CANADA

ROYAL COMMISSION ON HEALTH SERVICES

DENTAL MANPOWER IN CANADA

Bruce A. McFarlane

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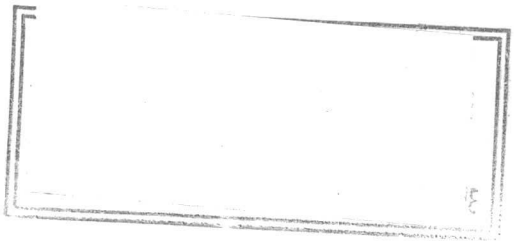

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Price subject to change without notice

ROGER DUHAMEL, F.R.S.C.
Queen's Printer and Controller of Stationery
Ottawa, Canada
1965

ROYAL COMMISSION ON HEALTH SERVICES

DENTAL [illegible]

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ACKNOWLEDGEMENTS

This study could never have been carried out and completed without the assistance of a large number of people.

Special thanks are due to Mrs. B. Isabel Brown, Director, Bureau of Economic Research, Canadian Dental Association, who was a source of constant, intelligent and insightful assistance throughout all phases of the project; her efforts are greatly appreciated.

I would also like to thank the Deans of all the Canadian Dental Schools who broke into their very busy schedules to provide us with data – no matter how seemingly irrelevant – at a moment's notice.

The women dentists of Canada provided invaluable assistance by completing a lengthy mailed questionnaire, by returning it, and by adding many additional comments. Their assistance is acknowledged.

I would also like to thank those dentists, male and female, practising in Ottawa whom I constantly interrupted at their work to ask for clarification of various dental technical points which cropped up in the research. Their complete frankness and assistance to a non-dentist is especially appreciated.

In addition, I would like to express my appreciation to the officials of the Canadian Dental Association who so generously placed their research, library, and other facilities at my disposal. I would, also, like to thank all those others – officials of the provincial dental associations, local dental societies, dental supply company officials, dental technicians, officials of the dental technicians' associations, the Royal Canadian Dental Corps, and members of federal and provincial government departments – who so generously supplied us with data.

Acknowledgement is due also to my colleagues Professors Hyman Burshtyn and Peter Pineo and my wife Constance whose comments after reading various sections of an early draft were very useful.

Finally, I would like to acknowledge the continued co-operation of the secretariat of the Royal Commission on Health Services – in the face of the most unreasonable requests. The assistance provided by Professor Bernard Blishen,

Director of Research, Major Norman Lafrance, Secretary, and Mrs. Helen Roney, Assistant Secretary, is especially appreciated.

Needless to say, while assistance in the form of data, etc., was obtained from these varied sources and many others, I alone am responsible for the final analysis and conclusions obtained herein.

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1964

CHAPTER 1

INTRODUCTION

The main purposes in this study are to investigate the long and short-term trends in the supply of and demand for dental manpower resources in Canada to evaluate some of the problems thereof, and to suggest possible solutions. This introductory chapter outlines the material contained in the various chapters of the report.

Chapter 2 analyses the supply situation, on the basis of both historical and current statistical data. Changes in the absolute numbers of dentists and in the population-dentist ratios over the years are examined; regional and provincial variations in these ratios assessed, and international comparisons made wherever possible. The major source of recruits – the dental schools of six Canadian universities – is considered, and the number of applicants, registered students, graduates and unfilled places discussed in the light of the country's needs for dental services. Finally, projections of the number of dentists expected to be on the Canadian Dental Association (C.D.A.) register – who will, that is, be licensed to practise in Canada – are made, based on the present population-dentist ratios of Canada, the province of British Columbia, the United States and Sweden. In each instance the number lost to the profession each year through death, retirement and emigration are taken into account in the projected totals.

Chapter 3 describes geographic and age distribution of the dentists. The wide variation in provincial population-dentist ratios is noted and some attention paid to the problem of maldistribution, that is, the shortage in rural areas in comparison with the urban areas. Factors contributing to the disparity in the number of dentists from area to area are discussed (such as financial incentives) and the importance of the location of dental schools, their source of recruits, negative attitudes towards dental practice in rural areas and interprovincial migration of dentists considered.

The age distribution of the members of the profession is analysed in the light of the various crisis periods – a major economic depression and two world wars – which have struck Canada in this century, and affected the number of recruits; measures taken to offset these effects, such as accelerated dental courses and crash programmes at the universities, are discussed. The significant

relationship between age and productivity and consequently, the supply of dental services is explored in view of the age distribution of the dentists. Regional differences are noted.

A section of this chapter is given to the subject of specialists, who comprise a tiny proportion of Canada's dentists; their concentration in the large metropolitan areas, changing numbers and proportions are described, and international comparisons made where data are available.

Because of their recruitment potential, a special section of Chapter 3 is devoted to the subject of women dentists. Considerable space is given to a description of their social and ethnic origins, their mode and type of practice, and the various factors which enable them to play the dual role of professional and housewife. This material is based, mainly, on data obtained from questionnaires sent to all women dentists in Canada.

Chapter 4 discusses the present need, demand and supply of dental services, and probable future changes in them. Various criteria on which assessment of need can be made are noted and the varied dental care needs of the public, young and old, are discussed.

The almost universal need for dental care is then examined in the light of the population's demand for such care, and the various factors – age and sex, socio-economic status, education, and residential location – which affect demand are analysed.

The dental services available to those who demand them – who are not, of course, necessarily those whose need is greatest – are outlined, and the various sources of care – private, school, hospital, illegal, and specialist – described. Finally, some factors likely to bring about changes in the need, demand for, and supply of these services are suggested. Notable among these factors are the medico-dental (fluoridation of public water supplies), social (higher standards of living), technological (improved dental instruments) and the organizational (increased use of auxiliaries).

Chapter 5 analyses the process of recruitment to professions in general and to dentistry in particular. Dentistry is in competition with all the other professions and occupations for able high school students. The factors which appear to have induced recruits to enter dentistry are therefore analysed, with particular emphasis on their social and economic, educational and "home town" backgrounds, and the role played by the prestige of the profession in the recruitment process.

The duties, training and recruitment problems of the dental hygienists, the dental technicians and the dental assistants who comprise the major ancillary occupations associated with dentistry are described in Chapter 6, and their role in the dental health team analysed. An examination is made of the increased productivity and financial rewards which accrue to the dentists who utilize the services of these auxiliaries. The contribution to dental service made by two other types of dental auxiliaries, the New Zealand Dental Nurse and the Royal

Canadian Dental Corps' Advanced Clinical Technician is introduced so as to provide some data on experiments with various types of dental supporting staff which have been carried out.

The final chapter, Chapter 7, is essentially a summary of findings with some few comments and suggestions for future recruitment policy and plans.

CHAPTER 2

SUPPLY OF DENTISTS

The dental profession like other professions in Canada has seen a tremendous growth in its numbers since the turn of the century.

There were, however, dentists practising in Canada before 1900. The rise and growth of the voluntary and professional associations attest to this. The Royal College of Dental Surgeons of Ontario was incorporated as early as 1868 and the Ontario Dental Association, under differing names has held meetings since January 1867. In Quebec, the College of Dental Surgeons (incorporated in 1904) had been in existence since 1869 as the Dental Association of the Province of Quebec, Board of Trustees and Examiners. But even before these formal organizations came into being (about the time of Canada's Confederation) to guard the interests of the public and the members of the profession, there had been resident and itinerant dentists providing various levels of quality of dental care for the residents of Lower and Upper Canada, Prince Edward Island, Nova Scotia and New Brunswick.

The resident dentists of the pre-Confederation period were primarily men who had received their dental education and training in the United States or who had served an apprenticeship under a dental school-trained dentist. These were the men whose early influence on the occupation led to the establishment of the provincial associations and eventually in 1902 to the formation of the Canadian Dental Association. The number of resident dentists during the early period is difficult to determine but Professeur Armand Fortier has noted that:[1]

> Le dentiste le plus éminent de cette époque [en Québec] fut incomtestablement Aldis Bernard. Originaire des Cantons de l'Est, il étudia aux États-Unis, pour ensuite s'établir à Montreal vers 1841, portant à *quatre* le nombre des praticiens.

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[1] Fortier, Professeur Armand, D.D.S., "Histoire de la profession dentaire dans la métropole", *J.A.D. Canad.*, Vol. 18, juin, 1952, p. 384, my italics.

Conditions in Upper Canada were much the same for as Dr. Gullett has pointed out, "According to the scanty records of the time, there were not more than six dentists in Ontario in the year 1846".[1]

With these small numbers and a growing population it appears likely that a considerable amount of the dental care received by the population of this early period was provided by the itinerant "dentists", or "drawers of teeth", or in Quebec, "dentateurs". Little is known of the training, education or origins of these men but a dentist writing of these early journeymen said:[2]

> The early days of dentistry in Prince Edward Island were similar to those of most places. It is possible to obtain a connected story of these itinerant dentists from the newspaper files of the day. These men, almost without exception, had several traits common to all; they seldom stayed long in one place, their advertisements were masterpieces of extravagant claims, and most identified themselves as 'Dr.'.

In Lower Canada conditions were not much better and Fortier commenting on this group said:[3]

> On souligne bien en passant, dans les almanachs du temps, la présence de 'dentateurs' (comme on les nommait alors) ou 'd'arracheurs de dents' et 'saigneurs', mais aucun de ces pionniers ne semble digne de la tradition de Pierre Fauchard.

The quality of much of the work performed by the itinerants is open to question since little is known of their training but the following example of their work, while not necessarily typical, does give us some indication of its quality:[4]

> About the last of the itinerant practitioners 'The original Professor Ashley, of Montreal', used considerable space to announce his arrival [in Charlottetown] in May 1880, and much less to announce his hurried departure not long after as the result of a threat of damage actions by the husband of a Mrs. McDonald who had severe haemorrhage following the extraction of a lower molar.

Conditions changed quickly, however, and between 1846 and 1866 the number of recognized dentists in Ontario alone changed from 6 to 175, an increase of 169 in 20 years! The growth continued after Confederation and by 1881 there were 510 recognized dentists in Canada and over 1,000 by the turn of the century.

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[1] Gullett, Dr. Don W., "History of Dentistry in Ontario", *J. Canad. D.A.*, Vol. 18, June 1952, p. 357

[2] Millar, Dr. J.P., "History of Dentistry in Prince Edward Island", *J. Canad. D.A.*, Vol. 18, June 1952, p. 354.

[3] Fortier, *op.cit.*, p. 384.

[4] Millar, *op.cit.*, p. 354.

POPULATION DENTIST RATIOS

Since the formation of the Canadian Dental Association in 1902 statistics have been kept of the growth in numbers of the profession and the present number of dentists on the rolls of the C.D.A. is four-and-a-half times the number of dentists accounted for in 1901 (Table 2–1). The rate of growth of the profession has, however, not been as great as the rate of growth of the general population; hence, the population-dentist ratio has been changing.

TABLE 2–1

NUMBER OF DENTISTS BY PROVINCE AND CANADA, 1881–1962

Number of Dentists

Year	Canada[1]	Province									
		Nfld	PEI	NS	NB	PQ	Ont	Man	Sask	Alta	BC
1881	510	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1891	753	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1901	1,310	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1911	2,183	NA	22	125	98	327	1,127	130	89	105	160
1921	3,158	NA	22	154	112	629	1,377	217	183	191	273
1931	4,039	NA	29	161	124	831	1,852	251	223	231	337
1938	4,174	NA	30	169	110	874	1,932	251	210	236	362
1941	4,210	NA	28	178	118	933	1,891	249	219	242	352
1943	4,294	NA	28	175	94	954	1,938	256	216	269	364
1944	4,405	NA	23	183	98	958	2,026	252	208	282	375
1945	4,529	NA	28	191	114	989	2,062	250	205	303	387
1946	4,565	NA	28	188	105	1,014	2,107	234	191	290	408
1947	4,602	NA	28	180	114	1,041	2,081	244	195	264	455
1948	4,601	NA	28	192	108	1,059	2,032	251	195	272	464
1949	4,549	NA	29	178	112	1,063	1,984	245	195	269	474
1950	4,627	19	29	171	105	1,090	1,995	240	209	283	486
1951	4,912	21	30	192	106	1,147	2,103	259	217	321	516
1952	5,071	21	29	196	110	1,208	2,154	261	218	328	546
1953	5,215	24	33	197	113	1,242	2,218	258	223	352	555
1954	5,298	32	34	198	116	1,273	2,220	262	215	371	577
1955	5,354	33	35	198	119	1,282	2,231	265	224	377	590
1956	5,416	35	33	198	122	1,294	2,270	255	217	383	609
1957	5,481	39	34	193	125	1,314	2,297	263	208	396	612
1958	5,564	41	34	191	125	1,306	2,370	246	209	412	630
1959	5,753	46	33	190	124	1,352	2,476	277	210	417	628
1960	5,780	43	35	193	114	1,384	2,477	277	192	412	653
1961	5,865	42	31	196	120	1,388	2,513	286	196	431	662
1962	5,868	43	29	190	124	1,417	2,484	283	193	434	671

[1] The numbers of dentists shown for the years 1881–1931 inclusive were obtained from census statistics.

