing effective health promotion strategies to address these problems. This scoping review of selected studies on newcomer children in the United States and Canada specifically addresses the following research questions:

- What is the oral health status of children of newcomers?
- What are potential barriers to their use of dental services?
- What interventions have been developed and implemented to improve their oral health?

Methods

Search Methods Used to Identify Studies

Our preliminary search revealed a systematic review that evaluated cultural competencies in oral health research on immigrant children, worldwide.[10] Although the scope of that review was different from ours, it included overall research on the oral health of newcomers from 1995 until 2008. From the pool of papers reviewed in that study, we selected the relevant North American studies and adapted the search strategy to find more recently published research from 2007 to September 2014 in the following databases: Ovid MEDLINE (in-process and non-indexed citations); Embase, Web of Science and Scopus. The search terms (**Appendix 1**) were initially established using MEDLINE and modified while exploring other databases. We imposed no language or publication restriction. In addition, we searched references in retrieved articles to identify studies not captured by our primary search strategy.

Inclusion Criteria

We included any cross-sectional, cohort, intervention, case control or qualitative/mixed-methods study. Reviews, clinical case studies, case reports, letters and editorials were excluded in terms of evidence-based recommendations, although they were used to identify relevant references. The study population had to be children (ages 0–18 years) of newcomers living in North America.

To allow us to assess the oral health status of newcomer children, their use of dental services, the effects of various barriers to optimal oral health and effective health promotion activities to reduce these barriers, studies had to report on the following specific outcome measures:

- *Oral health status* measured by caries prevalence and relevant indices, such as decayed/missing/filled teeth/surface scores (in primary and/or permanent dentition), gingivitis and periodontitis
- *Oral health behaviour*, either protective (such as regular dental visits, adequate oral hygiene practices, use of toothpastes with fluoride) or harming (such as diets rich in sugar, use of nursing bottles)
- *Oral health environment* that either promotes the child's oral health status or places it at higher risk, including availability of dental services, publicly funded dental programs, community dental care programs, geographic or language isolation or harmful health beliefs

Data Collection and Analysis

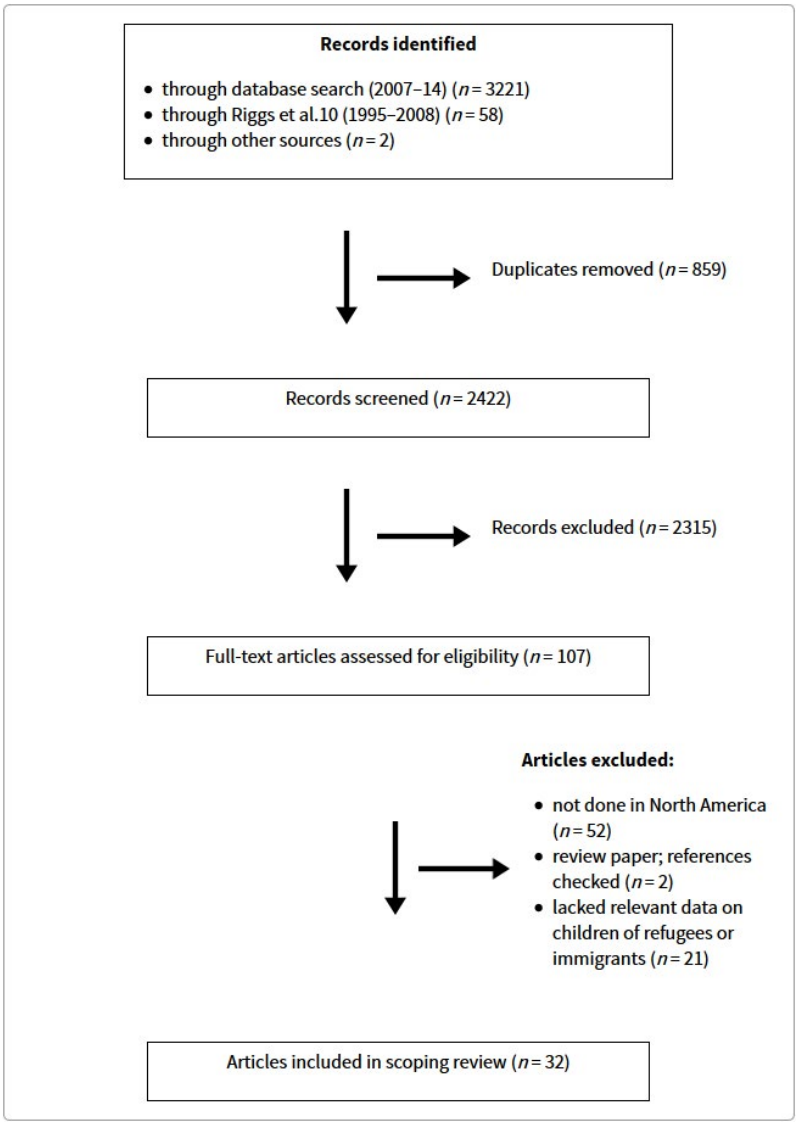
Search results were exported to EndNote (Version X7, Thomson Reuters, Philadelphia, PA) and duplicates were removed. Selection of relevant papers was carried out in 2 stages and both stages were performed independently by 2 reviewers (MR, A Abdelaziz). In the first stage, both reviewers read the titles and the abstracts to select potentially relevant papers according to the inclusion criteria. Disagreements were resolved through discussion and consensus with the other review author (A Azarpazhooh). In the second stage, the full texts of the included articles were evaluated. The PRISMA 2009 checklist was used to assess the availability of required and relevant items.[11] We used the retrieved information in the form of a scoping review; no critical appraisal of individual studies was done.

Results

Search Results

From an initial total of 3223 articles from databases and 58 from Riggs et al.,[10] several stages of screening reduced the number that met our criteria to 32 studies published between 1996 and 2014[3-5,8,12-39] (**Fig. 1**). Six studies were conducted in Canada (3 in Edmonton,[12,13,35] 1 in Vancouver,[19] 1 in Montréal [with a comparison to Talca, Chile][30] and 1 in Toronto[37]) and 26 in the United States (7 in California,[8,18,21,23,25,26,34] 5 in Massachusetts,[4,5,14,16,33] 3 in New York,[15,28,36] 2 in North Carolina[27,31] and 1 each in Washington,[17] Virginia,[31] Georgia,[32] Main,[20] Vermont[3] and Utah[22]).

