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REPORT ON THE FINDINGS OF THE ORAL HEALTH COMPONENT OF THE

CANADIAN HEALTH MEASURES SURVEY

2007–2009

Canada

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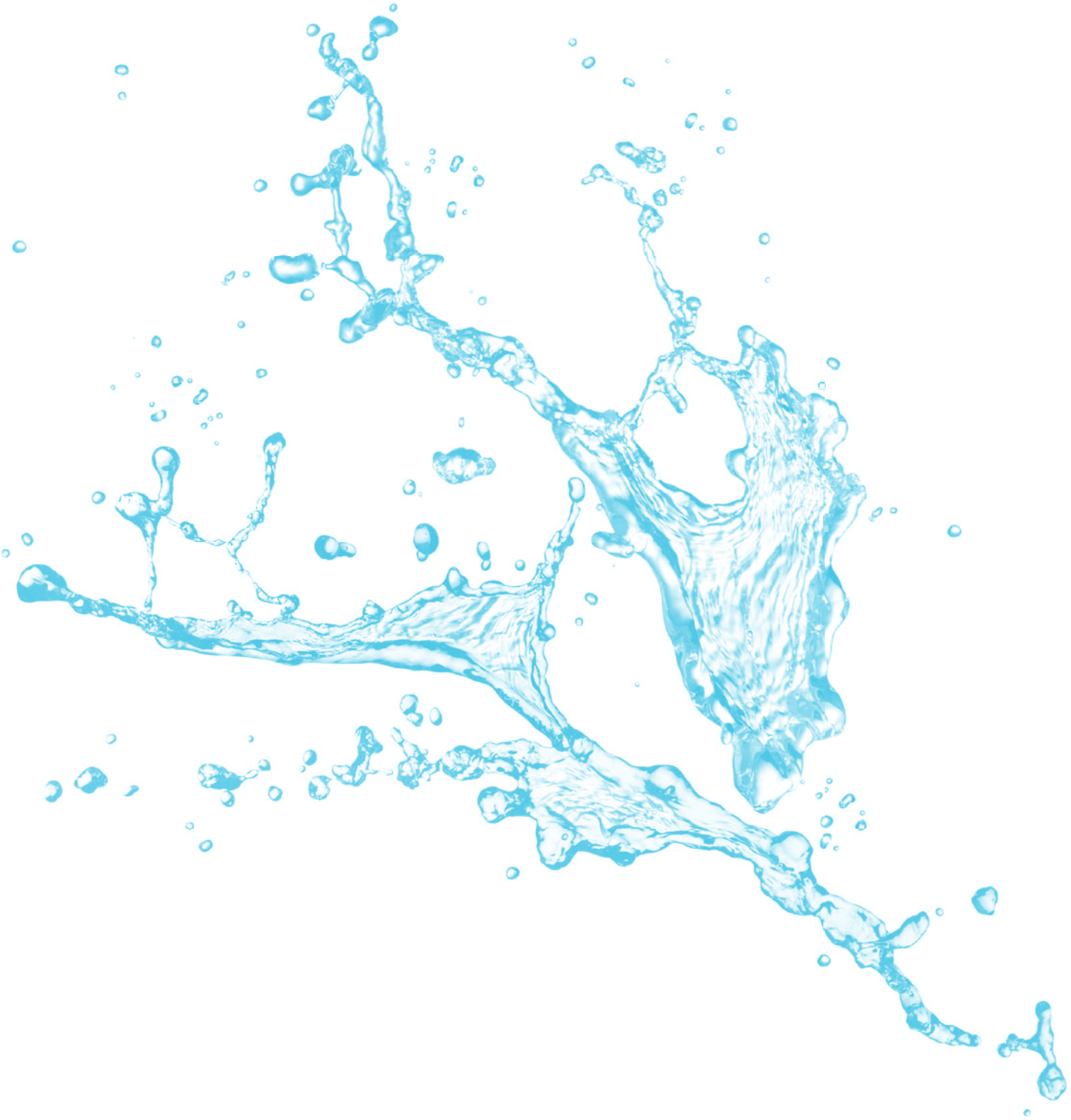
Sincerely,
Peter Cooney, BDS, LDM, DDPH, MSc, FRCD(C)
Chief Dental Officer
Health Canada



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Oral Health Component of the Canadian Health Measures Survey

Objective

This report provides national estimates of the oral health status of Canadians, placed in the context of Canada's oral health care delivery system and compared to previous Canadian estimates and two similar international surveys. The findings are derived from the Oral Health Module of the omnibus Canadian Health Measures Survey conducted from 2007 to 2009. Over 5,600 individuals were first interviewed in their homes and made a visit to a mobile examination centre. Of these 5,586 were examined by dentists calibrated for this study.

Context

Canada is an affluent, developed country with a GDP per capita of $40,200 (2008 est.). It ranks 3rd of 179 nations in the 2006 United Nations Human Development Index (HDI). In Canada, hospital and physicians' services are covered by publicly funded universal programs commonly referred to as "Medicare." However, most dental services are not included in Medicare. A detailed scan of all government payments estimates that only about 6% of all dental expenditures are publicly funded. A previous interview study estimated that 53% of Canadians had private dental insurance (National Population Health Survey 1996/1997). Whether payment is out of pocket or through private or public insurance, dental services are largely provided by independent private practitioners.

Pain and infection from oral diseases affect people's ability to function as full members of society.

Good oral health is important for people to eat, speak, and relate to each other without embarrassment. Pain and infection from oral diseases affect people's ability to function as full members of society. If they cannot attend school to learn, obtain employment, or attend their workplace to earn income because of oral disease, they, their families and Canadians in general become less well off. In the extreme, oral diseases can cause severe disability and even worse, as the families of the estimated 1,150 Canadians who were expected to die from oral cancer in 2009 can attest. While oral conditions are most important in and of their own right, there is increasing understanding of their contribution to the incidence and severity of other diseases such as diabetes and pneumonias (among debilitated people) and concern with their potential effects on cardiovascular conditions.

In 2009 Canadians spent roughly $12.8 billion on professional dental care. The direct costs of dental care are high relative to other conditions; the most recent data show that dental care costs ranked second only to cardiovascular disorders in total direct costs. They exceed the direct costs of treating mental illnesses, digestive diseases, respiratory diseases, injuries and cancers.

Canada is supplied with over 42,600 professionals providing oral health care to clients. In 2007, there were about 19,200 dentists; 20,900 dental hygienists, 2,200 denturists, 300 dental therapists, and unnumbered dental assistants and dental technologists. This supply equates to about 1,725 persons per dentist and about 777 Canadians for each registered oral health provider. A minority of professionals practice in public health settings. The Office of the Chief Dental Officer (OCDO) website (www.hc-sc.gc.ca/ocdo) shows that, in full-time equivalents (FTEs), in 2007/2008, 47 specialists, 66 clinical dentists, 152 therapists and 453 dental hygienists (Total = 719 FTEs) were part of the public health workforce.

Several previous attempts have been made to conduct a national survey of oral health. However, only the Nutrition Canada National Survey of 1970–72 has provided nation-wide data. In that survey, over 14,000 people aged 3–60+ were examined both dentally and medically. Participants in the 1970–72 survey also submitted blood and urine samples and completed dietary records, but the information on the social determinants of health was limited. Even though the dental findings had limitations due to concerns over calibration of the examiners and some improbable results in the analysis, they have remained the only clinically-measured national data on oral health conditions for 38 years.

CHMS Survey Aims

The purpose of the overall CHMS was to collect information "… to help evaluate the extent of health problems associated with such major health concerns as diabetes, obesity, hypertension, cardiovascular disease, exposure to infectious diseases, and the extent of exposure to environmental contaminants; (and) to ascertain relationships among disease risk factors, health protection practices, and health status based on direct measures. The survey was also to provide a platform to explore emerging public health issues and new measurement technologies."

CHMS Survey Methods

The Canadian Health Measures Survey aimed to provide national estimates for each of 5 age groups for conditions that have a prevalence of 10% or higher. There was no intent to collect valid data at the provincial level. The potential collection sites covered 97% of the population of Canada.

The survey gathered information related to nutrition, smoking habits, alcohol use, medical history, current health status, sexual behaviour, lifestyle, physical fitness, as well as demographic and socioeconomic variables. It also collected key information relevant to the health of Canadians in the form of direct physical measurements such as blood pressure, height and weight, blood and urine sampling, physical fitness testing and oral health status.

Overall, the CHMS survey included 46 questionnaire modules with 722 questions; approximately 50 physical measures; over 100 direct physical activity measures, over 120 biophysical analytes, and about a dozen Environment Canada weather and pollution indicators.

Data were gathered through personal household and individual interviews followed by a visit to a mobile examination centre (MEC) for an oral health examination, a physical examination and drawing the samples for biological testing.

CHMS clinical oral examination

In order to allow for the smooth flow of participants in the MEC, CHMS planners allowed 20 minutes for the oral health examination module. Accordingly the clinical protocol was designed to collect tooth-specific caries data – not surface-level measures, and periodontal status probing depths on indicator (not all) teeth. This level of detail was sufficient to meet the aims of the overall survey and for oral health policy analysis. The clinical protocol followed that recommended by an advisory committee, based on World Health Organization (WHO) measures and those tested in an earlier survey.

In order to allow for the smooth flow of participants in the MEC, CHMS planners allowed 20 minutes for the oral health examination module.

In the household interview, there were 34 specific oral health questions which sought information on satisfaction with oral health and appearance, oral symptoms, disability days, dental care habits including visits to a dental professional and ability to pay for dental care. At the start of the oral examination, the dentist-examiner asked a further 18 questions seeking information on dental symptoms (pain, bleeding, dry mouth, etc.) and an additional 15 medical history questions to ensure the person was able to undergo a complete clinical dental examination. The clinical data collection included conditions of edentulism and prosthesis wearing, mucosal lesions, dental fluorosis, occlusion, debris, gingivitis and calculus, periodontal measurement of probing depths and loss of attachment, incisor trauma, caries status of each tooth crown and root (for 28 teeth only) and recommendations for the type of treatment needed by the participant. Recommendations for future care were provided to the participants upon leaving the clinic as a partial thank you for their participation.

From 2007 to 2009, the examination teams visited 15 sites. All examiners were calibrated to WHO standards. Canadian Forces Dental Services contributed over 1,000 military-dentist clinic-days as the examination teams.

Findings

Visiting for professional care

Interviewers for the CHMS found that nearly three-quarters of Canadians (74.5%) made a dental visit in the previous 12 months. This compares to 49.5% found in the Nutrition Canada survey. Especially high rates are seen among children (91.0%) and adolescents (84.0%). Except for 20–39 year olds, more than three-quarters of the dentate (those with at least one natural tooth) visit at least once per year. Among older adults, 79.3% of dentate people and 18.3% of edentulous (those with no natural teeth) make annual visits. Still 34.2% of dentate and 41.4% of the edentulous need dental care. About 10% more Canadians visit for dental care in a year than do either Australians or Americans.

*About **10%** more Canadians visit for dental care in a year than do either Australians or Americans.*

The rates of annual visiting and receiving care are also greatly influenced by income and by insurance. Overall 17.3% report avoiding visiting, and 16.5% report declining recommended care, because of costs. Lower income families and those with no insurance report not obtaining care in the order of 3 to 4 times more than higher income Canadians.

High levels of visiting and dental sick-days have associated indirect costs of time lost from work, school or normal activities. 39.1% of Canadians experience such a time-loss. At 5 hours per school-day for children and adolescents and 7 hours per working-day for adults, an estimated 2.26 million school-days and 4.15 million working-days for adults are lost annually due to dental visits or dental sick-days.

Children 6–11 years old

Overall, 56.8% of Canadian children, aged 6–11 years old, are affected by dental caries. On average, they experience decay on 1.99 primary teeth and 0.49 permanent teeth, of which 2.04 are filled and 0.36 are still decayed. Allowing for the disparate age groups and the uncertain clinical criteria used in previous attempts at measuring oral health in Canada, the prevalence of dental caries on *permanent teeth* has declined, from affecting 74% of the children in the 1970–72 Nutrition Canada survey to less than 25% now. Further, the condition is less severe, since the mean count of decayed, missing, or filled permanent teeth (DMFT) is now 0.49 teeth compared to earlier population mean estimates which ranged from roughly 3 to 6 permanent teeth. However, even today, those with 1 or more teeth affected would have, on average, 2.1 DMFT.

31.6% of Canadian children have 1 or more sealants with a mean of 2.88 teeth sealed. 6.9% of Canadian children show evidence of dental trauma to the anterior incisor teeth. In comparison to children in the United States, Canadian children have very similar oral health indicators, except Canadians have fewer decayed and fewer sealed teeth.

So few Canadian children had moderate or severe fluorosis that, even combined, the prevalence is too low to allow reporting. Keeping in mind that the end-point of aesthetic concern for fluoride (intake) is considered to be "moderate dental fluorosis," dental fluorosis of cosmetic concern is minimal.

Adolescents 12–19 years old

The CHMS shows that 58.8% of adolescents have 1 or more teeth affected by dental caries and the mean count is 2.49 DMFT with 0.37 (14.4%) decayed. Both prevalence and severity of dental caries have declined greatly over the 38-year interval since the Nutrition Canada survey; the current survey shows that virtually no teeth are being extracted due to disease in adolescents.

50.6% of Canadian adolescents have received dental sealants with a mean count among those with a sealant of 3.51. 16.1% of Canadian adolescents have evidence of trauma to their front teeth. In general, as with the children, Canadian adolescents appear to have nearly equivalent oral health to those in the United States.

The CHMS examiners found that 18.5% of adolescents, aged 12–19 had less than acceptable occlusion. No valid comparisons with the information can be made with the earlier Nutrition Canada findings.

Adults 20–79 years old

In 1970–72, Nutrition Canada found that 23.6% of adults aged 19 and older were edentulous (had lost all their natural teeth) compared to the CHMS finding of 6.4%. Over the 38 years between surveys, the levels of edentulism among Canadians have fallen to such an extent that the proportion seen among Nutrition Canada's 40–49-year-olds is now found only among those aged 60–79.

For periodontal diseases, loss of attachment (LOA) is the current "gold standard" measurement used to describe the disease, with case definitions varying on how severe or how many sites constitute a case. Nutrition Canada's reporting categories are not consistent with those of the CHMS, so no historic comparisons of disease severity can be drawn. Internationally, the United States National Health and Nutrition Examination Survey (NHANES) of 1999–2004 data for adults aged 20–64 show that 14.9% have lost attachment of 5 mm, 8.4% have lost 6 mm, and 5.2% have lost 7 mm. Comparable data from the CHMS show that 5.7% of Canadians have their greatest attachment loss as 5 mm and 6.0% have attachment loss of 6 mm or more. 42.5% of Australians (aged 15–75+ years old) have lost 4 or more millimetres of attachment – the equivalent prevalence estimate for Canadians is 21.1%. While direct age comparisons cannot be made, it does appear that Canadian adults have better periodontal health.

International comparisons show that coronal caries seems to affect a higher proportion of Canadians, but the severity appears less than the Australians and equivalent to that in the U.S.

Nutrition Canada reported that 96.1% of Canadians 19 years old and older had experienced coronal caries with a mean DMFT of 17.5. According to the CHMS, 95.9% of adult dentate Canadians have experienced coronal decay with a mean count of 10.7 DMFT. Prevalence of coronal caries remains high for all age groups, but the severity has dropped such that fewer than half the numbers of teeth are affected in the age cohorts under 40 years of age. International comparisons show that coronal caries seems to affect a higher proportion of Canadians, but the severity appears less than the Australians and equivalent to that in the U.S.

One condition for which we have no historical record but is prevalent among 20.3% of adults, is root caries, or the decay of tooth roots that have become exposed largely due to periodontal diseases. Nearly 30% of the disease remains untreated.

Inequalities in health and access to care

While the above findings document the great improvement in oral health since the 1970–72 Nutrition Canada survey, the overall picture hides many of the inequalities that are found among sub-groups. Income has long been seen as a strong determinant of health in general, and the survey findings demonstrate its contribution to oral health.

Canadians from lower income families have almost two times worse outcomes compared to higher income Canadians as measured by:

- self-reported fair or poor oral health;
- DMFT among adolescents;
- the ratio of decayed teeth to total DMFT among adolescents and adults;
- edentulism;
- both the number of decayed (i.e., unfilled) and missing (due to disease) teeth among adults;
- prevalence of untreated coronal and root caries;
- highest debris and calculus scores;
- severe attachment loss (≥ 6 mm); and
- having 1 or more soft tissue lesions.

Again, compared to the higher income group, lower income Canadians in this survey have significantly:

- lower rates of visiting within the last 12 months;
- lower rates of visiting annually for check-ups, prevention, or treatment;
- lower prevalence of sealant application (adolescents);
- lower rates of receiving orthodontic treatment;
- higher proportions avoiding dental visits because of costs; and
- higher proportions declining recommended care because of costs.

Consistent with these findings, treatment needs are higher among lower income Canadians – 46.6% of lower income Canadians who are dentate need 1 or more types of treatment, compared to 25.6% of those with higher incomes.

Future studies

The CHMS provides a rich data source that begs further analysis to identify both the potential risk factors not employed in this descriptive analysis and the strength of those relevant factors. Further analyses may now be conducted to examine the associations of oral conditions with major health concerns such as nutrition and diseases such as diabetes. With the blood and urine assays, further analyses can also examine the relationship of dental conditions and exposure to environmental contaminants, e.g., mercury and Bisphenol A. Future surveys using the standardized protocol developed for this study will include those not targeted in the survey frame of this first CHMS, for example, preschool children, First Nations and Inuit people and those who are difficult to reach such as the homeless.

Conclusion

The oral health component of the CHMS survey is the result of strong co-operation between three departments of the Government of Canada: Statistics Canada, Health Canada, and the Department of National Defence. Statistics Canada developed the survey design, supplied the large trailers, conducted the sampling and recruitment, developed the data entry system and supplied the analyst to extract the findings from the raw data. Health Canada funded the development of the oral health survey questions and clinical examination protocol and provided the training and ongoing calibration for the examiners. The Canadian Forces supplied the dentists to conduct the examinations.

The oral health module of the Canadian Health Measures Survey has provided extensive data on the extent of oral health problems among Canadians aged 6–79 years. As shown in several tables, oral conditions appear to be strongly associated with determinants of health such as age, income, country of birth and with risk factors such as smoking, and regular visiting for care.

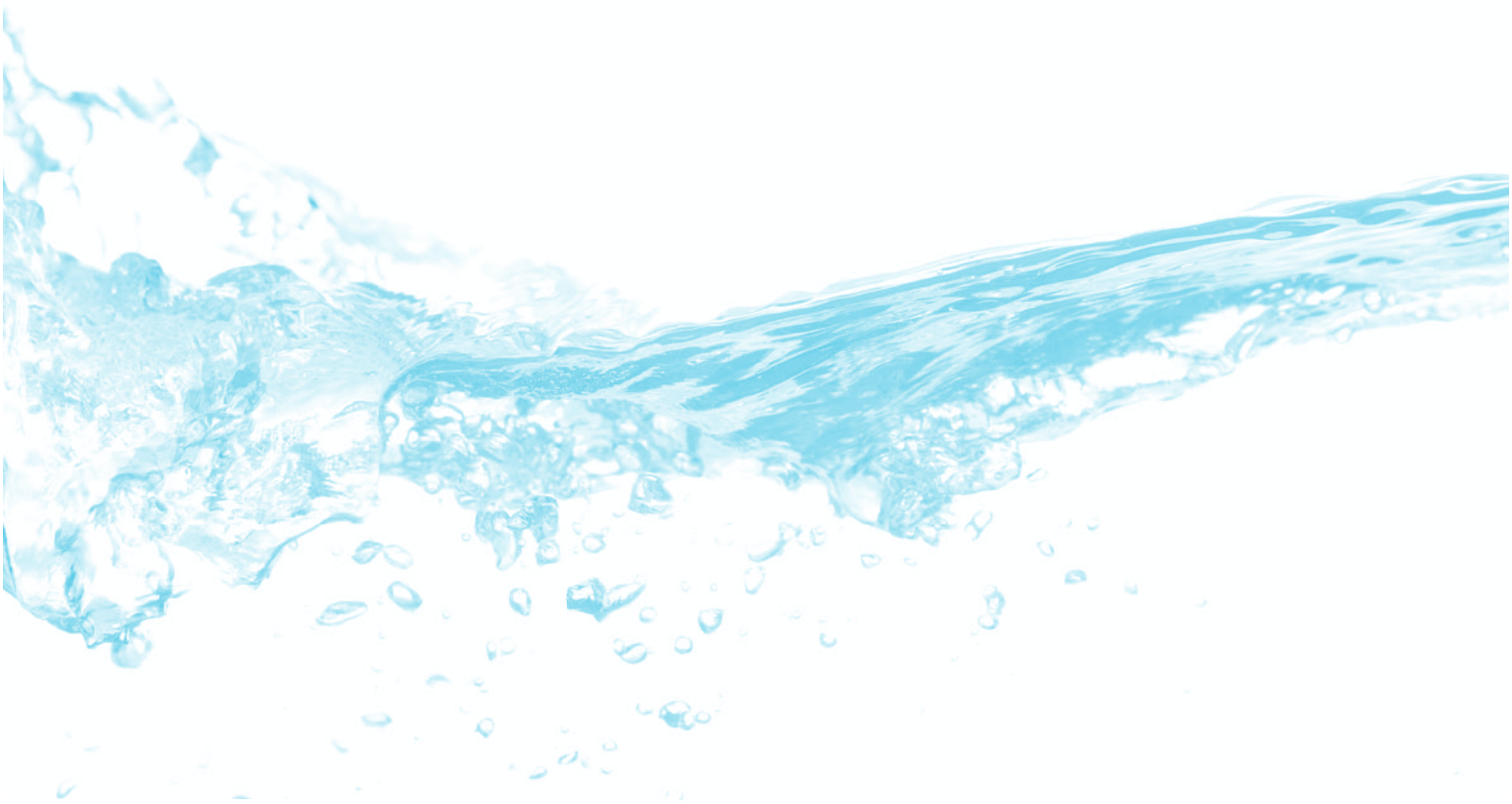
The real challenge is not the measurement of the problems but taking effective action to address them. The survey results provide a platform from which to explore policy options such as the need for achieving improved access to care and improved oral health.

Introduction and rationale

Good oral health is important for people to eat, speak, and relate to each other without embarrassment. Pain and infection from oral diseases affect people's ability to function as full members of society. If they cannot attend school to learn, obtain employment (Welsh 2007b), or attend their workplace to earn income because of oral disease, they, their families and Canadians in general become less well off. In the extreme, oral diseases can cause severe disability (Favero E 2007; Welsh 2007a) and even worse, as the families of the estimated 1,150 Canadians who were expected to die from oral cancer in 2009 (Canadian Cancer Society 2009) can attest. While oral conditions are most important in and of their own right, there is increasing understanding of their contribution to the incidence and severity of other diseases such as diabetes and pneumonias (among debilitated people), and concern with their potential effects on cardiovascular conditions (U.S. Department of Health and Human Services 2000).

Oral conditions are also widespread. Preventing, detecting, and treating them consumes the efforts of over 42,600 professional care providers in Canada.

For all of these reasons, it is important that Canadians and Canadian public, private and professional policy makers be adequately informed of the extent and distribution of current oral conditions in Canada. It is the first responsibility of the public health system to provide information on the nation's health status (Institute of Medicine 1988), in this case oral health status, so that appropriate efforts can be taken to reduce the burden of illness to the benefit of all Canadians.



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The context of health care in Canada

The nation

Demography and economic status

Canada is the second-largest country in the world (after Russia). Approximately 90% of its 33,873,357 people live within 160 km of the United States border. About 16% of the population is 0–14 years, and 15.2% are 65 years old and older. Infant mortality is 5.04 per 1,000 live births, and life expectancy at birth is 78.7 years for males and 83.9 years for females (Central Intelligence Agency 2009).

Canada is an affluent, developed country, a member of both the G8 and G20 group of nations. Its GDP per capita is $40,200 (2008 est.) and it ranks 3rd of 179 nations (behind Iceland and Norway) in the 2006 Human Development Index (HDI). The HDI is a composite of living a long and healthy life (measured by life expectancy), being educated (measured by adult literacy and enrolment at the primary, secondary and tertiary level) and having a decent standard of living (measured by purchasing power parity, PPP, income) (United Nations Development Programme 2009).

Responsibility for health care

Canada is administered by three levels of government: the national or federal government (1); provincial (10) or territorial (3); and municipal (many). Formally the organization and provision of health services are provincial responsibilities but, in reality, all three levels play roles in protecting and promoting health. Responsibilities at the federal level include the approval of drugs and devices, the testing of foods including meats that are sold in Canada, and the provision of care for First Nations people, the national police (RCMP) and Canadian Forces personnel and veterans. The federal department of health (Health Canada) also co-ordinates federal, provincial and territorial health-related working groups. One of these sets national guidelines for potable water, which includes recommendations for the concentration of fluoride (Federal-Provincial-Territorial Committee on Drinking Water 1996) in public water supplies. In consultation with the provinces and municipalities, Health Canada also undertakes periodic reviews of issues around water quality (Fluoride Expert Panel 2007).

The provinces and, to a large extent, the territories are responsible for the delivery of public and personal health services in their jurisdictions. Thus, legislation and organizations responsible for health care and health care providers are provincial. Much of the provincial role consists of providing for the licensing of health professionals, funding local hospitals and paying physicians and some other providers for the care provided under the Medicare program. Provinces also fund a large part of the post-secondary programs in universities and colleges that train health care providers.

Municipalities in the province of Ontario provide and partially fund the provision of community-based public health protection and promotion programs, deliver safe water and provide for waste disposal. In the rest of the provinces, provincial health departments or regional health authorities, funded by the particular province, provide the community-based public health programs. In most of these other provinces, public health is integrated within a regional framework of health care delivery where hospitals, physicians' services and public health services are managed by the regional health organization.

Historically, the federal government has played a major role in the development of Canada's universal hospital and physician care services known as Medicare by offering the provinces substantial funding and latterly tax-points in addition to transfers. Under the federal Canada Health Act provinces qualify for the federal funds as long as their

Medicare programs meet the five criteria of: public administration; universality (no exclusions due to age or prior conditions); accessibility (no user fees); comprehensive (all needed medical and hospital services); and portability between provinces. Originally, Medicare covered only the services that could be provided by physicians. While it now varies by province, other services have been added to Medicare for some groups, e.g., physiotherapy, drugs, oral surgery in hospitals, and others have been first added then taken away, e.g., optometrists, extensive exodontia.

The context of dental care in Canada

Source of dental expenditures

Unlike physician services, most dental services are not included in Medicare. Thus, while the majority of both medical and dental professionals are independent, and own and operate their own practices, in 2008, 98.6% (Canadian, Institute for Health Information 2008) of physicians' services were reimbursed by the various provincial and territorial Medicare plans with public funds. The Canadian Institute for Health Information (CIHI) reports that the major portion (Canadian Institute for Health Information 2008) of the payments for dental care comes from private sources, either out of pocket or through employer-sponsored, private insurance. As cited on the Office of the Chief Dental Officer website, a detailed scan of all government payments estimates that about 6% of all dental expenditures are publicly funded (Office of the Chief Dental Officer 2007/2008).

Dental care is costly relative to other conditions covered by Medicare. In 2009, the Canadian Institute for Health Information estimated that Canadians would spend $12.8 billion on dental care (Canadian Institute for Health Information 2009). As seen in Table 1.1, dental care costs ranked second only to cardiovascular disorders in total direct costs in 1998. If anything they were increasing faster than the costs of other conditions as they were ranked third in 1993 (Baldota 2004) behind cardiovascular and mental health costs. In both years they exceeded the direct costs of treating digestive diseases, respiratory diseases, injuries and cancers.

TABLE 1.1
Direct costs of treatment of diseases in Canada, 1993 and 1998

	$ Billions	
	1993	1998
Cardiovascular disorders	7.35	6.82
Dental services	**4.93**	**6.35***
Mental disorders	5.05	4.68
Digestive diseases	3.33	3.54
Respiratory diseases	3.79	3.46
Injuries	3.12	3.22
Cancer	3.22	2.46

*Source: CIHI 2009, Health Canada 1997, Health Canada 2002

Table 1.2 was constructed using data from both the Canadian Institute for Health Information (Canadian Institute for Health Information 2008) and population tables retrieved from Statistics Canada (Wikipedia 2009). The table shows that over the 48-year period from 1960–2008, expenditures on dental care increased in current dollars from $110 million to $12.12 billion, or from $6.16 to $361.62 per capita. Controlling for inflation (Statistics Canada 2009b) results in a 2008 estimate of $49.26 (1960 dollars) per capita – more than an eight-fold increase.

However, expenditures are the product of the costs per person using dental care services and the number of people using dental care. Table 1.2 also shows the "best estimate" of the proportion of the population making 1 or more visits in that year. The utilization estimates demonstrate a relatively slow rise in utilization (from 50% to 64%) by the populations under study over the 35 years between 1970 and 2005. However, the 2008 expenditures per person, adjusted simultaneously for inflation (1960 dollars), population growth and the increase in the proportion of the population using dental care, represented a four-fold increase over the 1970 amount. Assuming that dental fees did not increase in excess of the Consumer Price Index this increase can only represent more services per user and/or more expensive services for those receiving dental care.

Over the 48 years between 1960 and 2008, the data show a 2.6-fold increase (0.75/0.29) in the share of Gross Domestic Product (GDP) spent on dental care services and a relative increase of 37% in the dental care services share (from 5.1% to 7.0%) of the nation's expenditures on health care.

TABLE 1.2
Indicators of growth in dental care expenditures, Canada, 1960–2008

	Year					
Dental Expenditures	**1960**	**1970**	**1980**	**1990**	**2000**	**2008 (estimate)**
Total – $ millions	110	265	1,520	4,139	7,180	12,117
Per capita $ current	6.16	12.45	64.92	149.42	231.60	361.62
In 1960 $s	6.16	9.52	22.88	29.63	37.75	49.26
In 1960 $s per user*	na	19.04	45.76	55.91	63.98	77.33
% of total health care expenditures	5.1	4.2	5.8	6.8	7.5	7.0
% of GDP	0.29	0.31	0.42	0.61	0.69	0.75

*Note: Utilization estimates and year of survey used in calculations for expenditure per user, were for: 1970 – 50% (1972); 1980 – 50% (1979) {Charette 1986}; 1990 – 53% (1990) {Charrette 1993}; 2000 – 59% (1996) {Millar & Locker 1999}; 2008 – 63.7% (2008) {Statistics Canada 2009}

Sources: Baldota and Leake, 2004, with updates from CIHI NHEX 1975–2008 and Health Canada (2002) for expenditures; Statistics Canada for CPI, Wikipedia (2008) for population estimates and Statistics Canada 2009 CANSIM Table for utilization in 2008.

Numbers of providers

Consistent with increasing expenditures has been the rapidly increasing numbers of human resources allocated to the production of oral health care services (Table 1.3) since 1960. While the numbers of dentists more than tripled (from 5,780 to 19,201), the most dramatic increase occurred in the numbers of dental hygienists, increasing from 74 (1961) to nearly 21,000 in 2007. Denturists increased from, officially, 0 to over 2,200, following changes in legislation that now provides for denturists to practice in all provinces. Dental therapist numbers are relatively stable at about 300. Thus by 2007, there were an estimated 42,633 oral health care providers in Canada, up from 5,854 in 1960. In 2007, the ratio of the population to a dentist was 1,725:1 and with the addition of dental hygienists, denturists and dental therapists, the ratio of the population to all registered providers was 777:1.

Of these, a minority practice in public health settings. The Office of the Chief Dental Officer website shows that in full-time equivalents (FTEs), 47 specialists, 66 clinical dentists, 152 therapists and 453 dental hygienists (Total = 719 FTEs) were part of the public health workforce (Office of the Chief Dental Officer 2009).

TABLE 1.3
Indicators of growth in dental care providers, Canada, 1960–2008

	Year					
Dental Care Providers	**1960**	**1970**	**1980**	**1990**	**2000**	**2007**
Dentists	5,780	7,413	11,095	14,341	17,287	19,201
Dental Hygienists	74 (1961)	746	3,862	8,832	14,895	20,928
Denturists	0	0	1,526	1,925 (1989)	2,075 (1999)	2,200
Dental Therapists						304
Population per dental care provider	3,052	2,610	1,466	1,088	905	777

Sources: Baldota and Leake 2004; with updates from CIHI's Canada's Health Care Providers various years up to 2009 and from private correspondence with denturist and dental therapist organizations.

Private dental insurance

In 1996/97, 53% of respondents to the National Population Health Survey aged 12 and older reported having dental insurance; two years later this had risen to 56% (Statistics Canada 1999). In 1999, the Romanow Commission on the Future of Health Care (Romanow 2002) estimated that private insurance constituted $3,508 (55%) of the $6,378 millions of private expenditures on dental care, and that proportion had not changed by 2006, the most recent year for which data are available (Canadian Institute for Health Information 2008).

Most "insurance" in Canada is sold as indemnity insurance, i.e., the carrier indemnifies the patients for their costs, or in many cases pays the bill directly to the provider through a transfer of funds electronically. Many plans have no patient charges (co-insurance or deductibles) for basic care, but they require patients to pay a share of major restorative or prosthodontic care costs. Where orthodontic services are covered, they are often cost-shared and subject to a life-time maximum. Aside from one or two union-led programs, there are few alternate models of private "insurance" in Canada.

While the coverage is termed "insurance", dental benefits do not meet the usual criteria for insurance in that the "losses" are usually too small to be catastrophic and are relatively predictable both as to cost and to timing. Much of the industry is not currently backed by an insured pool of funds; rather the "insurance" firms act as paid administrators who receive and pay claims and then are reimbursed by the employers. Employers usually pay the majority share of the premiums and they are high. For example, the plan that covers the Faculty and Librarians at the University of Toronto in 2005–06, cost $780 per year for a single person and $1,740 per year for a family of which the employee paid 20% of the premium (Dyce 2005). In addition, there are co-payments and yearly maxima on major restorative services and lifetime maxima on orthodontic services. The continuing trend to cost increases, well in excess of the rate of inflation (see Table 1.2), and the impact of non-traditional (i.e., contract – without employee health benefits) jobs (HRDC 1998) may affect the sustainability of private dental insurance in Canada.

Dental insurance remains a desirable workplace benefit since the premium, paid by the employer, is part of the compensation package for the employee, but is not taxed by the federal government and most provincial governments as income. Under this scheme, more affluent Canadians receive considerable publicly-funded subsidies for their dental care (Smythe 2001).

Public programs

Of the approximate 6% of dental services that are publicly funded, the federal government contributes 40% and the provinces provide the balance directly, or through their municipalities.

A report of public programs has been assembled by Quinonez et al. (2008). As an overview, in 2004–05, the federal government spent $228 million for its clients but even more, $271 million, paying for the private insurance premiums for its employees and retired workers. While it varied somewhat by province, the provinces expended funds for care that was covered by the Canada Health Act (Medicare), i.e., where it had to be delivered in hospital (e.g., oral cancer, anaesthesia and operating room costs for treatment of early childhood caries). However a large part of their costs were for the dental care provided to social service (welfare) clients, and depending on the province, targeted groups such as seniors, children with cleft-lip or cleft-palate, and for community-based preventive programs run by the municipalities or regional health authorities. Municipalities expended funds where the community-based programs were cost-shared with the province, or where they chose to operate such programs with their own funds. Again both provinces and municipalities expended funds for the dental insurance premiums on behalf of their current or retired employees but these funds are not separately identified by Canadian Institute for Health Information as public expenditures.

One major public program is water fluoridation. As of 2008, 45.1% (Office of the Chief Dental Officer 2009) of Canadians have access to fluoridated water.

Access to dental care

Access to care for disadvantaged Canadians is a major issue. While not everyone with the means to access care visits a dentist each year, the data consistently show that access to dental services is unequal. Particularly revealing is the comparison of factors influencing utilization of dental care and medical care as revealed by a 1998 study (Sabbah 1998) – see Table 1.4. Sabbah found that high education and high income were positively associated with the rate of visiting a dentist. In contrast, neither education nor income had any association with visiting a physician. Sabbah further showed that increasing age predicted higher utilization of physicians but lower utilization of dentists, and that poor general health predicted highest attendance of a physician but lowest utilization of dentists. For dental care socio-economic factors determine dental care utilization to the extent that visiting a dentist is opposite to the expected needs.

In summary, the expenditure data show that the direct costs of the largely (94%) privately funded dental care system have increased faster than the growth in population, the increase in utilization and the rise in prices as measured by the Consumer Price Index. As well they are increasing relative to other expenditures on health and as a proportion of the GDP. These increased expenditures have provided the revenue for the hugely increasing numbers of dental care providers. Private, employer-sponsored 'insurance' is the modal method of paying for dental services in Canada followed by out-of-pocket payments. Publicly-funded programs provided by governments either deliver services with salaried staff or more often pay for services for special client groups such as military personnel, prisoners, and First Nations people. Provincial programs pay for services that can only be delivered in hospital, or cover, with varying degrees of comprehensiveness, welfare clients and usually one priority target group such as children or seniors. Municipalities or regional health authorities commonly operate community-based preventive programs including support for water fluoridation. However, despite the large and increasing resources expended on dental care, of which the targeted public programs remain a very small part, utilization remains inconsistent with both the expected needs and the publicly-funded Medicare scheme.

TABLE 1.4
Comparison of effects of factors determining utilization of dental care with their effect on utilization of medical care, Canada, 1994

	Percent of Canadians making 1 or more visits to:	
Factors	**Dentists**	**Physicians**
Education		
Less than High School	40.9	77.5
Completed High School	54.1	78.6
More than High School	64.7	80.1
Income		
Less than $20,000	34.0	80.7
$20,000–$49,999	51.2	78.1
Greater than $50,000	68.8	77.6
Age – years		
12–19	71.4	72.6
20–44	57.0	76.6
45–64	48.8	78.6
65+	34.3	87.5
General health		
Poor	32.7	94.7
Fair	36.7	90.1
Good	48.3	82.7
Very good	56.0	77.5
Excellent	60.2	69.2
Employed (those aged 20+)		
Yes	58.3	76.3
No	39.5	83.3

Source: Sabbah 1998

2

Measuring oral health in populations

Dental conditions are unique in that most are chronic, progressive and irreversible, but situated where they can be easily examined. Accordingly, their occurrence and progression is visible to clinical examination and trained examiners can readily measure the existing prevalence and severity of dental diseases to that point in the person's life. Measurement and recording criteria for epidemiologic surveys have evolved since World War II (WWII), and now are relatively standard throughout the world, in large part due to the work of the World Health Organization (WHO) and its *Survey Methods* publications (World Health Organization 1997).

However, information on oral health status is not routinely collected by provincial/territorial or the federal health departments as part of their vital statistics or disease surveillance processes. Thus, information on oral health has to be collected by surveys dedicated in whole, or in part, to that purpose. Household interview surveys can provide self-reported estimates of the prevalence of conditions that patients perceive they have, for example; edentulism; symptoms and impacts of oral conditions; preventive and risk behaviours; and the utilization of dental services. However, direct examinations must be conducted to determine the prevalence and severity of dental diseases and conditions in a population.

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Household interview surveys

Since WWII, several interview surveys containing questions on 1 or more areas relative to oral health behaviours, dental care utilization, or dental status (edentulous or dentate) have been conducted. Perhaps the first was the in-depth household interview survey conducted for the Canada Sickness Survey 1950–51 (Minister of Trade and Commerce 1960). Enumerators obtained information on the number of dental visits and the rate of visiting. 14.7% of the participants made a visit during the study period. Utilization was shown to be linked to age (adolescents highest), gender (females higher), income (upper income group highest) and region (British Columbia highest).

Interview surveys have been conducted subsequently but have not followed consistent methods relative to the target population or the oral health questions used. Various findings are available from the Canada Health Survey (Health and Welfare Canada and Statistics Canada 1981) – and a secondary analysis (Charette 1986); the 1990 Health Promotion Survey (Charette 1993); the biennial, now longitudinal, National Population Health Surveys (NPHS) from 1994–95 (Cycle 1) to 2006–07 (Cycle 7); the 1999 report on The Health of Canadians (Federal Provincial and Territorial Advisory Committee on Population Health 1999) which used data from Cycle 2 of the NPHS; and the repeated, cross-sectional Canadian Community Health Survey (Statistics Canada 2007). For the latter, many of the dentist utilization questions are located in optional modules, and for 2006/2007 not all provinces opted to include the oral health questions.

Examination surveys

Examination surveys are not new or that rare. The introduction to the 1977 *Nutrition Canada Dental Report* states that dental surveys of children had been carried out in various provinces "…over the last 25 years…" (i.e., since 1952). However, these were again, not conducted to a consistent standard as to the sampling process, the information collected, or the calculation of the relevant indices.

In 1959, the Public Health and Research Committees of the Canadian Dental Association (CDA) (Canadian Dental Association 1959) sought to improve upon the dissimilar methods by publishing *The Evaluation of Canadian Dental Health*. They hoped to provide provincial/territorial health departments with a standard survey method in anticipation of them conducting a national survey of children's dental health. Dr. Grainger of the University of Toronto prepared the first draft of the CDA system which was based on survey methods operating in Ontario and in British Columbia which, in turn, had evolved from an earlier system developed by the Ontario Dental Association. The 1959 CDA document describes the calculation of the dental indices as well as sampling and recording procedures, whereby local surveys can be aggregated into provincial and national data. Indeed Dr. Grainger's work and the protocol outlined in the CDA document became a prototype for the WHO methodology (World Health Organization 1967). It remains the reference document for the calculation of the epidemiologic indices but the system did not include an interview or self-report component.

Examination surveys in Canada

In 1961, following the development of the CDA system, six provinces aimed to complete their component of a national survey (Canadian Dental Association 1962). However, only children aged 7–13 were included in the survey, leaving no data for the majority of the population. Because of the non-participating provinces, and the convenience sampling of Ontario children, the findings could not be used to provide reliable information on the nation as a whole. Nonetheless these data were used to support the CDA's 1962 brief to the Royal Commission on Health Services which, in response, stressed the need for national estimates on the dental health of Canadians (Hall E 1964).

The Nutrition Canada Dental Report cites a document titled *Dental Care in Canada*, 1967, which allegedly contained oral health status data. However none of the CDA, University of Toronto or Health Canada libraries has a record of that publication.

About eight years after the six-provinces survey (1968–70), another attempt was made to collect national data, but again just for children. This time, all 10 provinces (but no territories) participated (Lewis 1973). The report provides estimates for each province but the author declined to combine the data into a national estimate since the sampling methods and field procedures differed between the provinces.

The only complete national examination survey of all ages was conducted between 1970 and 1972 as part of the Nutrition Canada National Survey (Nutrition Canada 1977). In that survey, over 14,000 people aged 3–60+ years were examined both dentally and medically. As well, participants submitted blood and urine samples and completed dietary records. The Nutrition Canada Dental Survey was a huge accomplishment, but even then, with 14,000+ participants, sample sizes for some age groups were too small to provide reliable provincial estimates and close examination revealed some improbable findings.

Between then and now, only two national examination surveys have been conducted in Canada, both on potentially non-representative samples of children aged 6 and 12 living in First Nations communities (Department of Community Dentistry and National School of Dental Therapy 1991; Saskatchewan Indian Federated College National School of Dental Therapy 2000).

