

Comparing Characteristics of Canadians Who Visited Dentists and Physicians During 1993/94: A Secondary Analysis

• Wael Sabbah, BDS, M.Sc. •
• James L. Leake, DDS, M.Sc., FRCD(C) •

A b s t r a c t

Unlike medical care, dental services are not included in Canada's universal system of health care. Using the data from the 1994 National Population Health Survey, we estimate the proportion of the population aged 12 and older visiting dentists and physicians in 1993/94 and compare the factors that influence the use of dentists' and physicians' services. Overall, 52.4% of Canadians made one or more visits to a dentist and 78.4% visited a physician. Logistic regression analysis indicates that whereas visiting a family physician is more likely to occur for people who are ill (generally, on medications or needing help with daily living) or pregnant, visiting a dentist is more likely to occur for young, healthy, wealthy and highly educated people. Future dental health policy needs better information on health status linked to use of services.

MeSH Key Words: comparative study; dental health services/utilization; health services/utilization

© J Can Dent Assoc 2000; 66:90-5
This article has been peer reviewed.

Dental care is not part of Canada's publicly financed and administered system of insured health care. Bringing dental care into that system has been recommended a number of times, from the proposal of the 1935 Employment and Social Insurance Act¹ through subsequent reviews, including the 1964 Royal Commission on Health Services.² Thus, in contrast to the universal, comprehensive medical and hospital care system, the dental care system in Canada consists of publicly financed but limited services for people on income support, publicly financed universal children's dental programs in four provinces, seniors' care in one province and the territories, private insurance for employed individuals and their dependants and out-of-pocket payments for most others.³

A substantial literature indicates that the factors that increase utilization of dental care services are higher levels of education,⁴⁻⁸ higher income,⁴⁻⁹ younger age,^{4,6} having natural teeth,^{4,6,9,10} being employed,^{4,8} being of higher social class,¹¹ residence history and location,⁴⁻⁹ sex (female),^{4,6} having dental insurance,^{6,12} behaving preventively,⁴ having positive attitudes toward health,^{4,11} having a better supply of dentists^{4,6,13} and race, ethnicity and cultural background.^{4,8,14,15} Factors that increase physician visits are reported to include poor general

health¹⁶ and older age, disability, chronic diseases and socioeconomic status.¹⁷

Even with no universal dental insurance program, the percentage of Canadians visiting a dentist in a year increased from 15% in 1950¹⁸ to 51% in 1979.⁴ By comparison, 76% of Canadians visited a physician in 1979.¹⁹ More recent percentages of Canadians visiting dentists are not known; however, we do know that poor people, recent immigrants and seniors have more morbidity and higher treatment needs for both general^{16,17} and oral health.²⁰⁻²²

We set out to determine the current rate of dental visiting in Canada, to identify the determinants of utilization of dentists, and to compare those determinants with the determinants for visiting primary care physicians.

Methods

Data Source

Data for this study were obtained from the 1994/95 National Population Health Survey²³ (NPHS94). The NPHS94 was conducted by Statistics Canada in 1994/95 to gather information on Canadians' health risks, health status, health problems and their consequences, and health care utilization. Personal interviews were conducted for all subjects

except for a few in British Columbia. The NPHS94 included a sample size of 26,429 household residents in all provinces, with the exclusion of populations on reserves, Canadian Forces bases, Yukon, the Northwest Territories and some remote areas in Quebec and Ontario. Children under 12 years of age were not included in the NPHS94.

The NPHS94 included a question about the number of visits to a physician and to a dentist or orthodontist in the past year. Because the survey was not designed to collect data specific to dentistry, it had no questions about the oral health status of the population, no information on dental insurance plans, no questions on the use of other dental care providers (e.g., denturists and dental therapists) and no information on the use of fluoridated water.

To augment the database, we obtained the population-to-dentist ratio for each province from the Canadian Dental Association and added it to each record in the file.

Dependent Variables

The reported number of visits to dentists was highly skewed; therefore, that number and the number of visits to physicians were recoded to a dichotomous variable to indicate use (one or more visits in the previous year) or non-use of care.

Independent Variables

Based on the literature review, factors that were likely to determine dentist or physician utilization were selected from the data set. These were classified according to Andersen^{24,25} into predisposing, enabling and need factors.