Figure 1: Selection of studies based on the inclusion/exclusion criteria



Of the included studies, 22 were cross-sectional,[4,13-18,20,22,24-35,37] 5 were cohort,[5,8,19,38,39] 4 were qualitative[12,21,23,36] and 1 was descriptive[3] (**Table 1**) Six of the studies included consultation services (for example group discussions or one-on-one counseling)[3,8,12,15,19,21] and 1 study included free dental care.[5]

Questionnaires were used to collect data in all of the studies; in 15, they were administered by interviewers.[5,12-15,17,18,23,28,31,34-37,39] Data collected from dental examinations were used in 12 of the studies.[4,5,13,14,16,19,25,26,32,33,35,37] External data sources used in the studies included the California Health Interview Survey,[18] the National Survey of America's Families,[24] the Migration Transitions Study,[27] the NYC Child Community Health Survey,[28] the Medical Expenditure Panel Survey,[29] the DeKalb County Board of Health,[32] the New Immigrant Survey,[38] the California Oral Health Needs Assessment[25] and the Survey of Income and Program Participation.[39] Of all the studies, 4 reported the use of validated questionnaires.[13,26,27,30]

Oral Health Status of Children of Newcomers

Children of newcomer families tend to exhibit poorer oral health compared with their non-newcomer counterparts (**Table 2**), especially those whose families speak languages other than English at home.[5,25,26,29,37] For example, in a sample of African newcomer children in Edmonton, 64% had untreated caries (mean decayed/extracted/filled surfaces of primary teeth = 11.2 ± 12.9, of which mean decayed surface = 6.9 ± 8.5).[13] When compared with children of Canadian-born parents, children of newcomers presented higher mean decayed/extracted/filled primary teeth scores (3.05 vs. 1.83, $p < 0.05$) mean decayed/missing/filled permanent teeth scores (0.73 vs. 0.42, $p < 0.05$).[37] Similarly, in the United States, compared with children of US-born parents, children of immigrants had a significantly larger number of carious surfaces (11.5 vs. 9.4, $p = 0.01$)[5] and twice the prevalence of early childhood caries (odds ratio 2.06; 95% confidence interval 1.47–2.88).[4] The situation was even worse among refugee children, who exhibited a greater number of untreated caries (up to about 75%).[14,16,20,26,32]

Use of Dental Services for Children

A smaller proportion of children of newcomer families have regular dental visits compared with non-newcomers (**Table 2**).[4,13,24, 26-28,36-39] Children of non-permanent residents have the lowest utilization rate (only 32% had 1 or more dental visits in a year), followed by children of permanent residents (41%), naturalized parents, i.e., foreign-born with United States citizenship (50%) and US-born parents (> 50%).[39] Similar findings were noted in a sample of African newcomer children in Edmonton, Alberta,[13] and Latino newcomers in North Carolina,[27] where over 50% had never had a dental visit. In addition, newcomer children are most likely to visit a dentist for emergencies or when in pain.[26,28,31,36-38]

It seems that parental education remains a predictor of dental care utilization. A study among Chilean newcomer families in Montréal shows that children of parents with a university education are twice as likely to visit a dentist compared with children of parents without higher education.[30]

Newcomer families are also less likely than non-newcomers to visit the same dental office.[17] In a group of recent newcomer mothers who had children enrolled in Medicaid, only 38% reported having a regular dental office, 27% had a regular dentist, fewer mothers saw the

same dentist at each visit and an even smaller number remained with the same dentist for 1 year or more.[17]

Limited English proficiency has also been shown to hinder access to dental care for children of newcomer families.[12,13] In particular, those who speak a non-English language at home are less likely to visit a dentist for preventive or other services and more likely to visit only when their child is in pain.[12,13,29,31,36,37] Similarly, higher rates of caries have been found among children of newcomer families speaking languages other than English at home.[5,25,26,29,37]

Barriers to Appropriate Oral Health for Newcomer Children

Risk factors reported to act as barriers to achieving and maintaining adequate oral health for children of newcomers were grouped into 3 levels: child, family and community (**Table 2**).

Child level (oral hygiene practices): Children of newcomers and foreign-born parents differ from non-newcomers in their oral hygiene practices; tooth brushing or flossing is not carried out regularly (or at all),[14,37,40] nor are these practices valued by the children or their parents.[12]

Family level (parenting practices, oral health perceptions): A higher percentage of foreign-born mothers of 19-month-old infants in Alberta reported the use of nursing bottles compared with Canadian-born mothers (85% vs. 62%).[35] More important, foreign-born mothers reported more riskier practices, such as propping of bottles against the child's mouth, leaving the baby unattended with a bottle and giving a bottle as soon as the child cries. A smaller number of foreign-born mothers reported cleaning their children's teeth.[35]

Foreign-born parents may have different views on the significance of preventive oral care compared with native-born parents. For example, about 75% of a sample of African newcomer parents in Edmonton reported that they didn't need professional dental care for young children.[13] Similar findings were reported in a sample of Chinese parents of children with extensive caries living in New York; the majority (75%) did not value dental treatment for primary teeth and considered dental examinations as a financial burden.[40] In another study,[21] no members of ethnic minority groups (African-American, Chinese, Latino and Filipino) in San Francisco obtained early preventive care for their children because of lack of knowledge about the importance of primary teeth. Such perceptions may be a result of an illness reaction (as opposed to illness prevention) parental approach to oral health.[12]

Community level (dental insurance, dental care provider): Newcomer populations are more likely to be uninsured[18,22,24,26,34] and more likely to rely only on public health insurance or no insurance at all.[22] For example in the United States, the highest proportion of those with no insurance was seen among foreign-born children with non-naturalized parents (52.3%), followed by US-born children with non-naturalized parents (34.37%), US-born children with US naturalized parents (15.34%) and, finally, foreign-born children with naturalized US-citizen parents (12.86%).[24] In both insured and uninsured groups, newcomer children are less likely to use dental services compared with non-newcomer children.[18]

The dental care provider may present another barrier to newcomer parents seeking treatment for their children. One study[26] reported the characteristics of dental care providers that act as a barrier. Most of the children in this study were from a population of poor and newcomer families (43% lived in non-English-speaking households and 10% were born outside the United States) and visited dentists only if the dental office was near their home. Their parents reported that almost 50% of children had to travel 5 or more miles to get dental treatment on their last visit and about 20% of dentists were not fluent in the language spoken by the child.[26]

Interventions for Newcomer Children

Three studies[3,8,19] explored intervention programs developed to improve the oral health status of newcomer children; 2 of them targeted parents and the other targeted children.