Source: Canadian Dental Association.

"ADEQUACY"

It is difficult to determine the optimum population-dentist ratio required to serve adequately the dental health needs of any population. In part, this arises out of our lack of any clear-cut standards of "adequacy".[1] In addition, a ratio which might be considered "adequate" at one point in time, because of increased demand on the part of an educated public or a marked reduction in dental disease and illness due to increased dental knowledge, fluoridation of public water supplies or for some other reason, may be totally "inadequate" at another time. "Inadequate", that is, if the test of "adequacy" were that the profession had to meet immediately all the demands for service being made upon it or if the test were that all dentists had to be guaranteed a minimum number of patients per year.

While such tests of "adequacy" may be lacking it is generally assumed by the dental profession that the higher the population-dentist ratio in any area, be it nation, province or city, the more likely it is that the profession will be better able to serve the dental health needs of the population.[2]

INTERNATIONAL, PROVINCIAL AND RURAL-URBAN COMPARISONS

International comparisons of the population-dentist ratio have been made and Canada's position *vis-à-vis* the United States, Australia and New Zealand, and most of the countries of Western Europe is not a particularly favourable one (Table 2–2). The ratio in Canada has not been a static one but has changed over the years as the population has increased and as a smaller or larger proportion of the population has been recruited into the profession (Table 2–3). In general, while there have been some minor fluctuations, the rate of increase in population growth over the last four decades has been greater than the rate of increase in the number of dentists.[3]

The national population-dentist ratio for Canada while lower than some countries in Western Europe and higher than others does not provide, however, an accurate picture of the provision of dental services in the country as a whole.

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[1] Cf., the *Report of the Committee of Enquiry into the Cost of the National Health Service*, (the Guillebaud Report), Cmd. 9663, H.M.S.O. 1956, pp. 49–50.

[2] *Ibid.*, the authors state: "We conclude that in the absence of an objective and attainable standard of adequacy the aim must be, as in the field of education, to provide the best service possible within the limits of available resources", p. 50.

[3] There was a marked lowering of the ratio in the 1944–46 period when the universities had "accelerated" classes due to the exigencies of World War II; again, there was a raising of the ratio in the 1951–53 period about the time when large numbers of student-veterans were completing their courses of study under the auspices of the Department of Veterans Affairs Post-War Rehabilitation Programme. These were both emergency situations.

TABLE 2–2

POPULATION-DENTIST RATIOS, 1956–1962

Country	Year	Population Per Dentist
Sweden	1958	1,500
Norway	1958	1,600
Germany	1959	1,700
Austria	1959	1,800
U.S.A.	1961	1,900
Denmark	1958	2,000
Australia	1956	2,300
Switzerland	1960	2,400
New Zealand	1959	2,600
Finland	1958	2,600
Luxembourg	1958	2,700
France	1958	3,000
Greece	1958	3,000
Canada	*1962*	*3,100*
United Kingdom	1958	3,900
Netherlands	1958	4,400
Italy	1956	5,500
Belgium	1959	6,800
Spain	1959	11,100
Portugal	1959	74,200

Source: American Dental Association, *Number of Dentists in Countries of the World*, 593/8/61.

TABLE 2–3

POPULATION-DENTIST RATIOS, CANADA, 1881–1962

Year	Canada	Year	Canada
1881	8,480	1950	2,906
1891	6,419	1951	2,791
1901	4,100	1952	2,763
1911	3,301	1953	2,772
1921	2,783	1954	2,802
1931	2,569	1955	2,855
1938	2,646	1956	2,898
1941	2,733	1957	2,934
1943	2,714	1958	2,985
1944	2,678	1959	2,969
1945	2,638	1960	3,025
1946	2,644	1961	3,047
1947	2,671	1962	3,108
1948	2,728		
1949	2,819		

Source: Canadian Dental Association.

There are marked regional differences in the distribution of dentists in Canada and the provincial population-dentist ratios range from a low of 10,648 in Newfoundland to a high of 2,406 in British Columbia (Tables 2–4 and 2–5).

These provincial ratios like the over-all ratio for Canada noted above have not been static but with the notable exceptions of Newfoundland and Alberta *all* the provinces have experienced a greater proportional increase in population than in dentists (Table 2–6). Since its entry into Confederation, Newfoundland's population-dentist ratio has been improved considerably, from 18,158 in 1950 to its present ratio of 10,648. In the period 1938–62 the Province of Alberta has managed a slight increase in the proportion of its dentists over its

TABLE 2–4

POPULATION-DENTIST RATIOS, PROVINCES AND CANADA, 1881–1962

Year	Canada	Province									
		Nfld	PEI	NS	NB	PQ	Ont	Man	Sask	Alta	BC
1881	8,480	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1891	6,419	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1901	4,100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1911	3,301	NA	4,260	3,939	3,591	6,134	2,242	3,549	5,533	3,565	2,453
1921	2,783	NA	4,028	3,401	3,463	3,753	2,130	2,812	4,139	3,081	1,921
1931	2,569	NA	3,036	3,185	3,292	3,459	1,853	2,789	4,133	3,167	2,060
1938	2,646	NA	3,100	3,248	3,973	3,594	1,882	2,849	4,390	3,288	2,097
1941	2,733	NA	3,394	3,247	3,876	3,571	2,003	2,931	4,091	3,290	2,323
1943	2,714	NA	3,214	3,377	4,936	3,553	2,004	2,828	3,926	2,885	2,390
1944	2,678	NA	3,956	3,311	4,724	3,608	1,932	2,869	4,029	2,784	2,400
1945	2,638	NA	3,250	3,199	4,044	3,539	1,922	2,908	4,078	2,667	2,408
1946	2,644	NA	3,286	3,292	4,448	3,511	1,898	3,107	4,361	2,786	2,326
1947	2,671	NA	3,357	3,378	4,193	3,486	1,967	2,979	4,272	3,042	2,204
1948	2,728	NA	3,357	3,203	4,518	3,503	2,055	2,944	4,287	3,033	2,250
1949	2,819	NA	3,207	3,511	4,446	3,563	2,155	3,045	4,297	3,175	2,283
1950	2,906	18,158	3,241	3,678	4,838	3,561	2,194	3,154	3,981	3,127	2,290
1951	2,791	16,714	3,200	3,323	4,830	3,460	2,126	2,965	3,839	2,844	2,203
1952	2,763	17,210	3,394	3,278	4,688	3,357	2,134	2,975	3,815	2,864	2,134
1953	2,772	15,583	3,030	3,315	4,655	3,361	2,159	3,093	3,780	2,764	2,171
1954	2,802	11,969	2,970	3,348	4,595	3,353	2,226	3,088	4,005	2,728	2,163
1955	2,855	11,970	2,886	3,399	4,538	3,423	2,293	3,106	3,897	2,804	2,195
1956	2,898	11,600	3,030	3,449	4,484	3,491	2,320	3,290	4,046	2,848	2,204
1957	2,934	10,643	2,920	3,599	4,437	3,522	2,353	3,232	4,234	2,836	2,285
1958	2,985	10,341	2,912	3,670	4,496	3,652	2,378	3,504	4,211	2,825	2,352
1959	2,969	9,391	3,030	3,731	4,605	3,627	2,351	3,159	4,243	2,892	2,449
1960	3,025	10,256	2,886	3,725	5,105	3,630	2,410	3,217	4,724	3,029	2,400
1961	3,047	10,667	3,322	3,709	4,908	3,705	2,432	3,168	4,668	2,995	2,420
1962	3,108	10,648	3,608	3,879	4,822	3,712	2,511	3,257	4,794	3,069	2,406

Source: Canadian Dental Association.

increase in population. If the shorter time span of the last decade is considered, however, the trend in Alberta like that in the other provinces is towards a worse ratio than previously. That is, the dental resources have not kept apace with the recent growth in population.

TABLE 2–5

POPULATION-DENTIST RATIOS AND DENTISTS PER 10,000 POPULATION, 1962

Province	Population-Dentist Ratio	Dentists Per 10,000 Population
Newfoundland	10,648	.9
Prince Edward Island	3,608	2,8
Nova Scotia	3,879	2.6
New Brunswick	4,822	2.1
Quebec	3,712	2.7
Ontario	2,511	4.0
Manitoba	3,257	3.1
Saskatchewan	4,794	2.1
Alberta	3,069	3.2
British Columbia	2,406	4.1
Canada	3,108	3.2

Source: *J. Canad. D.A.*, Vol. 28, July 1962.

TABLE 2–6

ABSOLUTE INCREASE IN DENTISTS AND PER CENT INCREASE IN DENTISTS AND POPULATION, BY PROVINCE, 1938–1962 AND 1952–1962

Province	Increase since 1938			Increase since 1952		
	Dentists		Population Per Cent	Dentists		Population Per Cent
	No.	Per Cent		No.	Per Cent	
Newfoundland	24	126.3	NA	22	104.8	26.7
Prince Edward Island.	-1	-3.3	12.5	0	0.0	6.3
Nova Scotia	21	12.4	34.2	-6	-3.1	14.7
New Brunswick	14	12.7	36.8	14	12.7	15.9
Quebec	543	62.1	67.4	209	17.3	29.7
Ontario	552	28.6	71.5	330	15.3	35.6
Manitoba	32	12.7	28.9	22	8.4	18.7
Saskatchewan	-17	-8.1	.3	-25	-11.5	11.2
Alberta	198	83.9	71.6	106	32.3	41.8
British Columbia	309	85.3	114.6	125	22.9	39.8
Canada	1,675	39.9	65.1	797	15.7	30.2

Source: *J. Canad. D.A.*, Vol. 28, July 1962.

This regional pattern of differential distribution of dentists is not unique to Canada. In the United States, for example, as of mid-1960 the New England states had a ratio of 1,489 whereas the states of the south-eastern region had a ratio of 2,825.[1] Similarly, in England at the year's end in 1961 the county of Staffordshire had a ratio of 6,780 and Sussex County a ratio of 2,520.[2]

In addition to the wide variation in provincial ratios the contrast in population-dentist ratios between urban and rural areas is even more startling. highlighting a very serious maldistribution of dentists throughout the country (Table 2–7).[3] This maldistribution exists in all the provinces and even those with the most favourable over-all provincial ratios are not exempt from this pattern of distribution. For example, Ontario, the most populous and wealthiest of the provinces has rural areas with ratios as unsatisfactory as 20,892.[4]
This is not to sav. however, that the urban areas are all equally blessed with a favourable ratio, for in 1962 in the same province, the city of Pembroke, approximately 100 miles northwest of the nation's capital had a ratio of 10,000![5]

TABLE 2–7

POPULATION-DENTIST RATIOS, BY SIZE OF COMMUNITY AND PROVINCE, 1960

Province	Community Size		
	Under 10,000	Over 10,000	Ratio of Column B to A
	A	B	C
Newfoundland	30,859	3,424	1:9
Prince Edward Island	5,304	902	1:6
Nova Scotia	5,146	2,693	1:2
New Brunswick	8,604	2,682	1:3
Quebec	7,828	2,538	1:3
Ontario	4,136	1,956	1:2
Manitoba	9,145	2,041	1:4
Saskatchewan	8,411	2,046	1:4
Alberta	7,167	1,790	1:4
British Columbia	3,920	1,933	1:2
Canada	6,061	2,119	1:3

Source: *J. Canad. D.A.*, Vol. 26, September 1960.

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[1] American Dental Association, Bureau of Economic Research and Statistics, *Distribution of Dentists in the United States by State, Region, District and County*, American Dental Association, Chicago, 1961.

[2] Dental Estimates Board, *Statistics — 1961*, London, 1962, Table 10. The statistics were made available through The Secretary, British Dental Association, London, W.1, England.

[3] :"Urban" is used here to mean population concentrations of 10,000 or over and "rural" to mean all other communities.

[4] Cf. Table 3–7.

[5] MacGregor, S.A., *Rural Ontario and Its Health Problems*, Toronto, 1962 (mimeo.). Cf. Tables 3–2 to 3–12 of this study.