Other attempts have been made to promote a national survey of Canadians. In 1990, a number of prominent Canadian academics obtained funding from the National Health Research and Development Program of Health Canada and the sponsorship of the Canadian Dental Association to hold a workshop to develop a new examination system (Banting 1990). Participants at the workshop approved a revised instrument containing appropriate questions for interviewing the subjects and updated the examination instrument to include conditions such as fluorosis, revised measures of mucosal lesions, periodontal health and surface measures of caries including root caries. They also agreed on priority age groups to be

surveyed and agreed to seek the research funds to conduct the examinations. However, the funds were never approved, in part because the application did not receive the support of the rest of the academic community since it would have consumed close to the total amount made available for dental research in Canada.

The most recent attempt to conduct a national survey used the methods pioneered by the British Columbia Dental Association (BCDA). Using this method, the data are collected by private dentists who complete special examination records on their patients on a specific day and then the records are returned to the Association for analysis and report generation. In 2006, investigators from faculties of dentistry in Quebec, Ontario and Alberta (Leake 2006b) further refined the examination record form and developed two (adult, adolescent) self-complete patient questionnaires. Consistent with the then understanding of population health and its determinants, the questionnaires set out to determine risk and preventive factors that might be associated with the concurrent but independently (dentist-denturist) measured clinical conditions and diseases. Quantities of the blank forms along with an instruction manual were couriered to 1:50 dentists and 1:10 denturists across Canada for completion on one day, March 23, 2006. The data were returned by prepaid courier and then analyzed at the University of Toronto. The findings on the prevalence and distribution of conditions were consistent with the expectations of the investigators given their knowledge of provincial data, and despite the low participation by dentists (12%) and denturists (16%), much was learned.

Oral health surveys in other countries

Oral health examination surveys are common in many developed countries. Over the last 25 years in the United States, various departments of government have funded examination surveys of employed adults and seniors (U.S. Department of Health and Human Services 1987), middle aged and older adults including some served by the Indian Health Service as part of the second International Collaborative Study of Oral Health Outcomes (ICS-II) (Reifel 1997) and the ongoing National Health and Nutrition Examination Surveys as reported in the special issue of the *Journal of Dental Research* (Kleinman 1996). Similarly the United Kingdom (Office for National Statistics 1988) and Australia (Slade GD 2007) have conducted a number of surveys, among the latest being surveys of adult oral health.

But it is not just developed countries that have placed priority on measuring the oral health status of their populations. "Googling" "national oral health survey" revealed 2.3 million hits; a cursory scan of a few showed oral health surveys were planned for, or had been conducted in, Brunei (Kon 2009), Cambodia (Ministry of Health 2000), Iceland (The Centre for Oral Health (Iceland) 2008), India (Staff Reporter 2002), Vietnam (Trong 2002) and Zimbabwe (Frencken 1999).

Previous reports on the oral health of Canadians

On three occasions, investigators have written reports on the oral health of Canadians. The first was commissioned by the Royal Commission on Health Services (Kohn 1967), the second was used to support the CDA's proposed children's dental plan (Lewis 1968), and the third appears as Appendix I to the Canadian Dental Association's brief to the 1979 Health Services Review (Canadian Dental Association 1980). Kohn (1967) had to extrapolate from municipal and some provincial data to make the case that oral health was likely poor. Lewis (1968) obtained recent data for children from nine provinces but was only able to use those from five. The anonymous author of the 1979 CDA report (Canadian Dental Association 1980) used similar sources, apparently not trusting some of the Nutrition Canada findings. Both Kohn and the anonymous author made the point that national oral health status was largely undocumented.

In summary, up to 2007, little had changed since the CDA's 1962 call for obtaining national data on oral health – we had no current nation-wide information on the oral health of Canadians that was collected according to a standard protocol. The information from the Nutrition Canada survey was then 37 years old and, over that period, dental caries rates among children had declined (improved) greatly in at least two provinces (Johnston, Grainger, and Ryan 1986; Payette and Brodeur 1992), but we still knew little about whether that decline had been maintained, and if it had, whether it was carrying forward into the adolescent, young adult and senior years.

3

The Canadian Health Measures Survey (CHMS)

Brief description

The following descriptions have been only slightly edited from the CHMS website (Statistics Canada):

> *To address longstanding limitations within Canada's health surveillance system…the Canadian Health Measures Survey collected key information relevant to the health of Canadians in the form of direct physical measurements such as blood pressure, height and weight, blood and urine sampling and physical fitness testing. Also, through questionnaires, it gathered information related to nutrition, smoking habits, alcohol use, medical history, current health status, sexual behaviour, lifestyle, physical fitness, as well as demographic and socioeconomic variables.*
>
> *All this valuable information is expected to help evaluate the extent of health problems associated with such major health concerns as diabetes, obesity, hypertension, cardiovascular disease, exposure to infectious diseases, and the extent of exposure to environmental contaminants. The data will serve to ascertain relationships among disease risk factors, health protection practices, and health status based on direct measures. The survey will also provide a platform to explore emerging public health issues and new measurement technologies.*

Survey operations

The survey collected measures from approximately 5,600 people, representing 97% of the Canadian population aged 6–79 years. Survey development and testing occurred during 2003–06, with data collection occurring from March 2007 to February 2009 (Health Canada).

Data were gathered through personal household and individual interviews followed by a visit to a mobile examination centre (MEC) for a physical examination and drawing the samples for biological testing. It is one of the very few surveys in Canada that has collected direct clinical measurements.

The survey was conducted in 15 sites (see Appendix 1) across the country, over a period of 24 months. The CHMS MECs stayed in each site for 6–8 weeks. Two sets of two MECs were used to "leap frog" across the country so that the examinations could continue without waiting for the movement and set-up of the mobile units.

Sampling strategy

The sampling has been described more fully elsewhere (Giroux 2007) and that document is only précised here. Briefly:

> *"…the strategy aimed to provide national (not provincial) estimates for each of the 5 age groups for conditions that have a prevalence of 10% or higher with a coefficient of variation of 16.5%. The country was divided into 257 potential collection sites; each with a population of >10,000 where each potential respondent had a maximum travel distance to the clinic of 100 km (50 km in urban centres) or less. These 257 sites covered 97% of the population of Canada. The region (British Columbia, Prairies, Ontario, Quebec, Atlantic) and urban/rural nature of each of the 257 sites were identified and then 15 sites were systematically selected in proportion to the size of their population. Within each site, dwellings with known household composition (from the 2006 census) were divided into 6 strata to obtain sufficient numbers of people in each of the targeted age groups and a random sample of*

dwellings from each stratum was taken. Within a selected household, one or two (two especially where children aged 6–11 years old were to participate) persons were selected. All five regions were represented."

People living on First Nations reserves or Crown lands, residents of institutions, full-time members of the Canadian Forces and residents of certain remote regions were excluded.

Data were collected over 2 years and the sites were visited in an order which accounted for seasonal variation, i.e., regions with more than one site were visited in both summer and winter.

Household interview

The first contact with respondents was made by a letter, sent by mail, telling the persons living at the sampled address that an interviewer would visit their home to collect some information about the household. During the home visit, the interviewer randomly selected a respondent and conducted a health interview lasting about 45 minutes. The interviewer then helped the participant to set an appointment for the physical measures at the MEC (Health Canada).

Visiting CHMS Mobile Examination Centres

The use of MECs was patterned after the United States National Health and Nutrition Examination Survey (NHANES). Two sets of two 53-foot (Tremblay 2006) trailers were obtained; in each set one trailer was used as an administration area and the other as the clinic. The two trailers were linked by an enclosed pedestrian walkway. After registration in the administration trailer, participants were taken to stations in the clinic area. Each station served as a site for a particular measure: e.g., blood draw, urine sample, oral health exam, and measures of anthropometry, cardiovascular fitness, muscular strength and flexibility.

Outcomes

As stated by Tremblay (Tremblay 2006), the CHMS offers "... enormous ... analytical potential ... (with) 46 questionnaire modules with 722 questions; approximately 50 physical measures; over 100 direct physical activity measures, over 120 biophysical analytes, (and) about a dozen Environment Canada weather and pollution indicators..."

Oral health module

Collecting information on the oral health of Canadians is clearly not a new idea. Most recently, it was a major recommendation flowing out of the 2004 Access and Care Symposium (Armstrong 2005). However, it took the establishment of the Office of the Chief Dental Officer (OCDO) and the action of Dr. Peter Cooney, Chief Dental Officer (CDO) to bring the goal of a national examination survey to fruition. The conduct of the CHMS offered a genuine opportunity to append an oral health module to an examination survey in which the costs of the sampling, ethical review, recruitment of subjects, and operation of the clinical facilities were largely covered. The additional costs of the dentist examiners and recorders, their training and travel, the additional analysis and separate write-up of the oral health module were indeed significant (approximately $2 million). The Canadian Forces contributed over 1,000 military-dentist examiner days as the examination teams (See Appendix 1).

The Canadian Forces contributed over 1,000 military-dentist examiner days as the examination teams.

Having obtained funding, the Chief Dental Officer set up a steering committee to advise on the measures, methods and standards as the oral health module of the CHMS was being developed. The members were also to provide further support as the project was implemented. Members of the advisory committee are listed in Appendix 2. The Advisory Committee was to advise in gathering epidemiological information for program planning; to develop the oral health module and the clinical survey; to coordinate a pretest to assess the suitability and implementation of the clinical survey including the equipment, the qualitative questions and the calibration of examiners; and assist in the monitoring of the physical survey.

The Committee met seven times; January 12 and April 4–5, 2005, April 21, 2008 and April 27 and November 10, 2009, January 19 and March 23, 2010. One of the early recommendations from the Committee was that the oral health status data be collected at a level sufficient for policy decision-making, not at the level that would be the standard of clinical research. This recommendation was made in light of the short time (20 minutes) allocated for the oral health examination

module by the planners at Statistics Canada who needed to maintain a speedy flow of participants along the stations inside the MEC. The committee felt such a recommendation would allow the examiners to collect a wider array of clinical data and likely increase the reliability of the measures. Accordingly the clinical protocol was designed to collect tooth-specific caries data – not surface-level measures, and periodontal status probing depths on indicator teeth – not all teeth.

The actual development of the instruments was led by staff in the OCDO. After each of the first two meetings of the Advisory Committee, OCDO staff submitted several references to the Committee members, usually by e-mail, seeking their input on the items to be included in the questionnaire and the clinical examination protocol.

Much of the clinical protocol followed that developed for the 2006 "one-day survey" (Leake 2006b). The dentist-manual used in the 2006 survey (Leake 2006b) was edited to provide the CHMS clinic manual that was used as the training and reference document for the examiners. As all the clinical items became final, an international external examiner (Dr. Helen Whelton, Cork, Ireland), familiar with training dentist-examiners for the World Health Organization, was engaged to provide the initial clinical training, and one examiner from Health Canada and the Department of National Defence (Dr. Harry Ames and Major Nathalie Morin) were designated as the gold standard examiner trainers for the balance of the survey.

Data collection

Participant-based information was obtained during a household interview (Statistics Canada 2006a) and during the initial stage of a subsequent visit to the MEC. There were 34 specific oral health questions which sought information on satisfaction with oral health and appearance, oral symptoms, disability days, dental care habits including visits to a dental professional and source of funds to pay for dental care. In addition, there were relevant sections of the interview where respondents reported general health levels, diet patterns, smoking behaviours, soft drink consumption, and socio-demographic information such as country of birth, aboriginal status, employment status, education and income.

At the start of the oral examination (Statistics Canada 2006b), the dentist-examiner (a Canadian-licensed dentist) asked 18 questions with further details on dental symptoms (pain, bleeding, dry mouth, etc.) and an additional 15 medical history questions to ensure the person was able to undergo a clinical dental examination. The clinical data collection (Statistics Canada 2006b) included conditions of edentulism and prosthesis wearing, mucosal lesions, dental fluorosis, occlusion, debris, gingivitis and calculus, periodontal measurement of probing depths and loss of attachment, incisor trauma, caries status of each tooth crown and root (for 28 teeth only), and recommendations for the type of treatment needed by the participant. Recommendations for future care were provided to the participants upon leaving the clinic as a partial thank you for their participation.

There were 34 specific oral health questions which sought information on satisfaction with oral health and appearance, oral symptoms, disability days, dental care habits including visits to a dental professional and source of funds to pay for dental care.

The MECs operated 7 days a week starting before 7:00 a.m. each morning. The oral health examinations began as early as 6:45 a.m. and were completed either at 9:00 p.m. on "long" days or 4 p.m. on "short" days. All data were directly entered on a computer by a dental recorder at the time of the examination. The oral health clinical examination required about 13 minutes for a dentate adult examination; the periodontal measures took the majority of that time. Edentulous adults took about 3 minutes and children required 7–8 minutes; room cleaning after each participant took another 5–7 minutes. A participant spent 2–2.5 hours in the MEC to complete all physical and biological measures.

Two groups of 5 or 7 Canadian Forces dentists took turns conducting the examinations. Individual dentists examined participants at between 1 and 4 sites. An initial central calibration took place for all groups. In addition, the first day at each new site was used for recalibration for all measures; further, using reference to standard photographs, fluorosis measures were also recalibrated at the middle and towards the end of each site's examinations. All examiners achieved high agreement (Cohen's Kappa ≥ 0.6) initially at all site locations.

Equipment and infection control

The MEC dental examining room was equipped with a portable chair (ADEC Portachair 3460), ceiling-mounted dental light, sterilizer (Tuttnauer Autoclave 1730M), two operator stools, and computer for direct data entry. Examining instruments consisted of Williams Probe (Hu-Friedy PQW6), with markings at 1, 2, 3, 5, 7, 8, 9, 10 mm; mouth mirror (#4 head); college pliers; 2x2 cotton gauze; and cotton rolls. All examiners wore lab coats, examining gloves and masks; glasses (but not magnifying) were optional. Participants were provided with a dental bib and safety glasses. All instruments were individually bagged and sterilized. Sterilizers were spore tested bi-weekly. Surfaces that were touched by the examiners were covered by impermeable plastic barriers and all surfaces in the dental room were disinfected with anti-microbial wipes after each examination.

Quality control of data-entry

All data were directly entered into a computer at the time of collection. For the dental clinical examination, a detailed quality checking protocol was built into the data-entry program. With the extensive input of the OCDO staff, Statistics Canada programmed entry values such that many areas of logical inconsistency were "greyed-out" and erroneous entries could not be made. For example, if a subject was edentulous, no tooth-related scores could be entered.

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Quality assurance of output

All analyses were conducted in-house by Statistics Canada. Prior to the analytic stage, the OCDO commissioned two reports which were to be used to guide the data analysis. The first report (Leake 2007) recommended the means to cross-tabulate the data in an attempt to reveal any internal data inconsistencies (e.g., if a person was scored as dentate on both arches then they had to have between 1–14 teeth in both arches; or if they had gingivitis/calculus scores on the indicator teeth, then those teeth must be present in the tooth "grid" where the caries status was recorded). Next, the programmers were expected to check the relevant person-level outcomes (e.g., DMFT and its components) for out-of-range values and then for "reasonableness" in relation to the latest United States NHANES survey results, taking into consideration the Canadian context (e.g., historically lower severity of periodontal diseases should be maintained).

The second report (Leake 2008) provided 35 mock tables which could be used to display the findings of the CHMS oral health module. The suggested tables drew on more recent national survey publications, mainly those of the United States and Australia. The recommended tables were formatted to display the CHMS findings in such a manner that both took advantage of the rich information and also would allow readers to compare the findings with those of the other countries.

Both reports were shared with the analysts at Statistics Canada and used during the analysis and write-up of the findings. In addition, both the writer and OCDO staff responded to questions posed by the analyst. An experienced methodologist also verified the coding to produce all estimates in an effort to ensure reliability of the estimates. Furthermore, all numbers were verified prior to publication. Accordingly the reader is assured that the data have been cross-checked to ensure they are internally consistent and reasonable and are presented in a manner that is consistent with other international reports on oral health status.

Response rate

Of the households selected for inclusion in the CHMS, the response rate was 69.6% – meaning that in 69.6% of the selected households, the sex and date of birth of all household members were provided by a household resident. Within each of the responding households, 1 or 2 members were then selected to participate in the CHMS; 88.3% of these selected household members completed the household questionnaire, and 84.9% of the responding household members participated in the subsequent clinic component of the survey. Note that the response rate was not calculated as simply the product of these response fractions, because of the complexities involved in selecting two respondents in certain households.

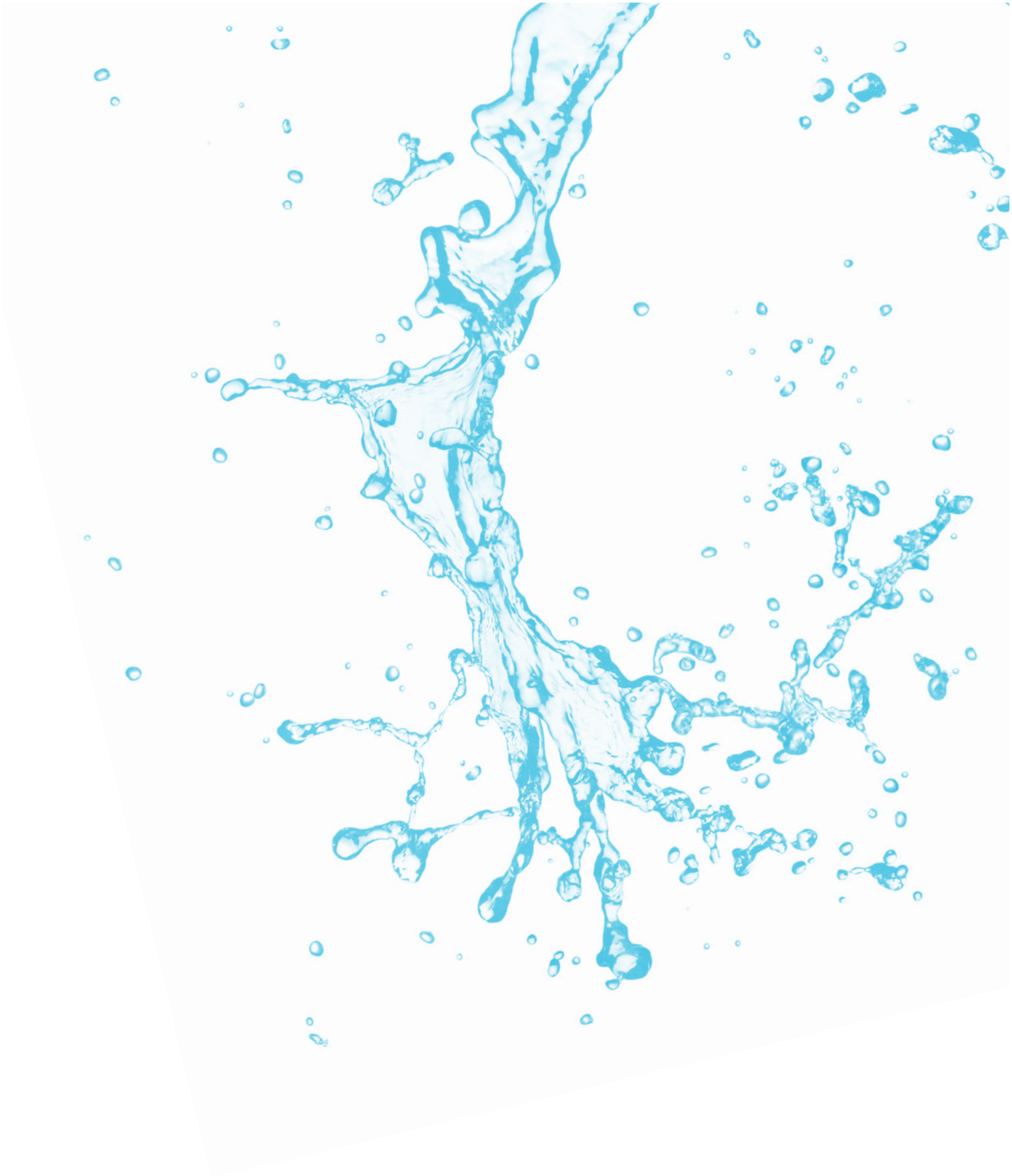
Sample weighting

For each respondent in the survey, a sample weight was applied; this weight corresponds to the number of people in Canada represented by the respondent in the survey population as a whole. This weight is developed initially by the sampling frames of the CHMS: first by a geographical unit of collection site selection, and second by an area frame for the dwellings within each collection site (using the 2006 Census). The selection weights are converted to household weights and then finally person weights, since the person is the final sampling unit. The weights are adjusted for non-response at the interview and clinic stages, as well as several other adjustments. Finally, the weights are calibrated to ensure the sum of the final weights corresponds to estimates of the Canadian population from the five geographic regions and the five selected CHMS age groups, as well as for each sex. Population estimates are based on the most recent Census counts. For a more detailed description of the CHMS weighting strategy, refer to the *Data User's Guide* (Statistics Canada 2010).

Analytical techniques

Descriptive statistics (frequencies, means) were used to estimate the oral health status of Canadians by selected socio-demographic and other characteristics. All estimates were based on weighted data to represent the Canadian population. Variance estimation (95% confidence intervals, coefficients of variation) was calculated based on the bootstrap technique to account for the complex sampling design (Rao JNK 1992; Rust KF 1996; Yeo D 1999). In cases where means were examined for respondents who had the variable of interest above a certain value, the lower confidence limit was forced to this lower value. For example, when calculating the mean number of coronal cavities among respondents who have at least one, the lower boundary was forced to 1.00. Estimates with a coefficient of variation (CV) of 16.6% to 33.3% have been marked in the tables to interpret with caution due to high sampling variation of the estimate. Estimates with a CV greater than 33.3% are not provided due to unreliable and likely invalid estimates; small sample sizes (< 10) also lead to suppression of the estimates, regardless of the CV.

All analyses were conducted using SUDAAN v.10 (Research Triangle Institute 2008).



4

Findings

Introduction

The findings of the oral health component of the CHMS, while standing on their own, are more easily understood in a context that compares the results among sub-groups of the community. Comparisons by age, sex and race are common, but more often such comparators are widened to include factors that have been shown to influence health, labelled as determinants of health. But determinants of health are more than categories for comparison, since, where they can be changed, they are seen as risk factors and are important to consider in developing health promotion strategies aimed at improving a population's health.

The *Second Report on the Health of Canadians* (Health Canada 1999) identifies the following factors as "determinants" of overall health:

1. Income and Social Status
2. Social Support Networks
3. Education and Literacy
4. Employment/Working Conditions
5. Social Environments
6. Physical Environments
7. Personal Health Practices and Coping Skills
8. Healthy Child Development
9. Biology and Genetic Endowment
10. Health Services
11. Gender
12. Culture

National interview surveys in Canada (Millar 1999; Sabbah 1998), oral health surveys in the United States (U.S. Department of Health and Human Services 2007) and Australia (Slade GD 2007), and earlier regional surveys in Canada have demonstrated that many of these same determinants are influential in gaining access to oral health services and, by extension, to oral health. Accordingly the findings of the survey are presented using some of these determinants, or their proxies, to illustrate their effect on oral health in Canada and point to potential oral health promotion opportunities. In addition, retaining natural teeth – being dentate – is a strong determinant of ability to chew, speak and smile or interact socially and is used to illustrate its effect on self-reported outcomes. Traditionally, oral health also varies greatly according to age, if for no other reasons than children naturally shed their primary teeth and chronic periodontitis is a condition of adulthood.

Table 4.1 lists the determinants used to describe the findings in this report compared to the key determinants identified in the Second Report on the Health of Canadians (Health Canada 1999).

Orientation to detailed tables

The results tables (see Appendix 3) are presented in a consistent format. Outcomes are defined in the heading for the table and the values are found in each cell. Since the results come from a sample survey, each value has an estimate of its variability, the 95% confidence interval (95% CI). This statistic shows the potential range of the value 95 times out of 100 similar samples. A common way of expressing the 95% CI is that the value would fall within that interval 19 times out of 20 samples.

Occasionally the reader encounters an "E" beside the value. This means that the individual scores were highly variable (also seen by the wide confidence interval) and the results should be interpreted with caution. On other occasions, the cell will show an "F" which means either that the sample size was too small – less than 10 cases, or the coefficient of variation (a statistic derived from the

standard deviation divided by the arithmetic mean) is greater than 0.333. This limit is set by Statistics Canada's release guidelines to withhold reporting the value because it is highly unstable and cannot be reliably projected to the whole population.

TABLE 4.1
Determinants of health used to characterize findings of the oral health component of the CHMS

Key determinant from the *Second Report on the Health of Canadians*	Oral health determinants used in this report
	Age: • Children (6–11 years old) • Adolescents (12–19 years old) • Young adults (20–39 years old) • Adults (40–59 years old) • Older adults (60–79 years old)
Income and Social Status	Income: Lower group • Less than middle group Middle group • $30,000–$59,999 for 1 or 2 persons • $40,000–$79,999 for 3 or 4 persons • $60,000–$79,999 for 5 or more persons Higher group • More than the middle group
Education and Literacy	Highest level of education in the household • Higher: completed degree or diploma • Lower: less than degree or diploma
Employment/ Working Conditions	Dental insurance • Private: a marker for employment • Public • Non-insured
Personal Health Practices	Smoking behaviour • Never smoked • Past smoker • Current smoker
Health Services	Visiting oral health professional • Within the last 12 months • More than one year ago
Gender	Male Female
Culture	Born in Canada • Yes • No Aboriginal person • Yes • No
	Dental status • Dentate (with 1 or more natural teeth) • Edentulous (no natural teeth)

Sample size

Table 1 shows the distribution of the sample by age and by the determinants that will be used throughout the report to describe the findings. The actual number of participants interviewed and examined, the weighted number they represent, and the weighted percent of that age group are shown for each cell.

The survey results are presented for children (6–11 years old), adolescents (12–19 years old), young adults (20–39 years old), adults (40–59 years old), and older adults (60–79 years old), as well as for all age groups combined (6–79 years old). As seen, the enrolment process obtained 5,586 participants; over 1,000 participants were in each of the five age groups.

Most of the determining characteristics are self-evident but income requires some explanation. Information on income and household size was obtained in the household interview and for the analysis, that information was partitioned into categories of sufficient size to allow for the examination of the effect of income. Three income categories are used for this report. The middle group (29.7%) consists of families who had incomes of $30,000 to $59,999 for 1 or 2 persons in the household, $40,000 to $79,999 for 3 or 4 persons, and $60,000 to $79,999 for 5 or more persons in the household. Families earning less than these amounts (18.9%) make up the lower group; families earning more (44.7%) make up the higher income category. As these income/household size categories were derived for this report, they have not been used by other agencies for the examination of social policy.

The sampled households are relatively highly educated resulting in just two categories; those living in families where someone has obtained a post-secondary degree or diploma (76.0%) and those in families where the highest level of education is some post-secondary education or less (24.0%).

As seen in Table 1, 62.6% of Canadians have private dental insurance, usually an employee benefit. Public insurance covers 5.5% of the population and 31.9% have no dental insurance.

21.5% "E" of the population covered in this report were born outside Canada and this proportion increases with increasing age, from 10.6% "E" for adolescents to 27.6% "E" for older adults.

Aboriginals make up 3.1% "E" of the Canadians covered in this report. People living on reserves were not eligible for inclusion in the sample survey, so these Aboriginals represent those who claim Aboriginal heritage. The results of separate surveys on the oral health of First Nations and Inuit people will be available at a future date.

20.3% of the population are smokers including those who smoke daily or occasionally. Past smokers (27.1%) were those who were former daily smokers or former occasional smokers. Never smokers (52.6%) were defined as those who had smoked no more than 100 cigarettes in their life. The proportion of current smokers was highest among younger adults aged 20–39 years old (25.0%) and adults aged 40–59 years old (23.2%).

94.8% of Canadians are dentate – defined as having at least one natural tooth. Even among the oldest group, 78.3% are dentate.

Determinants of insurance

The 1996 National Population Health Survey showed that having "insured" dental care is an important factor in visiting for professional care (Millar 1999). As such, information on the distribution of insurance among Canadians provides a frame of reference to help understand much of the information on visiting for, and preclusion from, recommended treatment in the tables that follow. As with all self-reported information, there is the possibility of recall error whereby, in this case, participants are not clear whether their insurance is public or private – although they should be well aware whether they have insurance or not. As seen in Table 2, the highest proportion of private insurance coverage (78.2%) is found among the most affluent group and adolescents (71.4%). Private insurance coverage falls to 38.6% among the oldest adults – consistent with the loss of employee benefits after retirement. Indeed, 53.2% of the oldest age group have no insurance at all, surpassed only by the edentulous (61.2%). Public insurance is most commonly found in Aboriginals (38.1%), the result of the non-insured health benefits program for First Nations and Inuit people, the lower income category (17.7%), probably due to public assistance programs, and children (11.7% "E") consistent with Quebec's child dental program. Having no insurance is 2 1/2 times more common in the lower income families (49.8%) compared to the higher income families (19.8%). On the other hand, 83% of Aboriginal people have either private or public insurance.

Self-reported outcomes

84.5% of Canadians report that their oral health is good, very good or excellent, leaving 15.5% of Canadians who state that their oral health is fair or poor (Table 3). Adults aged 40–59 years and young adults aged 20–39 years report the highest levels of fair or poor oral health (17.4%). Males tend to report fair or poor oral health slightly more than females (16.8% versus 14.1%). However, more of those from families with lower incomes (24.6%), with public insurance (26.3%), which are less frequent recipients of professional care (25.5%) and are current smokers (26.4%) report fair or poor oral health – about 10% more than Canadians as a whole. 28.0% "E" of Aboriginal Canadians report fair or poor oral health but this result must be interpreted with caution. Lower income (31.3%), publicly insured (37.3%), and infrequent visitors (34.8%) among adults aged 40–59 years, as well as lower income young adults (32.6%), report rates of fair or poor oral health that are at least two times the national average. 10.8% "E" of the edentulous report fair or poor oral health compared to 15.7% of the dentate.

Table 4 shows that 12.2% of Canadians responded that they avoid certain foods because of problems with their teeth or mouth. 14.2% of females and 10.2% of males report avoiding foods but the lowest proportion is found among children (7.6%). The differences among the other determining characteristics are less pronounced than those for the global outcome measure of fair or poor oral health. Avoiding foods is found among 13.1% of those from families with lower incomes, 14.5% of those with no insurance coverage, 13.9% of those who have not visited a dentist within the last 12 months and 13.2% of those with lower education – but none of these show a difference of even 3% compared to the national average. The highest levels of food avoidance are found among the edentulous overall (25.5%) and for the edentulous adults and older adults. Within the table, a high proportion of avoiding foods is seen among the adults who are publicly insured (20.7% "E").

The highest levels of food avoidance are found among the edentulous overall (25.5%) and for the edentulous adults and older adults.

Table 5 provides the findings on prevalence of pain in the mouth, reported as often or sometimes in the last 12 months; 11.6% of Canadians have the condition and it is most frequently reported by young adults (14.6%) and least frequently by parents on behalf of children (5.4%). 13.5% of females and 9.7% of males report they have pain. The prevalence of pain is higher for those from families with lower incomes (12.2% and 16.0%) and who are publicly insured (17.8%), among current smokers (16.9%), and among Aboriginal people (26.8% "E"). Experiencing pain appears to be lower for the edentulous (8.2% "E"). The highest proportions with pain are found among young adults with lower incomes (19.8%) and who are smokers (20.7%), and among adults aged 40–59 years who are in the lower income category (20.3% "E").

Time lost and dental visits

Part of society's burden of illness are indirect costs, namely the time lost by individuals who are ill and can't work or attend school, or who take the time away from work or school to seek professional care. Table 6 shows the percentage of Canadians who reported time-lost from normal activities for oral health reasons. 39.1% of Canadians experience such a time-loss, most frequently (49.5%) by the adolescent group – consistent with frequent visits during treatment for orthodontic conditions. Time-loss is reported by 41.1% of females and 37.2% of males. It increases with increasing income (from 27.5% to 45.3%), insurance coverage (from 29.0% to 44.7%), visiting within the last year (4.6% to 52.7%), non-smoking status (26.0% to 41.3%) and being dentate (9.8% "E" to 40.8%). More than 50% of adolescents who are female (51.5%), or who come from families with higher incomes (54.4%), or have private insurance (56.1%), or who visited within the last year (59.3%) experienced time-loss. The group experiencing the lowest time-loss are those who are edentulous (9.8% "E").

These data need to be interpreted alongside Table 9, which shows that 74.5% of Canadians made a visit for professional care in the previous year. Even if all of the people (39.1%) who declared time-loss, lost that time because of visiting for care (i.e., no lost time due to stay-at-home illness) it would appear that at least 35% of all Canadians (74.5%–39.1%) were able to visit for care outside of normal activities, school or work hours.

Table 7 provides information on the mean number of hours per person lost from work, school or from normal activities for those who stated they lost time. Overall, a mean of 3.54 hours per year was lost due to dental diseases including professional treatment. Consistent with the earlier table, the highest mean number of hours is lost by adolescents (5.41 hrs "E"). Overall, the number of lost hours is more than one hour higher for females (4.15 hrs) compared to males (2.87 hrs). Differences among other factors are generally small and not statistically different; those of one-half hour to an hour are found only between smokers (3.19 hrs) and non smokers (3.71 hrs, 3.73 hrs). Other estimates of differences of one-half to one hour are less robust (note the cautionary "E"s) and occur only between the publicly insured (2.76 hrs "E") vs the privately insured (3.64 hrs) and the non-insured (3.45 hrs), and those who have visited in the last year (3.58 hrs) vs those who have not visited (2.17 hrs "E"). Within the table, apparent differences of one-half hour or more occur:

- among 20–39 year olds, the middle (2.36 hrs) and the higher (3.52 hrs) and lower (4.78 hrs "E") income groups;
- among 40–59 year olds, the lower (2.11 hrs) and middle (3.28 hrs) and higher (3.56 hrs) income groups and, significantly, between the publicly insured (2.09 hrs) and the private and non-insured (3.35 hrs); and
- among the 60–79 year olds, the lower (2.92 hrs) compared to the middle (3.63 hrs) and higher (3.49 hrs) income groups, those who had visited more than 1 year ago (1.30 hrs) versus recent (3.46 hrs) visitors, those born in (3.19 hrs) versus out (3.76 hrs) of Canada, and those who had never smoked (2.97 hrs) compared to those who were past smokers (3.84 hrs).

As seen in Table 8, an estimated total of 40.36 million hours were lost from normal activities, school or work in the previous 12 months due to check-ups or problems with teeth. Those who have not visited for professional care within the last year report a total of 686.52 "E" thousand hours lost – presumably for illness related to dental conditions. However, those who have visited report a total of 39.64 million hours or 98.2% of all the time lost. At 5 hours per school-day for children and adolescents and 7 hours per working-day for adults, an estimated 2.26 million school-days and 4.15 million working-days for adults are lost annually due to dental visits or dental sick-days.

Absolute highest rates of avoiding visiting because of costs occur among young adults with either no insurance (49.9% – approaching a four-fold difference compared to those privately insured) and lower incomes (46.7% – a four-fold difference compared to those with higher incomes) and among adults aged 40–59 years with no insurance (42.3% – a 5.7-fold difference compared to those with private insurance).

The percent of Canadians making a visit for oral health care for any reason within the last 12 months is shown in Table 9. 74.5% of Canadians report a visit within the last year, 75.9% of females and 73.1% of males. Not shown in the table is the rate for adults (aged 20–79) which is 71.6% (95% CI = 68.4–74.7). Highest rates of visiting within the last year occur among children (91.0%) and adolescents (84.0%), and lowest among the young adults (67.8%) and older (68.4%) adults. Overall, 83.8% of people from the most affluent and 82.3% of privately insured families visited compared to 60.0% of people from the lower income category and 59.3% of non-insured families. Higher proportions of visiting for any reason within the last year are found among people from families with higher education, never and past smokers, and those who are dentate. 79.1% of Aboriginal Canadians visited, compared to 74.4% of non-Aboriginals. Not shown in the table is the finding that 11.2% of Canadians report that they visited between 1 and 2 years ago, showing that 85.7% (95% CI = 83.2–87.9) of Canadians visit within a 2-year period.

Within the table, the highest rates of visiting within the last year were found among privately insured children (95.4%), children from families with higher incomes (95.2%), and Aboriginal children (92.2%). Rates of visiting lower than 60% are found among all adult groups who are in the lower income category or are current smokers. Similarly low rates are seen among those with no insurance (young adults and adults), public insurance (young adults), and lower education (older adults). The lowest rates of visiting within the last year are found among the oldest edentulous group (18.3%).

Table 10 provides the information on dental visiting usually at least once per year for check-ups or treatment. The question was asked of all those interviewed, not just those who had made a visit within the last year. While the interval between visits for preventive care is to be determined by the oral health care professional based on the individual patient's risk, many private insurance policies limit payment for recall visits to once every nine months. The standard of at least once per year for check-ups or treatment is common to other national surveys and serves as a marker for access to preventive care. As seen in Table 10, 74.3% of Canadians report they usually visit at least once per year for check-ups or treatment, 76.6% of females and 71.9% of males. Highest reported rates of visiting at least once per year for preventive care or treatment occur among children (92.2%) and, except for the 40–59 year olds, rates decline among the increasingly older age groups. Among all the ages surveyed, 84.5% of people from the most affluent and 84.1% of privately insured families usually visit for check-ups or treatment at least once per year compared to 58.0% of people from the lower income category and 56.0% of non-insured families. Of those who visited within the past year, 94.1% did so to obtain preventive care or regular treatment. Higher proportions of visiting for preventive care at least once per year are seen among those from families with higher education, never and past smokers, and those who are dentate. 78.9% of Aboriginal Canadians report they visit for check-ups or treatment at least once per year compared to 74.1% of non-Aboriginals and, within the table, one can see that almost all (98.7%) of the Aboriginal children usually make a visit for check-ups or treatment at least once per year.

Since by and large, dental services are not covered by Medicare, out-of-pocket costs may deter people from seeking care. Table 11 shows the responses to the question: "In the past 12 months have you avoided going to a dental professional because of the cost of care?". 17.3% of Canadians said "yes", 19.2% of females and 15.5% of males. Among age groups, avoidance is highest among young adults (23.7%) and lowest among teenagers (9.5%). Other factors that increase deterrence by at least 5% more than the national average include those with lower income (34.5%), not having insurance (35.9%), being born outside Canada (22.8%), and being a current smoker

(25.9%). Absolute highest rates of avoiding visiting because of costs occur among young adults with either no insurance (49.9% – approaching a four-fold difference compared to those privately insured) and lower incomes (46.7% – a four-fold difference compared to those with higher incomes) and among adults aged 40–59 years with no insurance (42.3% – a 5.7-fold difference compared to those with private insurance).

Out-of-pocket costs may deter people from accepting the treatment that is recommended even when they do visit. Table 12 provides the responses to the question: "In the past 12 months, have you avoided having all the treatment that was recommended because of costs?". The question was asked of all participants, not just those who said they had made a visit in the last year. 16.5% of participants report that they declined recommended care, significantly more females (18.6%) than males (14.4%). 19.4% of young adults declined care because of the costs. As with "not visiting because of costs", highest rates of declining care occurred among the young adults (37.7%) and adults aged 40–59 years (35.9%) who were in the lower income category and among young adults (33.5%) and adults (32.0%) who had no insurance coverage. Low numbers of declining care among children and adolescents produced cautionary data ("E") for almost all factors that can be reported.

Preventive dental behaviours

Brushing twice per day is the standard of home care recommended by the Canadian Dental Association and dental public health organizations (Ontario Association of Public Health Dentistry). Table 13 shows that 73.2% of dentate Canadians follow this recommendation, with compliance significantly higher among females (80.9%) compared to males (65.4%). Markedly higher rates of brushing are also seen among the privately insured (76.0%) compared to the publicly insured (57.9%), those who have visited within the last year (76.3%), non-Aboriginals (73.8%), and never (76.6%) and past (74.8%) smokers. Within the table, highest rates are seen among both children and adolescents who were born outside Canada (84.1%) and among female adolescents (83.0%). Lowest rates (43.7%) are seen among publicly insured 40–59 year olds.

Table 14 provides the estimates for the percent of dentate people who report flossing their teeth at least five times a week. Overall 28.3% floss that frequently, with the rates increasing from children (11.7%) to older adults (40.6%). 36.2% of females state they floss compared to 20.3% of males. Other characteristics that favour flossing for Canadians aged 6–79 years are high income (30.4%), visiting a dental professional within the last year (31.1%), being born outside Canada (35.8%), and being a past smoker (34.9%). Within the table, being female, visiting a dental professional within the last year, living in a family with higher education, and being born outside Canada are positive influences among those aged 6–79 years but the influence of other determinants is not consistent. For example, high income is a positive factor for adults aged 20–59 years but less so for children and adolescents. Similarly, being a past smoker is a positive influence for young adults but not as influential at the other ages.

Clinically assessed oral health

The tables providing the clinical findings for the survey participants also follow a standard format, where the health measures are presented for that group as a whole and for the categories of the factors believed to influence the health indicator. Since age is such a determinant of oral health, the results for each age group are presented in separate sections, starting with children.

Child (6–11 years old) oral health

Coronal caries

The major condition of children's oral health is coronal dental caries or tooth decay. Table 15 shows the prevalence and severity of dental caries in the primary teeth among Canadian children aged 6–11 years. The severity of the condition is shown by the mean numbers of teeth that were decayed (d/D) – with or without fillings, missing (m/M), i.e., prematurely lost due to decay, or filled (f/F) with a restoration to replace the tooth structure lost to decay. The condition is recorded as prevalent if the child had at least one primary tooth that is decayed, missing, or filled (dmft), i.e., dmft of 1 or more. 47.8% of children have at least 1 dmf tooth (dmft greater than 0), 49.2% of males and 46.3% of females. Caries is extremely prevalent among

Aboriginal children (83.9%) and relatively high among children living in families with public insurance (60.9%), or where the highest level of education was less than a degree or diploma (60.1%), or in the middle income category (55.0%). The lowest prevalence (40.5%) is found among children born outside Canada.

The mean counts of the primary teeth decayed, missing, filled and total (dmft) are shown in the last four columns of Table 15. The mean count for all is 1.99 dmft, of which 1.64 are filled and 0.28 are decayed (untreated). By and large, the mean number of missing teeth is too unreliable to report and many of the other scores have cautionary notes ("E") accompanying them. Caries severity scores (mean dmft) appear somewhat higher among children from families with public insurance (2.81 "E"), with lower education (2.67), or those in the middle income category (2.44).

Table 16 shows similar findings for children's permanent teeth. Both prevalence and severity are lower since not all of the permanent teeth have emerged in this age group, and many of those teeth that are present have not been exposed for a sufficiently long period to decay and need restoration (fillings). Thus, many cells in the table are too unreliable to report or are reported with a cautionary "E". Overall, 23.6% of the children have caries in their permanent teeth and 0.49 permanent teeth are decayed, missing, or filled (DMFT).

The results of combining findings on the primary and permanent teeth are shown in Table 17. Overall, 56.8% of children aged 6–11 years are affected by dental caries. The experience of the more numerous primary teeth dominates the data and so the trends, seen in Table 15, are again evident. Prevalence is virtually the same among males (58.6%) and females (54.8%), and significantly higher among children from Aboriginal families (89.2%) and from families with lower education (72.0%). Lowest prevalence (50.2%) is seen among children born outside the country.