Programs for parents: An educational program among 20 newcomer Latino parents of low socioeconomic status was successful in improving the knowledge of 10 participants; however, only 5 showed an improvement in reported behaviour.[8] In a health promotion program in Vancouver, British Columbia, designed to educate Vietnamese mothers of preschool children with extensive tooth decay, mothers who had more than 1 counseling session reported significant reductions in the use of a nursing bottle for their children during both sleep time and day time.[19] Children of these mothers also demonstrated a significant reduction in the prevalence of caries compared with other children of similar age at baseline.[19]

Programs for children: In a school-based program, dental services provided for newcomer and impoverished children were successful in reducing the need for restorative care in the second year of its implementation. Although in the first year, 52% and 22% of children received preventive and restorative care, respectively, in the second year, the figures were 60% and 11%.[2]

Discussion

This scoping review aimed to provide a better under-

standing of the oral health of newcomer children in North America. In the Canadian setting, oral health has traditionally received low priority in public policy discussions and has not been subjected to the tenets of the *Canada Health Act*, i.e., comprehensive, accessible, portable, universal and publicly funded and administered. As a result, almost all Canadians are burdened with financing their own dental care.[6] Although various oral health strategies, including increased accessibility and some publicly funded dental services (usually for emergency care) are in place for children from low-income families or those on social assistance,[41] many Canadians still do not have easy or affordable access to dental health services. Successive reductions in public dental funding, especially for disadvantaged populations, has left Canada ranked second to last among Organisation for Economic Co-operation and Development nations in terms of public funding of dental care.[6]

A case in point is the proposed cuts to dental benefits for newcomers to Canada under the Interim Federal Health Program.[9] The limitations and problems with this program, for both providers and newcomer patients, have been outlined in a report by Amin and colleagues.[42] A symposium mentioned by these researchers revealed that newcomers to Canada have many pressing concerns, such as housing, employment, education and general health; thus, preventive oral health may not be high on their priority list.[42] The following discussion of the findings from our review should be considered in this context.

Regardless of their birthplace, many studies have shown that children of newcomers have worse oral health than their non-newcomer counterparts.[5,16,37] Several barriers play a role, such as cost of regular dental care, insufficient dental insurance coverage, language and parental beliefs and practices that put the children at higher risk for dental diseases.[26,36,37] Consequently, newcomers rank lower in terms of use of dental services.[18]

The data obtained from the studies included in this review reveal a number of key findings that will familiarize clinicians, researchers and public health policymakers with evidence-based information on the oral health status of newcomer children in both Canada and the United States, although most of the studies were conducted in the United States. This scoping review aimed to map available research, without necessarily ranking individual articles based on design or quality. As many of the studies used questionnaires or interviews to obtain information, this could have introduced recall bias by parents trying to remember details of the child's oral health and social acceptance bias by parents trying to respond to questions in a way that would please the researcher.

Higher Levels of Caries

Newcomer children have consistently been shown to have higher levels of caries.[33] A more detailed study of these children is needed to identify which group is in the majority: Canadian-born children of newcomer parents, foreign-born children who have been raised in Canada or foreign-born children recently moved to Canada. This is important because, if those born or raised in Canada exhibit more disease, this would reflect the need for prevention and treatment programs that target such children as early as possible (e.g., school-based oral health programs).

Variations in Oral Health Status by Location

Children of newcomers living in different parts of the new country may exhibit different oral health characteristics.[3,4] Hence, a general policy may not be applicable to all newcomer children in all regions. A targeted approach to the delivery of dental services for particular groups may allow the best use of the limited resources.

Language Literacy

Newcomer children are less likely to receive routine or preventive dental care.[29] Various reasons have been associated with this, including language and cultural barriers.[12,13,25,36,37] Language barriers have been consistently associated with less use of dental care[29] and issues of communication with health care providers.[34] An interesting finding from Noyce and colleagues[29] indicates that, among a group of people of the same race/ethnicity, those who speak English at home are more likely to seek dental care. Although it is not possible to separate the impact of the language barrier from other socioeconomic factors, such as parental education, household income and health insurance status, general education programs to improve language literacy (in 1 of the official languages) as well as more specific programs to improve oral health literacy could overcome cultural beliefs and practices that are harmful to the oral health of children and help increase the use of dental services.

To make interventional and educational programs more effective, large public health units and private offices could make use of internal staff resources for interpreting or use a company or organization providing telephone interpretation services,[42] e.g., Can Talk Canada. However, even when these services are available, public health facilities and private offices may insist that the patient or their parents bring an interpreter along to visits. The availability of more multicultural and multi-language providers may prove beneficial in creating a better understanding of oral health messages.[42]

Awareness of the Importance of Oral Health

Although dental insurance is an important determinant of the use of dental care services, newcomer children use dental care less, regardless of their insurance status.[18] This may be related to newcomer children relying mainly on publicly funded dental programs, where practitioner reimbursement rates are relatively low.[22] In addition, as

newcomer children usually come from low-income families, the required co-payments may be a financial burden.

It is essential to realize that less use of dental services may be a result of lack of parental understanding of how preventive services and routine regular dental visits can be effective in improving the oral health of their children. It may also be caused by a lack of understanding or knowledge of health care resources[24] or fear or suspicion of government. Therefore, effective educational and supportive programs are important to help raise awareness among immigrant parents and their children of the importance of maintaining good oral health through regular preventive care. However, as mentioned above, newcomers in Canada have to focus on urgent needs related to housing, employment, language barriers, education and acute health care issues; thus, preventive dental care may not be a priority.[39]

Comprehensive Accessible Dental Care

Newcomer children are at higher risk of dental caries compared with non-newcomer children. They are also more likely to live in poverty or come from low-income households where the cost of dental care is a burden.[24] Providing free (or perhaps affordable) accessible and comprehensive dental care may be the most efficient way to eliminate caries in newcomer children who are in urgent need of dental care.[42] It is important to ensure access to care for this population (and other marginalized populations) through effective oral public health policies.

Conclusion

Children of newcomers are associated with worse oral health outcomes, including lower utilization rates, higher dental status scores and higher prevalence of caries compared with their non-newcomer counterparts. Barriers that play a role include cost of regular dental care, insufficient dental insurance coverage, communicating with dental care providers because of language barriers and parental beliefs and practices that put these children at a higher risk of dental diseases.[18,26,36,37] The increase in disparities between newcomer and non-newcomer children can be reduced through:

- implementation of more effective preschool and school-based oral health programs for young children
- improving newcomer parents' literacy in the official language(s)
- educating newcomer parents regarding good oral health practices
- providing affordable (ideally free) comprehensive dental care (the most efficient way to eliminate caries in children who are in urgent need of care)

The dental profession in Canada can contribute to improving the oral health of newcomers and disadvantaged populations by treating patients covered under publicly funded dental programs and supporting the work of organizations seeking to expand and improve these programs by advocating appropriate oral health policies.