Notwithstanding this one glaring urban example, in urban areas the population-dentist ratios are usually much more favourable than those of the rural areas, hence the number ot people eligible to be served by the rural dentist is at least triple that of his urban colleague. If the population-dentist ratio may be used as a measure of the availability of dental services, then, in general rural areas in Canada, with the possible exception of Prince Edward Island, are very poorly served in comparison with the urban areas. Prince Edward Island, despite the 6 to 1 disparity in favour of urban dentists, is excepted "because its small geographical area makes it possible for dentists serving the outlying areas to be located in Charlottetown itself".[1] Hence, these rural areas are probably almost as well served as the urban areas.

From the foregoing it can be seen that the population-dentist ratio is worse in Canada than in most of the countries in the world, with the exception of the United Kingdom, with which Canada normally compares herself: and the ratio in Canada is worsening. In addition to this unfavourable external comparison there is an internal distribution of dentists such that some provinces have three times the number of dentists per 10,000 population that other provinces have. Concommitant with this differential pattern of distribution at the provincial level, within each province there is a vast difference in the availability of dentists when the urban and the rural districts are compared. In neither short-run nor long-run terms does either of the latter two patterns of distribution appear to be changing in the direction of a more equitable distribution of dental resources.

DENTAL SCHOOLS

As noted earlier, there has been a continuous growth in the *absolute* number of dentists practising in the country as a whole. Between 1901 and 1962 there was a 450 per cent increase in dentists in Canada. The greatest single source of these dentists to date has been the Canadian dental schools despite the fact that in the first decade or so of this century some still entered the profession via the apprenticeship route.[2]

The first three dental schools in Canada (School of Dentistry of the Royal College of Dental Surgeons, Toronto, 1875; Dental School of Montreal, 1892; and the Maritime Dental School, 1908) developed outside of, but usually having some connection with, the local universities. All three eventually became full-fledged faculties of universities; the Montreal Dental School actually hiving-off into two institutions: McGill University for the English speaking students and Laval

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[1] Bureau of Economic Research, Distribution of Dentists in Urban and Rural Areas of Canada, 1960, *J. Canad. D.A.*, p.558, Vol. 26, September 1960.

[2] For a detailed account of the history of dental education in Canada see Bagnall, J. Stanley, D.D.S., "Dental Education in Canada", *J. Canad. D.A.*, Vol. 18, June 1952, pp. 310–324; Paynter, Professor K.J., *Dental Education in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa, Queen's Printer (in *press*).

University of Montreal for the French speaking students.[1] In the meantime another school, as a department in the Faculty of Medicine of the University of Alberta came into being in 1918 and by 1924 had become known as the School of Dentistry. (It too, in 1944 became a faculty of the university.) This was the last dental school to be opened in Canada until 33 years later when the Faculty of Dentistry of the University of Manitoba registered its first dental undergraduates in the academic year 1958–59.

There had been, however, some slight expansion in facilities within the first five dental schools between 1950 and the opening of the sixth school, but this still meant that, except for the "accelerated" war-time classes and the classes of student-veterans, for 25 years there was no expansion in the facilities for training and educating dentists in Canada. During these two periods (i) 1924–50 and (ii) 1924–58 Canada's population increased by approximately 50 per cent and by over 80 per cent respectively. During the 1924–50 period, of course, extenuating circumstances in the form of an economic depression, from 1929 to almost 1939, and its financial consequences seriously limited university expansion in general as well as limiting the number of people able to embark on a six-year university career.

RESIDENTIAL DISTRIBUTION OF STUDENTS

There have been 4,105 graduates in dentistry from the six dental schools in Canada since 1939 (Table 2–8). Not all of these, of course, entered the labour force in Canada. A number of students from the Commonwealth and the United States and other foreign countries are always present at Canadian universities and dentistry has attracted some of these to Canada. Table 2–9 shows the residential distribution of students in Canadian dental schools from 1944–45 to the present academic year 1962–63 and of these over the 19-year period, 93 per cent have had Canadian home addresses; or, put another way, seven of every hundred students in the dental schools are being trained and educated to practise in another country. Somewhat offsetting this depletion in the supply of dentists from the Canadian dental schools is the supply of Canadian dentists educated in the dental schools of the United States, most of whom, it appears, return to practise in Canada. The figures in Table 2–10 show the annual proportion of all Canadians studying dentistry since 1955 who are receiving or have received their dental training in the United States.

CAPACITY OF DENTAL SCHOOLS, APPLICATIONS AND UNFILLED PLACES

Any increase in the supply of dentists from the Canadian dental schools depends, of course, upon a number of factors many of which are not under the

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[1] Bagnall, *op.cit.*, Montreal Dental School had originally been linked with the Bishop's College Medical Faculty for the English-speaking students.

direct control of the profession, for example (i) the creation of new dental schools; (ii) the expansion of the existing schools' capacities; and, (iii) a continuous supply of qualified recruits.

A new dental school has already been planned for the University of British Columbia, Vancouver, and it is expected to graduate its first class of dentists in 1968.[1] But as will be seen later, when the projected needs of the country are considered, more new dental schools will be required in order that the present population-dentist ratio be maintained or improved.[2]

TABLE 2–8

STUDENTS GRADUATING FROM CANADIAN DENTAL SCHOOLS, 1939–1962

Year	Total	School					
		Dalhousie	McGill	Montreal	Toronto	Manitoba[1]	Alberta
1962	225	15	36	43	85	14	32
1961	174	13	34	31	72	–	24
1960	215	14	37	42	94	–	28
1959	193	17	36	40	74	–	26
1958	203	16	34	49	75	–	29
1957	186	11	29	34	78	–	34
1956	168	13	33	20	76	–	26
1955	174	13	35	19	78	–	29
1954	172	14	37	20	69	–	32
1953	178	14	34	20	75	–	35
1952	215	12	36	55	85	–	27
1951	295	12	37	69	152	–	25
1950	306	11	36	42	168	–	49
1949	180	6	34	45	75	–	20
1948	99	9	15	38	24	–	13
1947	149	10	18	36	75	–	10
1946	102	0	5	41	56	–	0
1945	116	8	13	30	58	–	7
1944	140	6	12	37	61	–	24
1943	166	11	26	1[illegible]	103	–	8
1942	120	8	9	31	40	–	32
1941	97	7	18	14	45	–	13
1940	117	12	13	23	56	–	13
1939	115	15	17	16	49	–	18
Total	4,105	267	634	813	1,823	14	554

[1] First Graduating class.

Source: Canadian Dental Association.

[1] For further details on dental education and the growth and development of new schools, see Paynter, *op.cit.*

[2] Cf., pp. 30–31.

TABLE 2–9

RESIDENTIAL DISTRIBUTION OF STUDENTS
IN CANADIAN DENTAL SCHOOLS, 1944–1963

Year	Number of Students	Percentage			
		Canada	U.S.A.	Other	Total
1962–63	1,134	92	4	4	100
1961–62	1,052	90	5.5	4.5	100
1960–61	914	88	7	5	100
1959–60	906	88	7	5	100
1958–59	824	89	6	5	100
1957–58	787	91	6	3	100
1956–57	785	93	5	2	100
1955–56	769	92	5	3	100
1954–55	748	91	5	4	100
1953–54	707	92	4	4	100
1952–53	719	94	3	3	100
1951–52	755	94	3	3	100
1950–51	883	96	2	2	100
1949–50	1,034	96	2	2	100
1948–49	1,012	96	2	2	100
1947–48	922	94	1	5	100
1946–47	785	93	2	5	100
1945–46	518	96	1	3	100
1944–45	498	95	3	2	100
Total	15,752	93	4	3	100

Source: Canadian Dental Association.

TABLE 2–10

PROPORTION OF ALL CANADIAN DENTAL STUDENTS
STUDYING IN CANADA AND THE U.S.A., 1955–1963

Year	Number of Students	Canada	U.S.A.
1962–63	1,069	97	3
1961–62	976	97	3
1960–61	835	97	3
1959–60	849	95	5
1958–59	774	95	5
1957–58	761	94	6
1956–57	767	95	5
1955–56	745	95	5
Total	6,776	96	4

Source: Canadian Dental Association.

The total number of undergraduates in attendance at Canadian universities has increased by three-and-a-half times in the past two decades and during the same period the number of dental undergraduates has little more than doubled (Table 2–11). While this may be disturbing in the light of what has gone before it is not surprising when it is considered in financial terms. It is much less expensive to expand in some faculties than it is in others, for instance, it is less expensive to add an extra student in the humanities and the social sciences than it is in one of the professional fields such as dentistry.

TABLE 2–11

DENTAL STUDENTS IN CANADA AS A PERCENTAGE OF
(i) THE TOTAL STUDENT BODY, AND
(ii) UNDERGRADUATES ONLY, FOR SELECTED YEARS

	1940–41	1950–51	1960–61	1961–62
A. Total Students	36,319	68,306	114,000	128,894
B. Total Undergraduates	34,817	64,036	107,482	121,547
C. Dental Students	454	883	914	1,052
D. C as % of A	1.25%	1.29%	0.80%	0.82%
E. C as % of B	1.30%	1.38%	0.85%	0.87%

Source: Dominion Bureau of Statistics, *Fall Enrollment in Universities and Colleges, 1961*, Table 1; Canadian Dental Association.

TABLE 2–12

CAPACITY FOR FIRST-YEAR STUDENTS IN CANADIAN DENTAL SCHOOLS, NUMBER OF FIRST-YEAR STUDENTS AND UNFILLED PLACES, 1952–1963

Year	Capacity	Number of Students	Unfilled Places[1]
1952–53	202	172	30
1953–54	202	194	8
1954–55	202	211	+9
1955–56	202	199	3
1956–57	205	206	+1
1957–58	205	194	11
1958–59	263	250	13
1959–60	307	279	28
1960–61	327	268	59
1961–62	338	320	18
1962–63	338	332	6

[1] In two instances (1954–55 and 1956–57) there was an "overflow".

Source: *The Canadian Dental Association*, brief submitted to the Royal Commission on Health Services, Ottawa, March 1962, p. xx–3.

While recruitment to the dental schools will be treated in a subsequent section it is well at this point to look at the manner in which the present places available in the dental schools are being filled, because, in the long run, this is a forecast of the future supply in the form of graduates. Since the academic year 1952–53 the number of first-year places in the dental schools has increased from 202 to 338. The number of students in the first year, however, has usually been fewer, that is, some places have been left unfilled (Table 2–12). In part, this situation arises because of the system of handling applications on an individual university basis without the help of any central selection agency, also many students apply to more than one dental school (Table 2–13) and, in addition, a number who are sent letters of acceptance fail to show up for registration.

TABLE 2–13

APPLICATIONS AND APPLICANTS
TO CANADIAN DENTAL SCHOOLS, 1962

Number of applications to Canadian dental schools, 1962:

Dental School	*Number of Applications*
Dalhousie	55
McGill	119
Montréal	117
Toronto	240
Manitoba	117
Alberta	164
All Schools	812

Number of applications submitted by applicants, 1962:

641 applicants submitted one application
65 applicants submitted two applications
8 applicants submitted three applications
3 applicants submitted four applications
1 applicant submitted five applications

718 applicants submitted 812 applications

Number of applications submitted by Canadian applicants, 1962:

567 Canadians submitted one application
54 Canadians submitted two applications
6 Canadians submitted three applications
2 Canadians submitted four applications
1 Canadian submitted five applications

630 Canadians submitted 706 applications

Source: Canadian Dental Association.

The first and second of the two reasons cited above are closely related, of course, and it is only after some time that the number of applicants is differentiated from the number of applications. In 1962, 11.5 per cent of the applications received by Canadian dental schools represented multiple applications. In the third reason cited above, the number who were sent letters of acceptance in 1962 but who did not show up at registration represented 15 per cent of the total qualified students accepted (Table 2–14).

TABLE 2–14

APPLICATIONS, ACCEPTANCES AND ENROLLMENT IN CANADIAN DENTAL SCHOOLS, FALL 1962

Dental School	Total Applications	Qualified Applications	Per Cent Qualified	Number Accepted	Per Cent Qualified Accepted	Number Accepted Not Enrolled	Per Cent Accepted Not Enrolled
Dalhousie	55	35	64	27	77	1	3.5
McGill	119	108	90	52	48	15	29.0
Montréal	117	71	61	70	98	6	8.5
Toronto	240	190	79	128	67	8	6.0
Manitoba	117	40	34	40	100	9	22.5
Alberta	164	76	46	71	93	18	25.0
Total.....	812	520	64	388	75	57	15.0

Source: Canadian Dental Association.