Predisposing factors included socio-economic and demographic factors (e.g., age, sex, marital status, recent immigration, language spoken, owning a house, education level and currently attending school) and health attitudes (e.g., smoking, preventive behaviours and fear of dentist).

Enabling factors were the ability to pay (as indicated by employment status, working hours (part-time or full-time),

household income and income adequacy and community resources (i.e., the population-to-dentist ratio). The difference between the two health care delivery (medical and dental) systems also could be considered a major enabling factor, but this was not analysed statistically.

Need factors were limited in the data set to needing help in daily living due to health problems, number of medications taken, self-reported general health and pregnancy.

Data analysis

We first obtained the percentage of people visiting by province and by age group: adolescents (12-19 years), adults (20-64 years) and seniors (65 and over). We then examined the relationship between visiting and the independent variables using odds ratios and their 95% confidence intervals. Logistic regression analysis was then conducted using the factors found to be significant to identify those variables that had an independent effect on the utilization of either dentists or family physicians. Some of the variables associated with lower utilization (e.g., unemployment) could not be factors for the adolescents and seniors. Therefore, we ran three separate logistic regression analyses for the adolescents, adults and seniors.

Odds ratios (OR) provide an easily interpreted indication of the strength of a relationship. They are accepted as being beyond chance if their 95% confidence interval (95% CI) does not include unity (1.0), since factors with no association would have an odds ratio of 1.0. Logistic regression provides OR and their CI for each important factor, independently of all others.

Results

The household response rate at the national level was 88.7% and varied at the provincial level from 85.2% in Ontario to 93.2% in Alberta.

Across Canada, of 17,626 respondents, 52.4% reported at least one visit to a dentist or an orthodontist in the previous

Table 1 Percentage of Canadians reporting one or more visits to a dentist by age group and province, 1993/94

	Adolescents (12-19)	Adults (20-64)	Seniors (65+)	All ages
British Columbia	75.0 (240)	58.5 (1,691)	42.6 (352)	57.8 (2,283)
Alberta	69.9 (146)	53.2 (988)	42.0 (176)	53.6 (1,310)
Saskatchewan	65.0 (100)	42.4 (662)	24.3 (243)	53.6 (1,005)
Manitoba	66.2 (139)	52.0 (972)	29.4 (309)	47.8 (1,419)
Ontario	77.5 (503)	63.5 (3,699)	43.5 (984)	61.1 (6,186)
Quebec	73.6 (299)	46.9 (1,916)	23.1 (364)	46.6 (2,579)
New Brunswick	66.1 (121)	47.7 (778)	27.5 (211)	45.6 (1,110)
Nova Scotia	69.3 (88)	52.8 (634)	24.9 (189)	48.6 (911)
Prince Edward Island	79.0 (81)	54.0 (630)	36.9 (187)	52.7 (898)
Newfoundland/Labrador	49.2 (130)	37.9 (660)	13.3 (128)	36.1 (918)
Canada	71.4 (1,847)	54.1 (12,630)	34.3 (3,143)	52.4 (17,620)

(n) = denominator for that cell

year (1993). The mean number of dentist visits for the whole sample was 1.1 (Standard error of the mean [SEM] = 0.01). The mean number of visits among users was 2.1 (SEM = 0.02). The highest number of visits was 12. Over the same period, 78.4% of the respondents reported one or more visits to a family physician in the previous year. The mean number of physician visits for the whole sample was 3.74 (SEM = 0.04). The mean number of visits among users was 4.76 (SEM = 0.05). The highest number of visits was 31.

In all provinces, utilization was highest among adolescents and lowest among seniors (Table 1). While the highest rate of utilization for teenagers was observed in Prince Edward Island (79%), Ontario had the highest rates of utilization for adults (63.5%) and seniors (43.5%). Lowest rates of utilization for all three ages were observed in Newfoundland.

The independent predictors of people who visited a dentist were younger age, higher level of education, higher household income, residing in a province with a lower population-to-dentist ratio, non-smoking, being employed and having good general health (Table 2). Age had the greatest independent effect on dentist visits. The OR show that adolescents were almost three times (OR = 2.8; 95% CI = 2.7-2.9) more likely than the rest of the population to have visited a dentist. Good general health had the smallest independent effect on dentist visits; people who had good health were only 1.2 times more likely than people with poor health to have visited a dentist.