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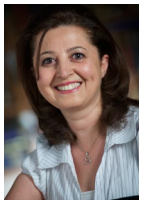

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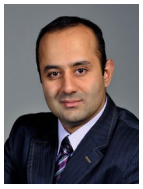

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Table 1 Description of the included studies

Authors, date	Location	Method for data collection	Study type
Amin and Perez 201212	Edmonton, Alta., Canada	Focus groups of participants were led by trained community health workers. An interview guide was developed from literature on barriers to oral health care and the opinions of health care workers. The interviews were then coded and codes were assigned to different categories of barriers.	Qualitative
Amin et al. 201513	Edmonton, Alta., Canada	Dental assessments were made by 2 dentists; inter- and intra-examiner agreement > 90%. WHO criteria used for recording caries data. Validated questionnaires administered by bilingual trained community workers.	Cross-sectional
Brown et al. 20058	Northern California, Calif., USA	Educational intervention program, consisting of 2 1.5-h lessons given in Spanish by a school nurse over 2 consecutive weeks, was aimed at improving oral health knowledge. Pre- and post-tests (developed with the assistance of a dentist) were administered before and 2 weeks after course completion.	Cohort
Cote et al. 200414	Mass., USA	A visual examination was conducted by a dental hygienist and the refugee parent or child was interviewed (interpreters available). Oral examination was based on the Basic Screening Survey of the Association of State and Territorial Dental Directors. Comparisons were made with NHANES III data; however, a probe was also used during examination.	Cross-sectional
Cruz et al. 200515	New York, NY, USA	A 33-item survey tool (in English and Spanish) was pilot tested to evaluate the needs of the participants regarding oral health, then administered by trained interviewers. A program was then developed based on their needs and delivered at maternal infancy care centres.	Cross-sectional
Geltman et al. 200116	Mass., USA	A visual examination of refugees' dentition was conducted within 90 days of arrival by Refugee Health Assessment Program, Mass Department of Public Health.	Cross-sectional
Grembowski et al. 200717	Wash., USA	The Social and Economic Science Research Center conducted surveys by phone, mail or Internet as per Dillman's protocol. Survey instrument (in 4 languages) constructed from items in the Community Tracking Study, the Medical Expenditure Panel Survey and Access to Baby and Child Dentistry Study.	Cross-sectional
Guendelman et al. 200518	Calif., US	Data were obtained from the California Health Interview Survey from Nov. 2000 to Sept. 2001. Interviews in 7 languages were conducted over the telephone using random digit dialing.	Cross-sectional
Harrison and Wong 200319	Vancouver, BC, Canada	Beginning in 1994, one-to-one consulting sessions were held between mothers and community dental health worker (CDHW) at immunization appointments. 4 follow-up dental examinations (1996–2001) were performed by a dentist, using mirror and explorer.	Cohort
Hayes et al. 199820	Portland, Me., USA	Charts from immigrants' initial medical reviews were obtained and reviewed.	Cross-sectional
Hilton et al. 200721	San Francisco Calif., USA	Input and advice from a community advisory board for each of the 4 groups. Group discussions (22), conducted in the presence of a facilitator, centred around oral health of parents and their children. A small set of questions was based on the research team's opinions.	Qualitative
Hobson et al. 200722	Salt Lake City, Utah, USA	Participants were given a pilot-tested survey in English or Spanish regarding water consumption at the health centre during a 2-week period.	Cross-sectional
Horton and Barker 201023	Mendota, Calif., USA	Parents interviewed regarding oral disease, oral hygiene, infant feeding practices and child dental experience. Dentist providers interviewed regarding DentiCal reimbursement policies. Young adult farmworkers interviewed.	Qualitative
Huang et al. 200624	USA	Data were collected from the 1999 National Survey of America's Families. Among other topics, this study targeted the health of the participants.	Cross-sectional
Maserejian et al. 20085	Boston, Mass., USA	Interviews were conducted as part of the New England Children's Amalgam Trial (NECAT) by interviewers certified by New England Research Institutes' Survey Research Center. Free semi-annual dental care was offered as part of the research, for a 5-year period. After initial examination, NECAT dentist restored all caries at baseline according to protocol. Each following examination included restoration of lesions based on D2 threshold.	Cohort

Authors, date	Location	Method for data collection	Study type
Mejia et al. 201125	Calif., USA	Dental screening by trained and calibrated dentists and dental hygienists (or specially trained school nurses) in Los Angeles County for the 2004–2005 California Oral Health Needs Assessment, which included a 6-item questionnaire completed by parents.	Cross-sectional
Melvin 20063	Vt., USA	Dental service program (tooth tutor program, Vermont Department of Health) started in the fall of 2001 and focused on providing at-risk children with in-school preventive services and referral to dental offices for needed care.	Descriptive
Mulligan et al. 201126	Los Angeles, Calif., USA	Surveys in 4 languages were sent out to the participants. Validated by advisory board (public health professionals, community organizers, school teachers, nurses, dental faculty). Two calibrated university faculty dentists performed clinical examinations under an adapted Association of State Dental Directors protocol.	Cross-sectional
Nahouraii et al. 200827	NC, USA	Data were collected from the Migration Transitions Study conducted between August 2002 and May 2003, using a validated Spanish ethno-survey instrument.	Cross-sectional
Norton et al. 201328	New York City, NY, USA	Data were collected from the 2009 NYC Child Community Health Survey and an independent survey. Computer-assisted random digit dialing telephone interviews (in 4 languages) were based on 1 randomly selected child in the household.	Cross-sectional
Noyce et al. 200929	USA	Data were collected from the Medical Expenditure Panel Survey Household Component for 2002–2004. The survey included demographic and health data. The 2 outcome variables were having a preventive dental visit and having a routine dental visit.	Cross-sectional
Nunez et al. 201330	Talca, Chile and Montréal, Que., Canada	Survey of children and their parents was performed in the 2 cities from 2009 to 2011 using validated questionnaires developed for the New Canadian Children and Youth Study 2005.	Cross-sectional
Nunn et al. 20094	Boston, Mass., USA	Definition of early childhood caries (ECC) = 1 primary maxillary incisor decayed, missing due to decay or filled. ECC study: dental exam with penlight conducted by trained and calibrated dental hygienists. NHANES III: examinations were conducted by physicians and dentists.	Cross-sectional
Quandt et al. 200731	NC and southwestern Va., USA	In conjunction with a community-based participatory research project, face-to-face interviews on oral health were conducted in October and November 2004 by trained native Spanish-speaking interviewers. Interviews covered oral health and oral health behaviours of mother, spouse and child > 5 years or closest to 5 years. Questionnaires were pretested and revised before use.	Cross-sectional
Shah et al. 201432	DeKalb County, Ga., USA	Data were collected from DeKalb County Board of Health records when refugees presented for initial screenings. Nurses performed visual dental examinations.	Cross-sectional
Soncini et al. 201033	Boston, Mass., USA	Students' teeth were examined in school dental clinics. Microbial assays of samples from 3 intraoral sites were obtained using whole genomic probes. Self or parent report on demographics.	Cross-sectional
Stevens et al. 201034	Calif., USA	Telephone interviews were conducted in the language of the participant (7 languages). Only data from parent–child dyads were used; only 1 child's data per family were used.	Cross-sectional
Weinstein et al. 199635	Edmonton, Alta., Canada	Interview and dental examination. Clinical examination was visual with a mirror and included all erupted teeth. Caries activity was measured using Cariostat. The interview instrument was based on previous research by Weinstein et al. and Lopez del Valle et al.	Cross-sectional
Wong et al. 200536	New York City, NY, USA	Qualitative interview, conducted with the aid of an interpreter by a pediatric dental resident, was based on 4 areas. Transcribed interviews were analyzed using standard thematic analysis.	Qualitative
Woodward et al. 199637	Toronto, Ont., Canada	Dental examination was conducted, as well as a telephone interview with the parent and a questionnaire sent to the dentist. Trained and calibrated examiners.	Cross-sectional
Yun et al. 201338	USA	Data were collected from the 2003 New Immigrant Survey, which is a 1-to-1 computer-assisted telephone survey in 18 languages that gathers parental demographic information and child health data.	Cohort
Ziol-Guest et al. 201239	USA	Data collected in interviews at 4-month intervals in the Survey of Income and Program Participation included socioeconomic and health information.	Cohort