The means of the counts of affected primary (dmft) and permanent (DMFT) teeth are shown in the last 4 columns. Canadian children experience decay on 2.48 primary or permanent teeth (1.99 dmft + 0.49 DMFT), of which 2.04 are filled and 0.36 are still decayed. Again the numbers of missing teeth are too few or unreliable to report and some other scores have cautionary notes

Mean caries severity scores are highest among children in families with public insurance (3.58), or with lower education (3.45), or those in the middle income category (2.95).

("E") accompanying them. Mean caries severity scores are highest among children in families with public insurance (3.58), or with lower education (3.45), or those in the middle income category (2.95). The lowest severity count is found among children born outside Canada (2.04 "E") and highest among Aboriginal children (6.62 "E").

Not shown in any table are the prevalence and severity scores for primary and permanent teeth among 6-year-olds. 46.6% (95% CI = 37.4–56.0) of 6 year olds had 1 or more dmft + DMFT, with a mean severity score of 2.52 "E" (95% CI = 1.5–3.6) dmft + DMFT.

Table 18 identifies the burden of illness in the child population that is either decayed (untreated) or filled. The ratio of decayed teeth to total teeth affected by decay (dt/dmft%) shows the proportion of the disease that is untreated; the ratio of filled teeth to dmft (ft/dmft%) shows the proportion of the disease that has been treated in time to avoid an extraction. Table 18 shows the data for both the primary teeth and the permanent teeth and for both types of teeth combined. For the combined data (see the second last column), 14.7% of the disease is untreated. Untreated disease tended to be 5% or more higher than the best-off category among families in the lower income category (17.6% "E"), those uninsured (19.1% "E"), those who had not visited within the last 12 months (30.9% "E"), and among families with lower education (18.9% "E").

In the furthest right column of Table 18, one can see that 82.3% of the disease has been treated with restorations. This figure tends to be higher by 5% or more than the worst-off in each category for females (85.1%), those with higher incomes (85.9% and 82.9%), those who are privately insured (84.7%), those who have visited a dentist in the last year (83.9%), and non-Aboriginal children (83.6%).

The same information on the primary and permanent teeth is shown separately in the left-hand columns of Table 18. Some of the data have the cautionary "E" beside them but the separate detail shows little divergence from the findings on the 2 types of teeth combined.

Type of caries

Not reported in any table is the prevalence of type and extreme severity of caries on individual teeth. The examiners collected information on the type of decay, i.e., whether it is pit and fissure decay, which occurs on the chewing surfaces of the molar or premolar teeth, or smooth surface decay, which occurs on the sides, front and back of all teeth. The examiners also identified whether the caries was severe, i.e., whether less than 1/3 of the crown of the tooth remained. Classifying the caries by type of decay produced numbers that cannot be reported, with the exception of the mean count of severely decayed teeth, which is zero.

Sealants

Table 19 provides the findings on the use of dental sealants in the child population. Sealants are coatings that are applied by a dental professional to the biting surfaces of permanent molar teeth. The sealant blocks out bacteria and the nutrients for those bacteria and thereby prevents a cavity from forming in this more decay-susceptible area of the tooth. Generally, if a child is assessed as susceptible to decay, all 4 molar teeth are treated shortly after the first permanent molars emerge, at age 6–7 years, and then 4 more second molars are treated when they emerge at age 12–14 years. However, if a child is extremely susceptible, to the extent that smooth surfaces are decaying, sealants are not provided since the tooth must be restored anyway. Thus, for 6–11-year-old children in an ideal world, we would expect over half of the children to have sealants (since caries was prevalent in 56.8% of children; see Table 17) and the mean number of sealants to equal 4. As shown in Table 19, 31.6% of children have 1 or more sealants and the mean count is 2.88. Sealant applications are somewhat more common for females (34.1%), children from higher income families (35.5%), those covered by public insurance (33.1% "E"), or those born outside Canada (35.0%). Sealants appear somewhat less common among Aboriginal children (26.8%).

Trauma

The examining dentists also collected information on dental trauma. Table 20 shows that 6.9% "E" of children showed some sign of trauma. Most (6.7% "E") had signs of fractured teeth as opposed to teeth lost due to trauma. Neither prevalence nor the number of affected teeth appears to differ significantly by the determining characteristics, although prevalence of any trauma (teeth lost or traumatized) tends to be higher among the non-insured (12.1% "E") and among males (8.8% "E").

Adolescent (12–19 years old) oral health

Coronal caries

Conventionally, for adolescents, dental epidemiologic studies consider only the permanent teeth, as there are so few primary teeth remaining and those that do remain are slated to be shed soon. Table 21 shows the findings on dental caries (DMFT) prevalence and severity in Canadian adolescents aged 12–19 years. 58.8% of adolescents have experienced decay in 1 or more permanent teeth. 62.7% of adolescent females and 55.1% of males have 1 or more DMFT. Prevalence is higher among the publicly insured (81.9%) than both the privately insured (56.5%) and the non-insured (60.1%). Prevalence tends to be higher among Aboriginal participants (75.9%), past (74.6% "E") smokers, those living in families reporting lower incomes (70.1%), those born outside Canada (67.1%), and those living in families where the highest level of education is less than a university degree or diploma (63.0%).

For adolescents, the mean count of decayed, missing or filled permanent teeth (DMFT) is 2.49 teeth of which 0.37 "E" are decayed and 2.10 are filled. As with the prevalence findings, females (2.91) tend to have higher mean scores than do males (2.10). DMFT counts are higher for current (4.30 "E") smokers compared to never smokers (2.24). Mean counts tend to be higher for past (3.18 "E") smokers, those covered by public insurance (3.65), those born outside Canada (3.63 "E"), Aboriginals (3.57 "E"), and those living in families with lower incomes (3.43) and lower education (2.88). While there is little difference in the overall severity according to whether a participant has visited (2.42 DMFT) or not visited (2.55 DMFT) a dental professional within the last year, there is an important difference in the number of decayed teeth – visitors have a mean of 0.24 "E" decayed compared to non-visitors who have a mean of 0.93 "E" decayed teeth.

While not shown in any table, the data show that 38.7% (95% CI = 24.9–54.6) of 12-year-olds had 1 or more permanent teeth affected by caries, and the mean DMFT was 1.02 "E" (95% CI = 0.54–1.50).

Table 22 shows the untreated (DT/DMFT) and treatment (FT/DMFT) ratios for adolescents. 84.4% of the disease is treated with restorations and there is no difference between males (84.1%) and females (84.5%). Treatment levels are significantly higher for adolescents living in the more affluent families (92.5%) and for those who visited a dentist within the last year (89.3%).

The amount of untreated disease is low, resulting in all the untreated disease proportions (DT/DMFT) having a cautionary "E" note. The factors that increase treatment ratios work in reverse as determinants of untreated disease. Notably, adolescents from the lower income category appear to have over a three-fold (28.9%/7.3% "E") higher proportion of untreated disease compared to their more affluent school mates. The same difference holds for those who did not visit a dental professional in the last year compared to those who did visit (36.5%/9.8% "E"). Those who are publicly insured (33.0% "E") and those with no insurance (20.7% "E") have more than a two-fold higher proportion of their disease untreated compared to those privately insured (9.5 "E").

Type of coronal caries

As for children, examiners collected information on the type of coronal decay, i.e., whether it was pit and fissure, or smooth surface, or both, and whether the caries on an individual tooth was severe, i.e., whether less than 1/3 of the crown of the tooth remained. Although not shown in a table, a mean of 0.22 "E" (95% CI = 0.10–0.34) teeth have decay exclusively in the pit and fissures. All of the findings of pit and fissure decay by category have a similar cautionary "E" note or are too unreliable to report. Similarly, the findings on smooth surface decay and both types of decay combined cannot be reported for adolescents. The mean counts of severely decayed teeth also cannot be reported.

Sealants

Table 23 provides the findings on the provision of dental sealants to adolescents. As seen in Table 21, close to 60% of adolescents had caries, so in the ideal, there would have been 60% of the adolescents with sealants and 8 sealants applied to the permanent molar teeth. Sealants are found on 50.6% of adolescents (Table 23), only somewhat more commonly among males (53.8%) than females (47.3%), but more frequently among those with higher incomes (58.2%) compared to the lower income families (37.7%) and recent visitors (54.9%) compared to those who visited more than 12 months ago (35.6%). Aboriginal adolescents have the highest prevalence of sealants (59.4% "E") but keep in mind that 75.9% had caries (see Table 21).

The mean number of sealants is 3.51, with higher numbers following the same trends as in the findings of prevalence. The 2 exceptions to this are the low mean numbers found among Aboriginal adolescents (2.45 sealants) and the high number (3.56 sealants) found among non-insured adolescents.

Trauma

So few teeth among adolescents were lost due to trauma that neither the prevalence nor the mean number of teeth lost can be reported. Table 24 shows that 16.1% of adolescents had evidence of previous trauma (lost or fractured) on their incisor (front) teeth, higher, but not significantly, among males (20.2%) compared to females (11.7% "E"). All but one of the prevalence estimates for the other determinants has a cautionary "E" and none appear to be statistically different. The greatest absolute difference in the prevalence of trauma occurs between non-Aboriginal (15.5%) and Aboriginal (26.4% "E") adolescents. Among those with at least one tooth affected, 1.32 teeth are lost or fractured. The mean estimates by determining characteristics range from 1.21 to 1.53 teeth and none of the differences are significant.

Adult (20–79 years old) oral health

Number of teeth and edentulism

The first column of Table 25 shows the proportion of all adults who are edentulous, i.e., they have no natural teeth. 6.4% of adults are edentulous, with little variation by sex (females 6.5%, males 6.3%). The greatest difference occurs among the age groups, with edentulism highest (21.7%) for the oldest age group compared to 4.4% "E" among the 40–59 year-olds. Those who visited a dentist within the last year (1.4% "E") and who never smoked (3.6% "E") also have low levels. Those with higher incomes (3.2% "E"), private insurance (3.0% "E") and higher education (4.3%) all have significantly lower levels of tooth loss.

The further columns of Table 25 provide 3 indicators of the adequacy of the natural dentition among the 93.6% of adults who are dentate: the proportions with a full complement of 28 teeth,* the proportions with a "compromised" natural dentition of fewer than 21 teeth; and the mean number of teeth present. Among dentate adult Canadians, 42.3% have all 28 teeth and 14.6% have fewer than 21 teeth. Overall, dentate adult Canadians have 24.53 teeth. Again the characteristics of younger age, higher incomes, private insurance coverage, higher education,

*Note that the surveyors did not examine third molar (wisdom) teeth.

and never smoking tend to favour better oral health. The findings on the proportion with 28 teeth and visiting for oral health care within the last year appear anomalous but the differences are not statistically significant.

Implant and denture use

Table 26 shows implant and denture use among the edentulous. The examiners found implants among only 12 edentulous people which produced unreliable estimates. Similarly, so few edentulous people wear lower dentures only that no values can be reported. 93.3% of the edentulous wear both maxillary and mandibular dentures and a further 3.5% wear maxillary dentures only. Generally, the determinants reveal few differences in the percent wearing dentures.

For the dentate adults, as seen in Table 27, less than 1% (0.8% "E") of dentate adults have received an implant and, accordingly, when the data are examined in terms of various characteristics, many of the findings are suppressed and all findings have a cautionary "E". Nonetheless, implants are found most commonly among those aged 40–59 years, higher income earners, and those who visited a dentist within the last year.

Table 27 shows that denture-wearing (fixed or removable) among the dentate is most common on the maxillary arch (8.4%) alone, compared to either the mandibular arch alone (4.4%) or wearing dentures on both arches (3.8%). Denture wearing appears more common among the oldest age group, consistent with their fewer numbers of teeth (see Table 25). Other characteristics which tended to favour denture-wearing include: being female, public and non-insurance, visiting in the last year; having lower education, being born outside Canada, and being a past smoker.

Coronal caries

Table 28 shows both the prevalence of coronal dental caries and its severity. The severity is provided according to the mean numbers of decayed (D), missing (M), and filled (F) and D+M+F teeth (DMFT). Not all jurisdictions report the missing (M) component for adults as originally the DMFT index was developed to record the dental caries experience and, among adults, some teeth may have been extracted to treat the effects of periodontal disease or trauma. However for this report, we followed the convention of the Australian report (Slade GD 2007) and extended the use of the index to include all missing teeth lost to caries or periodontal diseases; the examiners did not count as "missing due to disease" those lost to trauma or as a part of orthodontic treatment.

Almost 96% of dentate adults have experienced 1 or more decayed, missing or filled teeth but the prevalence varies by less than 3% among most of the characteristics examined (Table 28). Prevalence is higher among the increasingly older age groups, escalating from 91.2% among the 20–39 year olds, to 98.8% among the 40–59 year olds, to 100% among the oldest age group. Counter to trends seen in other health status indicators, disease prevalence appears highest in the most affluent group and lowest among those with lower incomes, but the differences are not statistically significant. The youngest (91.2%), those born outside Canada (93.5%) and those who never smoked (93.7%) have the absolute lowest prevalence but again, those values are within 3% of the national average.

Severity counts (mean DMFT) increase significantly with each older age group from 6.85 to 12.30 to 15.67 teeth (Table 28). Factors that significantly influence higher mean DMFT counts include sex (females 11.25, males 10.09); the aforementioned older age cohorts; public insurance (13.35); visiting a dentist within the last year (11.17); higher education (11.92); and past smoking (12.11).

Overall, the survey shows that dentate adults have few teeth with untreated decay, 0.58 on average, but they have 2.14 teeth extracted and 7.95 teeth filled (Table 28). With such low numbers of decayed teeth, some of the cells must be interpreted with caution, but males (0.72) have more untreated teeth decayed than females (0.45), higher income families (0.33) have fewer than the 2 lower income categories (0.72 "E" and 0.97 "E") and people with private insurance (0.38) have fewer than either the publicly insured (1.34 "E") or the non-insured (0.88). Other factors associated with mean counts close to or more than double the national average are not visiting within the last year (1.36) and being a current smoker (1.13). The mean counts of decayed teeth tend to be lower as age groups increase – falling from 0.81 in young adults, to 0.45 "E" in those aged 40–59 years and 0.37 in the oldest age group.

Dentate Canadian adults have an estimated 2.14 teeth missing due to disease and there is little difference by sex (Table 28). The mean number of missing teeth is higher for each older age group rising from 0.39 for the youngest, to 2.42 for those 40–59 years old, and highest (5.57) among the oldest age group. Other characteristics significantly associated with higher counts of missing teeth are lower income, public or non-insurance, lower education, and being a past smoker.

Filled teeth represent the successful early treatment of dental caries and, on average, dentate adults have 7.95 filled teeth. The number of successfully restored teeth is significantly higher among females (8.54) than males (7.34), the 2 older age groups (9.43 and 9.72) compared to those aged 20–39 years (5.65), visiting a dentist within the last year (8.81) vs not (5.94), and being a previous smoker (8.95) compared to a never smoker (7.66) or a current smoker (7.20).

Table 29 shows that 5.5% of the burden of coronal dental caries are still untreated (DT/DMFT%), 74.4% has been successfully filled (FT/DMFT%) and 20.1% was treated by extractions (MT/DMFT%). For comparisons with other jurisdictions, we also report the ratios of decayed and filled teeth using, as the denominator, the sum of the DFT.

The missing (M) component of the DMFT index indicates care that was provided because: the disease had progressed so far that extractions were the only option; extractions were all that the patient could afford; or either the dentist, or the patient, or both, preferred that form of treatment. While it may be appropriate care, extraction represents a failure in both primary and secondary prevention. 20.1% of the disease has been treated by means of extraction (Table 29). There is little difference by sex but an apparent six-fold difference amongst the age groups with 35.6% of the disease among the oldest, and only 5.7% among the 20–39 year olds having been treated by extractions. Significantly higher MT/DMFT ratios are found among the lower income group (28.2%), the lower education group (26.1%), the publicly (27.4%) and non-insured (27.0%), and those who had not visited in the last year (23.8%).

5.5% of the coronal caries in the adult population are still decayed (Table 29). This is greater for males (7.1%) compared to females (4.0%), and nearly five times higher for the young adults (11.9%) compared to the oldest age group (2.4%). Lower income families have three times more of their caries untreated (9.3% “E”) compared to the higher income group (3.0%), and those with lower education (8.5%) also have higher proportion of untreated disease than those with higher education (4.3%). Those who have not visited within the last year have 14.2% of their disease untreated compared to 2.3% among the recent visitors – a six-fold difference. Current smokers also have a significantly greater proportion of their disease remaining untreated.

The FT/DMFT (filled) ratio shows the extent of caries that is successfully treated at an early stage and is a marker for having a combination of good access to care and, to some extent, a lower severity of disease. As seen in Table 29, 74.4% of the disease has been filled or restored, higher among the younger (82.4%) and the middle (76.7%) aged subjects compared to the oldest (62.0%) age group. The filled ratio is significantly higher among the higher (81.7%) and middle (71.6%) compared to the lower (62.5%) income group, the privately insured (80.8%) compared to either the publicly (62.6%) or non-insured (65.1%) people, and those who visited for care in the last year (78.9%) compared to those who have not (62.0%). There are also differences favouring those with higher education, those born in Canada, and people who never smoked.

Untreated coronal and root caries

Table 30 provides more detail on the untreated burden of illness separately for both root and coronal caries. Root caries, as the name implies, is dental decay that attacks the roots of the teeth that have become exposed due to periodontal diseases (see later description of periodontal diseases). It is a disease that has gained prominence since older adults have become able to retain more natural teeth, as opposed to earlier times where teeth were extracted due to coronal caries. Root caries appears to be more difficult to detect and is much more difficult to treat on some tooth surfaces.

In examining untreated root caries in more detail (Table 30), we see that many of the estimates of prevalence must be interpreted with caution ("E"). However, in addition to an apparent reverse income gradient, prevalence is significantly higher among those who have public insurance (17.6% "E"), those who visited for dental care more than one year ago (12.1%), and those with lower education (12.7%). While the mean counts often have to be interpreted with caution, they do not appear to vary significantly according to the social or behavioural characteristics used to examine the findings.

Table 30 also shows the proportion of adults with untreated caries and the mean number of untreated teeth among those with 1 or more untreated teeth. 19.7% of adult Canadians have untreated coronal caries and they have 2.97 tooth crowns untreated. That is almost three times as many that have untreated root caries (6.8%), but the mean count among them is much the same – 2.81 teeth. For both coronal and root caries, over two times as many lower income Canadian adults have untreated disease compared to the higher income group. Mean counts of untreated teeth tend to also favour the most affluent but the differences are not significant.

Dental examiners also found that 23.4% of males and 16.1% of females have 1 or more untreated coronal caries lesion (Table 30). In contrast to untreated root caries, prevalence of untreated coronal caries is lower with increasing age from 22.5% for the youngest, to 18.5% for the middle and 16.0% for the oldest age group; the mean count for those aged 60–79 years appears lowest at 2.35 teeth. Prevalence is dramatically higher among those who have not visited a dentist in the last year (37.0%), and notably higher in the lower income group (29.8%), among the publicly (35.8%) and non-insured (25.0%) groups, those with lower education (28.3%), Aboriginal people (34.4%), and current smokers (29.5%). Mean counts appear higher for the publicly insured (3.73), those who have not visited (3.67), and those with lower education (3.56).

Root caries

Table 31 mirrors Table 28 for root caries. As shown, 20.3% of dentate adults have 1 or more decayed or filled root cavities, with an overall mean of 0.66 root decayed or filled teeth (RDFT). That mean is the sum of 0.19 "E" decayed and 0.47 filled teeth.

The prevalence of RDFT is no different by sex but increases dramatically with age such that 43.3% of the oldest group is affected – a seven-fold difference compared to the youngest (5.8%) age group (Table 31). Other significant differences are seen among the privately (17.4%) and publicly (31.4%) insured, the more highly educated (17.4%) compared to those with lower education (28.7%), and non-smokers (15.6%) compared to both past smokers (25.5%) and current smokers (23.8%).

Cross-tabulating the mean RDFT counts with the determining characteristics produces many estimates that have a cautionary "E" (Table 31). Nonetheless, mean counts appear no different by sex but are highest (1.56) for the oldest age group and the publicly insured (1.12 "E").

For dentate adults, the mean root-decayed teeth (RDT) are so few that virtually all of the findings must be interpreted with caution ("E") (Table 31). However, when cross-tabulated with the determining characteristics, they appear to follow the same direction as the prevalence. Many of the filled counts must also be interpreted with caution but appear to be influenced by age, insurance coverage, and visiting within the last year, e.g., non-visitors (0.46 "E") have a five-fold greater number of untreated root-decayed teeth than do the recent visitors (0.09).

As shown in Table 31, many of the means of the counts of root-filled (RFT) teeth also have the cautionary "E" designation. Even so, only visiting in the last year appears to contribute to any significant difference: recent visitors have 0.57 RFT and non-visitors have 0.22 "E" RFT – a two-fold difference.

Table 32 shows the proportion of the root caries that is either decayed (RDT/RDFT) or successfully restored (RFT/RDFT), and thereby parallels the findings for coronal caries in Table 29. Whereas only 5.5% of coronal caries is untreated, 28.9% of root caries is untreated. The proportion of teeth with untreated root caries does not vary significantly by sex but tends to be higher for the lower income (38.2% "E") adults compared to those with higher incomes (17.5% "E"). The proportion of root caries that remains untreated is five times higher for those who have not visited for professional care in the last year (68.0%) compared to those who have visited (13.1%) and is three times higher among the youngest adults (65.9%) compared to the older adults (18.4% "E") and among Aboriginals (86.7%) compared to non-Aboriginals

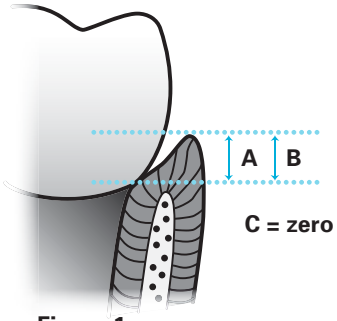


Figure 1

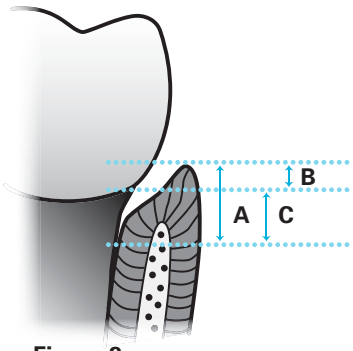


Figure 2

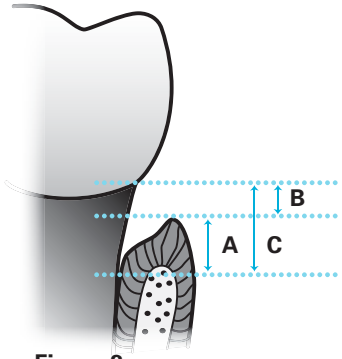


Figure 3

(27.7%). The proportions are two times higher among the publicly (44.2% "E") and non-insured (39.1%) compared to the privately insured (16.9%) and those with lower education (46.1% "E") compared to those with higher education (18.6%). The findings on the filled component of root caries are the complement of the unfilled component, so the same observations apply in reverse.

Periodontal conditions

The measurement of periodontal conditions is difficult clinically and the indices in current use do not measure active disease. For background and the purposes of definition, the structures surrounding the teeth that keep them in place (gingiva, bone, and the attachment mechanism – the periodontal ligament – between the teeth and bone) are referred to as the periodontium. These structures are subject to diseases and host defence response, the effect of which is to produce inflammation of the gingiva (gingivitis), inflammation of the bone (periodontitis), and loss of attachment (LOA). In the huge majority of people, the periodontal ligament does not fall away from the tooth after one disease episode, but rather the attachment migrates away from the crown along the root of the tooth in small bursts over a long period. In healthy young adults, the attachment is found at the junction of the enamel covering the crown and the beginning of the root which is covered in cementum – the cemento-enamel junction (CEJ). Others have observed (Burt BA 2005, pp. 268–9) that even among dentally conscious college students and professors in Norway, there is migration of the attachment down/up the root, between 0.07 mm and 0.13 mm annually. Thus, the examination protocol records the cumulative history of the effects of "natural" migration, previous bouts of active disease, and periods of repair.

Using blunt probes with millimetre markings, examiners measure loss of attachment (LOA) as the distance from where the attachment is found in healthy young adults (the CEJ) to where it is found in a participant at the time of the examination. However, LOA is difficult to measure accurately since the gingiva covers the site of the attachment. Examiners are really "sensing" the level of the attachment by gently probing and identifying the attachment point as the bottom of a so-called "pocket" between the tooth root and the gingiva, and then measuring the distance from that point to the CEJ. Thus, there are 2 measures to indicate disease: pocket (or probing) depth and loss of attachment.

The above diagrams adapted from Burt BA (2005, p. 205), illustrate the clinical measurements and the necessary calculations. "A" represents the pocket depth, "C" represents the loss of attachment, and "B" is the distance from the crest of the gingiva to the CEJ. Figure 1 shows a healthy periodontium with no real pocket and no loss of attachment. Figure 2 represents one situation where the attachment has migrated down the root and the LOA has to be calculated by subtracting the distance "B" from the pocket depth "A". Figure 3 shows the LOA calculated by adding the extent of recession "B" to the pocket depth "A".

Using the World Health Organization (World Health Organization 1997)'s indicator teeth, and depending on the teeth that were present, examiners probed 6 sites on each of up to 10 teeth. If all indicator teeth were present they recorded the worst (highest) probing depths and loss of attachment measures for 6 sites on 8 molar teeth and 2 anterior teeth. Then the worst score for an individual participant was used in the tables. While the scores are subject to measurement errors, the method does not

capture the status of the whole mouth and therefore may over- or under-represent the severity of the disease in an individual participant. Nonetheless, these methods are deemed to provide representative information on populations and replicate the measurement of periodontal conditions used in other national surveys.

Clinically, pocket depths can be reduced by home care and professional treatment, but loss of attachment is largely irreversible.

Case-definitions of periodontal disease for epidemiologic purposes vary. The U.S. National Center for Health Statistics defines periodontal disease as at least 1 periodontal pocket with a probing depth of 4 mm or more and a loss of attachment at the same site of 3 mm or more (Slade GD 2007). A more recent definition for epidemiologic surveys is that put forward by the U.S. Centers for Disease Control and the American Academy of Periodontology (Page RC 2007). Moderate disease is defined as either 2 sites with LOA of 4 mm or more, or 2 sites with probing depths of 5 mm or more. Severe disease is defined as 2 sites with LOA of 6 mm or more with at least 1 probing site with 5 mm or greater. However, both of these definitions can only be used with a full periodontal examination of all teeth present and this fuller examination required more time than was available for the CHMS survey.

Loss of attachment (LOA) is considered as the true measure of the effects of disease (Burt BA 2005, pp. 260 and 263). Conventionally, healthy individuals are defined as those with loss of attachment (LOA) of 3 mm or less. Sites with LOA of 4–5 mm are considered to have, or have had, moderate disease; teeth with LOA of 6 mm or more are considered to have, or to have had, severe disease. However, chewing function is well maintained with minor loss of attachment (< 4 mm), and teeth are not likely threatened until the loss of attachment is 6 mm or more. Clinically, pocket depths can be reduced by home care and professional treatment, but loss of attachment is largely irreversible.

Lastly, readers need to consider the findings while keeping in mind the age group. None of the standards for defining severity of disease consider attachment loss relative to age. For example, a 70-year-old with a maximum of 4 mm of attachment loss on a number of teeth should probably be regarded as having aged successfully whereas a 20-year-old with the same findings would seem to be at risk for loss of teeth.

Table 33 shows the findings on debris (soft, cream-coloured deposits or stain) and calculus (calcified, adherent material, also known as "tartar") found on the indicator teeth. Neither of these is a measure of disease but they are seen as local factors that, if present for a sufficient interval, are associated with the development of gingivitis. Both can be prevented by home care but calculus can only be removed with scaling by a professional.

The table provides the worst score found on any of the 10 indicator teeth; a score of "0" means no debris was found and '3' means that more than 2/3 of the crown was covered with debris. For calculus, a score of 2 is recorded if between 1/3 and 2/3 of a surface were covered and/or that flecks of sub-gingival calculus were present, and 3 means that more than 2/3 of a surface was covered and/or there was a heavy band of sub-gingival calculus found in the "pocket" surrounding the tooth.

Combining the worst scores for debris (codes 2 and 3 in Table 33) results in 27% of 20–79 year olds with debris greater than code 1. Those with lower incomes, those publicly insured and those who have not visited a dental professional in the last year tend to have higher debris scores (> code 1).

Only 1.5% "E" – too low for further analysis – of participants had scores of 3 for calculus, so that information has been integrated with those who have scores of 2. As shown in Table 33, worst scores (2 or 3) for calculus are found among 10.7% of Canadians. Males (13.2%) tend to have higher scores than females (8.2%). Significantly higher proportions of the oldest age group, the lower income group, the publicly and non-insured, infrequent visitors, those born outside Canada, and current smokers have calculus scores of 2 or 3.

As seen in Table 34, 32.3% of Canadian adults showed signs of gingivitis (combining codes 2 and 3) in 1 or more locations. Scores of 2 and 3 were again combined since the number of individuals scoring 3 were too low to report. Those with lower incomes (47.7%), those publicly insured (50.6%), and those who have not visited a dental professional in the last year (47.6%) have greater occurrence of gingivitis scores of 2 or 3 than those with higher incomes (25.1%), those privately insured (27.2%), or those who have visited a dental professional in the last year (47.6%).

Good health tends to be somewhat higher among females (80.6%) compared to males (77.7%), but no characteristic other than age appears to determine good periodontal health.

Table 35 provides the findings on the distribution of dentate people according to their worst (deepest) probing scores ranging from 0–1 mm to 6 mm or more. Almost 80% (2.9% + 42.6% + 34.3%) have their worst probing depth as 3 mm or less. The prevalence of moderate disease (at least one pocket of 4 or 5 mm) is found among 16.0% (11.2% + 4. 8%) of the population. More than 20% of the oldest (23.8%), those with lower incomes (21.5%), those who have not visited within the last year (22.6%), those with lower education (20.8%), those born outside Canada (20.9%), and current smokers (22.2%) had signs of moderate disease.

Accepting the convention that worst scores of 6 mm or more are of concern, only 4.1% have or have had severe disease (Table 35). Cautionary "E"s are found frequently in the column containing the estimates of the prevalence of people with at least 1 pocket of 6 mm or greater, and some data are withheld because of the high coefficient of variation. Deeper pocketing appears more prevalent (>2% higher than the national average of 4.1%) among the oldest age group, the lower income category, the non-insured, and those born outside Canada.

Mean pocket depths are shown in Table 35 for those with at least 1 pocket of 4 mm or more. The mean pocket depth for this sub-population (dentate with at least 1 site with a pocket of 4 mm) is 4.9 mm. The mean depths vary little, and are significantly higher only for those born outside Canada (5.2 mm).

The distribution of the adult dentate population according to the worst (greatest) loss of attachment (LOA) is seen in Table 36. 79.0% have good health (LOA = 0–3) and 6.0% have or (?) have had severe disease (LOA ≥ 6 mm). Prevalence of good periodontal health is significantly higher among the youngest (93.3%) age group compared with the middle (74.1%) and oldest (53.4%) age groups. Good health tends to be somewhat higher among females (80.6%) compared to males (77.7%), but no characteristic other than age appears to determine good periodontal health.

The findings on severe disease (LOA ≥ 6 mm) must often be interpreted with caution but it is apparent that severe disease is significantly higher amongst the oldest age group (14.8%), those with lower incomes (9.0% "E"), and those born outside Canada (12.4% "E") (Table 36). No other factor apparently influences the prevalence of severe disease. However, severe disease tends also to be more prevalent (> 2% higher than the national average of 6.0%) among those with no insurance.

The findings on the mean loss of attachment (LOA) are shown in Table 36 for those with at least 4 mm of attachment loss at one site. For the dentate population with at least 4 mm of LOA, mean attachment loss is 5.2 mm with the mean score higher among the non-insured (5.5 mm) and those born outside Canada (5.8 mm).

Although not shown in any table, mean loss of attachment was also examined for those with any sign of disease, defined as at least 2 mm of attachment loss at one site. For those with this lower level of attachment loss, mean attachment loss is 3.4 mm (95% CI = 3.19–3.53) with the mean score being higher among the oldest age group (4.0 mm, 95% CI = 3.78–4.17), those not reporting incomes (4.1 mm, 95% CI = 3.44–4.80), the uninsured (3.7 mm, 95% CI = 3.54–3.87), and those born outside Canada (3.8 mm, 95% CI = 3.45–4.10).

The Community Periodontal Index of Treatment Needs (CPITN) (Cutress TW 1987) is an index developed to measure the amount and level of periodontal care that should be provided to the adult population. For example, gingivitis alone could be treated/prevented by an oral hygiene (brushing and flossing) program delivered by dental health educators, whereas pockets of 6 mm or more would need the attention of a dental professional. Although the examiners did not record CPITN per se, the data that were recorded allow for allocation of the participants into the CPITN categories.

Table 37 shows that allocation, whereby participants were assigned to their worst condition. For example a person with pockets 4–5 mm could also have gingivitis and calculus but they would be allocated to the "pockets of 4–5 mm" column. Looking at the columns starting at the far right, the prevalence of pockets of 6 mm or greater and 4–5 mm correspond to the findings of Table 35. The middle column shows the proportion of people (46.9%)

Overall 23.8% of dentate adults have 1 or more lost or traumatized anterior teeth with a mean of 1.66 teeth affected. Very few (1.9% "E") show tooth loss; the majority (22.4%) present with evidence of incisor fractures.

who have calculus as their worst condition, and next left, the proportion who have inflammation of the gingival tissues, or gingivitis, (25.4%) as their worst condition.

As seen in Table 37, 7.5% are healthy, and by this array, prevalence of good periodontal health is higher among the younger (10.9%) compared to the older (2.9% "E") population and those who have visited a dental professional in the last year (8.9%) compared to those who have not visited (3.6% "E").

Trauma

Examiners recorded trauma according to the clinical presentation and, especially for lost teeth, by questioning the survey participant. For this report, the findings on traumatized teeth were aggregated into whether there was clinical evidence of trauma to a tooth (Codes 2–7) or not (Code 1) – see Table 4.2 for codes and definitions.

Table 38 shows the findings on the extent of dental trauma in the 8 anterior incisor teeth of the adult dentate population. Overall 23.8% of dentate adults have 1 or more lost or traumatized anterior teeth with a mean of 1.66 teeth affected. Very few (1.9% "E") show tooth loss; the majority (22.4%) present with evidence of incisor fractures. No single factor appears to significantly influence the prevalence or mean numbers of lost or fractured teeth – see right side of table – although there is a strong trend for higher prevalence among males (28.5%) and a higher mean number of teeth affected among those not reporting their incomes (2.14).

TABLE 4.2
Codes and definitions used for recording dental trauma

Code	Description	Definition
1	No evidence of traumatic injury	
2	Unrestored enamel fracture – does not involve dentin	
3	Unrestored enamel fracture – involves dentin	
4	Untreated damage – dark discolouration, swelling, fistula	Untreated damage as evidenced by 1) dark discolouration as compared with the other teeth (a discolouration of one tooth or adjacent teeth, which are otherwise healthy is considered a sign of injury) or 2) presence of a swelling and/or fistula in the labial or lingual vestibule adjacent to an otherwise healthy tooth
5	Restored fracture – full crown	Fracture restored, with a full crown. It may be necessary to question the respondent to determine the reason for the restoration
6	Restored fracture – other restoration	Fracture restored, with less extensive restoration than a full crown. It may be necessary to question the respondent to determine the reason for the restoration
7	Lingual restoration plus history of root canal treatment	Presence of lingual restoration as a sign of endodontic therapy, and a positive history from the respondent of root canal treatment following traumatic injury
8	Other	Any tooth or space that does not fall into the preceding categories

Other findings

Dental enamel fluorosis

The examiners recorded dental fluorosis among children, aged 6–12 years, using Dean's Index (Dean 1942). The criteria for the index are as follows:

TABLE 4.3
Dean's Index codes for recording dental fluorosis

Code	Description	Definition
0	Normal	The enamel surface is smooth, glossy and usually a pale creamy-white colour
1	Questionable	The enamel shows slight aberrations from the translucency of normal enamel, which may range from a few white flecks to occasional spots
2	Very mild	Small opaque, paper-white areas scattered irregularly over the tooth, but involving less than 25% of the labial tooth surface
3	Mild	The white opacity of the enamel of the teeth is more extensive than for code 2, but covers less than 50% of labial tooth surface
4	Moderate	The enamel surfaces of the teeth show marked wear and brown stain is frequently a disfiguring feature
5	Severe	The enamel surfaces are badly affected and hypoplasia is so marked that the general form of the tooth may be affected. There are pitted or worn areas and brown stains are widespread; the teeth often have a corroded appearance
6	All 4 anterior teeth absent	Could also be unavailable for assessment since banded

Dental fluorosis is one form of hypoplasia of the dental enamel, which depending on the amount of fluoride exposure (the dose) and the period of tooth development at which the exposure occurs, can be seen as ranging from a mild white chalky discoloration of the tooth surface, to brown staining, to pitting, to enamel loss (description adapted from the National Academy of Sciences 2006). According to Health Canada's expert panel on fluoride (Health Canada 2007), dental fluorosis is the first sign of potential excess fluoride intake and, "... the end-point of concern for fluoride (intake) is still considered to be 'moderate dental fluorosis,' according to Dean's Index. It was agreed (by the expert panel) that this should not be considered a toxicological endpoint, but that this endpoint is significant because it correlates with cosmetic problems."

Table 39 shows that 59.8% of the children have teeth that, according to Dean's Index, are normal and another 23.5% that are identified as questionable. 12.0% have 1 or more teeth with fluorosis classified as very mild and 4.4% "E" as mild. So few Canadian children have moderate or severe fluorosis that, even combined, the prevalence is too low to allow reporting however it can be seen that this number is less than 0.3%. There are no significant differences in non-normal teeth according to the determining characteristics.

Oral lesions

As seen in Table 40, soft tissue lesions are found among 11.6% of adults; significantly higher among the edentulous (40.9%) compared to the dentate (9.6%). They are significantly more common among the older age groups (12.9% and 20.0%) compared to the youngest (5.6%), among the lower (16.0%) compared to the higher income group (8.6%), and among the publicly (21.2% "E") and non-insured (17.5%) compared to those with private insurance (7.5% "E"), and among those who had not visited (17.1%) compared to those who had visited for professional care in the last year (8.9%).

Most of the estimates of the prevalence of specific types of lesions are withheld or must be interpreted with caution and little can be said about the influence of the various determinants. Denture stomatitis is the most common condition, found among 3.9% of the adult population, but 20.9% of the edentulous. Other conditions, in descending order of prevalence, are traumatic or other lesions (1.8% "E"), sinus or fistula (1.0%), glossitis (0.7% "E") and angular chelitis (0.5% "E").

Although the prevalence of white mucosal lesions cannot be reported, 64.7% of the lesions are leukoplakia, and 30.3% "E" are candidiasis. 73.1% "E" of lesions in past smokers with at least 1 white lesion are leukoplakia.

Occlusal conditions and orthodontic treatment

Not shown in any table is the finding that 76.0% (95% CI = 72.5–79.1) of dentate Canadians between the ages of 12 and 59 years have acceptable occlusion, which varies from a high of 81.5% among adolescents to 74.1% among adults aged 40–59 years. The most common malocclusion conditions in the population are crossbites, both posterior (10.5%) and anterior (7.6%) and are most frequently in the adult age group. Next most common are severe crowding found among 7.2% of the population, and severe spacing found among 2.3% "E". Excessive overjet and overbite are each found among 1.0% "E" and 1.1% "E", respectively, of the population but their distribution by age mostly cannot be reported.

Table 41 shows the proportion, 24.0%, of the dentate population aged 12–59 years who were judged to have less than acceptable occlusion. Prevalence is highest in the 40–59 year age group (25.9%) and lowest in the adolescents (18.5%), but none of the other determinants used in this report appears to influence the prevalence among those aged 6–79 years. Among adolescents, the condition is less prevalent among those who have visited in the last year (15.4% vs 32.9%) and non-Aboriginal adolescents (17.0% vs 43.1% "E"), with a strong trend favouring those with private insurance (16.6%) compared to the non-insured (25.6%). Since orthodontic treatment is more commonly provided in the adolescent years, these findings may reflect a treatment effect. However, no similar differences appear in the other 2 age groups.

Again not in any table is the finding that 4.1% of Canadians are currently receiving orthodontic care. 18% of adolescents and 6.2% of children are undergoing orthodontics with the proportion decreasing among the older age groups. Among children, 2.8% "E" have removable appliances and 2.9% "E" have fixed appliances, but among adolescents, 10.2% are receiving therapy using fixed appliances. The rest of the data on the type of care cannot be reported.

As seen in Table 42, the examiners found that 19.4% of Canadians have received, or are receiving currently, orthodontic treatment. Rates are highest among adolescents (35.9%) and young adults (28.5%). Among those aged 6–79 years, all of the characteristics with findings that can be reported (female, higher income, private insurance, recent visiting, higher education, born in Canada, and never smoking) make a significant difference in determining the receipt of orthodontic care. As seen in Table 41, none of these factors were associated with the prevalence of unacceptable occlusions. Within the adolescent group, the strongest determinants of orthodontic treatment include being female (42.7%) vs male (29.5%), having higher incomes (45.8%) vs lower incomes (19.4% "E"), visiting within the last year (40.9%) vs not visiting within the last year (11.5% "E"), and living in a family with higher education (40.8%) vs lower education (24.9%).

Intact restorations of amalgam and other materials

The examiners recorded whether restorations on teeth were intact according to the material (amalgam vs non-amalgam) used. The expectation was that the survey might identify whether one kind of material had higher success than the others. The finding of decay on a filled tooth took precedence over the type of restoration material, so there is no way of telling if secondary decay was more prevalent in one type of material compared to the others. The type of material was recorded only for successfully restored teeth, leaving 3 types for assessment: teeth with amalgam alone; teeth with a non-amalgam (most likely tooth-coloured) restoration alone, or teeth restored by 2 types of material in different positions on the tooth. Further in a one-time survey, the longevity of successful restorations cannot be determined.

Keeping in mind these caveats, lower prevalence of intact restorations are found in those who have teeth with 2 types of material (94.3%) and who have not attended for professional care within the last year (84.1%), or who are Aboriginal (84.1%). No other determinant seems to influence the count of intact restorations.

Reasons for exclusion from periodontal probing

Dentate participants were excluded from the probing depth and loss of attachment measurements if they responded yes to the first of a series of questions on their medical history. Parents of children younger than 15 were asked the same questions even though no probing was conducted on children. As the findings report the first reason, respondents could have had 1 or more other conditions therefore findings do not represent the prevalence of these conditions reported by participants. 7.8% of participants were excluded from that part of the exam. The proportion of those excluded increased from the adolescents (2.7% "E") to the highest among the oldest group (19.1%). The most frequent reason was participants stating they required antibiotics before dental appointments (2.5% "E") followed by heart murmurs (1.1% "E") and joint replacement (1.1%). Among the oldest age group, artificial material (stents, prosthetic valves) in the heart, veins, or arteries (3.1% "E") and a history of joint replacement (3.1%) were the most frequent reasons after "requiring antibiotics before dental care" (5.4%) (data not shown).