The significant predictors of utilization of dentists were also broken down by age group (Table 3). Eight variables were

found to have independent effect on dentist visits by adults, with education being the strongest and "taking no medications" weakest. For adolescents, "not needing help with the activities of daily living" had the strongest effect and the population-to-dentist ratio had the weakest. For seniors, six factors were significant, with education having the greatest effect. While none of the factors had a strong influence singly (OR above 5.0), the accuracy of the logistic models ranged from 65% to 70%, showing that these factors determined much of the visiting behaviour.

The variables that independently predicted family physician use were pregnancy, using medications, taking precautions to avoid injuries, poor general health, needing help for activities of daily living, being female and being a non-smoker (Table 4).

The influence of general health on the utilization of dentists and physicians is graphically illustrated in Figure 1. Decreasing levels of general health increased the proportion of people visiting a physician but decreased visitors to dentists.

Discussion

Since 1978-79, there may have been a small increase (from 51.0% to 52.4%) in the percentage of people reporting at least one visit to a dentist in the previous year. However, the earlier survey¹⁹ included children aged 11 and younger, who reported higher rates of visiting than did older people. By our own calculations, if these age groups had not been included, the national rate in 1978-79 would have been 51.6%. Thus, there has been little, if any, change in the proportion of Canadians making one or more annual visits to dentists over the 15-year

Table 2 Determinants of dentist utilization

Independent variable () = coding for logistic regression analysis	% Reporting ≥1 Visit	B	p	Odds Ratio (95% CI)
Constant		1.5883	< 0.001	
Age group		1.0319	< 0.001	2.8 (2.66-2.94)
12-19 = 1	71.4			
≥ 20 = 0	50.2			
Education group		0.7591	< 0.001	2.2 (2.12-2.27)
≥ High school = 1	58.6			
< High school = 0	40.9			
Income group		0.6948	< 0.001	2.0 (1.92-2.08)
≥ \$20,000 = 1	59.4			
< \$20,000 = 0	34.0			
Population/dentist ratio		0.3395	< 0.001	1.4 (1.33-1.46)
< 2000/dentist = 1	56.3			
≥ 2000/dentist = 0	45.4			
Smoking		0.3154	< 0.001	1.4 (1.30-1.47)
No = 1	55.5			
Yes = 0	45.5			
Employed		0.2696	< 0.001	1.3 (1.23-1.37)
Yes = 1	58.8			
No = 0	41.9			
General health		-0.2582	< 0.001	1.2 (1.09-1.30)
Good-excellent = 1	54.8			
Poor-fair = 0	35.8			
-2 Log likelihood	20,671.01			
df	16,189.00			
Significance level	< 0.0001			
Accuracy %	64.91%			

Table 3 Odds ratios (95% CI) of determinants of dentist utilization for three age groups

Independent Variable and Coding for Logistic Regression	Adolescents (12-19)	Adults (20-64)	Seniors (65+)
Education group ≥ High school = 1 < High school = 0	NS	2.1 (2.00-2.20)	2.2 (1.99-2.32)
Income ≥ \$20,000 = 1 < \$20,000 = 0	2.6 (2.31-2.88)	1.9 (1.80-2.00)	2.0 (1.86-2.20)
Population/dentist ratio < 2000/dentist = 1 ≥ 2000/dentist = 0	1.8 (1.53-2.06)	1.4 (1.28-1.47)	1.5 (1.36-1.70)
Smoking No = 1 Yes = 0	NS	1.4 (1.26-1.44)	1.7 (1.48-1.93)
Employed Yes = 1 No = 0	NS	1.4 (1.30-1.50)	NS
General health Good-excellent = 1 Poor-fair = 0	NS	1.3 (1.10-1.40)	1.3 (1.08-1.48)
Help needed No = 1 Yes = 0	3.5 (2.36-4.63)	NS	1.3 (1.09-1.47)
Currently attending school Yes = 1 No = 0	2.0 (1.70-2.29)	NS	NS
Sex Female = 1 Male = 0	NS	1.4 (1.30-1.50)	NS
Person on medication Yes = 1 No = 0	NS	1.2 (1.06-1.23)	NS
-2 Log likelihood	1,358.13	11,968.22	3,514.79
df	1,144	9,333	2,968
Significance level	< 0.001	< 0.001	< 0.001
Accuracy %	69.97%	64.02%	69.98%

interval. Consistent with previous surveys, high provincial variation in utilization of dental care services continues to exist, with residents of Newfoundland and Labrador visiting least.