Note: NHANES = National Health and Nutrition Examination Survey, WHO = World Health Organization

Table 2 Summary of data from North American studies addressing the oral health status of newcomers and barriers to their children's use of dental care.

Author, date	Population	Oral health status	Barriers to use of dental services
Amin and Perez 201212	7 focus groups of Ethiopian, Eritrean and Somali immigrant (< 5 years) mothers of children 3–5 years old recruited by Multicultural Health Brokers Co-op and given $20 incentive (n = 48)		Professional dental assessment was not a priority among participants, as home diagnosis was thought to be as effective. Flossing and regular dental visits not valued. Barriers included cost of dental insurance (because of absence of knowledge of publicly funded programs), lack of trust in dentists, lack of knowledge of dental services, low English proficiency, constraints, such as time, transportation, lack of family support, and lack of insurance. The study concluded that a "wait-for-the-patient-to-come approach" is ineffective for these immigrant families.
Amin et al. 201513	Children (< 6 years) of African parents (in Canada < 10 years); pairs of parents and children (n = 125). Convenience sample of participants obtained from community settlement agencies.	Examination revealed 63.7% with untreated caries. Mean defs of children with untreated caries 11.2 ± 12.9. Overall mean defs 7.2 ± 11.6. Mean ds of children with untreated caries 6.9 ± 8.5.	Never visited dentist: 52%. Parental perception: Children have no dental caries (52.8%), not sure (26.4%). 61.6% of parents unaware of children's dental status. Dental attendance significantly associated with age 49–72 months (p = 0.04), family in Canada > 5 years (p = 0.04) and having dental coverage (p = 0.03).
Cote et al. 200414	Refugees 6 months to 18 years of age (n = 224). Oral health assessment within 1 month of arrival between January 2001 and September 2002, under the Refugee Health Assessment Program, Mass Department of Public Healt Comparison with NHANES III US-born children, ages 2–16.9 years (n = 11 296)	NHANES III vs. refugee No untreated caries: 77.2% vs. 51.3% (p < 0.001) ≥ 10 carious surfaces: 3.1% vs. 14.3% (p < 0.001) No oral pain: 99.8% vs. 88.8% (p < 0.001) Oral pathology: no significant correlation No gingival bleeding: 35.5% vs. 69.6% (p < 0.001) No calculus: 50.9% vs. 22.6% (p < 0.001).	Refugee children from Africa were the least likely to have ever been to a dentist (12.8%) and the least likely to have used a toothbrush in their home country (10.2%). Distribution of treatment urgency, caries experience, untreated caries and dental caries varied significantly by region of origin.
Cruz et al. 200515	Pregnant low-income immigrant mothers (n = 486) and US-born mothers (n = 241) attending maternal–infant care centres between November 2001 and June 2002 were included in the initial survey as a single cohort	Participants did not have appropriate knowledge regarding oral health. Although almost all thought oral health and visiting a dentist were important, only about 50% reported having regular dental care and 59% thought dental care was "okay" during pregnancy. Need for dental care reported by 62%. Dental insurance (mostly Medicaid) while pregnant reported by70% and by 34% post-partum.	

Author, date	Population	Oral health status	Barriers to use of dental services
Geltman et al. 200116	Refugees under 18 years of age (n = 1825) from 19 countries and 15 newly independent states of Soviet Union. Screened between July 1995 and June 1998 at 16 sites.	62% of all refugee groups had dental abnormalities (mainly caries). Dental abnormalities positively associated with overweight or risk of overweight (OR = 2.6, 95% CI 1.2–4.4).	
Grembowski et al. 200717	Children 3–6 years old in Medicaid (n = 11 305); mothers (n = 4762) selected through disproportionate stratified sampling by race/ethnic group; Black, White, Hispanic and other		Percentage of immigrants: Black (9%), Hispanic (73%), White (6%), Asian (83%), Native American (1%). Percentage with regular dentist: Black (25%), Hispanic (25%), White (32%), Asian (28%), Native American (31%) ($p < .001$). Percentage with regular location for dental care: Black (37%), Hispanic (38%), White (38%), Asian (37%), Native American (48%) ($p = 0.78$). Compared with immigrant white mothers, the odds of having a regular dentist were lower for Black and higher for Hispanic mothers. For Hispanic mothers, those completing the survey in Spanish had lower odds of having a regular dentist than mothers completing in English.
Guendelman et al. 200518	Children in working poor families < 18 years old. Families with annual income < 200% of Federal Poverty Level and not on welfare. US born (n = 3978), immigrants (n = 462)	Last dental visit 1 month to 2 years: insured immigrants (70.5%), uninsured immigrants (60.4%), insured non-immigrants (81.5%), uninsured non-immigrants (70.1%); $p < 0.05$ for differences between groups. Last dental visit > 2 years or never: insured immigrants (29.5%), uninsured immigrants (39.6%), insured non-immigrants (18.5%), uninsured non-immigrants (29.9%); $p < 0.05$ for differences between groups. Insured immigrant children > 6 years were more likely to postpone or never visit a dentist than same-aged non-immigrant children (aged 7–11 years: OR = 6.5, 95% CI = 3.2–13.4; aged 12–17 years: OR = 3.0, 95% CI = 1.5–6.1).	
Harrison and Wong 200319	Convenience sample of Vietnamese immigrant preschool children. Three cohorts: baseline (control) (n = 14), comparison (another community) (n = 9), experimental (n = 16)	Children whose mothers had > 1 counseling visit fewer caries vs. children whose mothers did not. In 1996, defs baseline (5.1 SD 7.2), comparison (1.9 SD 5.8), experimental (1.1 SD 4.3). Caries-free children: baseline (50%), comparison (42.9%, $p < 0.05$), experimental (93.8%). 1998 and 2001 defs significantly lower than baseline ($p < 0.05$).	