It is apparent that the dental schools themselves take into account these latter factors because 388 letters of acceptance were sent out to fill 338 places. Many of these letters were sent out after some accepted applicants had notified the schools concerned that they would not be enrolling; subsequently letters were sent to other qualified applicants as replacements. Some of the places left vacant in the first year are usually filled by repeaters, dental students who failed the previous year's examinations and have been given permission to repeat. In addition, a certain number of the unfilled places will be filled in the upper years by immigrant dentists who have to spend a certain number of years at a Canadian dental school getting additional training in dentistry before they are eligible to practise in Canada.[1]

Although 338 places is given as the capacity of the first year of the dental schools the actual number of places is not quite that clear-cut. For instance, the Deans of two dental schools reported:[2]

[1] There were 40 students admitted with advanced status to Canadian dental schools in the 1962–63 academic year: 6 from Great Britain, 4 from Australia, 9 from the U.S.A., 17 from European countries, 2 from Iran and 1 each from Brazil and Egypt. Canadian Dental Association, *Dental Students' Register*, 1962–1963, *J. Canad. D.A.*, Vol. 29, April 1963.

[2] Personal communication.

1. The size of the first-year class is determined by the size of the second-year class. Seventy-four students can be physically accommodated in these two years. The size of the second year is first determined after supplemental examination results are completed in Faculty. The remaining places, to the number of 74, are assigned as first-year places.

2. When we go beyond the figure of 30 first-year dental student admissions to our College, we are governed to some extent by the existing facilities in the basic science departments which are closely allied with the Faculty of Medicine as well as with ourselves. The total number in First Year is 105 for Medicine and Dentistry combined, and at the moment we have 30 of these 105 places guaranteed for Dentistry. But if, for example, Medicine only accepts 72 instead of its allotted 75, we can fill the extra three places and we have done so. However, I would say that we would have extreme difficulty within our own facilities if we were to accept more than 33.

It appears then, that, on occasion, what might appear to be unfilled first-year places may simply be the result of some internal adjustment of places in the dental schools concerned. This may help us to understand the discrepancy between capacity and unfilled places when the differences are small, four to ten for example. When they are larger, of course, this is not an adequate explanation.

ADDITION AND ATTRITION

IMMIGRATION

A source of recruits which has helped most professions to keep apace of the expanding Canadian population and consequent increased demands for professional services has been immigration.[1] In dentistry, however, unlike its sister health-profession medicine, this source has been limited.[2] In part, this is a result of the various provincial regulations for dental licensure which make it difficult for most dentists migrating to Canada to obtain a licence to practise without first attending a Canadian dental school for at least two years (Table 2–15).[3] This regulation is even extended, with some exceptions, to graduate

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[1] Department of Labour, *The Migration of Professional Workers Into and Out of Canada 1946–1960*, Economics and Research Branch, Department of Labour, Ottawa: Queen's Printer, 1961.

[2] Between 1955 and 1959 only 66 per cent of the 5,107 successful candidates in the licensing examinations of the Medical Council of Canada were graduates of Canadian medical schools. The other third was about equally divided between doctors from the United Kingdom and Ireland, and foreign doctors. Farquharson, R.F., "Medical and Dental Education", *Canada's Universities in a New Age*, edited by A. Davidson Dunton and Dorothy Patterson, National Conference of Canadian Universities and Colleges (NCCUC): Le Droit, Ottawa, 1962, p. 72.

[3] Only 44 (or 0.73 per cent) of the 6,000 dentists registered with the Canadian Dental Association in 1963 did *not* hold an undergraduate degree, diploma, certificate, or equivalent (e.g. from the Royal College of Dental Surgeons of Ontario, degrees which were discontinued in 1925) from a Canadian or United States dental school. One-quarter of these immigrant dentists were licensed before World War II and only 33, or one-half of one per cent of the total body of Canadian dentists, are dentists who have been granted a licence to practise in Canada without first attending a dental school in Canada or the United States for at *least* one year.

TABLE 2–15

DENTISTS LISTED IN C.D.A. DIRECTORY, 1963, WITH QUALIFICATIONS OBTAINED FROM DENTAL SCHOOLS, NOT ON THE APPROVED LIST OF SCHOOLS, PRE-WAR AND POST-WAR, IN CANADA AND THE UNITED STATES

Province	Where Qualifications Obtained										Total No. of Dentists in Province (1963)
	United Kingdom & Eire		Australia & New Zealand		Europe		Other		Total		
	Pre-war	Post-war	Pre-war	Post-war	Pre-war	Post-war	Pre-war	Post-war	Pre-war	Post-war	
Newfoundland	–	4	–	–	–	–	–	1	–	5	41
Prince Edward Island ...	–	–	–	–	–	–	–	–	–	–	31
Nova Scotia	1[1]	–	–	–	–	–	–	–	1	–	191
New Brunswick	–	–	–	–	–	–	–	–	–	–	133
Quebec	–	–	–	–	2	–	–	–	2	–	1,404
Ontario	2	7	–	2	–	–	–	–	2	9	2,515
Manitoba	2[1]	3	–	–	–	–	–	–	2	3	321
Saskatchewan	1	1	–	–	1	2	–	1	2	4	197
Alberta	–	1	–	–	–	–	–	1	–	2	459
British Columbia	3	8	–	2	–	–	–	–	3	10	704
All Provinces	9[1]	24	–	4	3	2	–	3	12[1]	33	5,996[2]

[1] A duplicate registration is contained here – that is, one dentist is registered both in Nova Scotia and Manitoba.

[2] The four dentists (all trained in approved schools) presently licensed in the Northwest Territories and the Yukon are not contained in this figure, otherwise the total would be 6,000.

Source: Canadian Dental Association and C.D.A. *Directory*, 1963.

dentists from the United Kingdom and other Commonwealth countries. Dentists from foreign countries with the exception of the United States are usually entered in the second year of the four-year dental course at the dental schools. Those dentists from the United States who migrate to Canada and are graduates of dental schools approved by the C.D.A. are accepted for examination by the provincial licensing boards. The requirements for dental licensure in the various provinces are shown below (Table 2–16).

TABLE 2–16

REQUIREMENTS FOR DENTAL LICENSURE BY PROVINCE

Province	Canadian Citizenship Required	Accept Graduates[1] of Schools On C.D.A. List	Accept from Schools[2] Outside Canada and U.S.A.	Recognize[3] N.D.E.B. Certificate	Grant Interim Licences	Annual Fees $
Nfld	No	Yes	Yes	Yes	Yes	5
P.E.I.	Yes or intent	Yes	No	Yes	No	55
N.S.	No	Yes	No	Yes	No	65
N.B.	Yes or intent	Yes	No	Yes	No	60
Québec	Yes	Canadian only	No	No	Yes	75
Ont.	Yes or intent	Yes	Some	Yes	No	75
Man.	No	Yes	Some	Yes	No	100
Sask.	No	Yes	Some	Yes	Yes	150
Alta.	Yes or intent	Yes	Some	Yes	No	100
B.C.	No	Yes	Some	Yes	Yes[4]	125

[1] This is a list of dental schools prepared by the Council on Education of the C.D.A.

[2] Quebec accepts only graduates from Canadian schools, but revisions are presently taking place in Quebec, and in 1964 the province will accept graduates of schools on the C.D.A. list. Ontario, Manitoba, Saskatchewan, Alberta also accept holders of the B.D.S. from schools in the U.K., Australia and New Zealand. Ontario also accepts for examination the holders of the Fellowship in Dental Surgery of the Royal College of Surgeons of England and Edinburgh.

[3] National Dental Examining Board Certificate.

[4] Granted only for service in area where dentists urgently needed.

Source: Brief submitted to the Royal Commission on Health Services by the *Canadian Dental Association*, Ottawa, March 1962, Table XXI–1; and Canadian Dental Association.

DEATH, RETIREMENT AND EMIGRATION

The dental profession adds new dentists, usually recent graduates, to its register every year but, at the same time, loses some of its membership by death, retirement and emigration (Table 2–17).

TABLE 2–17

ANNUAL DEATHS, RETIREMENTS AND EMIGRATION OF CANADIAN DENTISTS, 1945–1961

Year	A	B	C	D	E	F	G	H
	Deaths	Deaths as % of Total	Retired	Retired as % of Total	Emigrants	Total A+C+E	F as % of Total[1]	Total
1961	46	0.7	63	1.1	15	124	2.1	5,865
1960	53	1.0	82	1.4	37	172	3.0	5,780
1959	75	1.3	62	1.1	19	156	2.7	5,753
1958	70	1.3	42	0.7	8	120	2.1	5,564
1957	71	1.3	55	1.0	9	135	2.5	5,481
1956	80	1.5	41	0.7	13	134	2.5	5,416
1955	68	1.3	40	0.7	11	119	2.2	5,354
1954	64	1.2	70	1.3	17	151	2.8	5,298
1953	56	1.1	32	0.6	4	92	2.8	5,215
1952	54	1.1	64	1.2	8	126	2.5	5,071
1951	63	1.2	43	0.9	10	116	2.3	4,912
1950	55	1.2	47	1.0	11	113	2.4	4,627
1949	75	1.6	37	0.8	4	116	2.5	4,549
1948	44	1.0	60	1.3	17	121	2.4	4,601
1947	56	1.2	61	1.3	7	124	2.5	4,602
1946	51	1.1	36	0.8	8	95	2.1	4,565
1945	64	1.4	29	0.6	3	96	2.1	4,529

[1] Percentages all rounded.

Source: Canadian Dental Association.

The loss to the profession by the death of its members has been running at an average of 1.2 per cent of the total C.D.A. membership per annum since 1945. This rate is likely to show a slight increase over the next few years because of the present age distribution of the members of the profession (Table 2–18). Almost one-third of the C.D.A. membership in 1960 were born before or shortly after the

TABLE 2–18

DISTRIBUTION OF CANADIAN DENTISTS BY AGE GROUPS, 1960

Age Group	Number	Per Cent
Under 35	1,364	23.6
35–44	1,745	30.2
45–54	873	15.1
55 and over	1,798	31.1
All ages	5,780	100.0

Source: "The Ages of Canadian Dentists, 1960", *J. Canad. D.A.*, Vol. 26, June 1960.

turn of the century. After a short time, other things being equal, it should return to, or perhaps fall below, the normal rate above because the profession will be getting "younger". That is, those presently of middle-age, 45 – 54, represent only 15 per cent of the profession, a smaller proportion of the profession than the age cohort which follows it. This small 45 – 54 age cohort represents, to some extent, that age cohort who came of university age shortly before and during the economic depression of the "thirties", a period, as noted earlier, when few could afford a lengthy and expensive professional education.

It is often difficult to determine from statistics the actual number of members of any profession who retire in any one year. This arises because while the professionals concerned may have actually ceased to practise, they retain their membership in their professional association, consequently, they will not appear in any statistics as retired professionals. This is particularly true in those professions where individual or group practice is the norm as opposed to those professions whose members are primarily employee-professionals, e.g., engineers or school teachers. In dentistry, as in most other individual practitioner professions, there is not usually a clean break from the profession on "retirement" as perhaps might be the case with a bank manager who has reached the bank's retirement age and leaves its employ on pension. The dentist tends to relinquish his practice gradually over a number of years. Hence, the only dentists listed as retired in Table 2–16 are those who formally announced their retirement to the C.D.A., and are so listed in the official records. This suggests that the total number of dentists in Canada as represented by the C.D.A. membership does not necessarily equal the total number of practising dentists in the country. The Secretary of the British Dental Association reports that of the 16,500 dentists on their register in 1962 there were 2,000 or 12 per cent "who were no longer practising dentistry"[1] and, the Bureau of Economic Research and Statistics of the American Dental Association reports that 12,000 or 11.3 per cent of the 106,000 dentists in the United States in 1961 "were retired or engaged in another occupation".[2] In Canada, the Manitoba Dental Association notes that in 1962, 11 per cent of the 229 dentists on their register "were inactive".[3]

The average number of dentists per annum since 1945 who have formally announced their retirement to the C.D.A. represent about 1.1 per cent of the total number of dentists practising in the year concerned. Hence, bearing in mind the proportion of inactive or dentists otherwise engaged for England and Wales, the United States and the Province of Manitoba, this 1.1 per cent seems very low for Canada and suggests that a sizeable proportion of the dentists registered with

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[1] Personal communication to the Bureau of Economic Research, Canadian Dental Association, from the British Dental Association, March 1963.

[2] Moen, B. Duane, "Survey of Present and Future Needs for Dental Manpower", *Proceedings of the Workshop on the Future Requirements of Dental Manpower and the Training and Utilization of Auxiliary Personnel*, University of Michigan, W.K. Kellogg Foundation Institute, 1962, p. 18. This study will hereafter be referred to as *The Michigan Study*.