In terms of identifying the determinants of utilization of dentists in Canada during 1993/94, this study was limited in that participants were not asked about dental insurance, dental status, water fluoridation or reasons for the last visit. Within these limits, the factors we identified were consistent with the literature, in which age, education, income, health behaviour, employment status and population-to-dentist ratios have been found to predict utilization. Because we could apply only the provincial average population-to-dentist ratio, the influence of this factor is understated in our results.

We also investigated which determinants affect utilization at different stages of life and whether the strength of common determinants varied across the age groups. For example, education level had the largest impact on making visits for both adults and seniors; however, since most adolescents were still in school, this variable had no significant effect on utilization for that age group. Household income predicted dentist visits

for all the age groups; however, as shown by the higher OR, visiting rates by adolescents were more sensitive to income than they were for adults and seniors. Employment status was important for adults only.

Not smoking was an important predictor of dentist visits for adults and seniors. Non-smokers may have a greater tendency toward disease-preventive activities such as dental visits. Unfortunately, tobacco use is a strong risk factor for periodontal and other soft tissue diseases in the mouth,²⁶ and smokers may not be attending sufficiently to meet their needs for early diagnosis and prompt treatment.

General health as a determinant of dental care utilization has not been specifically addressed in many other studies. We found that good to excellent general health of all respondents raised the probability of dentist visits slightly (OR = 1.2; 95% CI = 1.1-1.3). For adolescents, the effect of being able to function without assistance was the strongest predictor of use (OR = 3.5; 95% CI = 2.4-4.6). Therefore, people with poor general health, and especially handicapped adolescents, may not be well served. The trends toward retaining natural teeth

Table 4 Determinants of family physician utilization

Independent Variable	B	p	Odds Ratio
Constant	0.4261	< 0.001	
Pregnancy No = 0 Yes = 1	1.0151	< 0.05	2.76
Drug group No drug = 0 1+ drug = 1	1.0101	< 0.001	2.75
Injury preventive precautions No = 0 Yes = 1	0.7259	< 0.001	2.07
General health Good-excellent = 0 Poor-fair = 1	0.6922	< 0.001	2.00
Help needed No = 0 Yes = 1	0.5535	< 0.001	1.74
Sex Male = 0 Female = 1	0.5043	< 0.001	1.66
Smoking Yes = 0 No = 1	0.2440	< 0.001	1.28
-2 Log likelihood	11,445.57		
df	13,769		
Significance level	0.0001		
Accuracy %	83.18%		

and the potential for incident periodontal diseases and enamel and root caries among older adults raise concerns that the low utilization rates by the elderly may be insufficient to maintain their dental health and thereby adversely affect their general health.^{27,28}

The results of the analysis support Andersen's model,^{24,25} but only to some extent. We found that predisposing and enabling factors did play a significant role in reported dental care utilization. However, the dental need factors available to us in the database did not predict use of dentist services. For example, other studies have shown that having one or more natural teeth is a strong predictor of utilization by older people.^{4,5,9,10}

In the independent determinants of visiting physicians and dentists, three factors were common but the direction was inconsistent. Not smoking predicted higher probability of a visit both to dentists and to physicians. Poor general health predicted visiting a physician but reduced the probability of a visit to a dentist. Similarly, needing help with daily living reduced visits to dentists for adolescents and seniors but increased the probability of visits to physicians.