Author, date	Population	Oral health status	Barriers to use of dental services
Hayes et al. 199820	Immigrant patients aged 2 months to 18 years (n = 132). Health care evaluations at the International Clinic, 1994 and 1995	16.7% of the children had caries based on physical examination by pediatric residents, not by dentists.	
Hilton et al. 200721	Primary caregivers (≥ 18 years) of children 1–6 years old were selected on the basis of knowledge or experience and stratified by age groups. Four racial groups African-American, Chinese, Filipino, Latino immigrants (n = 103), US born (n = 74)		US-born caregivers more likely to take their child for preventive dental care at an earlier age. Some non-US-born caregivers more likely to delay treatment and viewed dentists as unethical and performing unnecessary treatment. Most caregivers only accessed dental care if there was a problem, as primary teeth fall out. For many participants, their own oral health experience and the views of extended family members acted as a barrier to the oral care of their children. There was a preference to seek oral health diagnosis in the medical office.
Hobson et al. 200722	Convenience sample of parents of urban public health centre patients (n = 215) Immigrants 64%, US born 36% Origins of immigrants: Mexico (53.1%), South America (6.2%), Central America (2.8%), other (1.9%)		41.2% of parents never gave tap water to their children and, of these, 40% did not consume fluoride supplements. Compared with non-Latino parents, Latino parents never drank tap water (OR 0.26, 95%CI 0.10–0.67), their children never drank tap water OR 0.32, 95%CI 0.15–0.70) and avoided tap water because it "causes illness" (OR 5.63, 95%CI 2.17–14.54).
Horton and Barker 201023	26 Mexican immigrant parents with a child < 6 years of age recruited through a randomized list and preschool Head Start programs 12 local dentists who accepted California Medicaid or DentiCal 4 farmworker young adults > 18 years born to Mexican immigrant farmworker parents		In Mexico, parents had subsistence diets which changed once in US to high sugar and refined foods. As mothers had to work shifts, switch from breastfeeding to bottle feeding; abetted by low-cost federal baby formula coupons. Unfamiliarity with breastfeeding led to inappropriate infant feeding practices and early childhood caries. Low reimbursement rates for children treated under DentiCal decreases access to care and promotes extractions rather than restoration of teeth. This leads to inequitable treatment for children of farmworkers and development of long-lasting "stigmatized biologies."
Huang et al. 200624	Children < 18 years, US born (n = 32 965), immigrant (n = 1027), accessed through a random digit dialing survey of homes and face to face interviews. 4 subgroups of children: US born with citizen parents US born with noncitizen parents naturalized foreign born with naturalized parents foreign born noncitizen with noncitizen parents		≥ 1 visit to the dentist in the last year: US born with citizen parents (80.47%, SE 0.44), US born with noncitizen parents (62.73%, SE 2.81), foreign born with citizen parents (84.65%, SE 3.42), foreign born with noncitizen parents (55.59%, SE 2.81). Compared with US-born children with citizen parents, foreign-born children with noncitizen parents were less likely to have visited a dentist in the past year (adjusted OR 1.76, 95% CI 1.34–2.31)

Author, date	Population	Oral health status	Barriers to use of dental services
Maserejian et al. 20085	English-speaking Boston area children 6–10 years of age (n = 283) with untreated caries, no amalgam fillings, no neuropsychologic or renal disorders enrolled as part of the New England Children's Amalgam Trial (NECAT)	Children of immigrants vs. non-immigrants ≥ 2 carious surfaces at baseline. Initial carious surfaces for children of immigrants 30% more than children of US born (β 0.26, SE 0.1, rate ratio 1.3, 95% CI 1.07–1.59) adjusting for age, gender, race, ethnicity and smoking status. No significant difference in 5-year net caries increase between children of immigrants and non-immigrants. Children of immigrants were more likely to withdraw from NECAT.	
Mejia et al. 201125	Complex stratified cluster sample of children in grade 3 (n = 10 450) enrolled in the California Oral Health Needs Assessment, 2004–2005.		Children from homes where no English spoken and/or parents with lower functional health literacy and/or attending a school with a higher percentage of children learning English were more likely to have no dental sealants.
Mulligan et al. 201126	59 randomly selected sites (public schools and early childhood programs) with poor, migrant and minority children in 3 cohorts ages 2–5, 6–8, 14–16 (n = 2313) Site selection requirements: > 50% students of minority race, > 62% of them on reduced cost/free meal programs	Untreated caries in 73% of children. Fillings or crowns in 53%. Needing urgent dental care: 9%. Never been to a dentist: 10% of all participants but 20% of 2–5 year olds. Non-white-Hispanic category of children most likely to have never been to a dentist (p = 0.003).	Approximately 50% of children had to travel ≥ 5 miles to get dental treatment on their last visit. About 20% of dentists were not fluent in the language spoken by the child. Significant association between caries and sociodemographic factors: race, ethnicity, parents' education, English spoken at home, birth abroad, toothache in the last 6 months, inability to access dental care and no dental insurance.
Nahouraii et al. 200827	Latina mothers 15–44 years of age (n = 174) selected using a multistage church-based sampling design. Immigrated from Latin America or Caribbean and had child ≤ 6 years of age	58.0% of mothers described the condition of her index child's teeth as excellent, very good or good	57.0% of children of Latina mothers had seen a dentist, and 47.4% had dental insurance Influential, emotional and material aid related (p < 0.01) to use of dental care (OR 3.13, 95% CI 1.67–5.87), as well as arrival in US before 1997 (OR 4.39, 95% CI 2.14–9.01) and child age > 2 and < 5 years (OR 20.14, 95% CI 4.96–81.83).
Norton et al. 201328	Children 2–12 years of age (n = 2435) in regard to receiving preventive dental care Children 6–12 years of age (n = 1416) regarding having dental sealants		No preventive dental visits in past year more likely among children born outside US than those born in US (adjusted prevalence ratio 1.73, 95% CI 1.23–2.42). Place of birth was not a factor for having no sealants; however, children with no preventive visits in the past year were more likely not to have sealants (adjusted prevalence ratio 1.47, 95% CI 1.32–1.63)
Noyce et al. 200929	Data on children from Medical Expenditure Panel Survey, 2002–2004 (n = 21 049). Age groups: 1–3, 4–6, 7–12, 13–15, 16–18 years		Households where the primary language was not English had lower rates of preventative/routine dental visits, but not after accounting for other factors. Spanish spoken at home was a barrier to dental access in educated Hispanic households. However, this was not the case for other ethnic households.