[3] *The Manitoba Dental Association*, brief submitted to the Royal Commission on Health Services, Winnipeg, January 1962.

the C.D.A. are in actual fact no longer practising, or at best, have cut-back their practice considerably.[1] Thus, the total number of dentists registered in Canada and used previously to determine the population-dentist ratio was actually an inflated one, which tends to make the present population-dentist ratio even more unfavourable.

Comparatively few Canadian dentists emigrate. The total number of emigrant dentists since 1945 is about 200.[2] In only one year since the end of World War II has the total number of dentists emigrating ever exceeded one-half of one per cent of the total number of dentists on the C.D.A. register; in 1960, the peak year of emigration, 37 dentists (0.6 per cent) emigrated. This number was double that of the number of dentists who emigrated in any other single year between 1945 and 1961 inclusive. The total number who have emigrated since 1945 does, however, represent approximately six per cent of the *total* number of dentists graduated from Canadian dental schools since that time and represents 6.4 per cent of the total number of Canadians graduated from these dental schools.

The emigrant dentists have followed the typical pattern of Canadian emigration: three-fifths have gone to practise in the United States (Table 2–19). One-quarter went to Great Britain and other parts of the Commonwealth and the remainder went to Europe and other parts of the world.

TABLE 2–19

DESTINATION OF EMIGRANT DENTISTS, CANADA, 1945–1961

Country	Dentists (200) Per Cent
United States	61
United Kingdom	12
Australia/New Zealand[1]	9
Other Commonwealth	3
European Countries	7
Middle East/Israel	2
China/"East"	1
Other	1
Unknown	4
Total	100

[1] Only one went to New Zealand, others to Australia.

Source: Canadian Dental Association.

[1] Canadian Dental Association officials state that they have no reason to believe that the proportion of inactive but not officially retired dentists is any higher or lower in Canada as a whole than anywhere else.

[2] This figure was obtained from the Canadian Dental Association. The figures reported in the Department of Labour study, *op. cit.*, are considerably higher. For example, they show 134 emigrant dentists between 1950–60 inclusive while the Canadian Dental Association's register accounts for only 83 during this same period.

It is difficult to determine any valid net migration (immigration – emigration) figure for dentists in Canada.[1] This arises because the 118 dentists who are shown above as emigrants between 1953 and 1960 are fully qualified to practise in Canada, whereas the immigrant dentists, listed in most government statistics, are immigrants whose "intended occupation" is dentistry (Table 2–20). But bearing in mind the provincial licensure regulations, only the 47 immigrant dentists from the United States, or 17 per cent of the immigrants listing their "intended occupations" as dentistry, would be eligible, on arrival, to sit for the licensing examinations. The others (83 per cent), with some exceptions, would have to return to the status of dental student for two or three years if they wished to practise dentistry in Canada.[2] Even if *all* of these, including the dentists from the United States, did eventually obtain their licenses the net migration would be 163, or, approximately 20 dentists per annum for the eight-year period.

TABLE 2–20

IMMIGRATION OF DENTISTS
INTO CANADA BY ORIGIN, 1953–1960

Country of Origin	Dentists (281) Per Cent
United Kingdom	25
United States	17
Elsewhere	58
Total	100

Source: Taken from Table 4, *The Migration of Professional Workers into and out of Canada*, 1946–1960, Department of Labour, Queen's Printer, Ottawa, 1961, pp. 14–15.

The foregoing section has been a brief look at the major source of supply for dentists in Canada (the dental schools of six Canadian universities), at the factors tending to limit this supply, at the role of immigration and emigration, and at other factors tending to reduce the number of dentists registered with the C.D.A. each year. In an earlier section the Canadian population-dentist ratio was compared with the ratios for other countries and in general, found unsatisfactory. At the same time it was noted that this ratio was worsening, that is, the supply of dentists was not keeping up with the increase in population.

MANPOWER PROJECTIONS

On the basis of these international comparisons and on the assumption that the more favourable the population-dentist ratio the more able the profession

[1] Department of Labour, *op.cit.* In their report a net migration figure was calculated but it was assumed that all those immigrants whose "intended occupation" was dentistry actually became dentists.

[2] Cf., p. 20 ff.

is to meet the dental needs of the population, the projected number of dentists required in Canada to keep pace with its growing population has been determined (Table 2–21). These projections have been made by using four different population-dentist ratios, viz., (i) the 1962 ratio for Canada; (ii) the 1962 ratio for British Columbia – the most favourable provincial ratio in Canada; (iii) the 1961 United States ratio; and, (iv) the 1959 Swedish ratio. The projected figures developed from the four ratios with the 1962 population of dentists in Canada as a base indicate the number of dentists whose names should be on the register of the C.D.A. if (i) the present population-dentist ratio is to be maintained in the future; (ii) the Canadian ratio is to be improved to that of the province with the most favourable ratio, British Columbia; (iii) and (iv) the over-all Canadian ratio is to be improved *eventually* to ratios prevalent in either the United States or Sweden.

TABLE 2–21

NUMBERS OF DENTISTS NEEDED IN CANADA
FOR SELECTED YEARS AS BASED ON PROJECTED POPULATIONS
AND VARIOUS POPULATION-DENTIST RATIOS

Projected Population[4]	Year	Canada[1] 3,108	B.C.[1] 2,406	U.S.A.[2] 1,900	Sweden[3] 1,500
–	1962	5,868	(5,868)	(5,868)	(5,868)
20,296,500	1966	6,530	8,440	10,680	13,530
22,589,500	1971	7,270	9,390	11,890	15,060
25,233,500	1976	8,120	10,490	13,280	16,820
28,246,700	1981	9,090	11,740	14,865	18,830
31,545,900	1986	10,150	13,110	16,605	21,030
35,106,700	1991	11,295	14,590	18,475	23,405

[1] 1962 population-dentist ratio.
[2] 1961 population-dentist ratio.
[3] 1959 population-dentist ratio.
[4] Stukel, A., "Population Projections, 1961–1991", Appendix E, in Brown, T.M., *Canadian Economic Growth*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1965.

It is quite obvious that to hope to reach the Swedish ratio of 1,500, even by 1991, is utopian; in the short run this would mean that by 1966 – now only two years away – we would have to double the number of dentists, and, even if the long-range view were taken, say 1991, it would mean increasing the population of dentists fourfold. Even an attempt to achieve the standard of the United States, without some type of "crash" programme, seems somewhat remote since that too would mean doubling the present body of dentists in Canada by 1971, that is, a *net* addition of 670 new dentists per annum to the register for the next nine years; to achieve the B.C. ratio would require an annual net addition of 390 for this same time period.

To estimate the number of new dentists who have to be added to the register of the C.D.A. during each five-year period (between 1962 and 1991) to maintain the present Canadian ratio, or to improve it (that is, to obtain the numbers noted in Table 2–21), it must be remembered that there are always some being dropped from the register. Some die, some retire or leave the profession, others emigrate. That is, the annual attrition rate has to be taken into account. Between 1945 and 1961, inclusive, the median annual attrition rate was 2.45 per cent. On this basis the numbers of new dentists required to be added to the register to maintain the present ratio or improve it, hence to keep up with the growing population and the attrition, have been estimated and are shown in Tables 2–22, 2–23, 2–24 and 2–25.[1]

The estimated numbers of new dentists required for each five-year period as indicated in the tables are based on the following assumptions:

(a) the numbers required are a fixed proportion of the population;

(b) the attrition rate (deaths, retirements, and emigration) is constant, taken at 2.45 per cent per annum, applied to the number on the register at the beginning of the year; and,

TABLE 2–22

NUMBER OF NEW DENTISTS TO BE ADDED TO THE REGISTER IF PRESENT CANADIAN RATIO (3.108) TO BE MAINTAINED

Projected Population[1]	Year	Number of New Dentists	Attrition	Net at Beginning of Year
–	1962	–	–	5,868
20,296,500	1966	1,262	600	6,530
22,589,500	1971	1,577	837	7,270
25,233,500	1976	1,782	932	8,120
28,246,700	1981	2,013	1,043	9,090
31,545,900	1986	2,226	1,166	10,150
35,106,700	1991	2,446	1,301	11,295

[1] Stukel, A., "Population Projections, 1961–1991", Appendix E, in Brown, T.M., *Canadian Economic Growth*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1965.

[1] The formula, developed by Professor Dale, D.K., Carleton University, Ottawa, is as follows:

Let x_o = number of dentists at the base date

y_i = number of new dentists added at the end of the ith year

x_i = number of dentists at end of the ith year

i = attrition rate (2.45 per cent per annum)

j = number of years in the period

Then $x_5 = y_o (1-i)^5 + y_1 (1-i)^4 + y_2 (1-i)^3 + y_3 (1-i)^2 + y_4 (1-i) + y_5$

Under assumption (c) above:

$$y_i = \frac{x_j - y_o (1-i)^j(i)}{1-(1-i)^j}$$

(c) the number of new dentists added each year is constant over the period between the years for which the projected populations are provided. New dentists are added at the end of each year.

The figures contained in Table 2–22 indicate the enormity of the problem of simply maintaining the present Canadian population-dentist ratio of 3,108 if Canada's population increases as predicted. To maintain this pace in the four-year period 1962 to 1966, 1,262 new dentist's names will have to be added to the register of the C.D.A., that is, an average *net* addition of 315.

TABLE 2–23

NUMBER OF DENTISTS TO BE ADDED TO THE REGISTER
IF PRESENT B.C. RATIO (2,406) TO BE ATTAINED

Projected Population[1]	Year	Number of New Dentists	Attrition	Canada Net Beginning of Year
–	1962	–	–	5,868
20,296,500	1966	3,243	671	8,440
22,589,500	1971	2,031	1,081	9,390
25,233,500	1976	2,305	1,205	10,490
28,246,700	1981	2,597	1,347	11,740
31,545,900	1986	2,876	1,506	13,110
35,106,700	1991	3,160	1,680	14,590

[1] Stukel, A., "Population Projections, 1961–1991", Appendix E, in Brown, T.M., *Canadian Economic Growth*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1965.

TABLE 2–24

NUMBER OF NEW DENTISTS TO BE ADDED TO THE REGISTER
IF 1961 U.S.A. RATIO (1,900) TO BE ATTAINED

Projected Population[1]	Year	Number of New Dentists	Attrition	Canada Net Beginning of Year
–	1962	–	–	5,868
20,296,500	1966	5,566	754	10,680
22,589,500	1971	2,578	1,368	11,890
25,233,500	1976	2,916	1,526	13,280
28,246,700	1981	3,291	1,706	14,865
31,545,900	1986	3,648	1,908	16,605
35,106,700	1991	3,997	2,127	18,475

[1] Stukel, A., "Population Projections, 1961–1991", Appendix E, in Brown, T.M., *Canadian Economic Growth*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1965.

TABLE 2–25

NUMBER OF NEW DENTISTS TO BE ADDED TO THE REGISTER IF 1959 SWEDISH RATIO (1,500) TO BE ATTAINED

Projected Population[1]	Year	Number of New Dentists	Attrition	Canada Net at Beginning of Year
–	1962	–	–	5,868
20,296,500	1966	8,521	859	13,530
22,589,500	1971	3,264	1,734	15,060
25,233,500	1976	3,693	1,933	16,820
28,246,700	1981	4,170	2,160	18,830
31,545,900	1986	4,616	2,416	21,030
35,106,700	1991	5,069	2,694	23,405

[1] Stukel, A., "Population Projections, 1961–1991", Appendix E, in Brown, T.M., *Canadian Economic Growth*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1965.

The supply of dentists available from the major source of Canadian dentists – the universities – for the four-year period can be estimated because they are all presently enrolled in the dental schools (Table 2–26). These 1,069 undergraduates (1,041 in Canadian schools and 28 studying in the U.S.A.) will not, however, all be additions to the register. There is, in the Canadian dental schools, a fairly constant 12.5 per cent drop out between the first and second years, of whom about two-thirds (approximately 8 per cent) are failures.[1] Some of these places left vacant will be filled in the upper years, of course, by foreign students admitted with advanced status (Cf. footnote 1, p. 19).[2]

TABLE 2–26

CANADIAN DENTAL STUDENTS BY SCHOOL, 1962–1963

Schools	Numbers
Dalhousie	57
McGill	88
Montreal	173
Toronto	448
Manitoba	102
Alberta	173
American Schools	28
All Schools	1,069

Source: Canadian Dental Association, "Dental Students' Register," *J. Canad. D.A.*, Vol. 29, April 1963.

[1] Canadian Dental Association records.