Factors identified as determining visits to dentists (age, education, employment and income) were not factors in visiting physicians. Under Canada's system of medical insurance, the barriers inherent in age, employment and low socio-economic status have been lowered, leaving visiting a physician determined more by need factors such as using medications (being

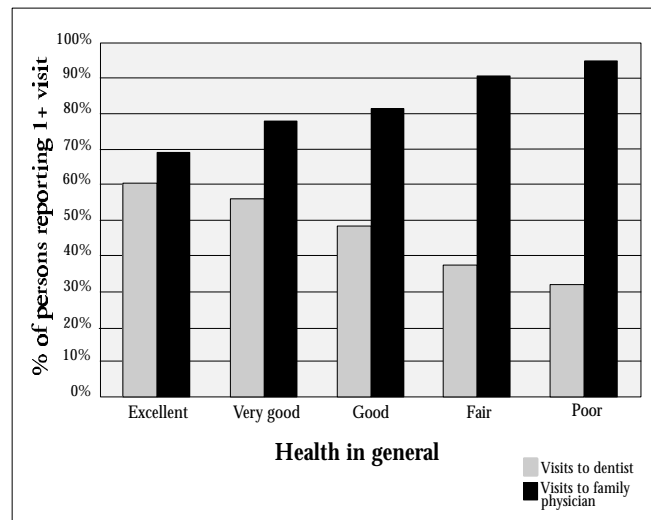


Figure 1: Visits to dentists and family physicians by general health.

sicker), poor general health, needing help with daily living and pregnancy. However, we have to qualify the conclusions from the comparison, since the NPHS94 database did not contain direct indicators of oral health status or needs. Nonetheless, the results of our analysis and the comparison between the determinants of dentist visits and family physician visits suggest major differences in the factors affecting access to care. While sicker and more dependent people are more likely to visit a family physician, healthy, young, highly educated, high-income people are more likely to visit a dentist.

Future studies of dental care utilization should include questions on insurance and perceived dental need. Proper epidemiological studies on dental health status linked to use of services are needed for final policy-making. ♦

Dr. Sabbah has recently completed his M.Sc. in the graduate department, community dentistry, faculty of dentistry, University of Toronto. This report is based on his essay completed in partial fulfilment of his DDPH.

Dr. Leake is professor and head of community dentistry in the department of biological and diagnostic sciences of the faculty of dentistry, University of Toronto.

Correspondence to: Dr. James L. Leake, Community Dentistry, Department of Biological and Diagnostic Sciences, Faculty of Dentistry, 124 Edward St, Toronto, Canada. M5G 1G6. E-mail: james.leake@utoronto.ca. Reprints will not be available.

The authors have no declared financial interest.

References

1. Employment and Social Insurance Act, Statutes of Canada, 25-26 George V, Chapter 38, Part IV 1935. In: The Royal Commission on Health Services, Vol. I, Queen's Printer, Ottawa. 1964. p. 400.
2. The Royal Commission on Health Services, Vol. I, Queen's Printer, Ottawa. 1964.
3. Ismail AI. Dental care in Canada. In: Burt BA, Eklund SA, editors. *Dentistry, dental practice and the community*. 5th ed. Philadelphia (PA): WB Saunders; 1999. p. 134-49.
4. Charette A. Dental care utilization: an analysis of the Canada Health Survey 1978-79. [MHA thesis]. Ottawa (ON), Canada: University of Ottawa; 1986.