Need for care

At the end of the clinical examination, the dentist-examiners recorded whether the participant needed care and, if so, what kind, and was it needed urgently. That information was communicated to the participants verbally at the time of the examination. Standard letters stating the needs were generated from fields filled in at the examination and if there was an urgent need, the letter indicated that the participant should have it attended to within 7 days. If a serious medical condition was found the letter stated the respondent should seek care immediately. And in the near future for a non-urgent need. To avoid having people receive a letter suggesting they only seek preventive care, prevention was not indicated unless there were another need Thus, the need for prevention is under-reported and the field indicating preventive needs was excluded from this report.

We created a hierarchy of need consistent with a 1978 publication of the American Dental Association and previous work on an elderly population in Ontario (Otchere DF 1990). Essentially the participants are triaged under a paradigm that ranges from threats to life or current severe pain, to restoration of function, to needs that could be met over a longer time period. Accordingly, the hierarchy places urgent needs first followed by surgical, endodontic, restorative, prosthodontic, periodontic, orthodontic, a group of services infrequently indicated for treatment (TMJ, esthetics, and soft tissue), and no needs. The hierarchy indicates the highest need for persons but they likely have other, lower-order needs. For example, a person identified as needing restorations could have prosthodontic, periodontic and preventive needs as well.

First, the needs of the edentulous are relatively narrow and only prosthodontic needs are sufficiently numerous to allow reporting. 39.4% (95% CI = 29.7–50.1) of edentulous people need prosthodontic services. Although no determinant significantly affects that estimate, the lowest estimate of prosthodontic need that can be reported is found among the privately insured (26.4% "E") and highest among those aged 40–59 years (46.2% "E").

Table 43 shows the distribution of needs, according to the hierarchy, for the dentate population. Nearly two-thirds, 65.8%, had no treatment needs identified at examination. The percent with no treatment needs was higher among the 2 younger age groups, the higher income group, the privately insured, those who visited in the last year, those with higher education and non-smokers.

Overall, 1.8% "E" had at least 1 urgent condition, and the needs ranged down in the hierarchy from surgery (7.3%), to endodontics (1.0% "E"), restorations (16.4%), prosthodontics (3.7%), periodontics (1.9% "E"), and orthodontics (1.7% "E"), to a collection of more modest and infrequent needs experienced by 0.4% "E" of Canadians.

5

How does our oral health compare?

Evaluating our current oral health can best be done in context, i.e., compared to earlier surveys, compared to survey results from other countries, or internal comparisons within the country, i.e., between regions or between urban and rural areas. The CHMS is designed to provide national estimates only, so there are insufficient numbers of participants to compare between regions. Side-by-side comparisons with the findings of previous surveys and with other countries can best be done where the survey methods are consistent. However, often these comparisons have to allow for differing age groups, clinical criteria, dental indices, reporting standards, and even the scope of the survey and whether the survey had a substantially different sample size.

Children

Within Canada, four previous reports have attempted to provide national estimates for the oral health of children (Canadian Dental Association 1962; Lewis 1968; Lewis 1973; Nutrition Canada 1977) (Table 5.1). Each report has its limitations, some severe. The Nutrition Canada Dental Report (Nutrition Canada 1977), with data collected in 1970–72, is the most comparable to the CHMS Oral Health Module in scope as they collected data on visiting behaviours and examined adults using standard methods.

As seen in Table 5.1, even allowing for the disparate age groups and the uncertain clinical criteria used in the other studies, the prevalence of dental caries in permanent teeth among Canadian children has declined from affecting between 55% and 97% of children in the 1960s/1970s to fewer than 25% in 2007–09. Further, the condition is less severe since the mean count of decayed, missing, or filled teeth (DMFT) is now 0.49 permanent teeth compared to the earlier population mean estimates which ranged from roughly 2.5 to 5.5 permanent teeth. However, even today, those with 1 or more teeth affected would have, on average, nearly 2.1 DMFT.

In 1970–72 the mean count of primary and permanent teeth affected by decay was 6.0 for 8–10 year olds, compared to 2.5 for the CHMS 6–11 year olds.

Nutrition Canada (Nutrition Canada 1977) reported findings on the orthodontic status of participants aged

TABLE 5.1
Caries in permanent* teeth of children from Canadian reports 1962 to 2007–09

Survey	CDA	DHSCP	Nutrition Canada		Health Canada	CHMS
Scope	6 provinces	5 provinces	National study		10 provinces	National study
Year data collected	1962	1968–70	1970–72		1973	2007–09
Age range (years of age)	7–13 median = 10	5–13 median = 9	8–10	12–14	13	6–11 median = 8
Prevalence %	81.20	not reported	74.30	92.70	54.70–96.70*	23.60
Mean DMFT	3.01–5.48*	3.71	2.50	8.00	not reported	0.49

Sources: Canadian Dental Association 1962; Lewis 1968; Lewis 1973; Nutrition Canada 1977

Note: Nutrition Canada data are from Table 20C (prevalence) and 41B (mean counts).

* Data are the range of the mean scores among the provinces reporting.

3–18 years old but employed much lower cut-offs to record abnormal conditions than did the CHMS examiners who were following more recent WHO criteria (World Health Organization 1997). Nutrition Canada also reported the findings according to the orthodontic Treatment Priority Index (Table OPTA), again not used for this survey, but which classified participants as having none or minor, definite, serious, or urgent orthodontic treatment needs. For 12–14 year olds, the Nutrition Canada Dental Report showed that 25.3% had definite needs, 12.8% had serious needs, and 0.8% had urgent needs. The CHMS examiners found that 18.5% of adolescents, aged 12–19 had less than acceptable occlusion.

As for international comparisons, children in the United States were surveyed as part of the continuous National Health and Nutrition Examination Survey (NHANES) (U.S. Department of Health and Human Services 2007) during 1999–2004. The United States survey includes the same age groups and uses very similar caries diagnostic criteria. For the survey cycle ending in 2004, 21.1% (95% CI = 19.27–22.84) of United States children aged 6–11 years had experienced decay in their permanent teeth, with a mean DMFT count of 0.45 (95% CI = 0.41–0.49). While there is a tendency for slightly higher proportions (23.6%) of Canadian children to be affected and have slightly higher mean counts (0.49), Canadian prevalence and severity counts correspond very closely to those in the United States. The NHANES survey showed that 0.12 teeth (26.7%) were still decayed, whereas Canadian children have fewer (16.9%) of their DMFT decayed.

Additionally, 30.5% of American children have 1 or more sealants, and among those children there is a mean number of 3.38 sealants. 31.6% of Canadian children have 1 or more sealants but, on average, have fewer – a mean of 2.88 – teeth sealed.

Lastly, NHANES examiners found evidence of trauma to the anterior teeth among 7.1% of children, and the equivalent figure in Canada is nearly the same, 6.9%. On balance, Canadian and American children have very similar oral health indicators except Canadians have fewer decayed and fewer sealed teeth.

Adolescents

Only the Nutrition Canada Dental Report (Nutrition Canada 1977) provides information equivalent to the CHMS on adolescents but it is reported in age-brackets of 12–14, 15, 16–18 and 19 years old. The median age for the CHMS age group of 12–19 year olds is 15–16 years old, so the closest comparison would be to the 15-year-olds in the Nutrition Canada report. In 1970–72, 96.6% of adolescents had 1 or more teeth affected

Both prevalence and severity of dental caries have declined greatly over the 38-year interval and now, virtually no teeth have been extracted due to disease in adolescents.

by decay with a mean count of 9.2 DMFT, of which 3.8 (41%) were decayed and 1.4 were missing. The CHMS findings for 12–19 year-olds show that 58.8% have 1 or more teeth affected and the mean count is 2.5 DMFT, with virtually none missing and 0.37 (14.4%) decayed. Both prevalence and severity of dental caries have declined greatly over the 38-year interval and now, virtually no teeth have been extracted due to disease in adolescents.

The above results among Canadian adolescents are very similar to the caries findings of the United States NHANES survey cycle ending in 2004 (U.S. Department of Health and Human Services 2007). NHANES found that 59.1% of United States adolescents had been affected by dental caries with a mean count of 2.55 DMFT with 0.47 (18.4%) of those being decayed. NHANES also reported that 37.7% of adolescents had sealants with a mean count among them of 5.1. 50.6% of Canadian adolescents have sealants, with a mean count among those with a sealant of 3.5. 20.2% of American adolescents compared to somewhat fewer, 16.1%, of Canadian adolescents have evidence of trauma to their front teeth. In general, as with children, Canadian adolescents appear to have nearly equivalent oral health to adolescents in the United States, albeit with variation in the use of sealants.

Adult Oral Health

Comparisons of the CHMS findings can be made with the only previous, nation-wide, clinical examination survey results for adults, namely the Nutrition Canada Survey of 1970–72 (Nutrition Canada 1977).

Two studies are used to place the Canadian findings on adults in an international context; the United States NHANES survey (1999–2004) (U.S. Department of Health and Human Services 2007) and the Australian National Survey of Adult Oral Health of 2004–2006 (Slade GD 2007), also known as the "Australian's Dental Generations" study. Both studies present findings from similarly developed economies and oral health care systems with populations that have the resources to obtain dental care. For adults, neither study reports using the same age-groupings as decided *a priori* for the CHMS, negating direct comparisons. However, the Canadian data will still be compared for its general "fit" or "non-fit" with the international findings.

Tooth loss

In 1970–72, Nutrition Canada found that 23.6% of adults aged 19 and older were edentulous (had lost all their natural teeth), compared to the CHMS finding of 6.4% (Table 5.2). The Nutrition Canada study reported edentulism by 10-year age brackets and for men and women separately. The text table below presents the findings in comparison to those of the CHMS.

TABLE 5.2
Percent of Canadians who are edentulous by age group in 1970–72 and 2007–09

Age group	Nutrition Canada 1970–72 * 19 years and older		CHMS 2007–09
	Male	Female	
20–29	4.8	5.8	not reportable
30–39	6.1	22.9	
40–49	18.0	26.5	4.4
50–59	30.4	38.4	
60+	49.5	55.7	(Age 60–79) 21.7

Source: Nutrition Canada 1977

As shown in Table 5.2, Nutrition Canada found great differences by gender, especially in the young adults. That difference has effectively disappeared as now 6.3% of adult males and 6.5% of adult females are edentulous. Over the 38 years between surveys, the levels of edentulism among Canadians have fallen to such an extent that the proportion seen among the 40–49-year-olds (median age 45 years) (~23%) in 1970–72 is found only among the CHMS oldest group who are ~25 years (median age 70 years old) older.

Edentulism is the cumulative result of disease plus the inability to access care to prevent or treat the disease at an early stage. Historically, where natural teeth were seen as a focus of infection, and neither self- nor professional primary preventive care was very effective, and because there were too few dentists to provide early interventions, edentulism among the elderly became the accepted norm, and viewed as a natural result of aging. The oldest group in the CHMS (born between 1930 and 1949) reached adulthood before there was water fluoridation, fluoride dentifrices, an emphasis on oral hygiene, high numbers of oral health professionals, and before the standard of living increased to allow less crowded homes and more variety in foods, etc. If the CHMS findings of much lower levels of edentulism, compared to the results of the Nutrition Canada Survey, mirror those from repeated surveys from other jurisdictions (Slade GD 2007), the age-specific differences could be cohort effects, and the younger generations may be less likely to experience the same levels of edentulism when they reach old age.

The NHANES (U.S. Department of Health and Human Services 2007) cycle ending in 2004 reported the prevalence of edentulism for U.S. adults, aged 20–64 years as 3.8%, and for age groups 20–34 years old (no report – CV > 30%), 35–49 years old (2.6%), 50–64 years old (10.1%) and 65–74 years old (23.8%). The Australian "Dental Generations" survey of 2004–06 (Slade GD 2007) also reported the prevalence of edentulism in different age-brackets: 15–34 years old (0.0%), 35–54 years old (1.7%), 55–74 years old (13.9%) and > 75 years old (35.7%) and 6.4% for all ages. Even though the comparisons are difficult because of the variation in the age groups used to report the results, it appears that similarly low proportions of Canadians have lost all their teeth.

Inadequate natural dentition

Nutrition Canada (Nutrition Canada 1977) used a cut-off of "less than 7 teeth in an arch" to define a dentition that was "insufficient for mastication" and reported the prevalence for the two arches separately, rather than for the whole person. The CHMS survey used the criteria based on various studies, as reported in the Australian document (Slade GD 2007, pp. 84–85), namely that fewer than 21 teeth represented an inadequate dentition. While NHANES did not report on this index, the Australian survey found that overall, 11.4% had fewer than 21 teeth, ranging from 0.4% for 15–34 year olds, to 6.8% for those aged 35–54 years, to 28.6% for those 55–74 years old. The CHMS found that 14.6% of dentate adults have fewer than 21 teeth, and that proportion ranged from 0.8% "E" for young adults, to 16.5% for those aged 40–59 years to 42.2% for the oldest age group. Again, comparisons are difficult because of the different age groupings but the findings for the two countries seem to be in the same order of magnitude.

Periodontal status

As discussed in the introduction to the periodontal findings, epidemiologic indices for periodontal conditions and case-definitions of disease continue to evolve as the natural history of the diseases becomes better understood. Nutrition Canada (Nutrition Canada 1977) described periodontal conditions under three categories: mild gingivitis; severe gingivitis; and obvious pockets/loose teeth. Their reporting categories are not consistent with the data collected by the CHMS examiners, so no historic comparisons of disease severity can be drawn.

Again, as explained in the background to the findings on periodontal conditions, loss of attachment (LOA) is the current "gold standard" measurement used to describe the disease with case definitions varying on how severe or how many sites constitute a case. The NHANES (U.S. Department of Health and Human Services 2007) data for adults aged 20–64 show that 14.9% have lost attachment of 5 mm, 8.4% have lost 6 mm, and 5.2% have lost 7 mm. Comparable data from the CHMS show that 5.7% of Canadians have their worst attachment loss as 5 mm and 6.0% have attachment loss of 6 mm or more. 42.5% of Australians (Slade GD 2007) (aged 15–75+ years old) have lost 4 or more millimetres of attachment; the equivalent prevalence estimate for Canadians is 21.1%. Again, while side-by-side age comparisons cannot be made, it does appear that Canadian adults have much better periodontal health than Australians.

Coronal Caries

Nutrition Canada (Nutrition Canada 1977) reported that 96.1% of Canadians 19 years and older had experienced coronal caries with a mean DMFT of 17.5. According to the CHMS, 95.9% of dentate Canadian adults have experienced coronal decay with a mean count of 10.7 DMFT. Table 5.3 shows the age comparisons over the 38-year interval. As seen, prevalence remains high for all age groups, but the severity has dropped such that far fewer than half the number of teeth is affected in the age cohorts under 40 years of age.

TABLE 5.3
Prevalence and severity of coronal caries among Canadian dentate adults by age group in 1970–72 and 2007–09

	Nutrition Canada 1970–72		CHMS 2007–09	
Age group	Prevalence (Table 20C)	Mean DMFT (Table 41B)	Prevalence	Mean DMFT
20–29	M = 95.6 F = 99.0	M = 14.5 F = 15.9	91.2	6.85
30–39	M = 97.6 F = 97.9	M = 17.2 F = 17.4		
40–49	M = 94.2 F = 96.2	M = 17.2 F = 19.6	98.8	12.30
50–59	M = 93.9 F = 94.1	M = 18.8 F = 19.5		
60+	M = 91.3 F = 92.3	M = 20.6 F = 21.5	100.0	15.67

Source: Nutrition Canada 1977, CHMS 2007–09

Note: M=male; F=female

In considering the data by birth cohort, the CHMS oldest age group (median age ~70) was ~32 years old in 1970. The comparisons in Table 5.3 show that the prevalence of coronal caries among those in the oldest CHMS age category has increased a little over the 38 years, but the severity counts have diminished. Explanation of this counter-intuitive finding awaits further analysis.

In the United States, 91.6% of adults have had coronal caries with a mean count of 10.33 DMFT of which 0.76 (7.4%) are untreated. In Australia, 90.1% of dentate people have had caries and the mean DMFT count among them is 12.8. The CHMS shows the prevalence of coronal decay among adult dentate Canadians to be 95.9%, with a mean count of 10.67 DMFT of which 0.58 (5.4%) are untreated. Coronal caries seems to affect a higher proportion of Canadians, but the severity appears less than the Australians and equivalent to that in the U.S.

However, slightly fewer teeth, and a lower proportion of the disease remain(s) untreated in Canada compared to the findings in the United States.

Root caries

Nutrition Canada did not include any report on root caries so no trend can be reported for Canadians. In the United States (U.S. Department of Health and Human Services 2007), 14.2% of adults have experienced root caries but no severity count is reported. The equivalent prevalence estimate for Canadians is 20.3%. The Australian report includes only the prevalence of decayed/untreated root surfaces (6.7%). The equivalent finding for Canadians is 6.8%. Thus, within the limits of the comparisons, root caries may be more prevalent than in the United States but treatment levels are much the same as the Australians.

Visiting behaviours

Visiting a dental health professional at least once in the previous 12 months is an indicator of access to care and, perhaps to a lesser extent, preventive behaviours. It is far from a precise measure of the quantity or pattern of care, as one visit for an extraction counts the same as several visits for extensive treatment. However, it is easily recalled by respondents and is commonly reported in national surveys.

Nutrition Canada (Nutrition Canada 1977) reported that 58% of children and adolescents (3–18 years old) and 44.2% of adults visited within the last 12 months. Overall, 49.5% of Canadians made a visit in the previous year in the Nutrition Canada survey but they did not report visiting behaviour separately for dentate and edentulous participants. Interviewers for the CHMS found that nearly three-quarters of Canadians (74.5%) made a visit in the previous 12 months. The age specific comparisons are seen in Table 5.4, where the major differences occur because higher proportions of those in the youngest and older age groups reported they visited in the last year. Among the older adults, a high proportion of dentate people (79.3%) compared to the edentulous (18.3%) visited a dental professional in the previous year. Generally, more than three-quarters of the dentate visit at least once per year. The exception occurs in the 20–39-year-olds, almost all of whom are dentate, but less than 68% report making a visit in the previous 12 months.

TABLE 5.4
Percent of Canadians reporting a visit for dental care in the previous 12 months by age group in 1970–72 and 2007–09

Age group	Nutrition Canada 1970–72		CHMS 2007–09	
	Male	Female		
8–10	63.1		6–11 years old	91.0
15	69.6		12–19 years old	84.0
20–29	49.2	53.8		67.8
30–39	46.1	49.3		
40–49	45.5	53.0		76.7
50–59	40.1	41.4	Dentate Edentulous	78.5 nr
60+	25.9	24.8		68.4
			Dentate Edentulous	79.3 18.3

Source: (Nutrition Canada 1977), CHMS 2007–09

Note: nr=not reported

Higher proportions of Canadians report having visited for dental care in the last year compared to adults in Australia (59.4%) and the United States (59.9% for adults, 54.5% for seniors). While the Canadian figure of 74.5% is inflated by the very high rates among the two youngest age groups, the proportions remain higher for Canadians in each of the age-specific comparisons – as best as those comparisons can be made given the different age groupings of the survey data. Table 5.5 provides the age-specific comparisons by country. About 10% more Canadians visit for dental care in a year than do either Australians or people in the United States.

TABLE 5.5
Percent of people visiting a dental health professional within the previous 12 months by country

Australia[1]		Canada[2] CHMS		United States[3]	
Age group	Percent visiting	Age group	Percent visiting	Age group	Percent visiting
		6–11	91.0		
		12–19	84.0		
15–34	56.5	20–39	67.8	20–34	54.6
35–54	62.7	40–59	76.7	35–54	62.5
55–74	62.0			55–64	62.8
		60–79	68.4	65–74	56.9
≥ 75	49.4			≥ 75	51.6
Ages 15–≥75	59.4	Ages 6–79 years old	74.5	Ages 20–64 years old	59.9
		Ages 20–79 years old	71.6	Ages ≥ 65 years old	54.5

Sources:
1 Table 6.1 (Slade GD 2007)
2 CHMS Table 9 and supporting text
3 Tables 48 and 69 (U.S. Department of Health and Human Services 2007)

6

What have we discovered from the CHMS Oral Health Component?

Most Canadians are well served by the dental care delivery system

Nearly three-quarters (74.5%) of Canadians report they have visited a dental professional in the previous 12 months and 85.7% have visited within the last 2 years. Reported rates of visiting in the last 12 months are exceedingly high for children (91.0%) and adolescents (84.0%) and continue above 75% for adults and older adults who are dentate. Further, most Canadians have no need for further treatment. 58.6% of the edentulous and 65.8% of the dentate have no needs identified by the dentist-examiners. A minority do not obtain care they might otherwise choose. 17.3% report avoiding visiting, and 16.5% report declining recommended care, because of costs.

These findings parallel the increasing accessibility to providers. In 1970, at the time of the Nutrition Canada survey, there were 7,413 dentists and 746 dental hygienists for a ratio of 2,873 people per dentist or 2,610 people per dental care provider (Leake 2006a). By 2007–08, the types of providers had risen to four and the numbers of providers had increased to over 42,600 for a ratio of 1,725 people per dentist and 777 people per provider (see Chapter 1).

Dental visits, along with dental sick-days, can take time from work, school or normal activities. 39.1% of Canadians experience such a time-loss. At 5 hours per school-day for children and adolescents and 7 hours per working-day for adults, an estimated 2.26 million school-days and 4.15 million working-days for adults are lost annually due to dental visits or sick-days.

Most Canadians are dentate

No children or adolescents in the CHMS sample have lost any permanent teeth. For adults, the CHMS findings greatly contrast with those of the last nation-wide survey, conducted in 1970–72 by Nutrition Canada. That survey found that 23.6% of adults, aged 19 and older, were edentulous (had lost all their natural teeth) but now, only 6.4% of adult Canadians (20–79 years old) are edentulous. Over the 38 years between surveys, the prevalence of edentulism among Canadians has fallen to such an extent that the proportion seen among Nutrition Canada's 45-year-olds is now found only among those who are about 25 years older than that.

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However, Canadians do continue to lose teeth to disease. Among the dentate, 14.6% have retained fewer than 21 teeth, indicating a potentially insufficient dentition if it were not restored by bridges or dentures. 42.2% of older Canadians aged 60–79 years have fewer than 21 natural teeth.

The long term decline in the edentulous population parallels the widespread use of fluorides in Canada and improved access to dental care over the past decades.

Dental decay of the crown of the teeth has declined greatly but root caries is prevalent

For dental caries, Nutrition Canada found that between 74% and 93% of children had had a cavity, whereas CHMS found that fewer than 57% had had a cavity. Similarly among adolescents, the prevalence has fallen from 97% to 59%. For adults, the prevalence remains much the same (96%) but, on average, Canadian adults have had fewer teeth, 10.7, affected now compared to the 17.5 found in 1970–72. The lower severity is even more dramatic in children where the average count is 0.49 teeth affected compared to 6.0 DMFT in the Nutrition Canada survey.

One condition for which we have no historical record but prevalent among 20.3% of adults, is root caries, or the decay of tooth roots that have become exposed largely due to periodontal diseases. Nearly 30% of the disease remains untreated.

Since the 1970s, the decline in both the prevalence and severity of coronal caries among children parallels the findings in the United States and other developed countries (Burt BA 2005, pp. 236–237) and has been attributed to the increasingly widespread use of fluorides (Bratthall D 1996). The findings on adult coronal caries are consistent with the exposure to fluorides but the findings on root caries need to be explored in subsequent analyses.

Dental enamel fluorosis

According to Health Canada's expert panel on fluoride, dental fluorosis is the first sign of potential excess fluoride intake; and, that "... the end-point of concern for fluoride (intake) is still considered to be 'moderate dental fluorosis,' (and) ... that this should not be considered a toxicological endpoint, but that this endpoint is significant because it correlates with cosmetic problems...". From the CHMS, we find that so few Canadian children have moderate or severe dental fluorosis that, even combining the categories, the prevalence is too low to allow reporting. 59.8% of the children have teeth with no signs of fluorosis and another 23.5% are identified as questionable.

The CHMS used the criteria of Dean's 1942 Index (Dean 1942) to classify the severity of dental enamel fluorosis based, in part, on the Expert Panel (Fluoride Expert Panel 2007) having defined the severity of "fluorosis of aesthetic concern" using Dean's Index. The examiners were recalibrated on its use at the initial training session and then at the start of each new location so these findings are valid. Although this cannot be tested from the data in this survey, it may well be the case that parents are taking to heart the recommendations relating to children and use of fluoridated toothpaste.

Periodontal health among the dentate

The extent of loss of attachment (LOA) of the periodontal structures from around the teeth is accepted as the true measure of periodontal disease. These measurements vary from 0–1 mm for those who have had virtually no disease, to greater than 6 mm of attachment loss for those who have experienced severe disease. The dentist-examiners measured the loss of attachment on 10 indicator teeth and we computed the findings to produce individual scores. 79.1% of dentate adults have good periodontal health (LOA = 0–3 mm) and 6.0% have had severe disease. Prevalence of good periodontal health is significantly higher among the youngest (93.3%) age group compared with the middle (74.1%) and oldest (53.4%) age groups. Good health tends to be somewhat higher among females (80.6%) compared to males (77.7%), but no characteristic other than age appears to determine good periodontal health.

Severe disease is significantly higher amongst the oldest age group (14.8%), those with lower incomes (9.0%), and those born outside Canada (12.4%). Additionally, severe disease tends to be more prevalent (>2% higher than the national average of 6.0%) among those with no insurance. No other factor appears to influence the prevalence of severe disease.

The mean loss of attachment (LOA) on the indicator teeth was also calculated. For the dentate population with at least 4 mm of LOA somewhere, mean attachment loss is 5.2 mm with the mean score among the non-insured being 5.5 mm and 5.8 mm among those born outside Canada.

Relatively good periodontal conditions in Canada are consistent with the finding that among the two older dentate adult groups, over 70% claim to brush at least two times per day (Table 13), 35–40% floss at least five times per week (Table 14), about 70% visit at least once per year for check-ups or treatment (Table 10), and between 77% and 88% do not smoke (Table 1). Further analysis should be conducted to identify whether all of these, or other factors are associated with less disease.

Inequalities in oral health and access to care are evident

Lower income families and those with no insurance report not obtaining care in the order of 3–4 times more than those with higher incomes or private insurance. The highest proportion of private insurance coverage (78.2%) is found among the most affluent group. Private insurance coverage falls to 38.6% among the older adults – consistent with the loss of employee benefits after retirement. Indeed, 53.2% of the oldest age group has no insurance at all, surpassed only by the edentulous (61.2%). Thus, higher income and private insurance coverage are very much related – higher income families are nearly four times as likely to have private insurance compared to no insurance or public insurance. Poorer families are two times more likely to have no insurance or public insurance and for most adults, public insurance is most likely a limited social service (welfare) benefit. Accordingly, the following discussion uses family incomes to discuss inequalities, keeping in mind that higher family income usually means private insurance coverage.

While not employing formal statistical analysis, a review of the tables shows that Canadians from lower income families often have worse health outcomes compared to those with higher incomes. While by no means the complete list, Canadians from lower income families have worse oral health outcomes as measured by:

- persistent pain; and
- having (all) 28 or fewer than 21 teeth.

Over and above these, Canadians from lower income families have almost two times or greater worse outcomes as measured by:

- self-reported fair or poor oral health;
- DMFT among adolescents;
- ratio of decayed teeth to total DMFT among adolescents and adults;
- edentulism;
- both the number of decayed (i.e., unfilled) and missing (due to disease) teeth;
- prevalence of untreated coronal and root caries;
- highest debris and calculus scores;
- severe attachment loss (≥ 6 mm); and
- having 1 or more soft tissue lesions.

Some of these inequalities may arise from their comparatively lower access to and receipt of professional care. Compared to the higher income group, lower income Canadians in this survey have significantly:

- lower rates of visiting within the last 12 months;
- lower rates of visiting annually for check-ups or treatment;
- lower prevalence of sealant application (adolescents); and
- lower rates of receiving orthodontic treatment.

Again compared to higher income Canadians, lower income Canadians exhibit more than a three-fold difference between themselves and higher income Canadians on measures of:

- avoiding visits to the dentist because of costs; and
- declining recommended care because of costs.

All of these are consistent with the observation that more lower income dentate Canadians (46.6%) need 1 or more types of treatment compared to 25.6% of those with higher incomes. Income has long been recognized as a strong determinant of health (Health Canada 1999).

Great opportunities exist for further exploration of these data

The database of the full CHMS is available to researchers across Canada. It provides a rich data source that begs further analysis to identify both the potential risk factors not examined in this descriptive analysis and the strength of all relevant determinants and risk factors. Further analyses also may now be conducted to examine the associations of oral conditions with major health concerns such as nutrition and diseases such as diabetes. With the blood and urine assays, further analyses of the full CHMS database can examine the relationship of dental conditions or therapies and exposure to environmental contaminants, e.g., mercury and Bisphenol A. These results can also be compared to the findings of surveys on the oral health of First Nations and Inuit people that are underway at the time of this writing. Future surveys using the standardized protocol developed for this study should include those not targeted in this cycle of the CHMS, for example, preschool children, the elderly and the homeless.

Conclusion

The oral health component of the CHMS survey is the result of strong co-operation between three departments of the Government of Canada: Statistics Canada, Health Canada, and the Department of National Defence. Statistics Canada developed the survey design, supplied the large trailers, conducted the sampling and recruitment, developed the data entry system and supplied the analyst to program the system to extract the findings from the raw data. Health Canada funded the development of the oral health survey questions and clinical examination protocol and provided the training and ongoing calibration for the examiners. The Canadian Forces supplied the dentists to conduct the examinations.

The oral health module of the Canadian Health Measures Survey has provided extensive data on the oral health of Canadians aged 6–79 years. This information will guide workforce training, dental public health program planning and public policy development for the next several years. As shown in several tables, oral conditions appear to be strongly associated with determinants of health such as age, income, country of birth, as well as with risk factors such as smoking and regular visiting for care. Further analyses may now be conducted to examine the associations of oral conditions with major health concerns such as nutrition and diseases such as diabetes. With the blood and urine assays, further analyses can also examine the relationship of dental conditions and exposure to environmental contaminants, e.g., mercury and Bisphenol A. The survey also provides a platform from which to explore policy options such as the need for achieving improved access to care and improved oral health.

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Glossary

Adapted from:

Slade GD, Spencer AJ, Roberts-Thomson KF. 2007. "Australia's dental generations: the national survey of adult oral health 2004–06." Australian Institute of Health and Welfare. Dental Statistics and Research Series No. 34. Canberra.

95% confidence interval Defines the uncertainty around an estimated value. There is a 95% probability that the true value falls within the range of the upper and lower limits.

Absolute difference The difference between two values calculated by subtracting one value from the other.

Attachment loss or loss of attachment (LOA) is the distance (in millimetres) from where the enamel of the tooth meets the root to the bottom of the pocket between the gum tissue and the tooth.

Birth cohort A group of people born during a particular period or year.

Calculus Hard deposit of mineralized material adhering to the tooth surface.

Calibration A procedure to promote standardization between examiners performing the oral examinations.

Cemento-enamel junction Point on a tooth surface where the tooth crown joins the tooth root.

Complete tooth loss Loss of all natural teeth (also referred to as edentulism).

Coronal Pertaining to the crown of a tooth.

Crown The portion of tooth covered by white enamel that usually is visible in the mouth.

Dental caries The process in which tooth structure is destroyed by acid produced by bacteria in the mouth. *See dental decay.*

Dental caries experience The cumulative effect of the caries process through a person's lifetime, manifesting as teeth that are decayed, missing or filled.

Dental decay Cavity resulting from dental caries.

Dental Enamel Fluorosis Discolouration or pitting of the dental enamel caused by exposure to excessive amounts of fluoride during enamel formation.

Dental insurance Universal dental care is not included in Canada's provincial and territorial publicly-funded "medicare" programs, and many employers have elected to include private dental insurance as a benefit to employees and their dependents. Publicly funded dental care is limited to First Nations people, to the elderly in the Territories and Alberta and to children in Quebec and three Atlantic provinces and to those receiving social (welfare) services.

Dental visiting Behaviour related to the use of dental services.

Dentate Having 1 or more natural teeth.

Dentition The set of teeth. A complete dentition comprises 28 adult teeth with some people having an additional 4 "wisdom" teeth.

Denture A removable dental prosthesis that substitutes for missing natural teeth and adjacent tissues.

Determinant of health A characteristic that influences the health of people but usually is difficult for the individual to change; for example, air pollution, exposure to lead in paint, or socio-economic status.

dmft (lower case letters) An index of dental caries experience measured by counting the number of decayed (d), missing (m), and filled (f) *baby* (primary or deciduous) teeth (T).

DMFT (upper case letters) An index of dental caries experience measured by counting the number of decayed (D), missing (M), and filled (F) *adult* (or permanent) teeth (T).

Edentulous A state of complete loss of all natural teeth.

Enamel Hard white mineralized tissue covering the crown of a tooth.

Epidemiology The study of the distribution and causes of health and disease in populations.

Examination protocol Methods and guidelines for conducting standardized oral examinations conducted in a survey.

Extraction Removal of a natural tooth.

Fluoride A naturally occurring trace mineral that helps to prevent tooth decay.

Gingiva Gum tissue.

Gingivitis Redness, swelling or bleeding of the gums caused by inflammation.

Incisor One of eight front teeth used during eating for cutting food.

OA *See Attachment loss.*

Mandible Lower jaw.

Maxilla Upper jaw.

Mean The arithmetic average of a set of values.

Natural teeth Refers to a person's own teeth as opposed to artificial teeth.

Orofacial pain Pain located in the face, jaw, temple, in front of the ear or in the ear.

Periodontal disease Disease of the gums and other tissues that attach to and anchor teeth to the jaws.

Periodontal pocket A space below the gum line that exists between the root of a tooth and the gum surrounding that tooth.

Periodontal recession The shrinkage of gum tissue away from the tooth resulting in exposure of dental roots and creating the appearance of longer teeth and increased exposure for root caries to occur.

Periodontitis Disease of the gums caused by bacteria, characterized by swelling and bleeding of the gums and loss of tissue that attaches the tooth to the jaw.

Permanent teeth Adult teeth.

Plaque A film composed of bacteria and food debris that adheres to the tooth surface.

Prevalence The proportion of people with a defined disease within a defined population.

Probing pocket depth The measured depth of the periodontal pocket.

Recorder A person, who recorded the results of an oral examination onto a computer.

Response rate The proportion of people from whom survey information is collected among the total number of people selected as intended study participants.

Restoration A filling to repair a tooth damaged by decay or injury.

Risk factor for health A characteristic, often a behaviour, that reduces health that can be changed by the individual, for example, smoking, seat-belt use, tooth cleaning, obesity.

Root That part of the tooth below the crown which is anchored to the jaw.

Root caries Dental caries that attacks the surface of the root of a tooth which has become exposed due to periodontal recession.

Root surface The surface of the root of a tooth.

Socioeconomic determinants Descriptive term for position in society, usually measured by attributes such as income, education.

Statistical significance An indication from a statistical test that an observed association is unlikely (usually less than 5% probability) to be due to chance created when a random sample of people is selected from a population.

Trend The general direction in which change over time is observed.

Weights Numbers applied to groups of study participants to correct for differences in probability of selection and in participation.

Wisdom tooth One of four molar teeth, each one positioned at the back of the mouth.

Appendices

Appendix 1
CHMS sites and oral examiners

CHMS Sites

There were 15 CHMS sites each of approximately 6 weeks in duration:

Atlantic – 1 site
Moncton

Quebec – 4 sites
Maurice, Montreal centre, Montreal south, Quebec City

Ontario – 6 sites
Clarington, Cobourg, Kitchener, North York, St Catharines, Toronto east

Alberta – 2 sites
Edmonton, Red Deer

British Columbia – 2 sites
Quesnel/Williams Lake, Vancouver

CHMS Oral Health Module Examiners

Captain Barbara Brigidear (2 sites)
Captain Ian Buckley (2 sites)
Captain Benoit Charette (3 sites)
Captain Mehmet Danis (4 sites)
Captain Theodorus T Emons (3 sites)
Captain Erin Hennessy (1 site)
Captain David Lee (1 site)
Captain Sean McIntosh (2sites)
Captain Francis Maillé (4 sites)
Captain Greg Olivieri (2 sites)
Captain Iwona Rusiecka (4 sites)
Captain Louis Roy (3 sites)

Appendix 2
Canadian Health Measures Survey Oral Health Steering Committee

Dr. Harry Ames
Assistant Chief Dental Officer
Office of the Chief Dental Officer, Health Canada
Ottawa, Ontario

Colonel Scott Becker
Director Dental Services, Canadian Forces
Ottawa, Ontario

Dr. Jean-Marc Brodeur /
Dr. Chantal Galarneau
Professeur, Département de
médecine sociale et préventive/
Dentiste-conseil, Institut national
de santé publique du Québec
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Dr. Peter Cooney
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Office of the Chief Dental Officer, Health Canada
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Ms. Amanda Gillis
Policy Advisor
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Dr. Malcolm Williamson /
Dr. Ron Kelly / Dr. Sandra Bennett
Ottawa/Victoria/Toronto
Federal Provincial Territorial Dental Working Group

Dr. James Leake
Professor Emeritus, University of Toronto
Kingston, Ontario

Dr. Patricia Main
Chair, Federal Dental Care Advisory Committee
Toronto, Ontario

Dr. Euan Swan
Manager Dental Programs, Canadian Dental Association
Ottawa, Ontario

Ms. Andrea Richard
Dental Hygienist
Canadian Association of Public Health Dentistry
Thunder Bay, Ontario

Dr. Gordon Thompson
Canadian Dental Regulatory Authorities Federation
Edmonton, Alberta

Appendix 3
Variable definitions; selected characteristics

Sex: Male versus Female

Age group: grouped according to the CHMS sampling plan: 6–11, 12–19, 20–39, 40–59, 60–79. Age was measured at both the household interview and the clinic visit. For this report, age was defined based on the clinic visit except for individuals who turned 80 years old between their household interview and their clinic visit.

Income: Lower versus middle versus higher

Lower income
- Less than middle group

Middle income
- $30,000–$59,999 for 1 or 2 individuals
- $40,000–$79,999 for 3 or 4 members
- $60,000– $79,999 for 5 or more family members

Higher income
- More than the middle group

Missing income
- Also included because more than 5% of population did not have information on income

Insurance status: Private versus public versus none

Private insurance
- Answered yes to if they had insurance (OHM_Q43) and answered 1 (employee-sponsored) or 3 (private) to what type of plan (OHM_Q44)

Public insurance
- Answered yes to if they had insurance (OHM_Q43) and answered 2 (provincial program), 4 (government program so social services clients) or 5 (government program for First Nations or Inuit) to what type of plan (OHM_Q44)

None
- Answered No to the question on if they had insurance (OHM_Q34)

Visiting a dental professional in the past year

Visited in past year
- Answered 1 (less than 1 year ago) to question on when the last time they saw a dental professional (OHM_Q34)

More than one year ago
- Answered 2–6 on OHM_Q34

Highest Household Education: College diploma/University degree versus less than a diploma/degree

Defined based on derived variable EDUDH04

Post-secondary degree/diploma
- Includes those who reported having a trades certificate or diploma, a diploma/certificate from college or CEGEP, a university certificate below a bachelor's level, a bachelor's degree, a university degree or certificate above the bachelor's level

Less than a post-secondary degree/diploma
- Includes those who reported having less than a secondary school diploma, a secondary school graduation with no post-secondary education, and those with some post-secondary education

Born in Canada: Born in Canada versus born outside of Canada

Born in Canada
- Answered 1 (Canada) to question in what country were you born (SDC_Q11)

Born outside Canada
- Answered 2–20 to question SDC_Q11

Aboriginal status: Aboriginal versus Non-Aboriginal

Aboriginal
- Answered 1 (yes) to question are you an Aboriginal person (SDC_Q22)

Non-Aboriginal
- Answered 2 (No) to SDC_Q22

Smoking status: Current smoker versus past smoker versus non-smoker

Defined based on the derived variable SMKDSTY

Current smoker
- Includes those who reported being a current daily smoker, an occasional smoker (former daily smoker), or an occasional smoker (never a daily smoker)

Past smoker
- Includes those who reported being a non-smoker (former daily smoker) or a non-smoker (former occasional smoker)

Non-smoker

- Includes those who reported they never smoked (at least 100 cigarettes in their lifetime)

Dentate status: Dentate versus edentulous

Dentate

- Dental status of respondent of 1–3 on OHE_N11 (dentate – both arches, upper arch only and lower arch only)

Edentulous

- Dental status of respondent of 4–5 on OHE_N11 (edentulous with 1 or more implants and edentulous)

Tables (General)

- Frequencies always defined according to response
- Those with missing values (don't know, refusal, not applicable) set to missing (so not included in proportions)
- Tables for 6–11 and 12–19-year-olds – no need to specify dentate only because none were edentulous

Tables (Specific)

Table 1

- Bootstrapped frequencies of demographic variables

Table 2

- Prevalence of insurance status: private versus public versus none, based on categories described above

Table 3

- Prevalence of self-reported fair or poor oral health: respondents who answered 4 (fair) or 5 (poor) response to OHM_Q11 – self-reported health of mouth

Table 4

- Prevalence of persons reporting avoiding foods: respondents who answered 1 (often) or 2 (sometimes) to OHM_Q22 – how often have you avoided eating particular foods because of mouth problems

Table 5

- Prevalence of persons reporting persistent pain: respondents who answered 1 (often) or 2 (sometimes) to OHM_Q23 – how often have you had any other persistent or ongoing pain anywhere in your mouth

Table 6

- Prevalence of persons reporting time lost from normal activities work or school: respondents who answered 1 (yes) to OHM_Q24 – have you taken time away from work or school for dental check-ups, etc.