[2] Canadian Dental Association, *Dental Students' Register*, 1962–63, *op. cit.*

From the foregoing analysis it is evident that in order to maintain the present, albeit inadequate, population-dentist ratio of 3,108 in Canada, the present facilities for educating and training dentists will have to be expanded and new dental schools developed.

In subsequent chapters some of the problems associated with the distribution of the dentists, the recruitment to the profession, the sources of recruits, alternate means of relieving the shortage of dentists, e.g., the increased utilization of dental auxiliaries and those factors affecting demand for dental services will be examined.

CHAPTER 3

SOME CHARACTERISTICS OF DENTAL PRACTITIONERS IN CANADA

The geographical distribution of dentists in Canada has long been of concern to the profession. As noted in the previous chapter their geographical distribution does not directly reflect the distribution of the population as a whole, hence the wide variation in provincial population-dentist ratios. Similarly, it was noted that within the provincial boundaries the ratios varied by size of community. The present chapter will examine further the geographical distribution of the membership of the C.D.A. by province and county and consider some of the factors which appear to make for the present inequable urban-rural distribution of the dentists. Further, the present age distribution of the dentists will be examined by geographical region because, unless recruitment and location-of-practice patterns change, these data will reflect the provincial population-dentist ratios of the future. In addition, two particular aspects of the membership of the profession will be analysed, viz., (i) the dental specialists; and, (ii) the women dentists.

GEOGRAPHIC DISTRIBUTION

The present (1963) geographic distribution of Canada's dentists by province is shown in Table 3–1. Here the inequable distribution of the dentists among the provinces in relation to the actual distribution of the population may be seen. In addition, Tables 3–2 to 3–12 list the distribution of dentists in Canada by counties or by similar political divisions and the population-dentist ratios for these areas.[1] The tremendous variation in these ratios even within individual provinces is the most notable feature of all these tables. In almost every instance an unfavourable population-dentist ratio denotes a rural area and a more favourable ratio an urban area. Some caution, however, must be exercised when looking at those areas which are adjacent to cities but are separated from the urban country

[1] It should be noted in all these tables (3–2 to 3–12 inclusive) that (i) the number of dentists shown is as of April 1963 on the Canadian Dental Association Register; and, (ii) the population for the individual counties or divisions is as of the 1961 Census. Hence, the population-dentist ratios in these tables are high estimates and both urban and rural ratios appear more favourable, than if the 1963 population figures could be used. The rural ratios will, however, be less distorted than the urban because of the more rapid urban growth.

or division by a county line or other political boundary, i.e., are in "the county". In some of these cases the residents of these adjoining areas are within easy commuting distance of the urban centre hence dental services are probably available to them, despite the apparently unfavourable population-dentist ratio for the county. For example, in Table 3–7, Russell County, Ontario, (20,892) is adjacent to Carleton County (1,972) which contains the City of Ottawa where a sizeable proportion of Russell residents go for their shopping, entertainment, etc. Similarly, in Table 3–6, the residents of Laprairie County in Quebec (31,157) are within easy reach of Montreal (2,329).

TABLE 3–1

GEOGRAPHIC DISTRIBUTION OF DENTISTS AND ESTIMATED POPULATION DISTRIBUTION, CANADA AND PROVINCES, 1963

Province	Dentists[1] (6,000)	Total Population[2] (18,238,247)
	%	%
Newfoundland	0.7	2.5
Prince Edward Island	0.5	0.6
Nova Scotia	3.1	4.0
New Brunswick	2.2	3.3
Quebec	23.4	28.8
Ontario	41.9	34.2
Manitoba	5.3	5.1
Saskatchewan	3.2	5.1
Alberta	7.6	7.3
British Columbia	11.7	8.9
Yukon and Northwest Territories	0.1	0.2
Canada	99.7	100.0

[1] Number as of April 1963. See footnote p.33.

[2] Dominion Bureau of Statistics, "Population", *Census of Canada 1961*, (4.7.1963), Ottawa: Queen's Printer 1962, p. 1–1.

Source: Canadian Dental Association; and Dominion Bureau of Statistics, "Population", *Census of Canada 1961*, Introductory Report to Volume 1 (Part 1), Bulletin 1.1–11, Ottawa: Queen's Printer, 1963.

TABLE 3–2

DISTRIBUTION OF DENTISTS BY CENSUS DIVISION, NEWFOUNDLAND, 1963[1]

Census Division	Number of Dentists	Population	Population-Dentist Ratio
1	24	188,904	7,871
2	0	24,779	0/24,779
3	0	23,299	0/23,299
4	1	24,185	24,185
5	7	39,086	5,584
6	3	38,045	12,682
7	2	39,652	19,826
8	1	44,659	44,659
9	0	21,710	0/21,710
10	3	13,534	4,511
Total	41	457,853	11,167

[1] Number of dentists as per Canadian Dental Association Register, April 1963. Population for Counties and Census Divisions as per *Census of Canada 1961*. See footnote p. 33.

Source: Canadian Dental Association; and Dominion Bureau of Statistics, "Population", *Census of Canada 1961*, Introductory Report to Volume 1 (Part 1), Bulletin 1.1–11, Ottawa: Queen's Printer, 1963.

TABLE 3–3

DISTRIBUTION OF DENTISTS BY COUNTIES, PRINCE EDWARD ISLAND, 1963[1]

County	Number of Dentists	Population	Population-Dentist Ratio
Kings	3	17,893	5,964
Prince	3	40,894	13,631
Queens	25	45,842	1,834
Total	31	104,629	3,375

[1] Number of dentists as per Canadian Dental Association Register, April 1963. Population for Counties and Census Divisions as per *Census of Canada 1961*. See footnote p. 33.

Source: Canadian Dental Association; and Dominion Bureau of Statistics, "Population", *Census of Canada 1961*, Introductory Report to Volume 1 (Part 1), Bulletin 1.1–11, Ottawa: Queen's Printer, 1963.

TABLE 3–4

DISTRIBUTION OF DENTISTS BY COUNTIES,
NOVA SCOTIA, 1963[1]

County	Number of Dentists	Population	Population-Dentist Ratio
Annapolis	9	22,649	2,517
Antigonish	4	14,360	3,590
Cape Breton	24	131,507	5,479
Colchester	10	34,307	3,431
Cumberland	8	37,767	4,721
Digby	4	20,216	5,054
Guysborough	0	13,274	0/13,274
Halifax	93	225,723	2,427
Hants	3	26,444	8,815
Inverness	2	18,718	9,359
Kings	8	41,747	5,218
Lunenburg	8	34,998	4,375
Pictou	8	43,908	5,489
Queens	4	13,155	3,289
Richmond	0	11,374	0/11,374
Shelburne	2	15,208	7,604
Victoria	0	8,266	0/8,266
Yarmouth	4	23,386	5,847
Total	191	737,007	3,859

[1] Number of dentists as per Canadian Dental Association Register, April 1963. Population for Counties and Census Divisions as per *Census of Canada 1961*. See footnote p.33.

Source: Canadian Dental Association; and Dominion Bureau of Statistics, "Population", *Census of Canada 1961*, Introductory Report to Volume 1 (Part 1), Bulletin 1.1–11, Ottawa: Queen's Printer, 1963.

TABLE 3–5

DISTRIBUTION OF DENTISTS BY COUNTIES,
NEW BRUNSWICK, 1963[1]

County	Number of Dentists	Population	Population-Dentist Ratio
Albert	0	12,485	0/12,485
Carleton	6	23,507	3,918
Charlotte	5	23,285	4,657
Gloucester	7	66,343	9,478
Kent	2	26,667	13,334
Kings	3	25,908	8,636
Madawaska	6	38,983	6,497
Northumberland	7	50,035	7,148
Queens	1	11,640	11,640
Restigouche	7	40,973	5,853
St. John	33	89,251	2,705
Sunbury	6	22,796	3,799
Victoria	5	19,712	3,942
Westmorland	29	93,679	3,230
York	16	52,672	3,292
Total	133	597,936	4,496

[1] Number of dentists as per Canadian Dental Association Register, April 1963. Population for Counties and Census Divisions as per *Census of Canada 1961*. See footnote p. 33.

Source: Canadian Dental Association; and Dominion Bureau of Statistics, "Population", *Census of Canada 1961*, Introductory Report to Volume 1 (Part 1), Bulletin 1.1–11, Ottawa: Queen's Printer. 1963.

TABLE 3-6

DISTRIBUTION OF DENTISTS BY COUNTIES, QUEBEC, 1963[1]

County	Number of Dentists	Population	Population-Dentist Ratio
Abitibi	11	108,313	9,847
Argenteuil	7	31,830	4,547
Arthabaska	10	45,301	4,530
Bagot	3	21,390	7,130
Beauce	10	62,264	6,226
Beauharnois	11	49,667	4,515
Bellechasse	1	26,054	26,054
Berthier	4	27,325	6,831
Bonaventure	4	42,962	10,741
Brome	2	13,691	6,846
Chambly	29	146,745	5,060
Champlain	16	111,953	6,997
Charlevoix	5	31,012	6,202
Châteauguay	3	34,042	11,347
Chicoutimi	26	157,196	6,046
Compton	1	24,410	24,410
Deux Montagnes	5	32,837	6,567
Dorchester	1	34,711	34,711
Drumond	10	58,220	5,822
Frontenac	3	30,600	10,200
Gaspé	4	74,341	18,585
Hull	27	129,111	4,782
Huntingdon	5	14,752	2,950
Iberville	3	18,080	6,027
Joliette	10	44,969	4,497
Kamouraska	3	27,138	9,046
Labelle	3	29,084	9,695
Lac-St-Jean	17	105,230	6,190
Laprairie	1	31,157	31,157
L'Assumption	4	39,440	9,860
Lévis	9	51,842	5,760
L'Islet	1	24,798	24,798
Lotbinière	3	30,234	10,078
Maskinongé	2	21,274	10,637
Matane	6	70,664	11,777
Mégantic	12	57,400	4,783
Missiguoi	11	29,526	2,684
Montcalm	3	18,766	6,255
Montmagny	3	26,450	8,817
Montmorency	1	25,708	25,708
Montreal & Jesus Islands	804	1,872,437	2,329
Napierville	1	11,216	11,216
Nicolet	3	30,827	10,276
Papineau	5	32,697	6,539
Pontiac	3	19,947	6,649
Portneuf	4	50,711	12,678
Québec	99	331,307	3,347

TABLE 3–6 (Concl.)

County	Number of Dentists	Population	Population-Dentist Ratio
Richelieu	5	38,565	7,713
Richmond	7	42,232	6,033
Rimouski	9	65,295	7,255
Rouville	3	25,979	8,660
Saguenay	9	81,900	9,100
Shefford	9	54,963	6,107
Sherbrooke	26	80,490	3,096
Soulanges	1	10,075	10,075
Stanstead	9	36,095	4,011
St. Hyacinthe	13	44,993	3,461
St. Jean	13	38,470	2,959
St. Maurice	35	109,873	3,139
Témiscaminque	15	60,288	4,019
Témiscouata	10	69,318	6,932
Terrebonne	17	102,275	6,016
Vaudreuil	5	28,681	5,736
Verchères	5	25,697	5,139
Wolfe	1	18,335	18,335
Yamaska	3	16,058	5,353
Total	1,404	5,259,211	3,746

[1] Number of dentists as per Canadian Dental Association Register, April 1963. Population for Counties and Census Divisions as per *Census of Canada 1961*. See footnote p. 33.

Source: Canadian Dental Association; and Dominion Bureau of Statistics, "Population", *Census of Canada 1961*, Introductory Report to Volume 1 (Part 1), Bulletin 1.1–11, Ottawa: Queen's Printer, 1963.