Author, date	Population	Oral health status	Barriers to use of dental services
Nunn et al. 20094	Children 1–3 years of age from 2 urban medical centres in Boston (n = 787) compared with similar-aged US children from NHANES III (n = 3644) conducted 1988–1994 Children of immigrants represented 62.5% of urban Boston children; 19.8% of US children ($p < 0.001$)	Boston children had significantly more missing primary teeth than US children. ECC prevalence in children of immigrants in urban Boston was 2.3% vs. US children at 12.3% ($p < 0.001$). ECC prevalence in children of US born parents in urban Boston was 4.4% vs. US children at 4.9% ($p < 0.001$). US children of immigrants had greater odds of ECC than those of US parents (OR 2.06, 95% CI 1.47–2.88). Urban Boston children of immigrants had lower odds of ECC than children of immigrants in US (OR 0.21, 95% CI 0.08–0.61).	Urban Boston children were more likely from lower-income immigrant households with no health insurance or only Medicaid than US children.
Núnez 201330	Children aged 4–7 and 10–13 years residing in Talca, Chile (n = 147) paired with Chilean immigrant children in Montréal, Canada (n =4).		Children of parents with university education in Talca were 2.2 times more likely to see a dentist (95% CI 1.3–3.73) than children of parents with less than university education. Similarly in Montréal, children of parents with a university education were 2.1 times more likely to see a dentist (95% CI 1.17–3.76). Although age group was not significant in Talca children, Montréal children 10–13 years of age were 2.11 times (95% CI 1.16–3.88) more likely to see a dentist than 4–7 year olds.
Quandt et al. 2007[31]	Women (n = 108) and spouses (n = 102) from Latino farmworker families, with a child < 13 years (n =79), recruited by 11 lay health promoters Mothers born in Mexico 95.3%, children born in US 75.2%	Mother–child dyads. Fair or poor oral health: mothers 63.9%, children 59.9%. Oral pain: mothers 13.9%, children 6.3%. Gum bleeding: mothers 25.0%, children 6.3%. Sensitivity to hot, cold: mothers 22.2%, children 5.1%. In the last year, received dental cleaning: 37%, 62%, respectively; dental examination: 15.7%, 29.1%; dental services annually: 17.6%, 17.7%); every 6 months: 7.4%, 39.2%.	Barriers to access: fees too high (90.6%, 61.5%), transportation (15.1%, 23.1%). Born in the US associated with having a dental visit in the last year ($\chi^2 = 4.692$, $p = 0.03$). Born in the US associated with child's oral condition excellent, very good or good ($\chi^2 = 4.078$, $p = 0.043$).
Shah et al. 2014[32]	Refugees 0–18 years of age entering the county between October 2010 and July 2011, of African, Bhutanese or Burmese descent, who submitted to dental screening (n = 366)	Dental caries in 44.8% of children. Rate of dental caries: African refugees 10.6%, Bhutanese 50.0%, Burmese 48.0% ($p < 0.001$).	
Soncini et al. 2010[33]	Financially disadvantaged, mostly Hispanic children 3–18 years (n = 75) seeking care at school dental clinics. Of the sample, 32% were immigrants born outside of the US or Canada	Immigrant vs. US dft + DFT 10.2 vs. 7.7. Increase in caries (dft + DFT) with age greater among immigrant than US-born children ($p < 0.047$). No significant differences in bacteria species between immigrant and non-immigrant children.	

Author, date	Population	Oral health status	Barriers to use of dental services
Stevens et al. 2010[34]	Families (n = 37 236) of children < 18 years identified from 2001, 2003 and 2005 California Health Interview Survey. Immigrant status of parent–child dyads, broken down into 4 categories: both citizens (n = 30 082), both documented = child legal resident or citizen/parent legal resident (n = 4018), mixed = child citizen/parent undocumented (n = 2256), both undocumented (n = 880)	Undocumented dyad children less likely to have insurance (OR 0.20, 95% CI 0.16–0.26), dental visits (OR 0.47, 95% CI 0.35–0.63) or regular source of care (OR 0.51, 95% CI 0.37–0.69) than citizen dyad children. Documented dyad children less likely to have insurance (OR 0.70, 95% CI 0.57–0.85) and a regular source of care (OR 0.78, 95% CI 0.63–0.96) than citizen dyad children. Proportion of children insured in 2005: citizens (89.4%), documented (49.8%), mixed (49.8%) and undocumented (44.1%). Differences significant (p < 0.01). Similar differences in insurance coverage for parents in the dyad (p < 0.01). Undocumented dyad children were less likely to have dental visits than citizens (OR 0.47, 95% CI 0.35–0.63).	
Weinstein et al. 1996[35]	Random selection from health records of children born from September 1991 to April 1992 Children (n = 938) about 18 months of age were studied from April to December 1993	72.7% of the mothers were born in Canada. Both race (p = 0.0008) and mother born outside of Canada (p = 0.06) were related to higher decay rates in children.	Dental health behaviours: compared with Canadian-born mothers, a higher percentage of foreign-born mothers reported current bottle use, bottle propping, leaving baby unattended with bottle to fall asleep (p<0.0001); a lower percentage reported cleaning the child's teeth. (p = 0.0004).
Wong et al. 2005[36]	Children, < 12 years, of Chinese immigrants with extensive caries (n = 24) referred for dental treatment under general anesthesia Interviews conducted (n = 20)	Children had decay in 6–20 teeth (median = 11).	This qualitative research study showed that immigrant Chinese parents' own childhood did not stress oral hygiene; many parents feared general anesthesia and sedation; cultural beliefs affected some parents' decision to allow treatment; parents' social support systems often opposed treatment as well.
Woodward t al. 1996[37]	15 randomly selected school children ages 8–9 years total n = 424. Immigrants (n = 169) and Canadian-born patients (n = 255)Patients of private dental practices (PDP; n = 128) , City of North York Public Health Department (NYPHD; n = 144) and Others (n=152),	NYPHD patients had higher DMFT (difference in means 0.31, 95% CI 0.05–0.57) and deft (difference in means 1.23, 95% CI 0.57–1.87) scores than PDP patients	Absence or presence of decay dependent on years mother in Canada (OR 1.28, 95% CI 1.07–1.55); parent makes dental appointment (OR 0.14, 95% CI 0.03–0.64); evidence of past decay (OR 3.51, 95% CI 1.68–7.33).
Yun et al. 2013[38]	Parents of children 5–18 years old (n = 2170) where at least 1 parent was not a US citizen before becoming legal permanent resident. Parent immigration status: legalized (n = 504), mixed status (n = 419), refugee (n = 290), temporary resident (n = 787), undocumented (n = 170)		Unadjusted results for delayed dental care (p = 0.019): legalized (17.0%), mixed status (23.3%), refugee (29.1%), temporary resident (20.1%), undocumented (23.4%). No significant differences were found in the adjusted results for delayed dental care.
Ziol-Guest and Kalil 2012[39]	Children < 18 years old residing in low-income households (n = 46 148) participating in the Survey of Income and Program Participation in 1996, 2001, 2004 and 2008		Rate of seeing a dentist was lower for children with a non-permanent parent compared with those with naturalized parents (χ^2 = 24.51, p < 0.001).