Table 7

- Mean number of hours per person lost from normal activities work or school activities due to check-ups or problems with teeth: OHM_Q25 – how many hours were you away from your normal activities; only applicable to respondents who answered 1 (yes) to OHM_Q24

Table 8

- Total number of mean hours lost from normal activities, work or school activities due to check-ups or problems with teeth: computed estimates of weighted totals and their confidence intervals, presented as "per 1,000 hours" for ease of interpretation

Table 9

- Percent of persons reporting having visited within the last year (for any reason): respondents who answered 1 (less than 1 year ago) to question on when the last time they saw a dental professional (OHM_Q34)

Table 10

- Percent of persons reporting visiting at least once per year for check-ups or treatment: (respondents who answered 1 (more than once per year) or 2 (about once a year) to question on how often they usually see a dental professional (OHM_Q33)

Table 11

- Percent of persons avoiding visiting dental professional because of costs: respondents who answered 1 (yes) to question on in past 12 months, have you avoided going to a dental professional because of the cost of dental care (OHM_Q41)

Table 12

- Percent of persons reporting declining recommended care because of costs: respondents who answered 1 (yes) to question on in past 12 months, have you avoided having all the dental treatment that was recommended because of the cost (OHM_Q42)

Table 13

- Percent of persons brushing 2 or more times per day: based on OHM_Q31 and OHM_N31; respondents who answered 2+ on how often they usually brush their teeth and 1 (per day) for reporting period OR respondents who answered 14+ on how often they usually brush their teeth and 2 (per week) for reporting period
- Dentate only

Table 14

- Percent of persons flossing at least 5 times per week: based on OHM_Q32 and OHM_N32; respondents who answered 1+ on how often they usually floss their teeth and 1 (per day) for reporting period OR respondents who answered 5+ on how often they usually floss their teeth and 2 (per week) for reporting period; respondents with a 6 (full set of dentures) were considered missing/N/As
- Dentate only

Table 15

- Ages 6–11
- Prevalence and severity of dental caries in primary teeth: based on OHE_N41 codes for primary teeth: 51–55, 61–65, 71–75, 81–85
- Decayed: codes 7–10; Missing: codes 5+19; Filled: codes 12–17
- dmft – sum of teeth with codes listed above

Table 16

- Ages 6–11
- Prevalence and severity of dental caries in permanent teeth: based on OHE_N41 codes for adult crowns: 11–17, 21–27, 31–37, 41–47
- Decayed: codes 7–10; Missing: codes 5+19; Filled: codes 12–17
- DMFT – sum of teeth with codes listed above

Table 17

- Ages 6–11
- Prevalence and severity of dental caries in primary and permanent teeth: based on OHE_N41 codes for baby teeth and adult crowns: 51–55, 61–65, 71–75, 81–85, 11–17, 21–27, 31–37, 41–47
- Decayed: codes 7–10; Missing: codes 5+19; Filled: codes 12–17; – summed those from Tables 1 and 2
- DMFT – sum of teeth with codes listed above

Table 18

- Ages 6–11
- Percent of Carious Teeth Decayed and Filled: based on OHE_N41 codes for baby teeth and adult crowns
- Proportion of dt/dmft, etc. calculated as a ratio of weighted sums
- Decayed: codes 7–10; Missing: codes 5+19; Filled: codes 12–17; – summed those from Tables 15, 16, and 17

Table 19

- Ages 6–11
- Sealants: based on OHE_N41 codes for adult molars: 16–17, 26–27, 36–37, 46–47
- Sealed: code 2

Table 20

- Ages 6–11
- Trauma: based on OHE_N41 & N43 codes for adult incisors: 11–12, 21–22, 31–32, 41–42
- Lost: (OHE_N41) code 4; Fractured (OHE_N43) codes 2–6, 8; Lost or fractured: sum of pervious codes

Table 21

- Ages 12–19
- Prevalence and severity of dental caries in permanent teeth: based on OHE_N41 codes for adult crowns: 11–17, 21–27, 31–37, 41–47
- Decayed: codes 7–10; Missing: codes 5+19; Filled: codes 12–17
- DMFT – sum of teeth with codes listed above
- Same as Table 16 but different age group

Table 22

- Ages 12–19
- Percent of Carious Teeth Decayed and Filled: based on OHE_N41 codes for adult crowns
- Proportion of DT/DMFT, etc., calculated as a ratio of weighted sums
- Decayed: codes 7–10; Missing: codes 5+19; Filled: codes 12–17; – permanent teeth summed from previous table
- Same as Table 18 but different age group

Table 23

- Ages 12–19
- Sealants: based on OHE_N41 codes for adult molars: 16–17, 26–27, 36–37, 46–47
- Sealed: code 2
- Same as Table 19 but different age group

Table 24

- Ages 12–19
- Trauma: based on OHE_N41 & N43 codes for adult incisors: 11–12, 21–22, 31–32, 41–42
- Lost: (OHE_N41) code 4; Fractured (OHE_N43) codes 2–6, 8; Lost or fractured: sum of previous codes
- Same as Table 20 but different age group

Table 25

- Ages 20+
- Column for percent edentulous includes those classified as edentulous with 1 or more implants (OHE_N11=4+5)
- Dentate only columns include subjects with OHE_N11=1–3
- Number of teeth calculated based on OHE_N41 codes for adult crowns; (teeth 11–17, 21–27, 31–37, 41–47) codes=1, 2, 7–10, 12–18, 20, 21

Table 26

- Edentulous only (OHE_N11=4+5); Ages 20+
- Column for edentulous with 1 or more implant (prevalence of OHE_N11=4)
- Upper arch only: OHE_12F=1 (yes to full denture on upper arch) and OHE_13F=2 (no full denture on lower arch)
- Lower arch only: OHE_12F=2 (no full denture on upper arch) and OHE_13F=1 (yes to full denture on lower arch)
- Both upper and lower arches: OHE_12F=1 (full denture on upper arch) and OHE_13F=1 (full denture on lower arch)
- Neither is OHE_12F=2 and OHE_13F=2

Table 27

- Dentate only (OHE_N11=1–3); Ages 20+
- Column for dentate with at least one implant: based on OHE_N41 codes for adult crowns; teeth 11–17, 21–27, 31–37, 41–47; code=19
- Upper arch only: YES to OHE_12 = 2 (fixed bridge), or 4 (partial denture – acrylic) or 5 (partial denture – cast chrome) and NO to OHE_13= 2 (fixed bridge) and 4 (partial denture – acrylic) and 5 (partial denture – cast chrome)
- Lower arch only: NO to OHE_12 = 2 (fixed bridge), and 4 (partial denture – acrylic) and 5 (partial denture – cast chrome) and YES to OHE_13= 2 (fixed bridge) or 4 (partial denture – acrylic) or 5 (partial denture – cast chrome)
- Both upper and lower arches: YES to OHE_12 = 2 (fixed bridge), or 4 (partial denture – acrylic) or 5 (partial denture – cast chrome) and YES to OHE_13= 2 (fixed bridge) or 4 (partial denture – acrylic) or 5 (partial denture – cast chrome)
- (Neither is NO to OHE_12 =2, 4, 5 and NO to OHE_13=2, 4, 5)

Table 28

- Dentate only (OHE_N11=1–3); Ages 20+
- Prevalence and severity of dental caries in permanent teeth: based on OHE_N41 codes for adult crowns: 11–17, 21–27, 31–37, 41–47
- Decayed: codes 7–10; Missing: codes 5+19; Filled: codes 12–17
- DMFT – sum of teeth with codes listed above
- Same as Tables 15 and 21 but different age group

Table 29

- Dentate only (OHE_N11=1–3); Ages 20+
- Percent of DMFT: based on OHE_N41 codes for adult crowns
- Proportion of DT/DMFT, etc. calculated as a ratio of weighted sums
- Teeth summed from previous table
- Similar to Table 18 but different age group

Table 30

- Dentate only (OHE_N11=1–3); Ages 20+
- Prevalence of untreated decay: based on OHE_N41 codes for adult crowns and roots: 11–17, 21–27, 31–37, 41–47
- Untreated coronal caries: codes 7–10; Untreated root caries: codes 7+11

Table 31

- Dentate only (OHE_N11=1–3); Ages 20+
- Prevalence and severity of root caries: based on OHE_N41 codes for adult roots: 11–17, 21–27, 31–37, 41–47
- RDF: codes 7, 11–17; Root decayed: codes 7+11; Root filled: codes 12–17

Table 32

- Dentate only (OHE_N11=1–3); Ages 20+
- Prevalence of RDFT: based on OHE_N41 codes for adult roots: 11–17, 21–27, 31–37, 41–47
- Proportion of rdt/rdft, etc. calculated as a ratio of weighted sums
- Numbers summed from previous table

Table 33

- Dentate only (OHE_N11=1–3); Ages 20+
- Debris: based on OHE_32D1–D6; responses subtract 1 for a scale of 0–4; those with code 5 were teeth missing so set to missing
- Calculus: based on OHE_32C1-C6; responses subtract 1 for a scale of 0–4; those with code 5 (in debris) were teeth missing so set to missing
- Took highest score at any site

Table 34

- Dentate only (OHE_N11=1–3); Ages 20+
- Gingivitis: based on OHE_31D1-D6; responses subtract 1 for a scale of 0–4; those with code 5 were teeth missing so set to missing
- Took highest score at any site

Table 35

- Dentate only (OHE_N11=1–3); Ages 20+
- Periodontal pockets: based on OHE_32P1-P6
- Took highest score at any site

Table 36

- Dentate only (OHE_N11=1–3); Ages 20+
- Attachment loss: based on OHE_32R1-R6
- Took highest score at any site

Table 37

- Dentate only (OHE_N11=1–3); Ages 20+
- CPITN score: based on OHE_32 responses
- Took highest scores at any site
- CPITN=4: those with probing scores > 5 mm
- CPITN=3: those with probing scores 4–5 mm
- CPITN=2: those with calculus scores > 0 (after subtracting 1 from the score)
- CPITN=1: those with gingivitis scores > 0 (after subtracting 1 from the score)
- Mutually exclusive

Table 38

- Dentate only (OHE_N11=1–3); Ages 20+
- Trauma: based on OHE_N41 and N43 codes for adult incisors: 11–12, 21–22, 31–32, 41–42
- Lost: (OHE_N41) code 4; Fractured (OHE_N43) codes 2–6, 8; Lost or fractured: sum of previous codes
- Same as Tables 20 and 24 but different age group

Table 39

- Ages 6–12
- Fluorosis: (based on OHE_N20); scale 1–6
- Responses subtract 1 for a scale of 0–5; those with code 7 were teeth missing so set to missing

Table 40

- Ages 20+
- Prevalence of soft tissue lesions: based on OHE_N14
- None versus one+ based on yes/no of OHE_N14=1

Table 41

- Ages 12–59
- Prevalence of less than acceptable occlusal conditions
- Based on OHE_N21=1 (acceptable occlusion=1 (yes), therefore less than acceptable is=2 (no))
- Only asked of individuals with OHE_N11=1

Table 42

- Prevalence of receiving orthodontic treatments currently or in the past
- Based on OHE_N23=1 and OHE_N22=2–5
- OHE_N23 did not ask individuals who responded OHE_N22=2–5 (currently receiving ortho treatment)

Table 43

- Dentate only (OHE_N11=1–3)
- Prevalence of requiring a need
- Urgent: based on yes to OHE_N61–OHE_N68
- Surgery: OHE_N53=5
- Endodontics: OHE_N53=8
- Restorations: OHE_N53=3
- Prosthodontics: OHE_N51=2–6 or OHE_N52=2–6
- Periodontics: OHE_N53=6
- Orthodontics: OHE_N53=9
- Miscellaneous: OHE_N53=4, 7, 10, 11
- No treatment needed: OHE_N53=1
- Mutually exclusive

TABLE 1 Sample sizes with both household interview and clinical examination in the CHMS oral health module

Characteristic	Age group																	
	Children 6–11 years			Adolescents 12–19 years			Young adults 20–39 years			Adults 40–59 years			Older adults 60–79 years			Ages 6–79 years		
	n	wtd n ('000s)	%	n	wtd n ('000s)	%	n	wtd n ('000s)	%	n	wtd n ('000s)	%	n	wtd n ('000s)	%	n	wtd n ('000s)	%
All	1,070	2,160.4	7.4	1,008	3,317.2	11.4	1,182	9,012.2	30.9	1,233	9,752.0	33.4	1,093	4,915.7	16.9	5,586	29,157.5	100.0
Female	530	1,061.9	49.2	496	1,609.7	48.5	659	4,471.9	49.6	652	4,908.2	50.3	549	2,568.1	52.2	2,886	14,619.7	50.1
Male	540	1,098.5	50.8	512	1,707.5	51.5	523	4,540.2	50.4	581	4,843.9	49.7	544	2,347.7	47.8	2,700	14,537.8	49.9
Higher income	488	972.1	45.0	424	1,372.3	41.4	485	3,802.4	42.2	636	5,408.7	55.5	310	1,471.5	29.9	2,343	13,027.0	44.7
Middle income	286	558.7	25.9	268	832.9	25.1	360	2,892.4	32.1	353	2,507.8	25.7	418	1,881.4	38.3	1,685	8,673.2	29.7
Lower income	266	565.7	26.2	187	634.3	19.1	274	1,713.3	19.0	204	1,499.6	15.4	283	1,103.8	22.5	1,214	5,516.7	18.9
Income missing	30	63.9	3.0	129	477.7	14.4	63	604.1	6.7	40	335.9	3.4 E	82	459.0	9.3	344	1,940.6	6.7
Privately insured	704	1,434.9	67.0	663	2,314.2	71.4	786	5,966.6	66.7	807	6,536.1	67.1	413	1,892.7	38.6	3,373	18,144.5	62.6
Publicly insured	139	251.3	11.7 E	56	202.1	6.2 E	51	313.0	3.5 E	51	417.9	4.3 E	83	402.7	8.2 E	380	1,586.9	5.5
Not insured	220	456.4	21.3	259	723.7	22.3	337	2,671.4	29.8	373	2,784.1	28.6	594	2,609.6	53.2	1,783	9,245.2	31.9
Visited a dental professional in the last year	963	1,923.9	91.0	842	2,721.5	84.0	779	5,908.5	67.8	913	7,302.3	76.7	691	3,159.5	68.4	4,188	21,015.7	74.5
Visited a dental professional more than one year ago	83	189.2	9.0	144	519.8	16.0	363	2,810.2	32.2	286	2,214.6	23.3	323	1,459.1	31.6	1,199	7,192.8	25.5
Highest Household Education = degree/diploma	863	1,718.9	81.8	762	2,375.6	75.4	937	7,205.6	81.8	922	7,102.3	75.6	680	2,944.8	63.3	4,164	21,347.1	76.0
Highest Household Education < degree/diploma	182	383.1	18.2	215	776.1	24.6	224	1,598.9	18.2	279	2,289.2	24.4	379	1,706.7	36.7	1,279	6,754.0	24.0
Born in Canada	972	1,991.8	92.2	903	2,965.8	89.4	939	6,986.3	77.5	956	7,391.0	75.8	791	3,558.5	72.4	4,561	22,893.5	78.5
Born outside Canada	98	…	F	105	351.4	10.6 E	243	2,025.8	22.5 E	276	2,358.9	24.2 E	302	1,357.2	27.6 E	1,024	6,261.8	21.5 E
Non-Aboriginal	1,033	2,062.4	95.8	970	3,126.8	94.4	1,144	8,752.0	97.2	1,199	9,442.8	96.9	1,082	4,841.5	98.5	5,428	28,225.4	96.9
Aboriginal	36	91.0	4.2	37	184.4	5.6 E	36	…	F	32	299.8	3.1	11	…	F	152	903.5	3.1 E
Never smoked	Not applicable			872	2,829.3	85.8	651	5,106.8	56.7	547	4,103.6	42.1	469	2,138.5	43.7	2,539	14,178.1	52.6
Past smoker				24	81.8	2.5 E	226	1,648.4	18.3	409	3,373.8	34.6	492	2,196.9	44.9	1,151	7,300.9	27.1
Current smoker				103	388.0	11.8 E	303	2,253.0	25.0	275	2,262.5	23.2	127	562.1	11.5	808	5,465.6	20.3
Dentate	1,070	2,160.4	100.0	1,008	3,317.2	100.0		…		1,182	9,326.9	95.6	846	3,850.0	78.3	5,284	27,644.3	94.8
Edentulous	0	0	0.0	0	0	0.0		…	F	51	425.1	4.4 E	247	1,065.8	21.7	302	1,513.1	5.2

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 2 Prevalence of dental insurance by type and selected characteristics

Characteristic	Privately insured		Publicly insured		No insurance	
	%	95% CI	%	95% CI	%	95% CI
All	62.6	57.6–67.4	5.5	4.5–6.7	31.9	27.4–36.8
Female	61.9	56.2–67.2	6.0	4.8–7.5	32.1	27.7–36.9
Male	63.4	58.2–68.3	5.0 E	3.4–7.2	31.7	26.6–37.2
Age 6–11	67.0	60.9–72.5	11.7 E	8.2–16.5	21.3	16.6–27.0
Age 12–19	71.4	64.5–77.5	6.2 E	3.7–10.3	22.3	17.4–28.2
Age 20–39	66.7	60.5–72.3	3.5 E	2.5–4.9	29.8	24.7–35.6
Age 40–59	67.1	60.3–73.3	4.3 E	2.9–6.4	28.6	22.8–35.1
Age 60–79	38.6	31.5–46.2	8.2 E	5.3–12.4	53.2	45.6–60.7
Higher income	78.2	73.1–82.5	2.0 E	1.4–3.0	19.8	15.5–24.9
Middle income	60.3	53.5–66.8	3.2 E	2.0–5.2	36.5	30.4–42.9
Lower income	32.5	28.1–37.2	17.7	14.8–21.0	49.8	46.0–53.6
Income missing	53.2	42.9–63.2	F	…	42.8	31.9–54.5
Highest Household Education= degree/diploma	67.7	62.8–72.3	3.6	2.9–4.5	28.6	24.1–33.7
Highest Household Education < degree/diploma	49.3	41.8–56.9	10.9	8.2–14.3	39.7	34.3–45.5
Born in Canada	64.0	58.3–69.3	5.9	4.8–7.3	30.1	25.1–35.6
Born outside Canada	57.6	49.8–65.1	3.8 E	2.6–5.7	38.6	31.4–46.2
Non-Aboriginal	63.2	58.0–68.1	4.4	3.4–5.8	32.4	27.8–37.3
Aboriginal	44.9 E	28.9–62.0	38.1	29.9–47.0	F	…
Never smoked	67.0	61.5–72.1	4.0	3.3–4.9	29.0	24.1–34.4
Past smoker	61.4	55.2–67.3	4.0	3.0–5.5	34.6	28.7–40.9
Current smoker	51.1	44.1–58.1	8.6 E	5.9–12.4	40.2	33.0–47.9
Dentate	64.5	59.6–69.1	5.2	4.2–6.5	30.3	26.0–35.0
Edentulous	28.8	20.5–38.8	10.0	7.5–13.1	61.2	50.5–71.0

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 3 Prevalence of self-reported fair or poor oral health because of problems with their oral health

Characteristic	Age group											
	Children 6–11 years		Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Older adults 60–79 years		Ages 6–79 years	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	8.2	6.1–10.9	11.4	8.4–15.2	17.4	14.8–20.2	17.4	15.0–20.2	14.2	12.4–16.3	15.5	13.8–17.4
Female	6.4	4.9–8.5	8.6	6.3–11.7	15.3	11.9–19.4	17.7	14.2–21.8	12.1	9.9–14.8	14.1	12.0–16.6
Male	9.9 E	6.8–14.3	13.9 E	9.9–19.4	19.4	15.0–24.7	17.2	13.9–21.1	16.5	13.4–20.2	16.8	14.6–19.3
Higher income	6.7 E	4.0–11.1	F	…	11.3 E	7.5–16.6	12.0	9.5–15.1	13.1	10.1–16.7	10.9	9.0–13.0
Middle income	6.9 E	4.8–9.8	16.5	12.4–21.7	17.8	13.6–23.1	19.1	13.7–25.9	13.7	10.5–17.7	16.5	13.8–19.5
Lower income	11.0 E	6.0–19.5	14.0 E	7.5–24.5	32.6	25.3–40.8	31.3	23.3–40.6	16.3	11.8–22.0	24.6	20.0–30.0
Income missing	F	…	F	…	F	…	31.1 E	15.4–52.7	F	…	16.2 E	11.4–22.5
Privately insured	6.6	5.2–8.3	10.5	8.0–13.7	14.1	11.1–17.8	14.8	12.9–16.9	9.9 E	6.6–14.6	12.9	11.6–14.3
Publicly insured	F	…	F	…	F	…	37.3	29.7–45.5	27.8 E	17.8–40.5	26.3	19.4–34.6
Not insured	F	…	F	…	23.3	17.4–30.5	20.6	14.8–27.8	15.1	12.7–17.9	18.6	15.3–22.5
Visited a dental professional in the last year	8.3	6.2–11.1	7.8	6.5–9.3	12.6 E	8.8–17.8	12.1	10.0–14.5	13.5	11.1–16.4	11.6	10.0–13.4
Visited a dental professional more than one year ago	F	…	26.1 E	15.7–40.1	23.9	17.9–31.0	34.8	27.5–42.9	16.6	12.7–21.5	25.5	21.0–30.7
Highest Household Education = degree/diploma	6.1	4.7–7.8	10.4 E	7.1–15.0	15.5	12.1–19.5	12.7	9.8–16.2	14.0	11.5–17.0	13.0	11.2–15.1
Highest Household Education < degree/diploma	F	…	14.8 E	8.7–24.0	21.9 E	15.0–30.9	29.0	23.1–35.8	13.6	10.3–17.9	21.1	17.4–25.4
Born in Canada	8.0	6.0–10.5	11.2	8.3–15.0	16.8	14.3–19.7	17.1	14.3–20.4	12.3	10.2–14.8	14.7	13.1–16.5
Born outside Canada	F	…	F	…	19.3	13.7–26.3	18.5 E	12.2–26.9	19.3	14.5–25.2	18.3	14.8–22.5
Non-Aboriginal	6.7	4.9–9.3	11.2	8.0–15.3	16.8	14.1–19.9	17.5	15.1–20.2	13.3	11.6–15.3	15.1	13.3–17.1
Aboriginal	F	…	F	…	F	…	F	…	F	…	28.0 E	18.2–40.6
Never smoked	Not applicable		11.1	8.2–14.9	11.3	8.3–15.2	12.8	9.8–16.6	11.8	9.3–14.8	11.8	10.1–13.7
Past smoker			F	…	21.1 E	13.5–31.6	16.0	12.1–20.9	14.2	11.1–18.0	16.6	13.3–20.6
Current smoker			12.7 E	6.6–22.9	28.3	22.0–35.5	27.5	19.7–37.1	24.2 E	16.6–33.8	26.4	21.1–32.5
Dentate	8.2	6.1–10.9	11.4	8.4–15.2	17.4	14.9–20.3	17.4	15.0–20.1	15.8	13.6–18.3	15.7	14.1–17.6
Edentulous	Not applicable		Not applicable		F	…	F	…	8.5 E	4.7–15.0	10.8 E	6.0–18.8

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 4 Prevalence of persons reporting avoiding foods because of problems with their mouth

Characteristic	Age group											
	Children 6–11 years		Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Older adults 60–79 years		Ages 6–79 years	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	7.6	6.2–9.3	12.5	9.6–16.3	13.5	11.3–16.1	11.7	8.7–15.5	12.7	10.1–15.7	12.2	11.2–13.3
Female	8.5	6.9–10.4	16.5 E	11.1–23.8	15.4	12.7–18.6	12.9	10.0–16.4	15.5	12.4–19.1	14.2	12.3–16.3
Male	6.7 E	4.5–10.1	8.8 E	5.7–13.4	11.6	8.6–15.6	10.4 E	5.6–18.6	9.6	7.1–12.9	10.2	8.0–12.9
Higher income	6.1	4.8–7.6	12.2	9.2–16.1	11.6 E	7.8–17.0	10.1 E	6.1–16.0	10.9 E	5.9–19.4	10.6	9.0–12.3
Middle income	9.9	7.5–12.9	13.6 E	9.6–18.9	16.2	12.6–20.6	13.5 E	9.2–19.4	13.7	11.2–16.6	14.2	12.8–15.8
Lower income	8.5 E	5.0–14.1	F	…	14.1	10.8–18.3	13.1 E	8.2–20.4	13.6	10.2–17.9	13.1	10.5–16.2
Income missing	F	…	F	…	F	…	F	…	F	…	11.8	8.6–15.9
Privately insured	8.2	6.9–9.6	12.6	9.7–16.1	12.4	9.2–16.5	9.7 E	6.6–14.0	9.7 E	6.8–13.8	10.8	9.3–12.5
Publicly insured	F	…	F	…	9.5 E	5.0–17.3	20.7 E	11.8–33.7	14.6 E	9.9–21.0	14.5	11.2–18.5
Not insured	5.9 E	3.5–9.7	11.7 E	6.3–20.6	16.1	11.6–22.0	15.1	11.0–20.4	14.4	11.2–18.4	14.5	11.9–17.5
Visited a dental professional in the last year	7.9	6.3–9.8	12.8	10.0–16.2	13.2 E	9.3–18.6	10.7 E	7.6–14.8	10.9	8.3–14.0	11.5	10.2–12.8
Visited a dental professional more than one year ago	F	…	F	…	13.7 E	9.4–19.6	15.4 E	9.4–24.1	15.3	12.9–18.0	13.9	11.0–17.5
Highest Household Education = degree/diploma	8.1	6.3–10.3	14.2	11.0–18.2	12.8	9.8–16.6	10.3 E	7.2–14.5	13.2	10.9–16.0	11.8	10.8–12.9
Highest Household Education < degree/diploma	6.4 E	4.0–10.2	7.2 E	3.9–12.8	16.6	12.4–21.9	16.0	11.7–21.5	10.5	7.7–14.3	13.2	11.0–15.7
Born in Canada	7.3	6.1–8.8	12.6	9.8–16.2	12.9	10.2–16.3	10.9	8.3–14.1	12.2	10.0–14.8	11.6	10.7–12.6
Born outside Canada	F	…	F	…	15.4	11.1–21.1	14.2 E	8.0–24.2	13.9 E	9.5–20.0	14.3	11.1–18.3
Non-Aboriginal	6.6	5.5–7.9	12.2	8.9–16.4	13.5	11.3–16.0	11.4	8.5–15.3	12.2	9.9–15.0	11.9	11.0–13.0
Aboriginal	F	…	F	…	F	…	F	…	F	…	20.6 E	12.8–31.4
Never smoked	Not applicable		13.4	10.1–17.7	11.5	8.6–15.4	6.2	5.0–7.6	11.2 E	8.0–15.6	10.3	9.2–11.5
Past smoker			F	…	15.0 E	9.0–24.0	15.9 E	9.6–25.0	13.9	11.2–17.1	15.1	12.6–18.1
Current smoker			F	…	16.8 E	11.9–23.2	15.5 E	10.3–22.6	13.8 E	9.3–20.0	15.1	12.2–18.5
Dentate	7.6	6.2–9.3	12.5	9.6–16.3	13.4	11.2–15.9	10.9	7.9–14.7	9.8	7.8–12.2	11.5	10.5–12.5
Edentulous	Not applicable		Not applicable		F	…	29.9 E	15.5–49.8	23.0	17.6–29.6	25.5	18.6–33.8

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 5 Prevalence of persons reporting persistent pain or ongoing pain anywhere in their mouth

Characteristic	Age group											
	Children 6–11 years		Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Older adults 60–79 years		Ages 6–79 years	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	5.4	4.4–6.8	10.4	7.8–13.7	14.6	12.8–16.7	12.7	9.7–16.5	7.4	6.2–8.6	11.6	10.4–12.9
Female	4.7 E	3.0–7.4	13.4 E	9.2–19.1	16.4	12.0–21.9	14.7	11.2–19.0	9.9	7.8–12.5	13.5	11.4–15.9
Male	6.1 E	4.2–8.9	7.6 E	5.2–10.8	13.0	10.2–16.3	10.7 E	6.5–17.3	4.6	3.4–6.0	9.7	7.5–12.5
Higher income	2.4 E	1.4–4.1	6.5 E	4.6–8.9	10.9	8.9–13.2	10.2	7.4–13.7	7.2 E	4.0–12.6	9.1	7.9–10.4
Middle income	F	…	9.2	6.8–12.3	16.5	13.9–19.5	13.2 E	8.2–20.5	7.8 E	5.1–11.9	12.2	10.4–14.2
Lower income	9.9 E	5.9–16.1	14.5 E	7.7–25.6	19.8	14.1–26.9	20.3 E	12.9–30.4	8.2	6.1–10.9	16.0	13.2–19.1
Income missing	F	…	F	…	F	…	F	…	F	…	13.6 E	8.8–20.4
Privately insured	3.4 E	2.3–5.0	8.3 E	5.7–12.0	13.5	10.6–17.1	10.6	8.2–13.6	5.5 E	3.6–8.3	10.2	8.7–11.9
Publicly insured	F	…	F	…	F	…	F	…	8.7 E	4.5–16.3	17.8	13.8–22.6
Not insured	F	…	14.7 E	8.9–23.4	16.1 E	10.2–24.5	15.7 E	10.5–22.7	8.3	6.6–10.5	13.2	10.5–16.5
Visited a dental professional in the last year	5.6	4.5–6.9	9.9	7.1–13.6	15.5	13.0–18.3	12.3	9.2–16.3	8.6	7.1–10.3	11.7	10.5–13.0
Visited a dental professional more than one year ago	F	…	10.1 E	5.6–17.4	13.7 E	8.7–21.0	14.3 E	8.8–22.4	4.3 E	2.5–7.3	11.5	8.5–15.4
Highest Household Education = degree/diploma	5.2	4.1–6.7	11.0 E	7.6–15.8	14.7	13.2–16.4	12.2	9.1–16.2	7.6	5.9–9.8	11.7	10.7–12.8
Highest Household Education < degree/diploma	F	…	9.0 E	5.6–14.2	15.9 E	9.9–24.5	16.2 E	11.1–22.9	5.4	4.1–7.1	12.0	9.4–15.1
Born in Canada	5.1	4.1–6.5	9.7	7.8–12.1	15.0	12.7–17.8	12.7	9.2–17.4	7.4	5.6–9.6	11.6	10.5–12.7
Born outside Canada	F	…	F	…	13.3 E	8.1–21.0	12.7 E	7.9–19.9	7.3	5.3–10.0	11.8 E	8.4–16.4
Non-Aboriginal	4.5	3.3–6.2	10.1	7.5–13.5	14.1	12.4–16.0	12.2	9.4–15.7	7.2	6.2–8.3	11.1	9.9–12.5
Aboriginal	F	…	F	…	F	…	F	…	F	…	26.8 E	18.2–37.5
Never smoked			10.2	7.4–13.9	12.0	9.3–15.4	8.1 E	5.6–11.7	6.9	5.1–9.4	9.8	8.2–11.5
Past smoker	Not applicable		F	…	14.4 E	9.5–21.3	16.0 E	11.2–22.4	7.4	5.4–10.0	13.1	11.0–15.6
Current smoker			F	…	20.7	15.5–27.1	16.2 E	10.1–24.9	9.1 E	4.9–16.4	16.9	14.1–20.0
Dentate	5.4	4.4–6.8	10.4	7.8–13.7	14.7	12.9–16.7	12.8	9.6–16.8	7.4	6.2–8.9	11.8	10.5–13.2
Edentulous	Not applicable		Not applicable		F	…	F	…	7.1 E	4.5–11.1	8.2 E	5.7–11.8

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 6 Prevalence of persons reporting time lost from normal activities, work or school activities in the past 12 months

Characteristic	Age group											
	Children 6–11 years		Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Older adults 60–79 years		Ages 6–79 years	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	45.7	41.4–50.0	49.5	45.2–53.8	35.8	31.8–39.9	39.0	32.5–45.9	35.8	29.9–42.3	39.1	34.8–43.7
Female	47.7	42.6–52.9	51.5	45.0–57.9	39.8	35.3–44.5	39.3	33.6–45.3	37.4	31.0–44.2	41.1	36.8–45.4
Male	43.8	37.9–49.8	47.7	41.5–53.9	31.7	25.3–38.9	38.7	30.2–47.8	34.1	26.4–42.8	37.2	31.8–43.0
Higher income	47.1	42.0–52.2	54.4	46.1–62.6	41.9	34.4–49.8	45.3	36.0–55.1	44.2	36.0–52.7	45.3	39.3–51.5
Middle income	44.2	37.6–51.1	48.2	42.3–54.1	33.7	26.5–41.7	33.3	26.4–41.1	36.2	29.0–44.0	36.2	32.3–40.3
Lower income	44.5	36.4–52.9	36.8	31.7–42.3	24.9	19.8–30.7	23.0	16.8–30.7	23.7	18.8–29.4	27.5	24.2–31.1
Income missing	48.2 E	26.4–70.8	54.4	45.7–62.9	37.8 E	26.0–51.2	49.5 E	22.3–77.0	37.0 E	22.8–53.8	44.1	36.8–51.6
Privately insured	50.3	44.8–55.9	56.1	50.1–61.8	39.4	33.0–46.2	43.2	36.2–50.6	48.2	41.8–54.7	44.7	39.5–50.0
Publicly insured	43.6 E	30.0–58.3	46.0	33.9–58.7	37.2 E	22.7–54.4	29.7 E	17.4–45.9	36.1 E	24.1–50.1	37.1	31.7–42.9
Not insured	32.8	27.4–38.8	31.8	25.2–39.2	28.2	22.5–34.7	30.5	22.6–39.6	26.9	20.2–34.7	29.0	24.5–34.0
Visited a dental professional in the last year	50.7	45.4–55.9	59.3	55.9–62.6	52.9	46.2–59.4	50.6	43.0–58.2	52.7	47.9–57.4	52.7	47.9–57.4
Visited a dental professional more than one year ago	F	…	F	…	3.5 E	1.9–6.5	4.8 E	2.5–9.0	F	…	4.6	3.5–6.0
Highest Household Education = degree/diploma	47.3	43.3–51.4	50.2	45.1–55.3	36.0	31.1–41.2	42.2	34.3–50.4	41.1	34.5–48.0	41.2	36.4–46.3
Highest Household Education < degree/diploma	40.6	32.0–49.9	51.1	41.3–60.9	36.6	27.8–46.4	33.0	27.8–38.6	28.0	21.8–35.2	35.1	31.4–39.1
Born in Canada	45.5	40.2–50.8	49.7	44.3–55.1	37.7	32.0–43.7	38.9	32.3–45.9	34.7	28.3–41.6	39.8	34.9–45.0
Born outside Canada	48.7	34.5–63.0	47.8	35.4–60.4	29.1	22.2–37.2	39.4 E	26.9–53.4	38.8	28.0–50.9	36.7	28.5–45.7
Non-Aboriginal	45.1	40.9–49.3	49.9	44.6–55.1	35.7	32.2–39.4	38.8	33.3–44.7	35.6	29.4–42.2	39.0	35.0–43.1
Aboriginal	63.1	46.0–77.4	45.1 E	26.0–65.8	F	…	F	…	F	…	45.2 E	23.2–69.3
Never smoked	Not applicable		50.2	44.7–55.6	37.7	32.1–43.7	39.6	30.5–49.4	41.6	34.5–49.0	41.3	36.1–46.7
Past smoker			54.5 E	21.0–84.4	39.0	32.6–45.7	50.8	43.7–57.8	33.5	25.8–42.3	43.0	37.7–48.4
Current smoker			45.5	36.6–54.7	29.1 E	20.6–39.4	20.1 E	14.0–27.9	24.2	17.9–31.8	26.0	21.7–30.9
Dentate	45.7	41.5–50.0	49.5	45.2–53.8	35.8	31.9–40.0	40.2	33.8–47.0	43.2	38.1–48.4	40.8	36.6–45.0
Edentulous	Not applicable		Not applicable		F	…	F	…	9.3 E	5.4–15.7	9.8 E	5.0–18.2

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 7 Mean number of hours per person lost from normal activities, work or school activities due to check-ups or problems with teeth*

Characteristic	Age group											
	Children 6–11 years		Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Older adults 60–79 years		Ages 6–79 years	
	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI
All	2.45	2.14–2.75	5.41 E	3.40–7.42	3.30	2.71–3.89	3.31	2.61–4.02	3.36	2.92–3.80	3.54	3.23–3.86
Female	2.47	2.22–2.73	8.06 E	3.89–12.22	3.94	2.86–5.02	3.43	2.64–4.22	3.49	2.76–4.21	4.15	3.51–4.79
Male	2.41	1.83–3.00	2.71	2.34–3.08	2.51	2.05–2.98	3.19	2.25–4.13	3.21	2.69–3.73	2.87	2.39–3.35
Higher income	2.28	1.86–2.71	3.81	2.76–4.86	3.52	2.39–4.66	3.56	2.49–4.62	3.49	2.38–4.60	3.47	2.92–4.03
Middle income	2.66	1.84–3.48	F	…	2.36	1.88–2.83	3.28	2.43–4.12	3.63	2.70–4.57	3.89	2.68–5.09
Lower income	2.64	2.09–3.19	F	…	4.78 E	2.92–6.64	2.11	1.50–2.72	2.92	1.97–3.86	3.48	2.86–4.11
Income missing	1.52 E	0.98–2.05	3.49	2.61–4.38	3.04 E	1.20–4.88	2.39 E	1.53–3.24	2.38	1.79–2.97	2.87	2.24–3.51
Privately insured	2.39	1.95–2.84	5.57 E	3.16–7.98	3.27	2.47–4.07	3.35	2.52–4.19	3.69	2.89–4.50	3.64	3.19–4.08
Publicly insured	2.09	1.51–2.67	F	…	1.87 E	1.15–2.60	2.09	1.78–2.39	2.14 E	1.07–3.21	2.76 E	1.58–3.95
Not insured	2.99	2.30–3.68	4.34 E	2.26–6.43	3.62 E	2.05–5.19	3.35	2.52–4.18	3.18	2.41–3.96	3.45	2.88–4.02
Visited a dental professional in the last year	2.46	2.14–2.78	5.46 E	3.42–7.49	3.31	2.70–3.93	3.35	2.64–4.07	3.46	3.01–3.91	3.58	3.26–3.91
Visited a dental professional more than one year ago	F	…	F	…	F	…	1.89 E	0.98–2.80	1.30	0.98–1.62	2.17 E	1.22–3.12
Highest Household Education = degree/diploma	2.41	2.04–2.78	5.82 E	3.22–8.43	3.21	2.61–3.82	3.42	2.54–4.31	3.52	2.98–4.06	3.61	3.20–4.01
Highest Household Education < degree/diploma	2.41	1.98–2.85	F	…	3.80 E	2.30–5.30	3.01	2.29–3.73	3.07	2.32–3.81	3.27	2.85–3.69
Born in Canada	2.48	2.16–2.80	5.68 E	3.44–7.93	3.18	2.50–3.86	3.37	2.75–3.98	3.19	2.69–3.69	3.58	3.21–3.95
Born outside Canada	2.07	1.54–2.60	2.99 E	1.96–4.01	3.84 E	2.36–5.32	3.14 E	1.70–4.58	3.76	2.92–4.59	3.41	2.52–4.30
Non-Aboriginal	2.35	2.15–2.55	5.43 E	3.37–7.50	3.34	2.68–4.01	3.29	2.54–4.04	3.41	2.94–3.89	3.55	3.21–3.89
Aboriginal	F	…	F	…	F	…	3.92 E	1.89–5.95	F	…	3.38 E	1.90–4.85
Never smoked	Not applicable		5.60 E	3.45–7.75	3.06	2.45–3.67	3.31	2.63–3.99	2.97	2.34–3.60	3.73	3.24–4.22
Past smoker			F	…	3.92 E	1.95–5.89	3.37	2.39–4.35	3.84	2.98–4.71	3.71	3.01–4.41
Current smoker			2.39	1.65–3.13	3.41	2.72–4.09	3.16	2.65–3.66	3.25 E	2.03–4.48	3.19	2.88–3.49
Dentate	2.45	2.14–2.75	5.41 E	3.40–7.42	3.30	2.71–3.89	3.32	2.61–4.04	3.15	2.64–3.66	3.52	3.21–3.83
Edentulous	Not applicable		Not applicable		0.00	0.00–0.00	2.50 E	1.02–3.98	F	…	F	…

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size
* Among those who reported time-loss

TABLE 8 Total number of hours lost from normal activities, work or school activities due to check-ups or problems with teeth

Characteristic	Age group											
	Children 6–11 years		Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Older adults 60–79 years		Ages 6–79 years	
	hours in '000s	95% CI	hours in '000s	95% CI	hours in '000s	95% CI	hours in '000s	95% CI	hours in '000s	95% CI	hours in '000s	95% CI
All	2,414.04	1,995.54–2,832.54	8,882.05 E	5,136.78–12,627.32	10,639.28	8,612.42–12,666.13	12,572.31	9,013.91–16,130.71	5,854.26	4,498.47–7,210.04	40,361.93	33,768.46–46,955.40
Female	1,253.51	1,049.36–1,457.66	6,673.51 E	3,019.06–10,327.96	7,019.73	4,930.15–9,109.31	6,599.75	4,863.46–8,336.03	3,292.62	2,504.10–4,081.13	24,839.11	20,066.00–29,612.23
Male	1,160.53	874.54–1,446.52	2,208.54	1,906.74–2,510.33	3,619.54	2,832.11–4,406.98	5,972.56 E	3,258.57–8,686.55	2,561.64	1,774.07–3,349.21	15,522.82	11,727.12–19,318.52
Higher income	1,045.11	779.38–1,310.85	2,844.67 E	1,795.38–3,893.95	5,617.12	3,799.33–7,434.91	8,720.60 E	5,259.57–12,181.62	2,250.46 E	1,084.42–3,416.50	20,477.96	15,871.89–25,084.02
Middle income	656.79 E	431.27–882.30	F	…	2,293.22 E	1,287.77–3,298.68	2,728.43 E	1,644.51–3,812.34	2,473.83	1,775.60–3,172.05	12,184.54	8,842.52–15,526.55
Lower income	665.35 E	448.57–882.13	F	…	2,034.30 E	942.00–3,126.60	726.67	514.25–939.09	761.84 E	403.77–1,119.92	5,284.70	4,178.83–6,390.58
Income missing	F	…	908.57 E	501.34–1,315.80	F	…	F	…	F	…	2,414.73 E	1,537.24–3,292.22
Privately insured	1,729.59	1,382.55–2,076.63	7,228.65 E	3,370.03–11,087.27	7,685.02	5,791.71–9,578.32	9,468.58	6,505.70–12,431.46	3,295.13 E	2,183.94–4,406.33	29,406.97	23,049.98–35,763.95
Publicly insured	229.48	162.98–295.99	F	…	218.16 E	112.36–323.96	259.48 E	110.97–407.99	F	…	1,626.54 E	808.31–2,444.76
Not insured	446.71 E	263.78–629.64	999.07 E	532.97–1,465.18	2,728.93 E	1,535.63–3,922.23	2,844.25 E	1,406.56–4,281.94	2,233.31	1,583.43–2,883.19	9,252.27 E	6,138.94–12,365.60
Visited a dental professional in the last year	2,392.88	1,979.83–2,805.92	8,802.28 E	5,045.50–12,559.06	10,344.00	8,308.00–12,380.01	12,372.39	8,811.70–15,933.09	5,733.17	4,372.39–7,093.95	39,644.73	32,943.01–46,346.45
Visited a dental professional more than one year ago	F	…	F	…	F	…	199.91 E	90.78–309.05	F	…	686.52 E	330.07–1,042.96
Highest Household Education = degree/ diploma	1,956.08	1,534.67–2,377.49	6,945.68 E	3,296.70–10,594.65	8,332.61	6,476.93–10,188.28	10,243.73 E	6,309.92–14,177.53	4,189.39 E	2,770.24–5,608.55	31,667.48	24,113.93–39,221.03
Highest Household Education < degree/ diploma	375.65	293.64–457.67	1,412.06 E	565.61–2,258.50	2,226.27 E	1,393.30–3,059.24	2,268.83 E	1,218.90–3,318.76	1,467.59 E	938.20–1,996.98	7,750.40	6,080.08–9,420.71
Born in Canada	2,244.41	1,825.21–2,663.62	8,380.95 E	4,528.49–12,233.42	8,373.14	6,453.28–10,293.00	9,658.41	7,480.12–11,836.70	3,875.36	3,054.61–4,696.10	32,532.28	27,174.14–37,890.41
Born outside Canada	169.63 E	76.71–262.54	F	…	2,266.13 E	907.87–3,624.40	F	…	F	…	7,829.65 E	2,845.50–12,813.81
Non-Aboriginal	2,186.68	1,863.72–2,509.64	8,473.34 E	4,711.82–12,234.85	10,459.35	8,490.05–12,428.65	12,048.55	8,703.07–15,394.03	5,815.56	4,432.17–7,198.95	38,983.47	32,784.63–45,182.32
Aboriginal	F	…	F	…	F	…	F	…	F	…	1,378.45 E	594.99–2,161.92
Never smoked			7,947.21 E	3,947.83–11,946.58	5,885.95 E	3,839.25–7,932.65	5,371.52	3,775.94–6,967.10	2,580.28 E	1,527.23–3,633.34	21,784.96	16,868.12–26,701.81
Past smoker	Not applicable		F	…	2,520.78 E	1,078.26–3,963.31	5,761.61 E	3,756.66–7,766.56	2,832.19	2,051.06–3,613.32	11,621.10	8,742.83–14,499.36
Current smoker			F	…	2,232.54	1,517.91–2,947.17	1,429.41 E	840.75–2,018.06	441.78 E	223.19–660.36	4,525.59	3,812.74–5,238.44
Dentate	2,414.04	1,995.54–2,832.54	8,882.05 E	5,136.78–12,627.32	10,639.28	8,612.42–12,666.13	12,451.66	8,913.85–15,989.46	5,169.96	3,553.84–6,786.09	39,556.98	32,862.29–46,251.68
Edentulous	Not applicable		Not applicable				F	…	F	…	F	…