TABLE 3–7

DISTRIBUTION OF DENTISTS BY COUNTIES, ONTARIO, 1963[1]

County	Number of Dentists	Population	Population-Dentist Ratio
Algoma	30	111,408	3,714
Brant	23	83,839	3,645
Bruce	11	43,036	3,912
Carleton	179	352,932	1,972
Cochrane	15	95,666	6,378
Dufferin	6	16,095	2,683
Dundas	7	17,162	2,452
Durham	11	39,916	3,629
Elgin	18	62,862	3,492
Essex	81	258,218	3,188
Frontenac	38	87,534	2,304
Glengarry	1	19,217	19,217
Grenville	6	22,864	3,811
Grey	20	62,005	3,100
Haldimand	6	28,197	4,700
Haliburton	1	8,928	8,928
Halton	41	106,967	2,609
Hastings	26	93,377	3,591
Huron	14	53,805	3,843
Kenora	12	51,474	4,290
Kent	25	89,427	3,577
Lambton	27	102,131	3,783
Lanark	15	40,313	2,688
Leeds	15	46,889	3,126
Lennox & Addington	3	23,717	7,906
Lincoln	52	126,674	2,436
Manitoulin	3	11,176	3,725
Middlesex	93	221,422	2,381
Muskoka	13	26,705	2,054
Nipissing	19	70,568	3,714
Norfolk	13	50,475	3,883
Northumberland	9	41,892	4,655
Ontario	42	135,895	3,236
Oxford	14	70,499	5,036
Parry Sound	6	29,632	4,939
Peel	39	111,575	2,861
Perth	14	57,452	4,104
Peterborough	31	76,375	2,464
Prescott	3	27,226	9,075
Prince Edward	3	21,108	7,036
Rainy River	6	26,531	4,422
Renfrew	22	89,635	4,074
Russell	1	20,892	20,892
Simcoe	56	141,271	2,523
Stormont	13	57,867	4,451
Sudbury	37	165,862	4,483
Thunder Bay	40	138,518	3,463
Timiskaming	10	50,971	5,097
Victoria	10	29,750	2,975
Waterloo	72	176,754	2,455
Welland	54	164,741	3,051
Wellington	27	84,702	3,137
Wentworth	141	358,837	2,545
York	1,035	1,733,108	1,675
Unknown	6		
Total	2,515	6,236,092	2,480

[1] Number of dentists as per Canadian Dental Association Register, April 1963. Population for Counties and Census Divisions as per *Census of Canada 1961*. See footnote p. 33.

Source: Canadian Dental Associations; and Dominion Bureau of Statistics, "Population", *Census of Canada 1961*, Introductory Report to Volume 1 (Part 1), Bulletin 1.1–11, Ottawa: Queen's Printer, 1963.

TABLE 3–8

DISTRIBUTION OF DENTISTS BY CENSUS DIVISION, MANITOBA, 1963[1]

Census Division	Number of Dentists	Population	Population-Dentist Ratio
1	1	28,734	28,734
2	8	36,105	4,513
3	3	21,980	7,327
4	2	14,217	7,109
5	2	31,402	15,701
6	8	30,929	3,866
7	19	49,536	2,607
8	4	21,617	5,404
9	1	11,832	11,832
10	5	19,296	3,859
11	1	13,447	13,447
12	3	28,686	9,562
13	4	12,880	3,220
14	0	6,702	0/6,702
15	2	14,906	7,453
16	8	46,781	5,848
17	7	21,323	3,046
18	0	15,403	0/15,403
19	0	19,921	0/19,921
20	243	475,989	1,959
Total	321	921,686	2,871

[1] Number of dentists as per Canadian Dental Association Register, April 1963. Population for Counties and Census Divisions as per *Census of Canada 1961*. See footnote p. 33.

Source: Canadian Dental Association; and Dominion Bureau of Statistics, "Population", *Census of Canada 1961*, Introductory Report to Volume 1 (Part 1), Bulletin 1.1–11, Ottawa: Queen's Printer, 1963.

TABLE 3–9

DISTRIBUTION OF DENTISTS BY CENSUS DIVISION, SASKATCHEWAN, 1963[1]

Census Division	Number of Dentists	Population	Population-Dentist Ratio
1	4	38,875	9,719
2	2	33,760	16,880
3	4	28,245	7,061
4	5	17,925	3,585
5	6	45,396	7,566
6	56	154,400	2,757
7	15	61,340	4,089
8	7	41,328	5,904
9	10	50,021	5,002
10	4	33,977	8,494
11	40	125,846	3,146
12	4	28,283	9,071
13	4	32,994	8,249
14	9	54,564	6,063
15	15	83,669	5,578
16	9	45,020	5,002
17	3	28,830	9,610
18	0	20,708	0/20,708
Total	197	925,181	4,696

[1] Number of dentists as per Canadian Dental Association Register, April 1963. Population for Counties and Census Divisions as per *Census of Canada 1961*. See footnote p. 33.

Source: Canadian Dental Association; and Dominion Bureau of Statistics, "Population", *Census of Canada 1961*, Introductory Report to Volume 1 (Part 1), Bulletin 1.1–11, Ottawa: Queen's Printer, 1963.

TABLE 3–10

DISTRIBUTION OF DENTISTS BY CENSUS DIVISION, ALBERTA, 1963[1]

Census Division	Number of Dentists	Population	Population-Dentist Ratio
1	9	39,140	4,349
2	26	83,306	3,204
3	5	30,967	6,193
4	2	15,020	7,510
5	8	38,115	4,764
6	145	317,989	2,193
7	9	40,837	4,537
8	21	76,533	3,644
9	6	20,274	3,379
10	10	70,177	9,018
11	193	410,679	2,128
12	7	47,310	6,759
13	4	45,431	11,358
14	3	19,282	6,427
15	11	76,884	6,989
Total	459	1,331,944	2,902

[1] Number of dentists as per Canadian Dental Association, Register, April 1963. Population for Counties and Census Divisions as per *Census of Canada 1961*. See footnote p. 33.

Source: Canadian Dental Association; and Dominion Bureau of Statistics, "Population", *Census of Canada 1961*, Introductory Report to Volume 1 (Part 1), Bulletin 1.1–11, Ottawa: Queen's Printer, 1963.

TABLE 3–11

DISTRIBUTION OF DENTISTS BY CENSUS DIVISION, BRITISH COLUMBIA, 1963[1]

Census Division	Number of Dentists	Population	Population-Dentist Ratio
1	8	34,244	4,281
2	24	70,707	2,946
3	36	94,646	2,629
4	454	907,531	1,999
5	126	290,835	2,308
6	18	66,290	3,683
7	5	21,325	4,265
8	19	74,240	3,907
9	8	38,203	4,775
10	6	31,061	5,177
Total	704	1,629,082	2,314

[1] Number of Dentists as per Canadian Dental Association Register, April 1963. Population for Counties and Census Divisions as per *Census of Canada 1961*. See footnote p. 33.

Source: Canadian Dental Association; and Dominion Bureau of Statistics, "Population", *Census of Canada 1961*, Introductory Report to Volume 1 (Part 1) Bulletin 1.1–11, Ottawa: Queen's Printer, 1963.

TABLE 3–12

DISTRIBUTION OF DENTISTS BY DISTRICT, NORTHWEST TERRITORIES AND THE YUKON, 1963[1]

District	Number of Dentists	Population	Population-Dentist Ratio
Franklin	0	5,758	0/5,758
Keewatin	0	2,345	0/2,345
Mackenzie	1	14,895	14,895
Total – N.W.T.	1	22,998	22,998
Total – Yukon	3	14,628	4,876

[1] Number of dentists as per Canadian Dental Association Register, April 1963. Population for Counties and Census Divisions as per *Census of Canada 1961*. See footnote p. 33.

Source: Canadian Dental Association; and Dominion Bureau of Statistics, "Population", *Census of Canada 1961*, Introductory Report to Volume 1 (Part 1), Bulletin 1.1–11, Ottawa Queen's Printer, 1963.

There are a number of factors which seem to operate so as to bring about the non-uniform distributions noted above. That is, a number of "reasons" and factors which influence the dentists to set up a practice in one place rather than another. Notable among these are (i) the geographical origin of the dentists, or, more precisely, their residence prior to entering dental school; (ii) the location of dental schools; (iii) the nature of the social and physical amenities which the dentists seek for themselves and for their families; and, (iv) their beliefs regarding the differing attitudes of the population of the rural and urban areas towards dental care.

GEOGRAPHIC ORIGIN AND LOCATION OF PRACTICE

In the *Survey of Recent Graduates* conducted by the C.D.A. they report that four-fifths of the dentists who responded to their mailed questionnaire were practising in the province wherein they had been resident prior to entering dental school.[1] Of the remainder now practising in provinces other than their home province, one-quarter were resident in the province wherein their dental school was located (Table 3–13). Similarly, three-fifths were practising in either the city or district where they lived prior to entering dental school (Table 3–14). (Setting up a practice in one's home town, of course, is not confined to dentistry but is probably common in those professions where the practitioners have to hang out their shingle and wait for customers, be they clients or patients. These findings, however, as we will note later, have serious implications for recruitment.)

TABLE 3–13

RECENT GRADUATES AND PRESENT LOCATION OF PRACTICE – PROVINCE

Location	Per Cent
	(535)
Home Province[1]	80.5
Another Province	19.5
Where attended dental school	(4.9)
Other	(14.6)
Total	100.0

[1] Province of residence before entering dental school.

Source: Canadian Dental Association, *Survey of Recent Graduates* (mimeo.), 1963.

LOCATION OF DENTAL SCHOOLS AND LOCATION OF PRACTICE

The presence of a dental school in a province seems to help the province so favoured to improve its population-dentist ratio by providing dental education for its residents and by attracting some of the "outsiders" who study there to remain

[1] Canadian Dental Association, *Survey of Recent Graduates*, mimeo., 1963.

in the province and practise. There are, however, three notable exceptions. The provinces of Nova Scotia and Quebec have dental schools yet have an unfavourable population-dentist ratio when compared with the provinces without a dental school: and British Columbia has the most favourable ratio despite the fact that, as yet, no students have graduated from its dental school.

TABLE 3–14

RECENT GRADUATES AND PRESENT LOCATION OF PRACTICE – CITY AND DISTRICT

Location	Per Cent
	(535)
Home Town/City[1]	61.5
Same Town/City	(42.7)
Same General District	(18.8)
Another Town/City	38.5
Where attended dental school	(6.5)
Other	(32.0)
Total	100.0

[1] Place of residence before entering dental school.

Source: Canadian Dental Association, *Survey of Recent Graduates* (mimeo.), 1963.

In part this is due to the selection process in the dental schools, the tradition of the schools, and to the recruitment processes which operate so as to attract "locals" to one school whereas "outsiders" are attracted to another. As reflected by the residential distribution (Table 3–15) of the present body of students the six dental schools in Canada may be placed into three categories, all of which have some bearing upon the provincial population-dentist ratios, viz.: (i) provincial schools; (ii) regional schools; and, (iii) international schools.

The dental schools of the Université de Montréal and the University of Toronto are purely *provincial* institutions serving primarily the province wherein they are located with 94 per cent and 93 per cent respectively coming from the province wherein the schools are located. The dental schools of the Universities of Manitoba and Alberta are essentially *regional* institutions: Manitoba's dental school serving the prairie provinces of Manitoba and Saskatchewan, and Alberta's serving the three Prairie Provinces and British Columbia. Dalhousie and McGill Universities' dental schools are *international* institutions inasmuch as the former serves Nova Scotia, and the other Atlantic Provinces – and one-sixth of its dental students come from abroad. McGill's dental school serves Quebec and the other provinces – 37 per cent of its dental students come from abroad –– 24 per cent from the U.S.A. and 13 per cent from the Commonwealth and elsewhere. Hence, it is not surprising that the latter two provinces do not reap all the benefits –– as *measur-*

ed by numbers — of the presence of a dental school when so many of their students are from outside the province and, more important, the country. On the other hand British Columbia, despite the lack of graduates from its new dental school, has been able to achieve her favourable position by comparatively good internal recruitment (Table 3–16) and, more important, as we shall see below (p. 53) by attracting dentists who first began to practise elsewhere in Canada.[1]

TABLE 3–15

RESIDENTIAL ORIGINS OF DENTAL STUDENTS IN CANADA BY DENTAL SCHOOL ATTENDED, 1962–63

Origin	All Schools (1,134)	Dalhousie (68)	McGill (139)	Montréal (178)	Toronto (471)	Manitoba (104)	Alberta (174)
	%	%	%	%	%	%	%
Canada							
Home Province ...	76	29	48	94	93	66	58
Other Province ...	16	54	15	3	2	32	41
Abroad							
Commonwealth ...	3	7	12	1	3	1	1
U.S.A.	4	9	24	1	2	—	—
Other	1	—	1	1	—	1	—
Total	100	99	100	100	100	100	100

Source: "Dental Students' Register", *J. Canad. D.A.*, Vol. 29, April 1963.