Note: CI = confidence interval, defs = Mean decayed/extracted/filled primary teeth, dft = Mean decayed/filled primary teeth, DFT = Mean Decayed/Filled permanent Teeth, DMFT = Mean Decayed/Missing/Filled Permanent Teeth, NHANES III = National Health and Nutrition Examination Survey, OR = odds ratio, US = United States.

Appendix 1: MEDLINE search strategy

1. Dental Caries/
2. exp Toothache
3. Dental Care/
4. Dental Care for Children/
5. Dental Caries Susceptibility
6. Dental Health Services/
7. exp Dental Plaque/
8. exp Dental Health Surveys/
9. exp Dental Records/
10. Dental Research/
11. exp Ethics, Dental/
12. exp Fees, Dental/
13. exp Health Education, Dental/
14. exp Oral Health/
15. dent*.mp. [mp = title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier]
16. oral health.mp. [mp = as in 15]
17. caries.mp. [mp = as in 15]
18. (tooth adj2 decay).mp. [mp = as in 15]
19. (oral adj2 hygiene).mp. [mp = as in 15]
20. (oral adj2 epidemiology).mp. [mp = as in 15]
21. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20
22. exp Ethnic Groups/
23. exp Culture/
24. exp Anthropology, Cultural/
25. exp Cross-Cultural Comparison/
26. exp Cultural Characteristics/
27. exp Cultural Deprivation/
28. exp Cultural Diversity/
29. exp Cultural Evolution/
30. exp "Transients and Migrants"/
31. exp Refugees/
32. exp "Emigration and Immigration"
33. exp Minority Groups/
34. exp Acculturation/
35. migra*.mp. [mp = as in 15]
36. refugee.mp. [mp = as in 15]
37. cultur*.mp. [mp = as in 15]
38. new* arriv*.mp. [mp = as in 15]
39. acculturate*.mp. [mp = as in 15]
40. cultur* competence*.mp. [mp = as in 15]
41. ethnic*.mp. [mp = as in 15]
42. 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41
43. 21 and 42
44. limit 43 to yr = "2007 – 2014"

Appendix 2: Articles excluded after the full-text reading: 1 = review paper, references were checked; 2 = study did not include relevant data on children of refugees or immigrants in North America.

Reference and title	Reason for exclusion
Connor et al. 2014. A narrative literature review on the health of migrant farm worker children in the USA.	1
Riggs et al. 2014. Assessing the cultural competence of oral health research conducted with migrant children.	1
Ghiabi et al. 2014. The oral health status of recent immigrants and refugees in Nova Scotia	2
Geltman et al. 2014. Health literacy, acculturation, and the use of preventive oral health care by Somali refugees living in Massachusetts	2
Jang et al. 2014. Dental care utilization and unmet dental needs in older Korean-Americans	2
Beck et al. 2014. The prevalence of caries and tooth loss among participants in the Hispanic Community Health Study/Study of Latinos.	2
Divaris et al. 2014. Influence of caregivers and children's entry into the dental care system.	2
Tiwari et al. 2014. Recruitment for health disparities preventive intervention trials: the Early Childhood Caries Collaborating Centers	2
Shaffer et al. 2013. Demographic, socioeconomic, and behavioral factors affecting patterns of tooth decay in the permanent dentition: principal components and factor analyses	2
Gonda et al. 2013. Predictors of multiple tooth loss among socioculturally diverse elderly subjects	2
Sirois et al. 2013. Understanding Muslim patients: cross-cultural dental hygiene care.	2
Adams et al. 2013. The cultural basis for oral health practices among Somali refugees pre-and post-resettlement in Massachusetts.	2
Borenstein et al. 2013. Oral health, oral pain, and visits to the dentist: neighbourhood influences among a large diverse urban sample of adults.	2
Geltman et al. 2013. The impact of functional health literacy and acculturation on the oral health status of Somali refugees living in Massachusetts.	2
Valencia et al. 2012. Racial and ethnic disparities in utilization of dental services among children in Iowa: the Latino experience	2
Puertes-Fernandez et al. 2011. Orthodontic treatment need in a 12-year-old population in the Western Sahara	2
Cohen et al. 2011. Behavioral and socioeconomic correlates of dental problem experience and patterns of health care-seeking	2
Amin et al. 2011. Utilization of dental services by children in low-income families in Alberta	2
Christensen et al. 2010. Oral health in children in Denmark under different public dental health care schemes	2
Manuel Almerich-Silla 2008. Caries and dental fluorosis in a western Saharan population of refugee children	2
Dasanayake et al. 2007. Challenges faced by minority children in obtaining dental care	2
Dong et al. 2007. Perceptions of oral illness among Chinese immigrants in Montreal: a qualitative study	2
Schenk et al. 2007. Oral health behaviour of children and adolescents in Germany. First results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)	2