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 9 Percent of persons reporting having visited a dental professional within the last year for any reason

Characteristic	Age group											
	Children 6–11 years		Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Older adults 60–79 years		Ages 6–79 years	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	91.0	88.1–93.3	84.0	78.3–88.4	67.8	64.0–71.4	76.7	72.6–80.4	68.4	59.6–76.0	74.5	71.4–77.4
Female	91.4	86.4–94.7	87.2	81.5–91.3	71.6	67.3–75.6	75.8	71.3–79.8	69.8	62.1–76.5	75.9	72.7–78.8
Male	90.7	88.3–92.6	81.0	74.3–86.3	63.8	58.4–68.9	77.7	71.1–83.1	66.9	55.9–76.3	73.1	69.4–76.5
Higher income	95.2	93.3–96.6	91.2	83.4–95.5	77.5	71.3–82.7	86.3	80.6–90.5	75.9	62.7–85.6	83.8	79.3–87.4
Middle income	91.6	85.1–95.4	78.9	69.9–85.8	63.3	55.8–70.2	66.8	57.2–75.3	71.0	63.8–77.2	69.3	64.7–73.5
Lower income	84.2	79.0–88.3	72.1	66.2–77.3	52.1	43.9–60.2	58.9	52.3–65.2	53.8	43.2–64.1	60.0	55.3–64.6
Income missing	81.7	56.9–93.8	86.4	79.3–91.4	70.4	54.8–82.3	71.8 E	39.6–90.8	65.9	45.9–81.5	74.0	65.6–80.9
Privately insured	95.4	93.3–96.9	89.0	82.9–93.1	75.0	70.2–79.1	85.4	80.7–89.1	76.3	65.6–84.4	82.3	78.2–85.8
Publicly insured	90.5	83.5–94.7	77.7	63.7–87.4	57.7	39.9–73.7	65.1	50.6–77.2	71.3	51.8–85.2	70.9	66.7–74.8
Not insured	76.4	65.6–84.6	70.0	60.2–78.3	53.0	42.1–63.6	57.7	49.8–65.3	61.9	53.3–69.9	59.3	55.0–63.5
Highest Household Education = degree/diploma	92.7	91.2–94.0	86.5	81.1–90.6	69.1	65.2–72.6	81.6	76.5–85.8	74.8	66.9–81.3	77.9	74.6–80.9
Highest Household Education < degree/diploma	84.5	72.2–92.0	76.7	67.2–84.1	61.8	51.3–71.3	64.1	57.1–70.5	57.9	48.9–66.4	64.6	61.7–67.5
Born in Canada	90.7	87.8–93.0	84.1	77.7–89.0	68.6	64.2–72.6	76.9	72.1–81.2	65.8	57.6–73.1	74.8	71.0–78.3
Born outside Canada	95.2	84.0–98.7	82.4	75.5–87.8	64.8	53.6–74.5	76.2	68.5–82.5	75.1	63.1–84.2	73.3	67.9–78.0
Non-Aboriginal	91.3	88.3–93.6	84.5	78.8–88.8	67.7	63.9–71.3	76.5	72.6–80.0	68.2	59.2–75.9	74.4	71.4–77.1
Aboriginal	92.2	76.8–97.7	74.6	51.8–88.9	70.7 E	44.2–88.1	83.4	63.7–93.5	83.9	46.8–96.9	79.1	63.4–89.2
Never smoked	Not applicable		85.1	80.2–88.9	69.5	65.5–73.3	80.9	74.1–86.2	74.0	65.3–81.1	76.6	73.3–79.6
Past smoker			84.6	45.6–97.3	74.2	68.6–79.2	83.1	78.3–86.9	66.5	56.0–75.6	76.2	72.1–79.9
Current smoker			76.0	62.9–85.6	59.2	48.6–69.1	59.4	53.5–65.0	54.2	41.4–66.5	60.0	54.4–65.4
Dentate	91.0	88.1–93.3	84.0	78.3–88.4	67.9	64.1–71.5	78.5	75.0–81.6	79.3	72.9–84.5	76.8	74.2–79.3
Edentulous	Not applicable		Not applicable		F	…	F	…	18.3	13.6–24.1	20.2 E	13.0–29.9

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 10 Percent of persons reporting usually visiting at least once per year for check-ups or treatment

Characteristic	Age group											
	Children 6–11 years		Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Older adults 60–79 years		Ages 6–79 years	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	92.2	87.1–95.4	84.7	78.7–89.2	71.1	67.0–74.9	75.3	71.0–79.2	63.2	55.7–70.1	74.3	70.6–77.7
Female	92.2	87.5–95.3	85.8	79.1–90.5	75.0	68.9–80.3	76.4	70.8–81.2	67.7	59.2–75.2	76.6	72.0–80.7
Male	92.2	85.7–95.8	83.6	76.1–89.1	67.2	63.0–71.2	74.2	68.9–78.9	58.2	49.2–66.8	71.9	68.4–75.2
Higher income	96.5	90.9–98.7	93.9	86.9–97.3	77.1	70.5–82.6	86.5	81.0–90.6	79.2	71.4–85.3	84.5	79.3–88.5
Middle income	91.4	78.6–96.9	84.0	77.5–88.9	73.8	67.8–79.0	65.2	56.1–73.3	61.6	53.7–69.0	70.8	66.2–75.0
Lower income	85.2	80.8–88.7	65.5	57.1–73.1	56.1	49.3–62.7	56.1	48.7–63.2	45.1	35.2–55.5	58.0	53.8–62.0
Income missing	96.0	84.6–99.1	84.5	72.6–91.8	62.8	45.4–77.3	56.0	39.3–71.4	61.6	45.8–75.4	67.8	61.5–73.4
Privately insured	96.7	93.3–98.4	91.8	87.9–94.6	79.1	74.1–83.4	85.2	79.7–89.4	76.9	68.8–83.4	84.1	79.6–87.7
Publicly insured	96.4	93.0–98.2	73.3	58.0–84.5	78.7	65.3–87.9	61.9	46.7–75.2	55.5	38.4–71.3	70.5	63.7–76.6
Not insured	76.2	64.2–85.1	65.5	53.6–75.7	53.1	44.4–61.6	54.5	45.9–62.9	54.5	46.5–62.3	56.0	52.5–59.5
Visited a dental professional in the last year	98.1	95.7–99.2	94.6	91.1–96.8	92.6	88.6–95.3	95.5	93.8–96.7	90.8	86.9–93.7	94.1	92.4–95.4
Visited a dental professional more than one year ago	54.6 E	35.6–72.4	44.4	33.7–55.8	33.3	27.2–40.0	16.8 E	11.5–23.9	16.1	11.8–21.5	26.1	22.4–30.2
Highest Household Education = degree/diploma	93.7	89.9–96.1	88.1	82.8–91.9	73.9	68.1–79.0	81.2	75.9–85.5	69.2	60.7–76.6	78.8	74.4–82.7
Highest Household Education < degree/diploma	88.0	76.2–94.4	77.9	66.5–86.2	61.5	52.0–70.2	60.1	52.9–66.9	52.8	48.3–57.4	62.2	59.0–65.3
Born in Canada	93.1	88.9–95.8	86.3	79.5–91.0	73.2	67.1–78.5	75.5	70.4–80.0	60.6	53.2–67.4	75.4	70.9–79.4
Born outside Canada	81.3	58.8–92.9	71.1	58.2–81.3	63.9	55.3–71.8	74.9	65.7–82.3	70.1	59.7–78.7	70.3	64.2–75.7
Non-Aboriginal	91.9	86.6–95.2	84.8	79.1–89.2	71.2	67.1–75.0	75.0	71.1–78.6	63.2	55.9–69.9	74.1	70.6–77.4
Aboriginal	98.7	93.2–99.8	80.9	50.2–94.7	68.0	57.5–76.9	84.8	54.0–96.3	F	…	78.9	63.3–89.0
Never smoked			86.9	82.1–90.6	75.4	72.9–77.8	81.3	74.8–86.5	72.7	65.9–78.6	79.0	76.5–81.4
Past smoker	Not applicable		75.6 E	43.6–92.6	73.6	62.7–82.3	79.4	74.0–83.9	59.8	50.4–68.6	72.2	65.4–78.0
Current smoker			70.9	52.9–84.1	59.4	49.3–68.9	58.7	53.5–63.8	42.1 E	28.5–57.0	58.2	52.6–63.6
Dentate	92.2	87.1–95.4	84.7	78.7–89.2	71.2	67.0–74.9	78.1	74.2–81.6	77.5	72.3–81.9	77.7	74.4–80.6
Edentulous	Not applicable		Not applicable		F	…	F	…	11.5 E	7.2–18.0	12.5 E	8.2–18.6

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 11 Percent of persons avoiding visiting a dental professional within the last year because of costs

Characteristic	Age group											
	Children 6–11 years		Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Older adults 60–79 years		Ages 6–79 years	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	11.4	8.2–15.6	9.5	7.4–12.1	23.7	19.5–28.5	17.5	14.7–20.8	13.2	10.9–15.9	17.3	14.9–20.0
Female	13.1 E	9.2–18.3	9.8 E	6.7–14.2	25.0	19.3–31.6	20.3	17.0–24.0	15.3	12.0–19.5	19.2	16.4–22.3
Male	9.8 E	6.4–14.8	9.2	6.8–12.4	22.5	17.4–28.5	14.7	11.0–19.4	10.8	8.3–14.1	15.5	12.7–18.7
Higher income	5.3 E	3.5–7.8	F	…	11.5 E	6.8–18.8	9.6 E	6.6–14.0	7.4 E	4.9–11.2	8.8	6.5–11.8
Middle income	14.2 E	9.1–21.4	12.5 E	7.9–19.1	25.6	20.2–31.9	21.2	15.5–28.3	12.4 E	8.7–17.3	19.5	16.3–23.1
Lower income	19.3 E	12.9–27.8	21.5 E	14.1–31.5	46.7	37.2–56.5	39.6	31.8–47.9	23.7	18.6–29.6	34.5	30.4–38.7
Income missing	F	…	10.3 E	5.5–18.5	26.2 E	14.9–41.8	F	…	F	…	16.5 E	11.6–22.9
Privately insured	6.1	4.6–8.0	4.1	3.0–5.7	13.1	10.1–16.9	7.4	5.6–9.7	5.9 E	3.4–10.0	8.6	7.4–9.9
Publicly insured	F	…	F	…	F	…	F	…	F	…	8.9 E	4.7–16.1
Not insured	27.9	19.8–37.8	24.7 E	17.5–33.8	49.9	41.9–57.8	42.3	34.9–50.1	19.4	16.2–23.2	35.9	30.9–41.3
Visited a dental professional in the last year	8.1 E	5.7–11.5	5.7	4.4–7.4	12.3	8.9–16.8	11.1	8.9–13.7	9.5 E	6.4–13.9	10.2	8.4–12.4
Visited a dental professional more than one year ago	39.7 E	24.9–56.8	24.5	17.7–32.9	45.3	38.3–52.5	36.6	29.1–44.8	21.2 E	14.0–30.7	36.1	31.2–41.3
Highest Household Education = degree/diploma	10.7	8.1–14.0	7.1	5.5–9.2	21.7	17.7–26.4	15.6	12.0–20.1	12.0	9.3–15.5	15.9	13.7–18.3
Highest Household Education < degree/diploma	F	…	14.8 E	9.9–21.6	29.2	20.9–39.1	23.5 E	16.7–32.1	14.9	10.7–20.4	21.1	16.8–26.3
Born in Canada	10.9 E	7.4–15.8	9.2	7.0–11.8	21.7	17.2–27.0	16.1	12.6–20.5	12.0	9.8–14.6	15.8	13.1–19.0
Born outside Canada	F	…	F	…	30.6	23.3–39.1	21.7	15.7–29.1	16.3	12.8–20.6	22.8	19.7–26.2
Non-Aboriginal	10.9	7.9–14.8	9.0	7.1–11.3	24.1	19.9–28.8	17.6	14.9–20.7	13.3	11.0–16.0	17.4	15.2–20.0
Aboriginal	F	…	F	…	F	…	F	…	F	…	F	…
Never smoked	Not applicable		9.0	7.1–11.4	21.2	15.4–28.4	15.2	12.1–18.8	11.7 E	8.1–16.6	15.6	13.0–18.5
Past smoker			F	…	19.5 E	12.9–28.5	16.6 E	11.6–23.1	12.6	9.8–16.0	16.1	12.8–20.0
Current smoker			F	…	32.5	24.0–42.5	23.3	17.9–29.7	20.8 E	13.1–31.4	25.9	20.3–32.4
Dentate	11.4	8.2–15.6	9.5	7.4–12.1	23.7	19.5–28.6	17.8	15.0–20.9	13.2	10.9–15.9	17.6	15.2–20.3
Edentulous	Not applicable		Not applicable		F	…	F	…	13.2 E	9.1–18.9	12.8 E	8.6–18.7

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 12 Percent of persons reporting declining recommended care within the last year because of costs

Characteristic	Age group											
	Children 6–11 years		Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Older adults 60–79 years		Ages 6–79 years	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	7.7	5.6–10.6	8.9 E	6.2–12.7	19.4	16.7–22.3	18.7	16.3–21.4	15.9	13.4–18.6	16.5	15.1–18.0
Female	11.3 E	7.6–16.6	11.2 E	7.0–17.4	22.2	19.1–25.6	20.6	16.8–25.1	16.1	12.5–20.4	18.6	17.0–20.2
Male	F	…	6.8 E	4.8–9.8	16.6	13.0–20.9	16.7	14.2–19.6	15.6	12.5–19.3	14.4	12.3–16.7
Higher income	3.0 E	1.8–5.0	1.6 E	1.1–2.5	11.6 E	8.2–16.1	12.4	9.2–16.4	8.5	6.2–11.5	9.9	8.5–11.5
Middle income	8.7 E	4.6–15.8	11.2 E	6.8–17.7	20.2	16.5–24.6	20.9	16.0–26.7	18.1	13.4–23.8	18.3	15.5–21.5
Lower income	13.7	10.1–18.3	21.8 E	13.3–33.6	37.7	30.2–45.8	35.9	27.5–45.4	21.7	17.2–27.1	29.7	25.6–34.2
Income missing	F	…	9.0 E	4.9–16.0	12.0 E	6.8–20.3	F	…	F	…	15.1 E	9.4–23.3
Privately insured	3.8 E	2.4–5.9	4.2 E	2.3–7.5	13.4	11.1–16.2	13.0	10.2–16.5	9.2	7.0–12.1	10.9	9.6–12.3
Publicly insured	F	…	F	…	F	…	F	…	24.7 E	13.4–41.1	18.1 E	12.2–26.0
Not insured	17.7	13.1–23.5	22.6	16.7–29.9	33.5	27.0–40.7	32.0	24.6–40.5	19.2	15.4–23.7	27.4	23.5–31.6
Visited a dental professional in the last year	6.1 E	4.0–9.2	5.9	4.3–8.0	14.7	12.1–17.7	15.9	13.6–18.6	15.9	12.8–19.5	13.4	12.4–14.4
Visited a dental professional more than one year ago	22.1 E	15.4–30.7	19.9 E	13.6–28.3	27.5	22.2–33.4	26.4	20.3–33.5	17.1 E	11.3–25.0	24.3	20.2–29.0
Highest Household Education = degree/diploma	7.3 E	5.1–10.4	6.3 E	3.7–10.4	16.5	13.6–19.9	17.3	15.4–19.5	15.7	12.5–19.4	14.8	13.5–16.2
Highest Household Education < degree/diploma	8.6 E	5.4–13.4	16.2 E	11.0–23.2	27.0	22.7–31.8	25.5	18.6–33.9	15.5	11.5–20.5	21.3	18.9–23.9
Born in Canada	7.1 E	4.8–10.4	8.7	6.5–11.5	18.1	14.9–21.9	17.9	14.4–22.0	15.4	12.8–18.4	15.4	13.8–17.3
Born outside Canada	F	…	F	…	23.6 E	16.8–32.2	21.1	16.0–27.3	17.1	12.9–22.2	20.3	16.9–24.2
Non-Aboriginal	7.6 E	5.2–10.8	8.4 E	5.4–12.7	19.7	17.0–22.7	18.8	16.5–21.3	15.3	12.9–17.9	16.5	15.1–17.9
Aboriginal	F	…	F	…	F	…	F	…	F	…	15.8 E	8.8–26.6
Never smoked	Not applicable		8.7 E	5.5–13.3	15.4	11.6–20.2	13.7	11.4–16.3	15.3	11.5–20.1	13.6	11.7–15.6
Past smoker			F	…	23.4 E	14.1–36.3	20.4	14.6–27.6	14.1	11.1–17.7	19.2	16.0–22.8
Current smoker			8.0	5.1–12.3	25.2	19.5–31.9	25.4	18.8–33.3	24.3 E	14.8–37.1	24.0	19.4–29.2
Dentate	7.7	5.6–10.6	8.9	6.2–12.7	19.4	16.7–22.4	19.1	16.5–21.8	17.3	14.5–20.5	16.8	15.4–18.4
Edentulous	Not applicable		Not applicable		F	…	F	…	10.7 E	6.8–16.5	10.4 E	7.1–14.9

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 13 Percent of dentate persons brushing 2 or more times per day

Characteristic	Age group											
	Children 6–11 years		Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Older adults 60–79 years		Ages 6–79 years	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	70.6	66.8–74.2	71.4	67.4–75.1	74.8	71.5–77.8	73.9	68.9–78.3	70.5	64.3–76.1	73.2	25.5–31.2
Female	72.1	66.3–77.2	83.0	78.6–86.7	81.4	76.5–85.5	80.9	75.6–85.4	82.5	77.3–86.7	80.9	32.9–39.7
Male	69.2	62.9–74.8	60.5	52.3–68.1	68.3	62.9–73.3	66.7	61.2–71.8	57.2	49.0–65.0	65.4	17.3–23.6
Higher income	74.1	67.3–79.9	70.2	63.4–76.3	78.9	73.1–83.8	76.5	69.2–82.5	76.0	69.8–81.2	76.3	26.6–34.5
Middle income	68.6	62.5–74.1	70.4	63.3–76.6	76.2	66.1–84.0	69.7	62.9–75.8	68.2	57.6–77.3	71.8	23.6–30.8
Lower income	68.6	57.4–78.0	67.8	55.4–78.0	65.4	56.6–73.2	66.6	54.8–76.7	66.1	55.3–75.4	66.5	20.7–29.4
Income missing	53.0 E	30.9–73.9	81.4	74.2–86.9	68.6	55.3–79.4	91.7	71.4–98.0	69.8	57.7–79.8	75.7	22.7–34.7
Privately insured	72.7	68.6–76.5	74.5	70.8–78.0	77.9	74.4–81.0	76.8	71.8–81.2	71.2	64.8–76.9	76.0	26.0–32.2
Publicly insured	68.8	49.5–83.2	55.0 E	35.7–72.9	63.0	44.4–78.4	43.7	30.7–57.6	61.8	49.1–73.1	57.9	19.4–40.6
Not insured	65.6	57.9–72.6	66.4	55.8–75.6	69.2	62.4–75.3	71.0	60.9–79.3	71.3	63.0–78.4	69.8	22.6–31.9
Visited a dental professional in the last year	72.3	68.4–75.9	75.3	72.0–78.3	79.0	73.8–83.3	77.5	72.2–82.0	71.9	65.4–77.6	76.3	27.7–34.8
Visited a dental professional more than one year ago	51.6	42.2–60.9	52.0	36.8–66.8	68.9	62.1–74.9	61.7	53.7–69.2	66.1	55.6–75.2	64.4	18.1–21.4
Highest Household Education = degree/diploma	73.5	69.8–76.9	74.3	70.2–78.1	75.8	71.6–79.5	76.6	70.6–81.6	72.3	65.9–77.8	75.3	25.2–32.9
Highest Household Education < degree/diploma	60.1	51.0–68.6	64.1	53.8–73.3	71.0	64.3–76.9	68.9	62.0–75.0	65.9	57.5–73.4	67.7	24.4–29.8
Born in Canada	69.5	65.8–72.9	69.9	65.5–74.0	73.6	70.4–76.6	72.2	67.8–76.1	67.6	63.0–71.9	71.5	23.8–28.7
Born outside Canada	84.1	75.8–90.0	84.1	77.6–89.0	78.9	67.0–87.3	79.2	67.6–87.4	77.4	66.8–85.3	79.2	31.7–40.1
Non-Aboriginal	72.4	68.3–76.1	72.4	69.2–75.4	75.3	71.8–78.5	74.1	70.1–77.8	71.5	65.7–76.7	73.8	25.5–31.2
Aboriginal	36.0 E	21.9–53.1	53.8 E	30.3–75.7	54.9 E	29.9–77.6	65.1 E	24.2–91.6	F	…	53.0	24.0–34.8
Never smoked	Not applicable		72.9	69.1–76.3	79.6	74.2–84.1	77.2	69.9–83.1	73.2	65.8–79.5	76.6	26.7–31.4
Past smoker			60.8 E	27.5–86.4	72.5	63.3–80.2	78.9	72.7–84.0	69.7	59.3–78.4	74.8	28.0–42.4
Current smoker			65.2	50.8–77.2	65.6	60.6–70.3	59.9	50.9–68.3	61.7	43.5–77.2	63.0	21.7–28.5

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 14 Percent of dentate persons flossing at least 5 times per week

Characteristic	Age group											
	Children 6–11 years		Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Older adults 60–79 years		Ages 6–79 years	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	11.7	8.8–15.4	18.4	15.1–22.3	24.1	20.3–28.5	34.5	30.6–38.6	40.6	32.8–48.8	28.3	25.5–31.2
Female	15.7	11.6–20.9	23.0	18.1–28.7	32.9	27.8–38.4	41.5	35.3–48.0	52.6	45.2–59.8	36.2	32.9–39.7
Male	7.8 E	5.3–11.4	14.1	10.5–18.8	15.5	11.3–20.9	27.4	23.4–31.9	27.2 E	17.4–39.9	20.3	17.3–23.6
Higher income	11.4 E	8.0–16.0	18.3	14.5–22.7	27.9	22.1–34.6	36.9	31.9–42.1	39.0	32.6–45.8	30.4	26.6–34.5
Middle income	12.0 E	8.2–17.2	12.2 E	8.2–17.8	20.4	15.6–26.2	32.7	27.4–38.4	46.0	34.5–57.9	27.1	23.6–30.8
Lower income	12.0 E	6.9–20.2	20.4 E	14.1–28.5	22.1	17.0–28.3	28.7	21.5–37.3	36.8	26.4–48.6	24.8	20.7–29.4
Income missing	F	…	27.2	20.3–35.3	24.2 E	15.1–36.4	34.3 E	18.6–54.5	33.6 E	22.3–47.3	28.3	22.7–34.7
Privately insured	12.1	9.8–15.0	20.6	16.8–25.0	24.8	19.3–31.2	36.3	31.7–41.3	42.3	31.8–53.5	29.0	26.0–32.2
Publicly insured	F	…	F	…	28.9 E	16.3–45.8	26.9 E	14.9–43.5	56.5 E	36.2–74.8	28.9 E	19.4–40.6
Not insured	F	…	15.0	11.0–20.1	22.7	17.9–28.4	31.2	23.1–40.6	36.1	30.2–42.4	27.0	22.6–31.9
Visited a dental professional in the last year	12.6	9.4–16.7	20.5	16.6–25.1	26.1	21.2–31.8	37.6	32.3–43.2	46.6	39.3–54.1	31.1	27.7–34.8
Visited a dental professional more than one year ago	F	…	F	…	19.7	15.1–25.2	24.4	18.1–31.9	19.5 E	12.3–29.5	19.7	18.1–21.4
Highest Household Education = degree/diploma	12.6	9.9–16.0	17.2	14.6–20.1	25.0	20.0–30.8	35.7	30.0–41.8	44.3	36.4–52.4	28.9	25.2–32.9
Highest Household Education < degree/diploma	F	…	22.8 E	13.5–35.8	22.5	16.7–29.6	31.3	26.3–36.9	34.0	25.1–44.3	27.0	24.4–29.8
Born in Canada	11.0	8.0–14.9	17.1	14.1–20.5	23.3	19.7–27.4	32.3	29.0–35.8	38.9	33.0–45.2	26.2	23.8–28.7
Born outside Canada	20.1	14.9–26.7	30.0 E	21.1–40.6	27.1 E	18.8–37.3	41.1	32.6–50.1	44.5	32.2–57.4	35.8	31.7–40.1
Non-Aboriginal	11.9	8.7–16.0	19.0	15.3–23.3	24.0	20.0–28.5	34.3	30.6–38.2	40.4	32.8–48.5	28.3	25.5–31.2
Aboriginal	F	…	F	…	F	…	42.3 E	27.0–59.2	F	…	29.1	24.0–34.8
Never smoked	Not applicable		20.0	16.5–24.0	23.3	18.8–28.4	35.9	29.2–43.2	44.0	34.9–53.5	29.0	26.7–31.4
Past smoker			F	…	30.5 E	18.4–46.1	36.5	30.0–43.5	37.6	30.0–45.9	34.9	28.0–42.4
Current smoker			F	…	21.4	15.6–28.7	28.9	21.8–37.2	38.3	27.1–51.0	24.9	21.7–28.5

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 15 Prevalence and severity of dental caries in primary teeth – ages 6–11

Characteristic	Prevalence		Mean number of primary teeth							
	Percent with dmft > 0		decayed		missing		filled		decayed, missing and filled	
	%	95% CI	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI
All	47.8	42.9–52.7	0.28	0.22–0.34	F	…	1.64	1.38–1.90	1.99	1.72–2.25
Female	46.3	37.8–55.1	0.26 E	0.15–0.36	F	…	1.66	1.32–2.00	1.94	1.53–2.35
Male	49.2	43.8–54.6	0.30 E	0.13–0.48	F	…	1.62	1.34–1.90	2.03	1.57–2.49
Higher income	44.5	37.7–51.6	0.23	0.16–0.29	0.05 E	0.02–0.08	1.50	1.11–1.89	1.77	1.40–2.15
Middle income	55.0	47.6–62.1	0.33	0.23–0.44	F	…	2.06	1.64–2.47	2.44	2.07–2.81
Lower income	45.9	36.9–55.1	0.30	0.22–0.38	F	…	1.43 E	0.92–1.94	1.86 E	1.15–2.56
Income missing	50.8 E	34.2–67.1	F	…	F	…	1.90 E	1.13–2.67	2.40 E	1.35–3.44
Privately insured	46.5	39.0–54.1	0.22	0.16–0.28	F	…	1.55	1.28–1.83	1.81	1.53–2.09
Publicly insured	60.9	51.0–69.9	0.41	0.30–0.52	F	…	2.12	1.52–2.73	2.81 E	1.79–3.83
Not insured	45.0	33.3–57.3	0.41 E	0.16–0.65	F	…	1.68 E	1.06–2.29	2.12 E	1.37–2.88
Visited a dental professional in the last year	48.9	43.5–54.2	0.26	0.21–0.30	F	…	1.70	1.42–1.98	2.03	1.76–2.30
Visited a dental professional more than one year ago	41.9	32.6–51.9	F	…	F	…	1.34 E	0.75–1.94	1.91 E	1.21–2.62
Highest Household Education = degree/diploma	44.5	38.8–50.5	0.23	0.17–0.30	F	…	1.48	1.26–1.71	1.79	1.58–2.01
Highest Household Education < degree/diploma	60.1	53.1–66.7	0.48 E	0.25–0.70	F	…	2.15	1.69–2.60	2.67	2.13–3.20
Born in Canada	48.4	43.3–53.5	0.29	0.22–0.35	F	…	1.68	1.42–1.94	2.03	1.77–2.29
Born outside Canada	40.5	28.3–53.9	0.21 E	0.09–0.33	F	…	1.17 E	0.74–1.59	1.43 E	0.91–1.94
Non-Aboriginal	46.0	41.0–51.1	0.26	0.21–0.32	0.04 E	0.02–0.06	1.53	1.28–1.77	1.83	1.58–2.08
Aboriginal	83.9	66.8–93.1	0.57 E	0.20–0.95	F	…	3.82 E	2.18–5.47	F	…

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 16 Prevalence and severity of dental caries in permanent teeth – ages 6–11

Characteristic	Prevalence		Mean number of permanent teeth							
	Percent with DMFT > 0		Decayed		Missing		Filled		Decayed–Missing and Filled	
	%	95% CI	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI
All	23.6	19.1–28.7	0.08 E	0.04–0.13	F	…	0.40 E	0.26–0.54	0.49	0.35–0.64
Female	20.2	15.6–25.7	F	…	0.00	0.00–0.00	0.33 E	0.20–0.47	0.40 E	0.25–0.55
Male	26.8	20.2–34.7	F	…	F	…	0.48 E	0.29–0.66	0.59 E	0.38–0.80
Higher income	20.0 E	13.4–28.8	F	…	0.00	0.00–0.00	0.36 E	0.17–0.54	0.39 E	0.19–0.58
Middle income	22.7	17.1–29.5	F	…	F	…	0.39 E	0.23–0.54	0.51 E	0.34–0.68
Lower income	30.9	23.3–39.7	F	…	F	…	0.53 E	0.33–0.73	0.68 E	0.41–0.95
Income missing	F	…	F	…	0.00	0.00–0.00	F	…	F	…
Privately insured	22.8	16.8–30.2	F	…	F	…	0.38 E	0.21–0.54	0.47 E	0.29–0.65
Publicly insured	32.5	24.7–41.3	F	…	0.00	0.00–0.00	0.68 E	0.46–0.90	0.77	0.55–0.99
Not insured	22.0 E	14.6–31.8	0.08 E	0.03–0.13	0.00	0.00–0.00	0.35 E	0.20–0.50	0.44 E	0.26–0.62
Visited a dental professional in the last year	24.7	20.0–30.1	0.08 E	0.03–0.12	F	…	0.44 E	0.28–0.59	0.52	0.36–0.67
Visited a dental professional more than one year ago	F	…	F	…	0.00	0.00–0.00	F	…	F	…
Highest Household Education = degree/diploma	20.8	17.2–24.9	F	…	F	…	0.34	0.25–0.43	0.41	0.31–0.52
Highest Household Education < degree/diploma	33.4 E	21.1–48.4	F	…	0.00	0.00–0.00	0.61 E	0.24–0.99	0.79 E	0.37–1.20
Born in Canada	23.6	19.1–28.7	0.08 E	0.03–0.13	F	…	0.40 E	0.26–0.54	0.48	0.34–0.63
Born outside Canada	23.5 E	12.9–38.9	F	…	0.00	0.00–0.00	F	…	F	…
Non-Aboriginal	22.8	18.4–27.8	0.07 E	0.04–0.10	F	…	0.38	0.26–0.50	0.45	0.32–0.58
Aboriginal	43.6 E	29.8–58.5	F	…	F	…	1.03 E	0.51–1.56	1.59 E	0.60–2.57

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 17 Prevalence and severity of dental caries in primary and permanent teeth – ages 6–11

Characteristic	Prevalence		Mean number of primary and permanent teeth							
	Percent with dmft + DMFT > 0		decayed + Decayed		missing + Missing		filled + Filled		dmft + DMFT	
	%	95% CI	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI
All	56.8	52.0–61.4	0.36	0.31–0.42	F	…	2.04	1.66–2.42	2.48	2.10–2.86
Female	54.8	47.8–61.7	0.32 E	0.20–0.45	F	…	1.99	1.59–2.38	2.34	1.89–2.79
Male	58.6	53.0–64.1	0.40 E	0.27–0.54	F	…	2.09	1.66–2.52	2.62	2.12–3.11
Higher income	51.9	44.6–59.0	0.25 E	0.17–0.34	0.05 E	0.02–0.08	1.86	1.33–2.39	2.16	1.63–2.69
Middle income	61.1	53.7–68.0	0.44	0.31–0.57	F	…	2.44	1.96–2.93	2.95	2.44–3.46
Lower income	61.4	50.7–71.1	0.45	0.34–0.55	F	…	1.96	1.34–2.58	2.53	1.76–3.31
Income missing	52.0	36.4–67.2	F	…	F	…	2.07 E	1.35–2.79	2.75 E	1.69–3.81
Privately insured	56.1	49.3–62.7	0.30	0.21–0.39	0.05 E	0.02–0.08	1.93	1.57–2.29	2.28	1.91–2.66
Publicly insured	68.6	60.4–75.8	0.50	0.39–0.62	F	…	2.80	2.11–3.49	3.58	2.57–4.60
Not insured	52.9	41.8–63.8	0.49 E	0.24–0.74	F	…	2.03 E	1.32–2.75	2.56 E	1.71–3.41
Visited a dental professional in the last year	57.7	53.2–62.1	0.33	0.27–0.40	F	…	2.14	1.73–2.54	2.55	2.17–2.93
Visited a dental professional more than one year ago	54.3	38.8–69.0	0.70 E	0.29–1.10	F	…	1.53 E	0.87–2.18	2.25	1.60–2.90
Highest Household Education = degree/diploma	53.0	47.7–58.3	0.30	0.25–0.35	F	…	1.83	1.53–2.13	2.21	1.94–2.47
Highest Household Education < degree/diploma	72.0	63.7–79.0	0.65 E	0.40–0.91	F	…	2.76	2.00–3.53	3.45	2.61–4.30
Born in Canada	57.3	52.7–61.8	0.37	0.31–0.42	F	…	2.08	1.71–2.45	2.52	2.16–2.88
Born outside Canada	50.2	35.2–65.0	0.35 E	0.13–0.58	F	…	1.64 E	0.94–2.33	2.04 E	1.22–2.86
Non-Aboriginal	55.2	50.4–59.8	0.33	0.27–0.39	0.04 E	0.02–0.06	1.90	1.56–2.25	2.28	1.94–2.62
Aboriginal	89.2	78.4–95.0	1.02 E	0.40–1.64	F	…	4.86 E	2.97–6.74	6.62 E	3.81–9.42

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 18 Percent of once carious teeth decayed and filled – ages 6–11

Characteristic	Primary teeth				Permanent teeth				Primary and permanent teeth			
	dt/dmft		ft/dmft		DT/DMFT		FT/DMFT		(dt+DT)/(dmft+DMFT)		(ft+FT)/(dmft+DMFT)	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	14.1	11.3–17.0	82.4	76.8–88.1	16.9 E	7.3–26.6	82.0	71.0–92.9	14.7	11.7–17.7	82.3	78.0–86.7
Female	13.3	9.6–16.9	85.4	81.6–89.2	F	…	83.3	71.7–94.8	13.9	9.6–18.2	85.1	80.5–89.6
Male	15.0 E	8.6–21.4	79.7	68.4–90.9	F	…	81.1	67.5–94.7	15.4	10.5–20.4	80.0	72.0–88.0
Higher income	12.7 E	7.8–17.6	84.4	78.3–90.6	F	…	92.5	87.4–97.7	11.8 E	7.0–16.6	85.9	80.0–91.8
Middle income	13.7 E	8.2–19.3	84.4	78.1–90.6	F	…	76.2 E	50.7–101.7	14.9	10.2–19.6	82.9	77.1–88.8
Lower income	16.2 E	10.6–21.8	77.1	68.4–85.7	21.7 E	9.9–33.5	77.8	66.2–89.5	17.6 E	11.6–23.7	77.3	71.2–83.3
Income missing	20.3 E	10.6–30.0	79.4	69.8–88.9	F	…	F	…	24.3 E	12.1–36.5	75.4	63.3–87.4
Privately insured	12.0	8.8–15.2	85.8	81.6–90.1	F	…	80.5	66.1–95.0	13.2	9.3–17.0	84.7	79.9–89.5
Publicly insured	14.6 E	9.0–20.2	75.5	65.0–86.0	F	…	87.9	76.9–98.9	14.1 E	8.1–20.0	78.2	70.9–85.4
Not insured	19.2 E	9.4–28.9	79.0	69.9–88.1	19.0 E	9.6–28.5	81.0	71.5–90.4	19.1 E	10.5–27.8	79.3	71.1–87.5
Visited a dental professional in the last year	12.6	9.7–15.5	83.8	78.5–89.1	14.5 E	5.4–23.6	84.3	73.8–94.8	13.0	9.4–16.5	83.9	79.3–88.5
Visited a dental professional more than one year ago	F	…	70.3 E	46.2–94.3	46.4 E	25.7–67.2	53.6 E	32.8–74.3	30.9 E	10.8–51.1	67.8	48.1–87.4
Highest Household Education = degree/diploma	13.0	9.5–16.6	82.7	75.3–90.1	15.7 E	6.0–25.5	82.6	70.8–94.4	13.5	10.4–16.7	82.7	77.3–88.1
Highest Household Education < degree/diploma	18.0 E	10.2–25.7	80.6	72.9–88.2	F	…	78.1	61.5–94.7	18.9 E	11.5–26.2	80.0	72.6–87.4
Born in Canada	14.1	11.0–17.2	82.5	76.6–88.4	16.3 E	6.9–25.7	82.5	71.4–93.5	14.5	11.6–17.4	82.5	78.1–86.9
Born outside Canada	14.9 E	7.2–22.6	81.7	73.8–89.7	F	…	76.9	52.0–101.8	17.4 E	7.7–27.0	80.3	70.8–89.7
Non-Aboriginal	14.3	11.1–17.5	83.3	79.3–87.4	15.2 E	8.4–22.0	84.6	77.9–91.3	14.5	11.5–17.5	83.6	79.8–87.4
Aboriginal	11.4 E	4.7–18.1	75.9	55.1–96.8	F	…	F	…	F	…	73.4	62.2–84.6

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 19 Prevalence and mean number of dental sealants – ages 6–11

Characteristic	Sealants			
	Percent with ≥ 1 sealant on permanent molar teeth		Mean number of sealants on permanent molar teeth among those with 1 or more sealants	
	%	95% CI	mean	95% CI
All	31.6	25.8–38.0	2.88	2.68–3.07
Female	34.1	29.4–39.1	2.97	2.74–3.20
Male	29.2	20.9–39.0	2.77	2.48–3.06
Higher income	35.5	27.5–44.4	2.93	2.72–3.14
Middle income	32.4	27.1–38.2	2.83	2.50–3.15
Lower income	24.4 E	14.6–37.7	2.85	2.39–3.30
Income missing	F	…	2.47 E	1.59–3.35
Privately insured	31.8	26.6–37.5	2.93	2.75–3.11
Publicly insured	33.1 E	17.2–54.2	3.00	2.54–3.46
Not insured	31.0 E	21.8–42.1	2.64	2.05–3.23
Visited a dental professional in the last year	33.7	28.2–39.6	2.91	2.71–3.10
Visited a dental professional more than one year ago	F	…	2.41	1.91–2.91
Highest Household Education = degree/diploma	32.6	26.2–39.7	2.94	2.79–3.10
Highest Household Education < degree/diploma	31.1	22.4–41.4	2.52	2.08–2.97
Born in Canada	31.3	25.1–38.3	2.89	2.72–3.06
Born outside Canada	35.0	27.4–43.5	2.73	1.91–3.55
Non-Aboriginal	31.9	25.8–38.6	2.87	2.67–3.06
Aboriginal	26.8	20.8–33.9	3.17 E	1.93–4.41

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)

F Estimate not provided because of extreme sampling variability or small sample size

TABLE 20 Prevalence and mean number of traumatized teeth – ages 6–11

Characteristic	Lost				Fractured				Lost or fractured			
	% with 1 or more incisor teeth lost due to trauma		Mean number of incisor teeth lost due to trauma among those with at least one lost		% with 1 or more traumatized incisor teeth		Mean number of incisor teeth traumatized among those with at least 1 tooth affected		% with 1 or more lost or traumatized incisor teeth		Mean number of incisor teeth lost or traumatized among those with at least one tooth affected	
	%	95% CI	mean	95% CI	%	95% CI	mean	95% CI	%	95% CI	mean	95% CI
All	F	…	F	…	6.7 E	4.3–10.2	1.22	1.01–1.43	6.9 E	4.4–10.7	1.21	1.02–1.41
Female	F	…	F	…	4.7 E	3.0–7.4	1.26	1.00–1.57	5.0 E	3.2–7.7	1.25	1.00–1.52
Male	F	…	F	…	8.5 E	5.2–13.7	1.19	1.00–1.41	8.8 E	5.3–14.1	1.19	1.00–1.40
Higher income	F	…	F	…	6.8 E	3.8–12.0	1.15	1.00–1.39	7.1 E	3.9–12.5	1.14	1.00–1.38
Middle income	F	…	F	…	F	…	1.19	1.00–1.41	F	…	1.19	1.00–1.41
Lower income	F	…	F	…	7.7 E	4.3–13.6	1.35 E	1.00–1.85	8.2 E	4.5–14.5	1.33 E	1.00–1.77
Income missing	F	…	F	…	F	…	F	…	F	…	F	…
Privately insured	F	…	F	…	5.4 E	3.3–8.7	1.25	1.10–1.40	5.6 E	3.3–9.4	1.25	1.10–1.39
Publicly insured	F	…	F	…	F	…	F	…	F	…	F	…
Not insured	F	…	F	…	11.5 E	6.0–20.9	1.22 E	1.00–1.80	12.1 E	6.4–21.5	1.21 E	1.00–1.73
Visited a dental professional in the last year	F	…	F	…	6.9 E	4.3–11.0	1.18	1.03–1.33	7.2 E	4.4–11.5	1.17	1.04–1.31
Visited a dental professional more than one year ago	F	…	F	…	F	…	F	…	F	…	F	…
Highest Household Education = degree/diploma	F	…	F	…	5.1 E	3.4–7.7	1.22	1.04–1.39	5.4 E	3.5–8.3	1.21	1.05–1.36
Highest Household Education < degree/diploma	F	…	F	…	11.8	5.4–23.8	1.27 E	1.00–1.80	F	…	1.27 E	1.00–1.80
Born in Canada	F	…	F	…	7.0 E	4.4–10.9	1.21	1.00–1.43	7.2 E	4.5–11.4	1.20	1.00–1.40
Born outside Canada	F	…	F	…	F	…	F	…	F	…	F	…
Non-Aboriginal	F	…	F	…	6.9 E	4.5–10.5	1.22	1.01–1.43	7.2 E	4.6–11.0	1.21	1.02–1.41
Aboriginal	F	…	F	…	F	…	F	…	F	…	F	…