5. Cageorge SM, Ryding WH, Leake JL. Dental health status survey of Manitoba children. *J Can Dent Assoc* 1980; 46:108-16.
6. Bullen ME. The utilization of dental services by Ontario adults, 1979-80. [M.Sc. thesis]. Toronto (ON), Canada: University of Toronto; 1982.
7. Ministry of Health. Ontario Health Survey 1990: highlights. Toronto (ON), Canada: Ontario Ministry of Health, January 1992.
8. United States Department of Health and Human Services. Dental visits, volume and interval since last visit: United States, 1978 and 1979. National Health Survey Series 10, No 138. Hayttsville (MD): Public Health Service, Centre for Disease Control; 1982 Apr. DHHS Pub No. (PHS) 821566.
9. Locker D, Leake JL, Lee J, Main P, Hicks T, Hamilton M. Utilization of dental services by older adults in four Ontario communities. *J Can Dent Assoc* 1991; 57:879-86.
10. Holtzman J, Berkey DB, Mann J. Predicting utilization of dental services by the aged. *J Public Health Dent* 1990; 50:164-71.
11. Lawton DM, Williams JI, Martinello BP. Determinants of dental care. *Can J Public Health* 1973; 64:343-50.
12. Locker D, Payne B. Inequalities in oral health: Ontarians aged 12 to 19 years. Community Dental Health Services Research Unit; Health Measurement and Epidemiology Report No. 4. Toronto (ON), Canada: Faculty of Dentistry, University of Toronto and Community Dental Services, North York Public Health Department; 1993.
13. Groenewegen PP, Postma JH. The supply and utilization of dental services. *Soc Sci Med* 1984; 19:451-9.
14. Hayward RA, Meetz HK, Shapiro MF, Freeman HE. Utilization of dental services: 1986, patterns and trends. *J Public Health Dent* 1989; 49:147-52.
15. United States Department of Health and Human Services. Use of dental services and dental health, United States 1986. National Health Survey Series 10, No 165. Hayttsville (MD): Public Health Service, Centre for Disease Control; 1988 Oct. DHHS Pub No. (PHS) 88-1553.
16. Woodward CA, Boyle MH, Offord DR, Racine YA. Correlates of children's use of physician and dentist services: Ontario child health study follow-up. *Can J Public Health* 1993; 84:103-6.
17. Matthews VL, Feather J. Utilization of health services in Western Canada: basic Canadian data from the World Health Organization/International Collaborative Study of Medical Care Utilization. *J Can Med Assoc* 1976; 114:309-12.
18. Department of National Health and Welfare and Dominion Bureau of Statistics. Illness and health in Canada: The Canadian sickness survey 1950-51. Ottawa (ON), Canada: Dominion Bureau of Statistics, Queen's Printer, Catalogue No. 82-518, 1960.
19. Canada Health Survey. The health of Canadians: report of the Canada Health Survey. Ottawa (ON), Canada: Health and Welfare Canada and Statistics Canada; 1981 June. Catalogue No. 82-538E.
20. Ford J, Locker D. The oral health of Canadian-born adults and foreign-born Ontario adults: an analysis of data from the Ontario Health Survey 1990. Toronto (ON), Canada: Community Dental Health Services Research Unit; Health Measurement and Epidemiology Report No. 7. Faculty of Dentistry, University of Toronto and Community Dental Services, North York Public Health Department; 1994.
21. Locker D, Ford J. Inequities in health: evaluation of area-based measures as indicators of health inequalities. Toronto (ON), Canada: Community Dental Health Services Research Unit; Health Measurement and Epidemiology Report No. 5, Faculty of Dentistry, University of Toronto and Community Dental Services North York Public Health Department; 1994.
22. Locker D, Payne B. Oral health status of Ontarians aged fifty years and over: clinical estimates: an analysis of data from the Ontario Health Survey 1990 and the Ontario study of the oral health of older adults. Toronto (ON), Canada: Community Dental Health Services Research Unit; Health Measurement and Epidemiology Report No. 2 Faculty of Dentistry, University of Toronto and Community Dental Services North York Public Health Department, 1993.
23. Statistics Canada, Health Statistics Division. National Population Health Survey 1994 Health. Available from URL: <http://www.library.utoronto.ca/datalib/codebooks/cstdli/nphs/nphs.pdf>.
24. Andersen R. A behavioral model of families' use of health services. Chicago (IL): University of Chicago, Center for Health Administration Research Series, No. 25, 1968.
25. Andersen R, Lion R, Andersen OW. Two decades of health services: social survey trends in use and expenditures. Cambridge (MA): Balinger, 1976.
26. Mecklenburg RE, Greenspan D, Kleinman DV, Manley MW, Neissen LC, Robertson PB, Winn DE. Tobacco effect in the mouth: a National Cancer Institute and National Institute of Dental Research Guide for Health Professionals. Bethesda (MD): United States Department of Health and Human Services, Public Health Service, National Institute of Health NIH Publication No. 94-3330.
27. Hollister MC, Weintraub JA. The association of oral status with systemic health, quality of life, and economic productivity. *J Dent Educ* 1993; 57:901-12.
28. Shay K, Ship JA. The importance of oral health in the older patient. *J Am Geriatr Soc* 1995; 43:1414-22.

First conference ad - to be stripped in