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 21 Prevalence and severity of dental caries in permanent teeth – ages 12–19

Characteristic	Prevalence		Mean number of permanent teeth							
	Percent with DMFT > 0		Decayed		Missing		Filled		Decayed, Missing and Filled	
	%	95% CI	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI
All	58.8	52.6–64.8	0.37 E	0.17–0.58	0.02 E	0.01–0.03	2.10	1.76–2.45	2.49	1.99–3.00
Female	62.7	54.4–70.4	0.43 E	0.17–0.68	F	…	2.46	1.97–2.95	2.91	2.24–3.58
Male	55.1	48.9–61.2	0.32 E	0.14–0.51	F	…	1.77	1.49–2.06	2.10	1.70–2.51
Higher income	51.4	43.3–59.5	F	…	F	…	1.81	1.29–2.34	1.96	1.38–2.54
Middle income	57.7	49.6–65.5	0.33 E	0.17–0.49	F	…	2.09	1.60–2.58	2.44	1.82–3.06
Lower income	70.1	58.9–79.3	F	…	F	…	2.40	1.93–2.88	3.43	2.65–4.21
Income missing	67.1	57.6–75.3	F	…	F	…	2.57	1.96–3.19	2.89	2.19–3.58
Privately insured	56.5	49.5–63.3	0.22 E	0.09–0.36	F	…	2.12	1.69–2.54	2.36	1.81–2.90
Publicly insured	81.9	73.7–87.9	F	…	F	…	2.43 E	1.48–3.37	3.65	2.85–4.45
Not insured	60.1	51.7–68.0	0.53 E	0.31–0.75	F	…	2.02	1.42–2.62	2.57	1.85–3.30
Visited a dental professional in the last year	58.6	51.9–65.0	0.24 E	0.08–0.39	F	…	2.16	1.75–2.57	2.42	1.88–2.96
Visited a dental professional more than one year ago	59.3	44.4–72.6	0.93 E	0.47–1.39	F	…	1.62 E	1.04–2.19	2.55	1.73–3.37
Highest Household Education = degree/diploma	57.2	49.9–64.3	0.28 E	0.12–0.45	F	…	2.03	1.57–2.49	2.33	1.75–2.91
Highest Household Education < degree/diploma	63.0	56.6–69.0	0.55 E	0.37–0.73	F	…	2.32	1.89–2.75	2.88	2.42–3.34
Born in Canada	57.8	50.8–64.6	0.37 E	0.15–0.58	F	…	1.98	1.57–2.39	2.36	1.81–2.91
Born outside Canada	67.1	54.4–77.7	F	…	F	…	3.18	2.24–4.11	3.63 E	2.39–4.88
Non-Aboriginal	57.7	51.9–63.4	0.33 E	0.18–0.47	F	…	2.08	1.74–2.42	2.43	1.96–2.89
Aboriginal	75.9	58.9–87.4	F	…	F	…	2.40	1.68–3.11	3.57 E	2.10–5.04
Never smoked	57.3	51.4–63.0	0.26 E	0.17–0.36	F	…	1.96	1.68–2.24	2.24	1.87–2.61
Past smoker	74.6 E	37.6–93.5	F	…	0.00	0.00–0.00	2.79 E	1.02–4.56	3.18 E	1.40–4.97
Current smoker	68.0	54.1–79.3	F	…	F	…	3.07	2.29–3.85	4.30 E	2.88–5.71

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 22 Percent of once carious teeth decayed and filled – ages 12–19

Characteristic	Permanent teeth					
	DT/DMFT			FT/DMFT		
	%		95% CI	%		95% CI
All	14.9	E	8.9–20.9	84.4		78.2–90.5
Female	14.6	E	8.0–21.3	84.5		77.5–91.6
Male	15.4	E	8.5–22.2	84.1		77.1–91.1
Higher income	7.3	E	3.4–11.3	92.5		88.5–96.5
Middle income	13.5	E	8.7–18.2	85.6		81.0–90.3
Lower income	28.9	E	13.6–44.1	70.0		53.8–86.3
Income missing	10.0	E	4.1–15.9	89.2		83.0–95.4
Privately insured	9.5	E	5.2–13.7	89.8		85.3–94.3
Publicly insured	33.0	E	12.4–53.5	66.5		46.1–87.0
Not insured	20.7	E	13.8–27.6	78.5		71.7–85.4
Visited a dental professional in the last year	9.8	E	5.0–14.6	89.3		84.3–94.4
Visited a dental professional more than one year ago	36.5	E	23.3–49.7	63.5		50.3–76.6
Highest Household Education = degree/diploma	12.1	E	6.8–17.4	87.2		81.5–92.9
Highest Household Education < degree/diploma	19.2		13.1–25.2	80.4		74.6–86.3
Born in Canada	15.5	E	8.6–22.5	83.8		76.6–91.0
Born outside Canada	F		…	87.4		77.5–97.4
Non-Aboriginal	13.5		9.5–17.6	85.8		81.5–90.1
Aboriginal	F		…	67.1	E	36.4–97.9
Never smoked	11.7		8.9–14.6	87.6		84.7–90.6
Past smoker	F		…	87.7		67.8–107.6
Current smoker	F		…	71.5		49.9–93.1

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 23 Prevalence and mean number of dental sealants – ages 12–19

Characteristic	Sealants			
	Percent with ≥ 1 sealant on permanent molar teeth		Mean number of sealants on permanent molar teeth among those with 1 or more sealants	
	%	95% CI	mean	95% CI
All	50.6	45.7–55.5	3.51	3.13–3.88
Female	47.3	41.2–53.5	3.40	2.89–3.92
Male	53.8	48.2–59.3	3.59	3.19–3.98
Higher income	58.2	50.1–65.8	3.84	3.24–4.44
Middle income	50.4	42.5–58.3	3.29	2.91–3.67
Lower income	37.7	28.2–48.2	2.87	2.08–3.65
Income missing	46.6	34.6–59.1	3.40	2.91–3.88
Privately insured	54.1	49.3–58.9	3.49	3.10–3.88
Publicly insured	44.8 E	25.6–65.6	3.41 E	2.26–4.56
Not insured	42.9 E	29.7–57.2	3.56	2.87–4.25
Visited a dental professional in the last year	54.9	49.6–60.0	3.54	3.13–3.94
Visited a dental professional more than one year ago	35.6	25.7–46.9	3.28	2.67–3.89
Highest Household Education = degree/diploma	54.0	47.1–60.6	3.64	3.19–4.09
Highest Household Education < degree/diploma	46.9 E	32.3–62.1	3.12	2.63–3.62
Born in Canada	51.6	46.6–56.5	3.55	3.14–3.95
Born outside Canada	42.7 E	28.4–58.3	3.09 E	2.07–4.11
Non-Aboriginal	50.0	44.7–55.4	3.59	3.24–3.94
Aboriginal	59.4 E	39.3–76.7	2.45	2.02–2.87
Never smoked	50.6	45.1–56.1	3.55	3.15–3.96
Past smoker	57.1 E	32.9–78.3	F	…
Current smoker	48.9	34.9–63.1	3.55	2.94–4.17

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 24 Prevalence and mean number of traumatized teeth – ages 12–19

Characteristic	Fractured				Lost or fractured			
	% with 1 or more traumatized incisor teeth		Mean number of incisor teeth traumatized among those with at least one tooth affected		% with 1 or more lost or traumatized incisor teeth		Mean number of incisor teeth lost or traumatized among those with at least one tooth affected	
	%	95% CI	mean	95% CI	%	95% CI	mean	95% CI
All	15.8	13.0–19.0	1.33	1.18–1.47	16.1	13.4–19.2	1.32	1.18–1.47
Female	11.7 E	8.1–16.5	1.29	1.12–1.45	11.7 E	8.1–16.5	1.29	1.12–1.45
Male	19.6	14.4–26.1	1.35	1.16–1.54	20.2	15.2–26.3	1.34	1.16–1.52
Higher income	15.8 E	10.8–22.5	1.26	1.15–1.37	16.5 E	11.6–23.1	1.25	1.15–1.36
Middle income	13.7	10.3–18.0	1.35	1.15–1.55	13.7	10.3–18.0	1.35	1.15–1.55
Lower income	21.3 E	14.4–30.4	1.42	1.14–1.70	21.3 E	14.4–30.4	1.42	1.14–1.70
Income missing	11.7 E	6.9–19.2	1.31 E	1.00–2.04	11.7 E	6.9–19.2	1.31 E	1.00–2.04
Privately insured	14.1	11.6–17.1	1.22	1.11–1.32	14.4	11.9–17.3	1.21	1.11–1.32
Publicly insured	F	…	F	…	F	…	F	…
Not insured	19.2 E	12.8–27.8	1.54	1.21–1.87	19.7 E	13.4–28.0	1.53 E	1.20–1.86
Visited a dental professional in the last year	15.8	13.0–19.0	1.33	1.16–1.50	16.1	13.5–19.1	1.32	1.15–1.49
Visited a dental professional more than one year ago	17.7 E	10.1–29.1	1.31	1.12–1.51	17.7 E	10.1–29.1	1.33	1.11–1.54
Highest Household Education = degree/diploma	16.1	12.7–20.2	1.31	1.13–1.49	16.5	13.2–20.4	1.30	1.12–1.48
Highest Household Education < degree/diploma	9.5 E	6.5–13.7	1.29	1.07–1.52	9.5 E	6.5–13.7	1.31	1.08–1.54
Born in Canada	16.0	12.9–19.7	1.33	1.17–1.49	16.3	13.3–19.8	1.33	1.17–1.48
Born outside Canada	13.7 E	7.5–23.9	1.29 E	1.00–1.83	13.7 E	7.5–23.9	1.29 E	1.00–1.83
Non-Aboriginal	15.2	12.4–18.4	1.31	1.14–1.49	15.5	12.8–18.6	1.31	1.14–1.48
Aboriginal	26.4 E	17.3–38.2	1.44	1.07–1.82	26.4 E	17.3–38.2	1.44	1.07–1.82
Never smoked	15.1	11.6–19.5	1.32	1.13–1.51	15.5	12.1–19.7	1.31	1.12–1.50
Past smoker	F	…	F	…	F	…	F	…
Current smoker	20.5 E	13.4–30.0	1.40	1.13–1.67	20.5	13.4–30.0	1.42 E	1.15–1.68

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 25 Tooth loss and edentulism – adults

Characteristic	Percent edentulous		% with 28 teeth		% with fewer than 21 teeth		Mean number of teeth present	
	%	95% CI	%	95% CI	%	95% CI	mean	95% CI
All	6.4	4.9–8.3	42.3	39.6–45.1	14.6	12.1–17.5	24.53	24.10–24.95
Female	6.5	4.9–8.6	38.1	36.0–40.1	15.0	12.7–17.8	24.35	23.91–24.79
Male	6.3	4.6–8.5	46.7	42.8–50.6	14.1	11.0–18.0	24.71	24.22–25.19
Age 20–39	F	…	66.7	63.4–69.8	0.8 E	0.4–1.4	27.12	26.99–27.25
Age 40–59	4.4 E	3.0–6.3	32.8	28.0–37.9	16.5	11.9–22.4	24.13	23.34–24.92
Age 60–79	21.7	15.7–29.1	8.6 E	5.8–12.8	42.2	35.4–49.5	19.43	18.15–20.72
Higher income	3.2 E	1.8–5.6	45.5	43.1–48.0	10.4	8.0–13.6	25.23	24.86–25.61
Middle income	8.5	6.3–11.5	42.8	35.0–51.0	17.2	14.0–20.8	24.27	23.56–24.97
Lower income	10.9 E	7.5–15.5	33.5	29.6–37.7	20.0	15.3–25.7	23.42	22.64–24.19
Income missing	5.4 E	3.0–9.7	40.5	30.7–51.0	18.5 E	10.8–29.8	23.54	22.08–25.00
Privately insured	3.0 E	2.1–4.2	46.8	44.3–49.4	10.4	8.1–13.3	25.29	24.92–25.66
Publicly insured	13.3 E	8.9–19.4	19.7	16.2–23.7	24.4	17.7–32.5	22.60	21.84–23.35
Not insured	11.4	8.5–15.3	36.6	31.7–41.7	21.4	16.6–27.1	23.32	22.44–24.21
Visited a dental professional in the last year	1.4 E	0.9–2.2	40.6	38.2–43.1	13.2	10.6–16.2	24.80	24.41–25.18
Visited a dental professional more than one year ago	14.3	10.9–18.7	45.8	38.9–52.9	17.9	15.1–21.1	23.84	23.20–24.48
Highest Household Education = degree/diploma	4.3	3.1–5.9	47.0	43.9–50.1	12.0	9.4–15.1	25.09	24.65–25.54
Highest Household Education < degree/diploma	12.4	9.4–16.2	29.9	24.3–36.1	22.3	17.7–27.6	22.94	22.21–23.67
Born in Canada	6.9	5.5–8.7	42.6	40.3–45.1	15.0	11.8–19.0	24.43	23.91–24.96
Born outside Canada	4.8 E	2.7–8.3	41.4	34.4–48.7	13.2	10.9–15.9	24.80	24.29–25.32
Non-Aboriginal	6.4	4.9–8.4	42.6	39.8–45.5	14.7	12.2–17.6	24.52	24.09–24.95
Aboriginal	F	…	32.1 E	20.2–46.9	F	…	24.92	23.81–26.03
Never smoked	3.6 E	2.4–5.5	48.7	44.2–53.2	10.8	8.6–13.3	25.21	24.79–25.62
Past smoker	9.7	7.1–13.0	33.9	28.9–39.2	18.5	15.2–22.3	23.76	23.29–24.22
Current smoker	7.8	5.8–10.3	39.5	33.5–45.8	18.0 E	12.6–25.1	24.03	23.20–24.86

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 26 Implant and denture use among edentulous – adults

Characteristic	Percent of edentulous with at least one implant		Among edentulous, percent wearing dentures							
			Upper arch only			Lower arch only		Both upper and lower arches	
	%	95% CI	%		95% CI	%	95% CI	%	95% CI
All	F	…	3.5	E	1.9–6.5	F	…	93.3	88.9–96.0
Female	F	…	4.9	E	2.7–9.0	F	…	93.8	88.7–96.7
Male	F	…	F		…	F	…	92.8	86.7–96.2
Age 20–39	0.0	0.0–0.0	0.0		0.0–0.0	F	…	F	…
Age 40–59	F	…	F		…	F	…	92.4	81.7–97.1
Age 60–79	4.1 E	2.2–7.6	4.5	E	2.4–8.0	F	…	93.5	89.1–96.2
Higher income	0.0	0.0–0.0	F		…	F	…	95.7	87.7–98.6
Middle income	F	…	F		…	F	…	91.9	83.4–96.3
Lower income	F	…	F		…	F	…	92.3	74.5–98.0
Income missing	0.0	0.0–0.0	0.0		0.0–0.0	F	…	100.0	
Privately insured	F	…	F		…	F	…	94.6	90.4–97.1
Publicly insured	F	…	F		…	F	…	93.1	74.6–98.4
Not insured	F	…	4.5	E	2.3–8.6	F	…	93.3	86.7–96.7
Visited a dental professional in the last year	F	…	F		…	F	…	92.1	82.2–96.7
Visited a dental professional more than one year ago	F	…	F		…	F	…	94.7	89.5–97.3
Highest Household Education = degree/diploma	F	…	F		…	F	…	94.7	89.9–97.3
Highest Household Education < degree/diploma	F	…	F		…	F	…	91.8	81.5–96.6
Born in Canada	3.6 E	1.9–6.7	F		…	F	…	92.2	86.6–95.6
Born outside Canada	0.0	0.0–0.0	F		…	F	…	98.0	94.7–99.3
Non-Aboriginal	F	…	3.6	E	1.9–6.6	F	…	93.2	88.7–95.9
Aboriginal	0.0	0.0–0.0	0.0		0.0–0.0	F	…	F	…
Never smoked	F	…	F		…	F	…	89.2	76.2–95.5
Past smoker	F	…	F		…	F	…	96.0	91.8–98.1
Current smoker	F	…	F		…	F	…	92.6	78.0–97.8

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 27 Implant and denture use among dentate – adults

Characteristic	Percent of dentate with at least one implant		Among dentate, percent wearing dentures or fixed bridges					
			Upper arch only		Lower arch only		Both upper and lower arches	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	0.8 E	0.5–1.3	8.4	7.1–10.0	4.4	3.8–5.2	3.8	3.0–4.8
Female	F	…	9.3	8.0–10.7	5.2	4.1–6.5	4.4 E	3.1–6.2
Male	F	…	7.5	5.8–9.8	3.6 E	2.6–5.0	3.1	2.3–4.3
Age 20–39	F	…	F	…	F	…	F	…
Age 40–59	1.1 E	0.6–2.0	9.5	7.8–11.5	3.2	2.4–4.4	3.6 E	2.4–5.6
Age 60–79	F	…	20.9	18.3–23.8	17.0	13.2–21.7	12.6	10.4–15.2
Higher income	1.2 E	0.7–2.2	7.7	5.8–10.2	3.7	2.7–5.1	3.4 E	2.2–5.2
Middle income	F	…	9.0	7.3–11.2	4.8	3.5–6.5	3.2	2.3–4.4
Lower income	F	…	7.1	5.2–9.6	6.3 E	4.2–9.3	4.6 E	2.5–8.1
Income missing	F	…	14.7 E	8.8–23.7	F	…	F	…
Privately insured	0.8 E	0.4–1.5	7.0	5.5–8.9	2.9	2.3–3.8	3.5 E	2.4–5.0
Publicly insured	0.0	0.0–0.0	11.4 E	6.5–19.1	6.3 E	3.8–10.3	F	0.9–21.4
Not insured	F	…	10.9	8.9–13.3	7.0	5.3–9.0	4.2 E	3.0–5.9
Visited a dental professional in the last year	1.0 E	0.6–1.7	9.7	8.1–11.7	4.3	3.5–5.3	4.6	3.4–6.0
Visited a dental professional more than one year ago	F	…	5.0 E	3.3–7.5	4.7	3.4–6.4	1.8 E	1.1–3.2
Highest Household Education = degree/diploma	0.9 E	0.5–1.6	7.4	6.6–8.4	3.8	3.1–4.7	3.4	2.5–4.6
Highest Household Education < degree/diploma	F	…	11.1 E	7.8–15.7	5.8 E	3.9–8.7	4.8 E	3.1–7.5
Born in Canada	0.8 E	0.5–1.3	7.8	6.3–9.6	4.2	3.4–5.1	2.7 E	1.9–3.7
Born outside Canada	F	…	10.4	7.5–14.1	5.1 E	3.3–7.7	7.2	5.3–9.8
Non-Aboriginal	0.8 E	0.5–1.4	8.5	7.1–10.2	4.5	3.8–5.3	3.8	3.0–4.9
Aboriginal	F	…	F	…	F	…	F	…
Never smoked	F	…	7.6	5.8–10.0	3.4	2.6–4.4	3.6 E	2.4–5.3
Past smoker	F	…	10.0	8.1–12.2	6.6	5.2–8.2	4.9 E	3.3–7.1
Current smoker	F	…	8.1 E	5.6–11.6	3.8 E	2.7–5.4	F	…

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 28 Prevalence and severity of coronal caries – dentate adults

Characteristic	Prevalence		Mean number of permanent teeth							
	Percent with DMFT > 0		Decayed		Missing		Filled		Decayed, Missing and Filled	
	%	95% CI	mean	95% CI	mean	95% CI	mean	95% CI	mean	95% CI
All	95.9	94.5–97.0	0.58	0.48–0.69	2.14	1.98–2.31	7.95	7.53–8.36	10.67	10.30–11.05
Female	96.5	94.4–97.8	0.45	0.37–0.54	2.26	2.05–2.47	8.54	8.18–8.90	11.25	10.95–11.56
Male	95.4	93.7–96.6	0.72	0.58–0.85	2.03	1.82–2.24	7.34	6.75–7.93	10.09	9.51–10.66
Age 20–39	91.2	88.1–93.5	0.81	0.61–1.01	0.39	0.27–0.51	5.65	5.08–6.22	6.85	6.27–7.43
Age 40–59	98.8	96.8–99.6	0.45 E	0.27–0.63	2.42	2.08–2.75	9.43	8.98–9.88	12.30	11.76–12.84
Age 60–79	100.0		0.37	0.29–0.46	5.57	5.03–6.12	9.72	8.67–10.76	15.67	15.10–16.24
Higher income	96.8	95.3–97.8	0.33	0.25–0.40	1.67	1.41–1.94	8.93	8.58–9.28	10.92	10.55–11.30
Middle income	96.2	94.0–97.6	0.72 E	0.43–1.00	2.26	1.99–2.53	7.50	6.89–8.10	10.48	9.65–11.30
Lower income	94.7	90.7–97.1	0.97 E	0.59–1.35	2.94	2.56–3.31	6.50	5.76–7.24	10.40	9.52–11.28
Income missing	91.4	83.0–95.9	F	…	2.94	2.23–3.65	6.74	5.78–7.70	10.52	9.64–11.39
Privately insured	95.5	93.7–96.8	0.38	0.30–0.46	1.59	1.39–1.79	8.30	7.83–8.77	10.27	9.81–10.73
Publicly insured	96.9	94.9–98.1	1.34 E	0.78–1.89	3.66	2.73–4.59	8.36	7.23–9.48	13.35	12.15–14.56
Not insured	96.7	94.5–98.1	0.88 E	0.58–1.19	3.01	2.65–3.38	7.27	6.75–7.80	11.17	10.69–11.64
Visited a dental professional in the last year	96.7	94.9–97.9	0.26	0.19–0.33	2.10	1.89–2.31	8.81	8.41–9.22	11.17	10.79–11.55
Visited a dental professional more than one year ago	95.3	92.4–97.1	1.36	1.07–1.65	2.28	2.00–2.56	5.94	5.42–6.47	9.58	9.01–10.16
Highest Household Education = degree/diploma	95.6	94.2–96.6	0.45	0.35–0.54	1.80	1.62–1.98	8.03	7.54–8.51	10.27	9.84–10.70
Highest Household Education < degree/diploma	97.1	92.3–98.9	1.01	0.77–1.25	3.11	2.65–3.57	7.79	7.26–8.33	11.92	11.25–12.58
Born in Canada	96.7	95.5–97.6	0.56	0.45–0.67	2.02	1.78–2.25	8.14	7.77–8.52	10.72	10.42–11.01
Born outside Canada	93.5	90.5–95.6	0.66 E	0.36–0.97	2.53	2.18–2.89	7.35	5.95–8.74	10.54	9.23–11.86
Non-Aboriginal	95.9	94.5–96.9	0.57	0.48–0.66	2.16	2.00–2.31	7.91	7.48–8.34	10.64	10.24–11.04
Aboriginal	97.7	87.8–99.6	1.05 E	0.48–1.61	1.70 E	0.79–2.62	9.23	7.54–10.92	11.98	9.77–14.19
Never smoked	93.7	91.2–95.5	0.42	0.34–0.50	1.75	1.53–1.97	7.66	7.17–8.15	9.83	9.32–10.35
Past smoker	98.5	97.5–99.2	0.47 E	0.26–0.68	2.70	2.40–3.00	8.95	8.23–9.66	12.11	11.61–12.61
Current smoker	97.5	95.3–98.7	1.13	0.84–1.42	2.26	1.84–2.67	7.20	6.65–7.74	10.58	9.78–11.38

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 29 Percent of DMF teeth that are decayed, missing, or filled – dentate adults

Characteristic	Among dentate adults									
	DT/DFT		DT/DMFT		FT/DFT		FT/DMFT		MT/DMFT	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	6.9	5.6–8.1	5.5	4.5–6.4	93.1	91.9–94.4	74.4	72.3–76.6	20.1	18.4–21.7
Female	5.0	4.2–5.9	4.0	3.3–4.7	95.0	94.1–95.8	75.9	73.9–77.9	20.1	18.1–22.0
Male	8.9	7.1–10.7	7.1	5.8–8.5	91.1	89.3–92.9	72.8	69.7–75.8	20.1	17.9–22.3
Age 20–39	12.6	9.4–15.8	11.9	8.9–14.8	87.4	84.2–90.6	82.4	78.9–86.0	5.7	4.0–7.4
Age 40–59	4.6 E	2.9–6.3	3.7 E	2.3–5.1	95.4	93.7–97.1	76.7	73.8–79.6	19.6	17.2–22.1
Age 60–79	3.7	2.6–4.8	2.4	1.8–3.0	96.3	95.2–97.4	62.0	57.3–66.8	35.6	31.2–39.9
Higher income	3.5	2.7–4.3	3.0	2.3–3.6	96.5	95.7–97.3	81.7	79.4–84.1	15.3	13.0–17.6
Middle income	8.7 E	5.6–11.9	6.9 E	4.3–9.4	91.3	88.1–94.4	71.6	69.2–74.0	21.6	19.6–23.5
Lower income	13.0 E	8.2–17.7	9.3 E	6.1–12.5	87.0	82.3–91.8	62.5	57.2–67.8	28.2	25.0–31.4
Income missing	F	…	F	…	89.0	81.6–96.4	64.1	56.8–71.4	28.0	21.7–34.3
Privately insured	4.4	3.4–5.3	3.7	2.9–4.5	95.6	94.7–96.6	80.8	78.7–82.9	15.5	13.5–17.5
Publicly insured	13.8 E	9.1–18.5	10.0 E	6.1–13.9	86.2	81.5–90.9	62.6	57.2–68.0	27.4	20.2–34.6
Not insured	10.8 E	7.0–14.6	7.9 E	5.2–10.6	89.2	85.4–93.0	65.1	60.7–69.5	27.0	24.1–29.9
Visited a dental professional in the last year	2.9	2.1–3.6	2.3	1.7–2.9	97.1	96.4–97.9	78.9	76.7–81.0	18.8	17.0–20.6
Visited a dental professional more than one year ago	18.6	14.8–22.3	14.2	11.3–17.1	81.4	77.7–85.2	62.0	58.3–65.8	23.8	21.0–26.6
Highest Household Education = degree/diploma	5.3	4.1–6.4	4.3	3.4–5.3	94.7	93.6–95.9	78.1	75.8–80.5	17.5	15.6–19.5
Highest Household Education < degree/diploma	11.5	8.7–14.2	8.5	6.3–10.6	88.5	85.8–91.3	65.4	62.5–68.4	26.1	22.9–29.3
Born in Canada	6.4	5.1–7.8	5.2	4.2–6.3	93.6	92.2–94.9	76.0	73.4–78.6	18.8	16.7–20.9
Born outside Canada	8.3 E	4.0–12.5	6.3 E	3.2–9.4	91.7	87.5–96.0	69.7	64.1–75.2	24.0	20.2–27.9
Non-Aboriginal	6.7	5.6–7.9	5.4	4.5–6.2	93.3	92.1–94.4	74.4	72.3–76.4	20.3	18.7–21.9
Aboriginal	10.2 E	5.1–15.3	8.7 E	4.7–12.8	89.8	84.7–94.9	77.0	67.7–86.4	14.2 E	7.4–21.0
Never smoked	5.2	4.3–6.2	4.3	3.5–5.1	94.8	93.8–95.7	77.9	76.0–79.8	17.8	15.6–20.0
Past smoker	4.9 E	2.6–7.3	3.8 E	2.1–5.6	95.1	92.7–97.4	73.9	70.0–77.7	22.3	19.6–25.0
Current smoker	13.6	10.2–16.9	10.7	8.0–13.3	86.4	83.1–89.8	68.0	64.3–71.7	21.3	18.4–24.2

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 30 Prevalence of untreated decay – dentate adults

Characteristic	Untreated coronal caries				Untreated root caries			
	% with 1 or more		Mean number of untreated teeth among those with ≥ 1		% with 1 or more		Mean number of untreated teeth among those with ≥ 1	
	%	95% CI	mean	95% CI	%	95% CI	mean	95% CI
All	19.7	17.2–22.4	2.97	2.55–3.40	6.8	5.5–8.3	2.81	1.97–3.64
Female	16.1	12.9–19.9	2.83	2.08–3.57	6.0 E	4.3–8.4	2.62 E	1.66–3.58
Male	23.4	21.0–25.9	3.07	2.62–3.52	7.5	6.3–9.0	2.96	2.13–3.79
Age 20–39	22.5	19.7–25.6	3.61	2.96–4.26	3.6 E	2.5–5.1	3.06 E	1.76–4.36
Age 40–59	18.5	15.1–22.4	2.45	1.77–3.12	8.0	6.3–10.2	2.84 E	1.69–3.98
Age 60–79	16.0	13.0–19.5	2.35	1.93–2.76	11.2	8.2–15.1	2.57	1.99–3.15
Higher income	13.5	10.2–17.8	2.40	1.93–2.87	4.7 E	3.0–7.2	1.90	1.48–2.33
Middle income	21.9	18.1–26.3	3.27 E	2.14–4.40	7.3 E	5.1–10.3	4.08 E	2.01–6.15
Lower income	29.8	24.3–35.9	3.25	2.34–4.16	11.5 E	8.1–16.0	2.56	1.77–3.35
Income missing	27.2 E	16.2–41.9	F	…	F	…	2.06 E	1.23–2.89
Privately insured	15.9	13.2–19.0	2.39	1.89–2.89	4.4	3.4–5.6	1.96 E	1.30–2.61
Publicly insured	35.8	26.3–46.7	3.73	2.89–4.58	17.6 E	10.5–27.9	2.83 E	1.37–4.29
Not insured	25.0	20.8–29.7	3.53	2.62–4.44	9.9 E	6.9–14.0	3.52 E	1.95–5.08
Visited a dental professional in the last year	12.9	10.9–15.0	2.02	1.72–2.31	4.6	3.6–6.0	1.85 E	1.23–2.47
Visited a dental professional more than one year ago	37.0	32.1–42.2	3.67	2.62–4.71	12.1	9.1–16.0	3.78 E	2.06–5.49
Highest Household Education = degree/diploma	16.7	14.7–18.9	2.68	2.28–3.08	4.5	3.4–5.8	2.38	1.84–2.92
Highest Household Education < degree/diploma	28.3	24.2–32.9	3.56	2.56–4.56	12.7	9.4–16.9	3.30 E	1.49–5.11
Born in Canada	18.8	15.9–22.2	2.97	2.56–3.38	6.7	5.8–7.7	3.01 E	1.97–4.04
Born outside Canada	22.3	17.4–28.0	2.98 E	1.92–4.04	7.0 E	3.8–12.6	2.23 E	1.48–2.98
Non-Aboriginal	19.3	16.7–22.1	2.96	2.52–3.40	6.6	5.4–8.2	2.76	1.92–3.61
Aboriginal	34.4	27.9–41.6	3.04 E	1.32–4.76	F	…	F	…
Never smoked	16.5	14.6–18.5	2.56	2.00–3.11	5.5 E	3.5–8.6	2.17	1.57–2.77
Past smoker	17.9	12.9–24.4	2.60	1.84–3.36	5.8 E	4.0–8.3	3.00 E	1.16–4.83
Current smoker	29.5	24.5–35.0	3.83	3.04–4.62	10.9	8.5–13.9	3.44	2.43–4.44

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 31 Prevalence and severity of root caries – dentate adults

Characteristic	Percent with 1 or more root decayed or filled teeth		Root decayed teeth			Root filled teeth			Root decayed or filled teeth		
	%	95% CI	mean		95% CI	mean		95% CI	mean		95% CI
All	20.3	17.5–23.5	0.19	E	0.12–0.26	0.47		0.34–0.60	0.66		0.49–0.83
Female	20.5	17.1–24.4	0.16	E	0.09–0.23	0.50	E	0.30–0.69	0.65	E	0.42–0.89
Male	20.1	17.4–23.1	0.22	E	0.14–0.31	0.44		0.36–0.52	0.66		0.53–0.79
Age 20–39	5.8	4.3–7.8	0.11	E	0.04–0.18	0.06	E	0.02–0.09	0.17	E	0.07–0.26
Age 40–59	24.9	20.9–29.4	0.23	E	0.10–0.35	0.53		0.39–0.67	0.76	E	0.51–1.01
Age 60–79	43.3	36.7–50.2	0.29	E	0.19–0.39	1.28	E	0.76–1.79	1.56		1.07–2.05
Higher income	18.3	14.1–23.4	0.09	E	0.05–0.13	0.42	E	0.25–0.59	0.51	E	0.32–0.70
Middle income	21.5	17.5–26.1	F		…	0.52	E	0.34–0.71	0.82	E	0.51–1.14
Lower income	23.7	19.4–28.6	0.29	E	0.14–0.44	0.47		0.35–0.59	0.77		0.56–0.97
Income missing	20.8	E 14.6–28.6	F		…	0.53	E	0.28–0.78	0.67		0.45–0.89
Privately insured	17.4	14.7–20.5	0.09	E	0.05–0.13	0.42		0.30–0.54	0.51		0.36–0.65
Publicly insured	31.4	24.4–39.4	0.50	E	0.18–0.82	0.63	E	0.29–0.96	1.12	E	0.65–1.60
Not insured	24.6	19.1–31.0	0.35	E	0.16–0.53	0.54	E	0.34–0.75	0.89		0.61–1.17
Visited a dental professional in the last year	20.8	17.7–24.3	0.09		0.07–0.11	0.57		0.40–0.74	0.65		0.47–0.83
Visited a dental professional more than one year ago	19.0	15.6–23.1	0.46	E	0.22–0.70	0.22	E	0.11–0.32	0.67	E	0.42–0.93
Highest Household Education = degree/diploma	17.4	14.6–20.5	0.11		0.07–0.14	0.46	E	0.31–0.62	0.57		0.40–0.74
Highest Household Education < degree/diploma	28.7	23.5–34.5	0.42	E	0.16–0.68	0.49		0.38–0.60	0.91		0.63–1.19
Born in Canada	19.3	17.0–22.0	0.20	E	0.12–0.29	0.39		0.31–0.46	0.59		0.44–0.73
Born outside Canada	23.4	E 16.4–32.1	0.16	E	0.08–0.23	0.72	E	0.30–1.14	0.87	E	0.46–1.29
Non-Aboriginal	20.5	17.6–23.6	0.18	E	0.12–0.25	0.48		0.35–0.61	0.66		0.49–0.84
Aboriginal	F	…	F		…	F		…	F		…
Never smoked	15.6	12.9–18.8	0.12	E	0.07–0.17	0.31	E	0.15–0.47	0.43	E	0.27–0.60
Past smoker	25.5	19.3–32.8	F		…	0.69	E	0.42–0.96	0.86	E	0.51–1.21
Current smoker	23.8	20.5–27.6	0.38	E	0.19–0.56	0.49		0.33–0.64	0.86		0.61–1.12

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 32 Percent of RDF teeth that are decayed or filled – dentate adults

Characteristic	RDT/RDFT		RFT/RDFT	
	%	95% CI	%	95% CI
All	28.9	21.6–36.2	71.1	63.8–78.4
Female	24.2 E	16.0–32.4	75.8	67.6–84.0
Male	33.6	25.6–41.6	66.4	58.4–74.4
Age 20–39	65.9	52.2–79.6	34.1 E	20.4–47.8
Age 40–59	30.1	21.8–38.3	69.9	61.7–78.2
Age 60–79	18.4 E	9.2–27.5	81.6	72.5–90.8
Higher income	17.5 E	9.5–25.6	82.5	74.4–90.5
Middle income	36.2 E	20.1–52.2	63.8	47.8–79.9
Lower income	38.2 E	25.2–51.3	61.8	48.7–74.8
Income missing	F	…	79.2	62.1–96.2
Privately insured	16.9	11.6–22.2	83.1	77.8–88.4
Publicly insured	44.2 E	22.5–66.0	55.8 E	34.0–77.5
Not insured	39.1 E	24.0–54.1	60.9	45.9–76.0
Visited a dental professional in the last year	13.1	10.2–16.1	86.9	83.9–89.8
Visited a dental professional more than one year ago	68.0	51.2–84.7	32.0 E	15.3–48.8
Highest Household Education = degree/diploma	18.6	13.4–23.7	81.4	76.3–86.6
Highest Household Education < degree/diploma	46.1 E	29.7–62.4	53.9	37.6–70.3
Born in Canada	34.3	26.6–41.9	65.7	58.1–73.4
Born outside Canada	17.9 E	6.6–29.2	82.1	70.8–93.4
Non-Aboriginal	27.7	21.4–34.0	72.3	66.0–78.6
Aboriginal	86.7	74.2–99.3	F	…
Never smoked	27.7 E	14.5–40.9	72.3	59.1–85.5
Past smoker	20.1 E	11.2–28.9	79.9	71.1–88.8
Current smoker	43.5	30.3–56.8	56.5	43.2–69.7

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

Table 33 Percent of participants by highest score for debris and calculus by highest score – dentate adults

Characteristic	Debris score								Calculus score					
	0		1		2		3		0		1		2 + 3	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	13.6	10.0–18.2	59.5	56.1–62.8	20.7	17.2–24.6	6.3	4.5–8.6	35.7	29.7–42.2	53.6	46.9–60.2	10.7	8.6–13.1
Female	15.4	12.1–19.3	63.3	60.1–66.4	16.4	13.4–19.9	5.0 E	3.1–7.9	42.6	35.3–50.3	49.2	40.3–58.1	8.2	5.9–11.2
Male	11.7 E	7.6–17.8	55.7	51.3–60.0	25.0	20.5–30.1	7.6	5.5–10.2	28.7	23.3–34.8	58.1	52.9–63.2	13.2	10.3–16.6
Age 20–39	10.6 E	6.4–17.0	59.7	54.7–64.5	24.0	18.0–31.2	5.7 E	4.1–8.0	39.6	30.2–49.9	52.8	42.1–63.1	7.6 E	5.3–10.9
Age 40–59	15.2 E	10.8–21.0	59.9	54.8–64.8	18.4	15.2–22.0	6.5 E	3.7–11.1	34.0	28.2–40.3	54.0	47.7–60.2	11.9 E	8.5–16.5
Age 60–79	16.7	13.7–20.2	58.0	53.6–62.3	18.3	14.2–23.4	6.9	5.0–9.5	30.6	26.5–35.0	54.8	50.4–59.0	14.7	11.3–18.9
Higher income	14.0 E	9.9–19.5	64.0	58.9–68.9	18.0	14.6–22.0	3.9 E	2.4–6.3	39.6	31.8–48.0	53.3	44.9–61.5	7.1	5.8–8.6
Middle income	16.2 E	10.6–24.0	58.1	52.5–63.5	18.4	14.4–23.1	7.4 E	5.3–10.2	35.7	27.9–44.4	53.2	44.5–61.8	11.0	8.1–14.9
Lower income	9.1 E	5.8–14.0	50.6	45.6–55.5	30.2	24.2–37.0	10.1 E	6.4–15.6	25.1	20.4–30.4	56.7	50.7–62.6	18.1	13.4–24.2
Income missing	9.8 E	5.8–16.2	56.8	43.6–69.1	25.5 E	15.8–38.3	7.9 E	4.2–14.2	35.4	25.9–46.3	49.4	35.3–63.5	15.2 E	10.0–22.5
Privately insured	16.3	11.9–21.8	62.0	58.2–65.6	18.1	14.9–21.8	3.7 E	2.5–5.4	40.6	33.8–47.8	52.2	44.7–59.6	7.2	5.5–9.3
Publicly insured	F	…	49.3	35.5–63.3	23.8 E	15.6–34.4	20.6 E	10.6–36.1	29.0 E	17.8–43.5	49.7 E	33.0–66.5	21.3 E	12.1–34.8
Not insured	9.4	6.8–12.9	55.8	51.0–60.5	25.3	20.4–31.0	9.5	6.8–13.0	26.9	21.4–33.1	57.2	50.4–63.7	15.9	12.0–21.0
Visited a dental professional in the last year	15.4	11.6–20.3	62.7	59.2–66.1	17.8	14.2–22.0	4.1 E	2.6–6.4	40.9	34.4–47.8	52.0	44.5–59.4	7.1	5.1–9.7
Visited a dental professional more than one year ago	8.7 E	5.3–14.2	51.5	46.0–57.0	28.2	23.8–33.1	11.5 E	8.2–15.9	22.4	17.4–28.3	57.9	52.2–63.5	19.7	15.1–25.2
Highest Household Education = degree/diploma	14.5 E	10.2–20.1	60.9	57.2–64.5	19.0	15.5–23.2	5.6 E	4.0–7.8	38.4	32.4–44.8	53.6	46.8–60.3	8.0	6.5–9.8
Highest Household Education < degree/diploma	11.4 E	8.0–16.0	55.4	47.7–62.7	25.1	19.4–31.9	8.1 E	5.2–12.3	28.3	21.3–36.5	53.6	45.0–61.9	18.1	13.0–24.8
Born in Canada	14.2	10.3–19.3	60.8	57.1–64.4	19.9	16.0–24.4	5.1 E	3.7–7.1	37.2	30.2–44.7	54.0	46.4–61.4	8.8	7.2–10.7
Born outside Canada	11.7 E	8.0–16.9	55.4	51.0–59.7	23.1	18.5–28.5	9.8 E	6.6–14.3	31.2	24.9–38.3	52.5	47.2–57.7	16.3 E	11.2–23.2
Non-Aboriginal	13.7	10.0–18.4	59.5	56.1–62.7	20.7	17.4–24.6	6.1 E	4.3–8.6	35.8	29.8–42.3	53.5	46.8–60.0	10.7	8.6–13.3
Aboriginal	F	…	60.2	46.3–72.5	18.2 E	9.6–31.8	F	…	32.7 E	17.7–52.2	58.5	43.1–72.4	8.8 E	4.7–16.1
Never smoked	13.5	9.8–18.3	62.1	57.9–66.0	18.8	15.3–22.8	5.7 E	3.5–9.2	39.5	32.8–46.7	51.2	43.6–58.7	9.3	6.7–12.7
Past smoker	16.6	12.6–21.6	59.6	54.6–64.5	18.1	14.1–22.8	5.7 E	3.7–8.7	37.8	31.0–45.0	53.7	44.8–62.3	8.6	6.4–11.4
Current smoker	9.6 E	5.4–16.6	53.6	49.9–57.2	28.4	22.4–35.2	8.4 E	5.8–12.1	23.7	18.4–30.0	59.7	54.5–64.6	16.6	12.7–21.4

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 34 Percent of participants by highest score for gingivitis – dentate adults

Characteristic	0		1		2 + 3	
	%	95% CI	%	95% CI	%	95% CI
All	11.6	8.7–15.1	56.2	51.2–61.0	32.3	27.0–38.1
Female	15.7	11.8–20.7	56.9	50.0–63.6	27.4	21.4–34.3
Male	7.4 E	5.0–10.7	55.4	50.2–60.4	37.3	31.4–43.6
Age 20–39	15.8	11.7–20.9	50.1	44.5–55.8	34.1	28.3–40.5
Age 40–59	9.4	7.0–12.6	60.6	54.8–66.2	29.9	24.6–35.9
Age 60–79	6.9 E	4.8–9.9	59.4	54.0–64.6	33.7	27.2–40.8
Higher income	13.5	10.0–18.0	61.4	53.3–68.9	25.1	19.5–31.7
Middle income	11.2	8.1–15.2	55.9	51.5–60.3	32.9	27.1–39.3
Lower income	7.4 E	4.3–12.6	44.9	38.3–51.7	47.7	38.6–56.9
Income missing	10.4 E	5.9–17.7	49.0	36.4–61.7	40.6	29.8–52.4
Privately insured	13.9	10.5–18.2	58.9	52.3–65.2	27.2	21.7–33.5
Publicly insured	F	…	47.3	34.9–60.0	50.6	37.8–63.3
Not insured	8.3 E	5.7–12.1	52.0	46.4–57.5	39.7	32.7–47.2
Visited a dental professional in the last year	12.8	9.9–16.3	60.6	54.5–66.3	26.7	21.1–33.0
Visited a dental professional more than one year ago	8.4 E	5.2–13.4	44.0	38.8–49.4	47.6	39.9–55.4
Highest Household Education = degree/diploma	12.7	9.7–16.3	58.0	52.2–63.6	29.3	23.8–35.4
Highest Household Education < degree/diploma	8.8 E	5.8–13.1	50.5	45.3–55.7	40.7	35.0–46.7
Born in Canada	12.8	9.4–17.1	57.3	52.4–61.9	30.0	25.0–35.5
Born outside Canada	7.9	5.9–10.4	52.8	44.6–60.8	39.3	30.7–48.7
Non-Aboriginal	11.7	8.9–15.4	56.1	50.7–61.3	32.2	26.6–38.3
Aboriginal	F	…	59.5 E	31.8–82.2	F	…
Never smoked	11.9	8.9–15.7	56.2	48.8–63.3	31.9	25.6–39.0
Past smoker	13.5	9.8–18.2	60.6	55.4–65.5	26.0	20.6–32.1
Current smoker	8.3 E	4.8–14.1	50.1	43.6–56.5	41.6	33.1–50.7

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 35 Prevalence and severity of periodontal pockets by highest score – dentate adults

Characteristic	0–1 mm		2 mm		3 mm		4 mm		5 mm		≥ 6 mm		Mean pocket depth among those with at least one pocket ≥ 4 mm	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	mean	95% CI
All	2.9 E	1.8–4.7	42.6	38.0–47.3	34.3	30.5–38.4	11.2	10.0–12.5	4.8	3.7–6.2	4.1	3.1–5.4	4.87	4.74–5.01
Female	4.1 E	2.4–6.7	45.9	41.6–50.3	33.2	28.8–37.9	9.8	7.9–12.1	3.6 E	2.2–5.8	3.5 E	2.3–5.3	4.83	4.57–5.09
Male	1.8 E	0.9–3.4	39.2	33.0–45.8	35.5	31.3–39.8	12.7	11.1–14.5	6.1 E	4.3–8.5	4.7	3.5–6.3	4.90	4.77–5.03
Age 20–39	1.6 E	0.9–2.9	49.7	42.2–57.2	35.7	29.7–42.2	8.7	7.7–9.9	F	…	F	…	4.61	4.24–4.98
Age 40–59	F	…	39.8	35.7–44.1	34.0	30.0–38.2	12.6	10.3–15.3	5.6	4.2–7.4	5.4	4.0–7.3	4.91	4.72–5.10
Age 60–79	7.4 E	4.8–11.4	30.3	26.2–34.7	31.4	27.5–35.6	14.5	11.7–17.7	9.3	7.1–12.0	7.2	5.2–9.7	5.10	4.91–5.30
Higher income	F	…	45.9	40.0–51.9	35.0	30.0–40.4	10.2	8.7–11.9	3.4 E	2.4–4.9	3.0 E	1.8–4.8	4.75	4.48–5.01
Middle income	3.8 E	2.2–6.5	41.8	36.0–47.9	33.8	28.1–39.9	12.0	9.6–14.9	4.8 E	3.1–7.4	3.8 E	2.2–6.5	4.89	4.60–5.19
Lower income	F	…	34.7	26.8–43.5	35.0	27.7–43.0	13.8	11.3–16.6	7.7 E	5.4–10.9	6.8 E	4.3–10.7	4.96	4.70–5.22
Income missing	F	…	42.7	33.6–52.3	30.0	23.0–38.0	F	…	7.8 E	4.3–13.6	F	…	5.18	4.60–5.75
Privately insured	F	…	46.6	40.8–52.5	34.9	30.4–39.6	9.6	8.3–11.0	3.6 E	2.6–5.1	2.8 E	1.9–4.0	4.77	4.63–4.91
Publicly insured	F	…	27.1 E	18.2–38.4	35.0	26.7–44.3	19.5	14.4–26.0	F	…	F	…	4.68	4.38–4.98
Not insured	3.7 E	2.3–6.0	36.6	32.1–41.4	32.7	27.4–38.6	13.5	10.5–17.2	6.4 E	4.4–9.2	7.0 E	4.9–10.0	5.03	4.76–5.30
Visited a dental professional in the last year	3.0 E	1.7–5.3	46.5	41.9–51.1	33.4	28.9–38.2	9.0	7.6–10.7	4.4	3.4–5.5	3.7	2.8–5.0	4.91	4.76–5.06
Visited a dental professional more than one year ago	2.7 E	1.6–4.7	32.6	26.2–39.8	36.8	32.7–41.2	16.3	13.7–19.3	6.3 E	3.8–10.1	5.2 E	3.2–8.5	4.86	4.55–5.16
Highest Household Education = degree/diploma	2.6 E	1.4–4.7	45.0	39.6–50.5	34.6	30.3–39.1	11.0	9.7–12.4	3.1 E	2.2–4.3	3.7	2.7–5.0	4.83	4.69–4.97
Highest Household Education < degree/diploma	4.3 E	2.3–7.6	35.6	31.0–40.4	34.7	28.4–41.6	11.3 E	8.0–15.8	9.5 E	6.3–14.0	4.7 E	3.3–6.6	4.94	4.72–5.15
Born in Canada	3.2 E	1.8–5.5	44.6	39.3–50.0	35.1	31.0–39.5	10.4	9.0–12.1	4.0 E	2.8–5.7	2.7 E	1.7–4.1	4.71	4.50–4.91
Born outside Canada	2.2 E	1.3–3.6	36.5	30.8–42.5	32.0	26.6–37.8	13.7	10.7–17.3	7.2 E	5.1–10.0	8.5	6.2–11.4	5.16	4.96–5.37
Non-Aboriginal	3.0 E	1.9–4.8	42.8	38.3–47.3	34.1	30.2–38.2	11.2	9.8–12.7	4.8	3.7–6.2	4.2	3.2–5.4	4.88	4.74–5.03
Aboriginal	F	…	35.9 E	17.3–60.0	43.3	30.8–56.7	F	…	F	…	F	…	4.47	4.00–4.97
Never smoked	4.1 E	2.3–7.2	44.4	40.1–48.8	36.0	31.3–40.9	8.7	7.3–10.5	3.8	2.8–5.2	3.0 E	1.6–5.5	4.86	4.57–5.14
Past smoker	2.0 E	1.4–2.9	45.2	37.8–52.8	29.9	24.5–36.0	11.5	9.0–14.7	5.9 E	4.0–8.8	5.4 E	3.9–7.5	4.98	4.77–5.19
Current smoker	F	…	35.0	28.4–42.2	36.3	31.4–41.6	16.4	12.9–20.7	5.8 E	3.9–8.6	5.1 E	3.0–8.5	4.79	4.48–5.10

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 36 Prevalence and severity of attachment loss by highest score – dentate adults

Characteristic	0–1 mm		2 mm		3 mm		4 mm		5 mm		≥ 6 mm		Mean loss of attachment among those with attachment loss of at least ≥ 4 mm	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	mean	95% CI
All	36.0	30.0–42.5	23.5	21.1–26.1	19.4	16.4–22.8	9.4	7.2–12.2	5.7	4.6–7.0	6.0	4.6–7.7	5.21	5.04–5.37
Female	37.0	30.7–43.7	24.9	20.9–29.3	18.7	15.4–22.5	9.4	6.9–12.6	5.0 E	3.5–7.1	5.0 E	3.5–7.3	5.15	4.89–5.41
Male	35.1	28.9–41.8	22.1	19.4–25.1	20.1	16.7–24.0	9.5	7.1–12.6	6.3	5.2–7.6	6.9	5.1–9.3	5.26	5.08–5.44
Age 20–39	61.5	51.2–70.8	20.3	16.9–24.1	11.6 E	7.0–18.4	3.4 E	1.8–6.2	F	…	F	…	5.00	4.46–5.54
Age 40–59	20.6	15.0–27.5	28.8	24.6–33.5	24.5	20.8–28.5	11.6	8.8–15.0	7.6	5.6–10.3	6.9 E	5.0–9.6	5.19	4.97–5.42
Age 60–79	7.3 E	4.9–10.9	18.1	14.7–22.1	27.5	23.7–31.6	20.3	15.7–25.8	12.0	9.5–15.0	14.8	11.6–18.8	5.31	5.02–5.61
Higher income	35.5	27.8–44.0	24.4	20.9–28.2	21.4	17.2–26.3	9.4 E	6.5–13.3	5.7 E	4.0–8.1	3.6 E	2.5–5.2	4.89	4.72–5.06
Middle income	37.9	30.7–45.6	23.0	18.2–28.6	18.2	14.6–22.4	9.1	6.7–12.3	4.5 E	2.7–7.6	7.3 E	4.7–11.2	5.33	5.04–5.62
Lower income	32.2	24.1–41.4	25.0	20.9–29.5	18.0	14.8–21.7	10.6 E	7.5–14.7	5.3 E	3.1–9.0	9.0 E	5.6–14.3	5.43	4.88–5.99
Income missing	41.7	33.4–50.4	15.2 E	10.0–22.3	14.6 E	8.2–24.7	7.9 E	4.8–12.7	F	…	F	…	5.82	4.81–6.83
Privately insured	38.8	32.5–45.5	25.0	21.8–28.6	18.5	15.2–22.3	9.2	6.7–12.6	3.8 E	2.4–6.0	4.7 E	3.4–6.5	5.00	4.87–5.12
Publicly insured	24.5 E	12.3–42.7	21.0 E	11.8–34.5	31.8	22.7–42.6	8.6 E	4.8–14.9	F	…	7.8 E	4.1–14.4	5.36	4.76–5.96
Not insured	31.5	24.8–39.1	20.6	17.8–23.8	20.0	16.0–24.6	10.0	7.7–12.8	9.5	7.6–11.9	8.4	6.2–11.2	5.47	5.17–5.76
Visited a dental professional in the last year	35.6	29.8–41.9	23.3	20.4–26.6	20.2	16.9–23.8	9.9	7.6–12.8	4.9	3.6–6.7	6.1	4.8–7.8	5.17	4.99–5.35
Visited a dental professional more than one year ago	35.8	28.9–43.4	24.3	19.2–30.1	17.7	14.6–21.4	8.3 E	5.5–12.3	8.2 E	5.9–11.4	5.7 E	3.7–8.9	5.31	4.92–5.71
Highest Household Education = degree/diploma	38.6	31.7–46.1	23.0	20.7–25.4	19.8	16.3–23.8	9.2	7.0–12.1	4.4	3.3–6.0	4.9 E	3.5–6.9	5.10	4.94–5.26
Highest Household Education < degree/diploma	29.5	23.3–36.5	26.2	21.5–31.6	18.3	15.1–22.1	10.1 E	6.6–15.1	8.1	6.1–10.8	7.7	6.0–9.9	5.27	4.95–5.58
Born in Canada	39.1	33.3–45.3	23.2	20.5–26.1	19.3	15.7–23.4	9.1	6.9–12.1	5.5	4.4–6.9	3.8	3.0–4.8	4.90	4.75–5.05
Born outside Canada	26.7 E	18.3–37.2	24.5	20.1–29.6	19.9	15.6–25.0	10.2 E	6.9–15.0	6.2 E	4.0–9.4	12.4 E	8.6–17.7	5.81	5.46–6.16
Non-Aboriginal	35.9	30.1–42.3	23.7	21.3–26.3	19.1	16.2–22.4	9.5	7.3–12.4	5.6	4.5–6.8	6.1	4.7–7.9	5.22	5.05–5.38
Aboriginal	38.8 E	24.4–55.6	F	…	30.5 E	18.5–45.9	F	…	F	…	F	…	F	…
Never smoked	39.5	32.7–46.7	25.9	22.9–29.1	18.5	15.1–22.5	7.5 E	5.0–10.9	3.6 E	2.5–5.3	4.9 E	2.9–8.1	5.38	4.97–5.79
Past smoker	27.8	21.0–35.7	21.9	16.5–28.4	21.9	18.2–26.1	13.5	10.5–17.2	7.4 E	4.6–11.7	7.6 E	5.3–10.7	5.01	4.73–5.28
Current smoker	38.7	31.3–46.7	20.0	15.6–25.3	18.4 E	12.9–25.5	8.7 E	5.7–12.9	8.3 E	5.3–12.7	5.9	4.5–7.7	5.22	5.04–5.40

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 37 Prevalence of periodontal conditions according to CPITN scores – dentate adults

Characteristic	Healthy		Gingivitis		Calculus		Pockets 4–5 mm		Pockets > 5 mm	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	7.5	5.7–9.8	25.4	21.2–30.1	46.9	42.8–51.1	16.0	14.2–18.0	4.1	3.1–5.4
Female	10.2	7.8–13.3	29.9	24.1–36.5	43.1	36.7–49.7	13.3	10.5–16.7	3.5 E	2.2–5.3
Male	4.8 E	2.7–8.5	20.9	17.6–24.5	50.8	47.6–54.0	18.8	16.0–21.9	4.7	3.5–6.3
Age 20–39	10.9	7.9–14.7	27.9	21.1–35.9	48.3	40.4–56.3	11.2	9.2–13.6	F	…
Age 40–59	5.8 E	4.1–8.1	24.0	19.9–28.7	46.7	41.9–51.5	18.1	15.2–21.4	5.4	4.0–7.3
Age 60–79	2.9 E	1.8–4.9	22.5	18.6–27.0	43.8	37.7–50.2	23.6	21.4–26.0	7.1	5.2–9.7
Higher income	8.1 E	5.1–12.6	28.8	24.4–33.7	46.5	39.8–53.4	13.6	11.4–16.3	3.0 E	1.8–4.8
Middle income	8.3 E	5.3–12.6	24.2	17.5–32.6	47.0	40.1–54.1	16.7	13.8–20.1	3.8 E	2.2–6.5
Lower income	4.8 E	2.8–8.0	17.6	13.5–22.6	49.5	43.4–55.7	21.3	17.3–26.0	6.8 E	4.2–10.7
Income missing	7.2 E	4.2–12.2	27.3 E	19.2–37.3	42.5	32.4–53.3	15.9 E	10.8–22.9	F	…
Privately insured	9.3	7.2–11.9	28.9	24.5–33.8	45.8	40.4–51.3	13.2	11.6–14.9	2.8 E	1.9–4.0
Publicly insured	F	…	23.3 E	13.0–38.2	41.0	29.2–53.8	31.4	22.4–42.1	F	…
Not insured	4.8 E	2.6–8.9	18.3	14.1–23.3	50.1	45.6–54.6	19.9	15.9–24.5	7.0 E	4.9–10.0
Visited a dental professional in the last year	8.9	6.8–11.6	29.1	24.6–34.1	44.9	39.8–50.1	13.4	11.6–15.3	3.7	2.8–5.0
Visited a dental professional more than one year ago	3.6 E	2.4–5.5	16.4	12.7–20.9	52.3	49.5–55.1	22.5	18.6–26.9	5.2 E	3.2–8.4
Highest Household Education = degree/diploma	8.5	6.4–11.2	26.8	22.6–31.4	47.0	42.4–51.7	14.1	12.2–16.2	3.7	2.7–5.0
Highest Household Education < degree/diploma	5.1 E	3.2–7.9	22.3	16.5–29.4	47.3	40.2–54.5	20.7	16.5–25.6	4.7 E	3.3–6.6
Born in Canada	8.0	5.8–10.9	27.2	22.2–32.9	47.7	42.5–53.0	14.4	12.1–17.2	2.7 E	1.7–4.1
Born outside Canada	6.0	4.5–7.8	20.1	15.8–25.2	44.6	40.5–48.9	20.8	17.8–24.2	8.5	6.2–11.4
Non-Aboriginal	7.7	5.9–10.0	25.3	21.2–30.0	46.9	42.7–51.1	16.0	14.0–18.1	4.2	3.2–5.4
Aboriginal	F	…	29.5 E	16.5–47.0	48.4	36.7–60.3	F	…	F	…
Never smoked	8.8	6.3–12.0	28.0	23.0–33.6	47.7	42.3–53.2	12.5	10.8–14.6	3.0 E	1.6–5.5
Past smoker	8.0	6.0–10.7	26.9	21.9–32.5	42.3	36.9–47.9	17.4	14.1–21.3	5.4 E	3.9–7.5
Current smoker	4.0 E	2.2–7.2	17.5 E	12.5–24.0	51.4	48.3–54.5	22.1	17.5–27.5	5.0 E	3.0–8.4

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 38 Prevalence of incisor trauma – dentate adults

Characteristic	Lost				Fractured				Lost or fractured			
	% with 1 or more incisor teeth lost due to trauma		Mean number of incisor teeth lost due to trauma among those with at least one lost		% with 1 or more traumatized incisor teeth		Mean number of incisor teeth traumatized among those with at least one tooth affected		% with 1 or more lost or traumatized incisor teeth		Mean number of incisor teeth lost or traumatized among those with at least one tooth affected	
	%	95% CI	mean	95% CI	%	95% CI	mean	95% CI	%	95% CI	mean	95% CI
All	1.9 E	1.1–3.3	2.25	1.67–2.83	22.4	18.8–26.5	1.61	1.49–1.72	23.8	20.0–28.1	1.66	1.55–1.78
Female	1.3 E	0.8–2.2	1.58 E	1.00–2.18	18.3	14.2–23.2	1.53	1.37–1.70	19.2	15.3–23.8	1.57	1.39–1.74
Male	F	…	2.63 E	1.66–3.60	26.6	22.3–31.5	1.66	1.54–1.79	28.5	23.7–33.8	1.73	1.60–1.86
Age 20–39	F	…	1.27	1.00–1.55	24.5	20.0–29.7	1.55	1.43–1.66	25.2	20.7–30.4	1.58	1.48–1.67
Age 40–59	F	…	3.02 E	1.76–4.28	22.7	18.5–27.6	1.64	1.46–1.82	24.5	19.9–29.7	1.73	1.52–1.94
Age 60–79	2.6 E	1.6–4.3	2.04	1.39–2.69	16.6	12.0–22.4	1.72	1.44–2.00	18.6	14.1–24.1	1.74	1.49–2.00
Higher income	F	…	2.79 E	1.84–3.75	23.2	19.7–27.1	1.51	1.43–1.58	24.6	20.8–28.8	1.59	1.49–1.69
Middle income	F	…	1.36	1.01–1.71	21.6	16.8–27.4	1.64	1.47–1.80	22.5	17.5–28.4	1.67	1.53–1.81
Lower income	F	…	F	…	24.0	17.4–32.2	1.67	1.36–1.99	25.4	19.0–33.1	1.72	1.41–2.04
Income missing	F	…	F	…	15.6 E	10.8–22.0	2.28	1.64–2.91	19.2	14.9–24.3	2.14	1.67–2.61
Privately insured	F	…	2.41 E	1.59–3.24	22.6	19.6–26.0	1.54	1.45–1.63	23.8	20.5–27.4	1.58	1.49–1.68
Publicly insured	0.0	0.0–0.0			13.7 E	8.2–22.0	2.05 E	1.00–3.13	13.7 E	8.2–22.0	2.05 E	1.00–3.13
Not insured	F	…	2.06 E	1.08–3.04	23.3	17.2–30.7	1.71	1.53–1.88	25.3	18.7–33.3	1.79	1.57–2.01
Visited a dental professional in the last year	2.0 E	1.2–3.4	2.34	1.62–3.06	22.5	18.5–27.1	1.62	1.49–1.75	24.0	19.8–28.7	1.68	1.54–1.81
Visited a dental professional more than one year ago	F	…	1.94 E	1.00–2.94	22.6	17.8–28.3	1.58	1.42–1.75	23.9	18.8–29.9	1.63	1.47–1.79
Highest Household Education = degree/diploma	1.8 E	1.1–2.9	2.18 E	1.39–2.97	22.4	18.5–26.9	1.61	1.51–1.71	24.0	19.8–28.6	1.67	1.55–1.78
Highest Household Education < degree/diploma	F	…	1.80 E	1.00–2.63	23.6	17.2–31.5	1.62	1.35–1.88	24.6	18.2–32.4	1.67	1.43–1.91
Born in Canada	1.8 E	1.0–3.1	2.42	1.65–3.18	23.4	20.0–27.2	1.58	1.46–1.70	24.7	21.1–28.8	1.63	1.51–1.75
Born outside Canada	F	…	1.84 E	1.22–2.45	19.3	14.1–25.8	1.72	1.57–1.88	20.9	15.8–27.3	1.78	1.58–1.99
Non-Aboriginal	1.9 E	1.1–3.4	2.26	1.68–2.84	22.5	18.7–26.8	1.62	1.50–1.74	23.9	19.9–28.4	1.67	1.56–1.79
Aboriginal	F	…	F	…	19.9 E	10.8–33.5	1.22	1.00–1.56	19.9 E	10.8–33.5	1.23	1.00–1.58
Never smoked	1.3 E	0.7–2.5	2.33 E	1.38–3.27	21.0	16.7–26.2	1.62	1.42–1.81	22.2	17.7–27.5	1.67	1.48–1.86
Past smoker	2.1 E	1.2–3.9	1.95	1.39–2.51	24.5	19.8–29.8	1.60	1.48–1.71	26.0	21.3–31.3	1.63	1.51–1.75
Current smoker	F	…	F	…	22.8	17.9–28.4	1.61	1.45–1.76	24.4	19.1–30.6	1.70	1.51–1.90

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 39 Prevalence and severity of fluorosis (Dean's Index) – ages 6–12

Characteristic	Normal		Questionable		Very mild		Mild		Moderate		Severe		Moderate + severe	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	59.8	51.8–67.2	23.5	18.2–29.8	12.0	9.4–15.3	4.4 E	2.6–7.4	F	…	0.0	0.0–0.0	F	…
Female	59.7	51.8–67.1	23.5	18.2–29.7	13.2 E	9.3–18.4	3.2 E	1.9–5.3	F	…	0.0	0.0–0.0	F	…
Male	59.9	49.8–69.2	23.5	16.8–31.9	11.0	8.1–14.8	F	…	F	…	0.0	0.0–0.0	F	…
Higher income	59.3	53.2–65.1	22.3	18.1–27.2	12.3	9.6–15.7	5.9 E	3.8–9.1	F	…	0.0	0.0–0.0	F	…
Middle income	65.4	55.7–74.0	24.1 E	16.7–33.3	8.6 E	5.1–14.1	F	…	F	…	0.0	0.0–0.0	F	…
Lower income	56.2	40.6–70.7	23.1 E	15.0–33.9	15.1 E	8.2–26.3	F	…	F	…	0.0	0.0–0.0	F	…
Income missing	50.0 E	32.1–67.9	F	…	F	…	0.0	0.0–0.0	F	…	0.0	0.0–0.0	F	…
Privately insured	57.2	48.9–65.2	23.7	18.1–30.5	13.9	10.4–18.3	5.1 E	3.3–7.7	F	…	0.0	0.0–0.0	F	…
Publicly insured	66.9	52.6–78.6	17.2 E	8.9–30.6	10.4 E	5.8–18.0	F	…	F	…	0.0	0.0–0.0	F	…
Not insured	63.5	53.1–72.7	25.9 E	17.6–36.5	F	…	F	…	F	…	0.0	0.0–0.0	F	…
Visited a dental professional in the last year	61.4	52.8–69.4	22.1	16.4–29.0	12.0	8.9–16.0	4.4 E	2.8–6.8	F	…	0.0	0.0–0.0	F	…
Visited a dental professional more than one year ago	48.0	36.1–60.1	35.6 E	22.2–51.8	F	…	F	…	F	…	0.0	0.0–0.0	F	…
Highest Household Education = degree/diploma	59.2	50.2–67.7	23.3	17.8–30.0	12.5	9.3–16.6	4.7 E	3.0–7.4	F	…	0.0	0.0–0.0	F	…
Highest Household Education < degree/diploma	63.7	51.6–74.4	21.8 E	15.0–30.5	10.7 E	6.9–16.1	F	…	F	…	0.0	0.0–0.0	F	…
Born in Canada	60.6	52.6–68.1	23.7	18.0–30.5	11.4	8.8–14.5	4.1 E	2.6–6.5	F	…	0.0	0.0–0.0	F	…
Born outside Canada	49.2 E	31.0–67.6	21.5 E	12.7–34.1	F	…	F	…	F	…	0.0	0.0–0.0	F	…
Non-Aboriginal	59.2		23.7	18.5–30.0	12.3	9.6–15.6	4.6 E	2.7–7.7	F	…	0.0	0.0–0.0	F	…
Aboriginal	70.6	51.8–84.2	F	…	F	…	F	…	F	…	0.0	0.0–0.0	F	…

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 40 Prevalence of soft tissue lesions by type – adults

Characteristic	1 or more lesions		Angular Chelitis		Denture Stomatitis		Glossitis		Sinus or Fistula		Traumatic or other ulcer		Other	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	11.6	9.4–14.2	0.5 E	0.3–0.8	3.9	2.9–5.1	0.7 E	0.4–1.2	1.0	0.8–1.3	1.8 E	1.3–2.7	1.9 E	1.2–2.9
Female	11.7	9.1–15.1	F	…	4.1	3.2–5.0	0.6 E	0.3–1.1	F	…	2.1 E	1.4–3.1	2.0 E	1.1–3.5
Male	11.4	9.3–14.0	F	…	3.7 E	2.4–5.5	F	…	1.1 E	0.6–1.8	1.6 E	1.0–2.6	1.8 E	1.1–2.8
Age 20–39	5.6	4.2–7.5	F	…	F	…	F	…	F	…	F	…	F	…
Age 40–59	12.9	10.0–16.3	F	…	4.2 E	2.8–6.2	F	…	1.0 E	0.6–1.8	2.1 E	1.3–3.4	2.4 E	1.3–4.5
Age 60–79	20.0	15.1–26.0	F	…	9.1	6.5–12.5	F	…	F	…	3.2 E	1.8–5.8	2.5 E	1.6–3.9
Higher income	8.6	6.8–10.8	F	…	2.5 E	1.7–3.7	F	…	F	…	2.3 E	1.4–3.7	1.6 E	1.1–2.4
Middle income	13.3	9.6–18.1	F	…	4.6	3.5–6.2	F	…	F	…	F	…	1.4 E	0.8–2.5
Lower income	16.0	11.6–21.7	F	…	5.7 E	3.8–8.5	F	…	F	…	F	…	3.0 E	1.8–5.1
Income missing	12.0 E	7.3–19.0	F	…	4.6 E	2.5–8.2	F	…	F	…	F	…	F	…
Privately insured	7.5	5.4–10.3	F	…	2.0 E	1.4–3.0	F	…	F	…	1.7 E	0.9–3.1	1.4 E	0.9–2.2
Publicly insured	21.2 E	14.2–30.5	F	…	F	…	F	…	F	…	F	…	F	…
Not insured	17.5	14.2–21.5	F	…	6.5 E	4.4–9.6	F	…	2.5 E	1.7–3.6	2.1 E	1.2–3.6	2.6 E	1.4–5.0
Visited a dental professional in the last year	8.9	7.4–10.6	F	…	2.4	1.9–3.1	F	…	F	…	1.7 E	1.2–2.5	1.8 E	1.0–3.1
Visited a dental professional more than one year ago	17.1	12.9–22.3	F	…	6.3 E	4.3–9.2	F	…	F	…	F	…	2.4 E	1.4–4.0
Highest Household Education = degree/diploma	9.3	7.0–12.3	F	…	3.1 E	1.9–4.8	0.4 E	0.2–0.7	F	…	1.6 E	0.9–2.7	1.6 E	1.0–2.5
Highest Household Education < degree/diploma	18.1	13.4–24.1	F	…	6.3	4.6–8.6	F	…	F	…	F	…	F	…
Born in Canada	11.8	9.6–14.3	0.6 E	0.4–1.0	4.2	3.0–5.8	F	…	0.7 E	0.4–1.2	1.6 E	1.1–2.3	1.8 E	1.2–2.8
Born outside Canada	11.1 E	7.9–15.4	F	…	2.8 E	2.0–4.0	F	…	2.1 E	1.5–3.1	2.6 E	1.4–4.7	F	…
Non-Aboriginal	11.7	9.5–14.3	0.4 E	0.2–0.7	3.9	2.9–5.3	0.7 E	0.4–1.3	1.0	0.8–1.4	1.9 E	1.3–2.7	1.9 E	1.3–3.0
Aboriginal	F	…	F	…	F	…	0.0	0.0–0.0	F	…	0.0	0.0–0.0	0.0	0.0–0.0
Never smoked	10.3	7.4–14.0	F	…	3.2 E	2.1–4.8	F	…	1.2	0.9–1.6	1.8 E	1.0–3.3	F	…
Past smoker	10.7	8.4–13.6	F	…	4.2	3.1–5.7	F	…	F	…	1.7 E	1.0–2.8	1.7 E	0.9–2.9
Current smoker	15.8	11.9–20.7	F	…	4.8 E	3.3–6.9	F	…	F	…	F	…	F	…
Dentate	9.6	7.9–11.6	F	…	2.7 E	1.9–3.7	0.6 E	0.3–1.1	1.1	0.8–1.4	1.6 E	1.1–2.5	1.8 E	1.1–2.9
Edentulous	40.9	30.0–52.9	F	…	20.9	16.9–25.7	F	…	F	…	F	…	F	…

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 41 Prevalence of less than acceptable occlusion among 12–59 year olds*

Characteristic	Age group							
	Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Ages 12–59 years	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	18.5	15.2–22.3	24.3	21.2–27.6	25.9	21.38–30.98	24.0	20.9–27.5
Female	17.5	12.8–23.6	21.9	18.1–26.2	22.0 E	15.56–30.04	21.2	17.2–25.8
Male	19.3	16.6–22.4	26.6	22.3–31.5	29.8	24.74–35.46	26.8	23.5–30.3
Higher income	15.8	12.1–20.4	24.3	19.2–30.3	29.0	24.90–33.56	25.5	21.9–29.4
Middle income	19.5	15.2–24.6	25.5	20.7–31.0	19.2 E	12.94–27.48	22.4	18.2–27.2
Lower income	26.1 E	16.2–39.2	25.9	20.0–32.8	26.9 E	16.50–40.61	26.3	21.1–32.2
Income missing	14.3 E	8.5–22.9	F	…	F	…	14.3 E	9.9–20.1
Privately insured	16.6	13.9–19.8	24.8	21.7–28.1	24.9	20.49–29.80	23.5	20.6–26.6
Publicly insured	F	…	26.5 E	18.3–36.7	F	…	18.8 E	10.6–31.2
Not insured	25.6	19.5–32.7	23.4 E	15.4–33.8	30.0	22.65–38.52	26.4	20.5–33.2
Visited a dental professional in the last year	15.4	12.9–18.3	23.5	19.8–27.6	24.8	19.94–30.37	22.7	19.6–26.0
Visited a dental professional more than one year ago	32.9	25.1–41.9	25.3	19.6–32.1	28.8	21.36–37.50	27.3	22.7–32.4
Highest Household Education = degree/diploma	17.8	14.9–21.0	22.8	19.4–26.5	26.8	21.96–32.33	23.7	20.6–27.0
Highest Household Education < degree/diploma	21.4	16.2–27.6	31.9 E	22.0–43.6	21.1 E	14.60–29.42	25.1	20.3–30.5
Born in Canada	18.8	15.4–22.8	23.0	19.0–27.5	25.6	21.17–30.61	23.2	19.9–26.9
Born outside Canada	F	…	28.8	22.6–35.8	26.7 E	17.40–38.68	26.8	21.2–33.2
Non-Aboriginal	17.0	14.1–20.4	24.1	20.9–27.7	26.3	21.80–31.41	23.9	20.8–27.4
Aboriginal	43.1 E	24.3–64.2	F	…	F	…	F	…
Never smoked	16.9	14.2–20.1	26.5	23.3–30.0	25.3	20.01–31.38	23.8	21.2–26.7
Past smoker	F	…	18.5 E	12.9–25.8	29.1	21.83–37.55	25.1	19.4–31.9
Current smoker	29.6 E	17.9–44.8	23.4	18.2–29.5	21.4 E	14.93–29.58	23.1	18.2–28.9

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size
* Only asked of individuals with dentate on both arches

TABLE 42 Prevalence of receiving orthodontic treatment currently or in the past – ages 6–79

Characteristic	Age group											
	Children 6–11 years		Adolescents 12–19 years		Young adults 20–39 years		Adults 40–59 years		Older adults 60–79 years		Ages 6–79 years	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	7.9	5.8–10.6	35.9	30.3–41.8	28.5	25.3–31.9	12.7	9.7–16.5	6.2 E	4.3–8.8	19.4	17.3–21.5
Female	9.5 E	6.8–13.1	42.7	35.1–50.5	32.1	26.7–38.2	15.9	12.2–20.3	8.3 E	5.8–11.7	22.6	19.7–25.8
Male	6.3 E	4.1–9.6	29.5	24.8–34.7	24.9	21.3–29.0	9.6 E	6.3–14.4	F	…	16.1	14.5–17.8
Higher income	10.1 E	7.0–14.5	45.8	39.8–52.0	33.4	25.9–41.8	16.0	12.1–20.8	9.7 E	5.7–16.1	23.4	20.8–26.2
Middle income	6.4 E	3.4–11.9	29.5 E	19.9–41.4	24.5	18.8–31.2	F	…	F	…	15.4	12.4–19.0
Lower income	F	…	19.4 E	12.1–29.6	24.7 E	17.2–34.1	9.5 E	4.9–17.5	F	…	14.4	10.7–19.1
Income missing	F	…	40.3	29.4–52.4	27.8 E	16.7–42.5	F	…	F	…	22.5	18.6–26.9
Privately insured	9.1	6.7–12.2	40.9	35.9–46.1	31.8	27.7–36.3	14.9	11.6–18.9	5.8 E	3.8–8.7	22.7	20.5–25.0
Publicly insured	F	…	F	…	F	…	F	…	F	…	11.9 E	6.2–21.7
Not insured	4.6 E	3.0–6.9	29.8	21.7–39.3	22.0	17.5–27.1	6.9 E	3.9–12.0	6.1 E	3.9–9.6	13.4	11.3–15.9
Visited a dental professional in the last year	8.8	6.5–11.7	40.9	35.6–46.4	33.0	28.8–37.5	14.4	10.5–19.5	7.2	5.3–9.8	21.6	19.3–24.2
Visited a dental professional more than one year ago	F	…	11.5 E	7.7–16.8	21.2	16.3–27.0	7.4 E	4.0–13.5	F	…	13.1	10.5–16.1
Highest Household Education = degree/diploma	8.3 E	5.9–11.6	40.8	34.7–47.2	30.3	27.2–33.5	14.1	10.2–19.0	7.3 E	4.6–11.4	21.5	19.6–23.6
Highest Household Education < degree/diploma	7.0 E	3.7–12.8	24.9	19.9–30.8	21.2 E	14.9–29.4	10.3 E	7.1–14.9	4.3 E	2.6–6.9	13.7	11.2–16.6
Born in Canada	7.1	5.1–9.8	36.8	30.7–43.4	31.3	27.6–35.3	13.1	9.5–17.7	5.9 E	3.9–9.0	20.8	18.5–23.3
Born outside Canada	F	…	27.7 E	15.4–44.7	18.7 E	12.7–26.5	11.8 E	7.5–18.1	6.8 E	4.7–9.7	14.2	11.3–17.8
Non-Aboriginal	8.2	6.1–10.9	36.7	31.3–42.6	28.5	25.1–32.2	12.3	9.9–15.0	6.3 E	4.5–8.8	19.3	17.4–21.3
Aboriginal	F	…	F	…	F	…	F	…	0.0	0.0–0.0	F	…
Never smoked	Not applicable		38.1	33.2–43.3	32.4	28.5–36.6	15.8	11.7–21.1	8.3 E	5.8–11.7	25.5	22.8–28.5
Past smoker			F	…	25.4 E	17.8–35.0	11.0 E	6.5–18.1	4.0 E	2.1–7.6	13.0	10.0–16.8
Current smoker			24.1 E	14.4–37.6	22.0	16.8–28.2	9.0 E	6.4–12.6	F	…	15.6	13.3–18.2

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size

TABLE 43 Percent of individuals by type of treatment need – dentate ages 6–79

Characteristic	Urgent		Surgery		Endodontics		Restorations		Prosthodontics		Periodontics		Orthodontics		Miscellaneous*		No treatment needed	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All	1.8 E	1.1–2.9	7.3	5.4–9.8	1.0 E	0.6–1.6	16.4	13.8–19.3	3.7	2.9–4.8	1.9 E	1.3–2.9	1.7 E	1.1–2.6	0.4 E	0.2–0.6	65.8	60.1–71.1
Female	F	…	5.4	3.9–7.4	0.7 E	0.5–1.0	15.9	13.4–18.7	3.6	2.8–4.6	1.7 E	0.9–3.2	1.5 E	0.9–2.5	F	…	69.3	64.5–73.7
Male	2.0 E	1.1–3.6	9.2	6.7–12.7	F	…	16.9	14.0–20.3	3.8 E	2.8–5.3	2.2 E	1.4–3.3	1.9 E	1.3–2.9	F	…	62.3	55.4–68.7
Age 6–11	2.0 E	1.3–3.2	1.4 E	0.8–2.4	F	…	12.1	9.5–15.3	0.0	0.0–0.0	0.0	0.0–0.0	8.2 E	5.4–12.3	F	…	75.9	70.3–80.7
Age 12–19	F	…	F	…	F	…	13.0 E	8.4–19.6	F	…	F	…	6.4 E	4.5–9.1	F	…	75.1	66.5–82.0
Age 20–39	F	…	11.5 E	8.0–16.2	1.8 E	0.9–3.3	14.1	11.6–17.0	F	…	F	…	F	…	F	…	66.8	60.4–72.7
Age 40–59	F	…	5.8 E	3.9–8.6	F	…	20.5	16.5–25.1	4.6 E	2.9–7.3	3.2 E	2.1–4.7	F	…	F	…	62.8	56.1–69.0
Age 60–79	F	…	7.8 E	5.2–11.6	F	…	17.2	14.5–20.3	12.9	10.2–16.0	F	…	0.0	0.0–0.0	F	…	57.2	51.0–63.2
Higher income	F	…	4.3	3.2–5.6	F	…	13.3	9.6–18.1	2.4 E	1.5–4.0	1.5 E	1.0–2.3	1.7 E	1.1–2.4	F	…	74.4	69.4–78.9
Middle income	F	…	9.6 E	6.1–14.9	F	…	17.4	14.4–20.9	4.8 E	3.4–6.6	1.9 E	1.1–3.0	2.0 E	1.2–3.1	F	…	61.0	52.4–69.0
Lower income	1.9 E	1.4–2.7	11.2 E	7.4–16.6	F	…	23.1	19.7–26.9	5.1	3.7–7.0	F	…	F	…	F	…	53.4	45.6–61.1
Income missing	F	…	7.5 E	3.9–13.7	F	…	15.2 E	8.6–25.5	F	…	F	…	F	…	F	…	61.1	54.4–67.5
Privately insured	1.1 E	0.6–2.1	5.0 E	3.3–7.4	F	…	14.5	11.9–17.4	2.5 E	1.7–3.8	1.3 E	0.8–2.0	1.9 E	1.2–2.9	0.2 E	0.1–0.4	72.9	67.3–77.8
Publicly insured	5.2 E	3.0–9.0	11.2 E	6.5–18.6	F	…	25.1	20.6–30.3	F	…	F	…	2.2 E	1.2–3.9	F	…	46.6	38.4–54.8
Not insured	F	…	11.9	8.6–16.1	F	…	19.1	15.1–23.9	5.7	4.5–7.3	3.5 E	2.2–5.6	1.4 E	0.8–2.3	F	…	53.7	47.3–60.0
Visited a dental professional in the last year	1.2 E	0.7–2.0	4.5 E	3.0–6.7	0.9 E	0.5–1.5	12.8	10.8–15.2	3.4	2.5–4.6	1.5 E	1.0–2.4	1.8 E	1.2–2.7	0.4 E	0.2–0.7	73.5	68.9–77.6
Visited a dental professional more than one year ago	F	…	14.6	11.5–18.5	F	…	27.9	21.6–35.2	4.8 E	3.1–7.4	3.3 E	1.9–5.6	F	…	F	…	42.6	34.8–50.8
Highest Household Education = degree/diploma	1.1 E	0.6–2.2	5.9 E	4.2–8.3	1.0 E	0.6–1.8	14.2	11.6–17.3	3.3 E	2.1–5.0	1.8 E	1.2–2.8	1.8 E	1.1–2.8	0.4 E	0.2–0.8	70.4	64.5–75.7
Highest Household Education < degree/diploma	F	…	11.0 E	6.8–17.3	F	…	22.7	19.4–26.4	5.6 E	3.9–8.1	1.9 E	1.1–3.5	F	…	F	…	51.6	44.9–58.2
Born in Canada	1.4 E	0.8–2.2	6.9	5.0–9.4	0.9 E	0.5–1.5	16.8	14.1–20.0	3.9	3.1–4.9	1.1 E	0.7–1.8	2.1 E	1.4–3.2	0.2 E	0.1–0.3	66.8	60.4–72.7
Born outside Canada	F	…	8.9 E	6.0–13.0	F	…	14.8	11.3–19.2	F	…	5.0 E	3.4–7.2	F	…	F	…	62.1	54.2–69.4
Non-Aboriginal	1.7 E	1.0–3.0	7.2	5.3–9.7	0.9 E	0.5–1.6	16.2	13.5–19.2	3.8	2.9–5.0	2.0 E	1.3–2.9	1.7 E	1.1–2.6	0.4 E	0.2–0.7	66.1	60.3–71.5
Aboriginal	F	…	11.2 E	5.7–20.7	F	…	23.4	17.6–30.3	F	…	F	…	F	…	0.0	0.0–0.0	55.6	44.1–66.6
Never smoked	2.0 E	1.1–3.6	6.0	4.3–8.2	F	…	14.6	11.6–18.3	3.0 E	2.0–4.3	1.7 E	1.0–2.9	1.8 E	1.1–2.8	F	…	69.9	64.1–75.2
Past smoker	F	…	6.3 E	3.7–10.6	F	…	18.7	14.9–23.3	5.1	3.9–6.6	2.6 E	1.6–4.1	F	…	F	…	65.0	57.9–71.5
Current smoker	F	…	15.0	10.9–20.4	F	…	19.9	15.2–25.6	5.7 E	3.8–8.5	F	…	F	…	F	…	50.8	42.5–58.9

E Interpret with caution (high sampling variability; coefficient of variation 16.6% to 33.3%)
F Estimate not provided because of extreme sampling variability or small sample size
* Miscellaneous needs include Temporomandibular Joint Disorder, esthetics, or soft tissue needs, as well as needs classified as other