TABLE 3–16

RATIO OF CANADIAN DENTAL STUDENTS TO POPULATION OF HOME PROVINCE, 1958–1963

Province	1958–59	1959–60	1960–61	1961–62	1962–63
Newfoundland	1:39,818	1: 49,889	1:57,375	1:58,625	1:33,571
Prince Edward Island	1:50,000	1:102,000	...	1:52,500	1:26,500
Nova Scotia	1:37,368	1: 37,684	1:42,529	1:36,600	1:32,435
New Brunswick	1:23,080	1: 28,095	1:35,294	1:43,714	1:55,182
Quebec	1:23,147	1: 23,469	1:25,530	1:23,084	1:22,266
Ontario	1:19,343	1: 16,533	1:17,056	1:14,816	1:13,609
Manitoba	1:24,857	1: 18,830	1:16,345	1:11,544	1:12,635
Saskatchewan	1:22,200	1: 18,792	1:18,200	1:19,125	1:15,246
Alberta	1:18,197	1: 18,014	1:18,594	1:14,854	1:13,048
British Columbia	1:23,754	1: 25,323	1:25,903	1:23,042	1:23,700

Source: "Dental Students' Register", *J. Canad. D.A.*, Vol. 26, March 1960; Vol. 27, March 1961; Vol. 28, June 1962; and Vol. 29, April 1963.

[1] The impact that the presence of a new dental school makes is noticeable, however, in Table 3–16. Manitoba's ratio changed from 24,857 in 1958–59 to 12,635 by 1962–63 after the new dental school was opened.

RURAL-URBAN DISTRIBUTION

The reasons why these recent graduates in dentistry selected their present locations to practise (Table 3–17) rather than another location (Table 3–18) highlight the role which the social and physical amenities of an area and the young dentists' conceptions of the public's attitude towards dental care play in the selection of a place to practise.[1] They also suggest, by implication, many of the reasons why urban rather than rural areas attract the young dentists today.

TABLE 3–17

RECENT DENTAL GRADUATES AND THEIR REASONS FOR SELECTING PRESENT PRACTICE LOCATIONS

Reason	Per Cent of All Reasons Mentioned (535)
Home Town	21.3
Need for Dentist	12.8
Good Location	8.3
Good Social Facilities	6.6
Good Economic Conditions	5.8
Expanding Area	5.0
Like Large City	4.8
Like Small- or Medium-Sized City	4.3
Like Small Town or Rural Area	3.6
Posted There	3.7
City Interested in Dentistry	3.5
Good Climate	2.5
Good Place to Live	2.2
Chance to Take over Practice	2.0
Near Other Dentists	1.6
Good Educational Facilities	1.0
Other	11.0
Total	100.0

Source: Canadian Dental Association, *Survey of Recent Graduates* (mimeo.), 1963.

In another study a questionnaire containing the following question was given to the members of a recent graduating class:[2]

> Do you intend to practise in a town of 5,000 or under? Yes_ or No_. State Reasons.

Most of the senior dental students answered "No" and some of the reasons given follow:[3]

(1) I feel by practising in the city I can make more money.

(2) I am told that people in outlying areas are prone to tell you what they want done rather than accept a complete examination.

[1] *Survey of Recent Graduates, op. cit.*

[2] MacGregor, S.A., *op.cit.*, p. 3.

[3] *Ibid.*

(3) I don't feel that the people in outlying areas have as much appreciation for preventive dentistry as the people in the cities.

(4) I would like to be in the city, closer to the hub of all educational facilities.

(5) I came from the country, but I married a city girl and she won't go to the country.

(6) I was brought up in the city and my home and friends are there.

(7) I am told it is hard to get people in outlying areas to make appointments.

(8) I want to specialize.

(9) I can't get suitable accommodation in the rural area.

A study of dentists in the U.S.A. asked the question: "Why did you choose this part of (town, city, borough) as a place to practise?" and elicited responses similar to those above.[1] The analysis of the responses is detailed below:

Why did you choose this part of (town, city, borough) as a place to practise?

	Per Cent of Total Sample (219)
Convenience or accessibility: main business district; transportation facilities	30
Economic character of town or area: expanding city; industrial area	10
Miscellaneous characteristics of the locality: close to beach; climate	12
Favourable dentist-patient ratio: few dentists in the locality; well-populated area	23
Desirable patients and assured patient load: people more dental conscious; suburban practice	21
"Home town", familiarity with town or area: my relatives live here; born and raised here	10
Influence of some individual: dental supply man, colleague	7
Availability of medical or dental facilities: hospital across the street; other medical men around	3
Relative had practice here:	2
Miscellaneous: wanted to practise where I lived; owned the building here	37
No answer:	1

[1] Kesel, Robert G., "Dental Practice", in *Survey of Dentistry*, (ed.) Hollingshead, Byron S. American Council on Education, Washington, D.C., 1961, p. 116. The italics are the author's. The analysis is based on unpublished data from the National Opinion Research Center, University of Chicago.

The nine reasons from the MacGregor study when viewed in conjunction with the "reasons" in Tables 3–17 and 3–18 and the U.S.A. data above make it quite plain why the rural-urban distribution is as it is. Earlier it was noted, however, that the dentists return to "the city or district" they were resident in before entering dental school. These findings are not at variance with one another.

TABLE 3–18

RECENT GRADUATES AND THEIR REASONS FOR NOT SELECTING ANOTHER PRACTICE LOCATION

Reason	Per Cent of All Reasons Mentioned (535)
Too Small City	15.3
Poor Economic Conditions	13.2
Dentists Not Needed	11.7
Wished to Remain near Friends and Relatives	8.5
Lack of Appreciation for Dentistry	6.8
Poor Social Facilities	6.1
Too Large City	5.6
Not Expanding	5.5
Poor Office Accommodation	4.5
Poor Climate	3.4
Poor Educational Facilities	2.1
Lack of Financial Assistance	1.1
Poor Housing	1.1
Other	15.1
Total	100.0

Source: Canadian Dental Association, *Survey of Recent Graduates* (mimeo.), 1963.

In 1923, 80 per cent of the graduating class in dentistry at the University of Toronto came from "the towns and villages and farms" of Ontario "and almost eighty per cent went back to serve rural Ontario".[1] In the 1963 graduating class of the same university only 11 of the 110 dental students come from communities with a population of 10,000 or less and it has been estimated that in recent years only 43 per cent of those coming from such communities return to a similar sized area.[2] That is, 43 per cent of the 10 per cent of the graduating class, or 4.7 dentists, will be left to locate in those areas where 33 per cent of the population of Ontario live.[3]

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[1] MacGregor, *op. cit.*, p. 3. The information contained in this and the following paragraph are based primarily on the MacGregor study.

[2] It is interesting to note that 72 per cent of this graduating class came from Metropolitan Toronto. (Cf. p. 45.)

[3] Dominion Bureau of Statistics, *Census of Canada 1961*, Advance Report No. AP–4 (28.6.62), Ottawa: Queen's Printer, 1962, p. 1: Rural and Urban Areas under 10,000.

Hence, in addition to the lack of social and physical amenities in the rural areas part of the rural-urban distribution problem lies in the sphere of recruitment. That is, a major source of recruits for the rural areas in an earlier period has now dried up, the rural area itself is not sending enough students into dentistry to keep itself supplied. And as Professor MacGregor has pointed out even with special financial and other incentives (e.g., The Red Cross Dental and Coach Plan) "the city-bred boy, in spite of the money, cannot be lured away from the comforts of a city home and a vitrolite trimmed office in a Plaza".[1]

The data in Table 3–19, taken from a recent survey, illustrate the pull which the big city has for dentists. Only one-half of those recent graduates from the small-(under 10,000) and medium-sized (10,000 – 99,999) cities and towns return to practise in the same place or in towns and cities of a similar size; whereas over three-quarters of those from the bigger cities (100,000 and over) locate their practice in a big city. One aspect not mentioned previously is the fact that the dental schools themselves are located in the larger cities and the student from the rural area or the small town or city will have spent six or seven years in the big city while taking his pre-dental and dental training and by the time of graduation will have acquired the values and tastes of big city life. A recent study reported in Hollingshead tends to support this when the location preferences of dental students and applicants to dental schools are compared and the author states:[2]

> About 52 percent of dental students would like to practise in cities that are the same size as their home towns; 28 percent, in cities larger than their home towns; and 20 percent, in smaller cities. In this regard, *a greater percentage of students than applicants prefer to locate in cities larger than the ones in which they grew up.*

TABLE 3–19

SIZE OF HOME TOWN OF RECENT GRADUATES AND SIZE OF TOWN/CITY WHERE PRACTICE LOCATED

Size of Town/City Where Practice Located	Size of Home Town		
	Under 10,000 (140)	10,000–99,999 (114)	100,000 and Over (279)
	%	%	%
Under 10,000	48.0	30.0	13
10,000 – 99,999	13.5	48.5	10
100,000 and over	37.5	21.5	77
No information	1.0	–	–
All towns/cities	100.0	100.0	100

Source: Canadian Dental Association, *Survey of Recent Graduates* (mimeo.), 1963.

[1] MacGregor, *op. cit.*, p. 2.

[2] Mann, W.R., "Dental Education" in Hollingshead, *op. cit.*, p. 288, my italics, see also Table 96, p. 287, same study, which shows that a slightly higher proportion of students than applicants came from communities of 20,000 and smaller.

A great deal of the resistance to locate a practice in the rural areas is related to the dentists' conception of their own roles as professional men and their perception of the attitudes towards dental care in the rural areas which appears to them to limit the dentist's professional role. For example:[1]

> I am told that people in outlying areas are prone to tell you what they want done rather than accept a complete examination.
>
> I don't feel that the people in the outlying areas have as much appreciation for preventive dentistry as the people in the cities.

These negative attitudes towards dental care are also reflected in the limited nature of the demand for dental services in the rural areas and consequently the rural or small town dentist's earning capacity is limited; a further deterrent to rural practice. In 1958, the mean net annual income of dentists in communities with a population of 2,500 and less was $6,663 compared to a mean net income of $11,789 per annum for dentists practising in communities having a population from 50,000 – 100,000.[2] The mean annual income for all Canadian dental private practitioners in the same year was $10,543, that is, one and a half times that of the dentists in the small communities noted above.[3]

RE-LOCATION AND INTERPROVINCIAL MOBILITY

Not all dentists stay in the same geographical area throughout their professional life and within the wide limits set by the provincial licensing regulations qualified dentists in Canada may locate their practices wherever they wish.[4] Hence, it is not surprising that some dentists set up practice first in one place then at a later date move to another. Concerning this situation in the U.S.A. one researcher has written:[5]

> In general, dentists may establish their practices wherever they wish. It is natural for dentists to concentrate in areas of high per capita income, favourable climate, cultural and recreational facilities and other attractive features. Certain attractive areas are so well supplied with dentists that not all are busy .... To a fairly large extent determination of location is made by trial and error. Regular publication of statistics on the distribution of dentists and economic data has helped to reduce the amount of trial-and-error determination of location. Yet there is a great deal of moving around by dentists seeking a location where they will be busier. In some instances, the original choice of location was not a good one. In other instances,

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1 MacGregor, *op.cit.*, p. 3.

2 Canadian Dental Association, *Survey of Dental Practice, 1958*, a booklet compiled from data contained in *J. Canad. D.A.*, Vol. 25, October, November and December 1959, p. 4. The mean net annual income for dentists in towns and cities between 2,500 and 5,000 was $8,079 and for those practising in cities and towns between 5,000 and 10,000 was $9,671.

3 *Ibid.*

4 Cf. pp. 20–22 and Table 2–15, p. 21.

5 Moen, *The Michigan Study, op.cit., p. 20.*

changes have taken place which have caused the location to be undesirable. Some of these changes include the influx of other dentists into the immediate area, shifts of population, local economic stagnation, urban renewal and expressway construction. Of course, the individual dentist often decides to change locations for personal reasons such as climate and health, cultural facilities and nearness to friends and relatives.

The foregoing probably applies equally to Canada and the Canadian dentist and may help us to understand some of the "reasons" for re-location of practices.

The Canadian pattern of interprovincial re-location of dentists has been essentially a westward movement and 70 per cent of all re-locations within Canada from 1945–1961 inclusive have taken place in that direction (Table 3–20) and over 40 per cent of those moving west have re-located in British Columbia. The provinces of Ontario and Quebec have suffered the greatest net loss due to re-location and British Columbia and Manitoba the greatest net gains (Table 3–21).

AGE DISTRIBUTION

Of particular importance to any manpower study is the age distribution of the professionals concerned because it indicates, to some extent, the differential pattern of growth of the profession during various periods and the adequacy of recruitment efforts. It also suggests some measure of the productivity of the work force concerned. The 1962 age distribution of the dentists registered with the C.D.A. is shown in Table 3–22.

In Canada as a whole slightly more than three-fifths of all dentists are under 50 years of age. The distribution of this age group among the provinces, however, is not uniform and in Newfoundland and Alberta almost 75 per cent of the dentists are under 50, in British Columbia almost 70 per cent and in Quebec almost 63 per cent fall into this age grouping, whereas in Prince Edward Island only 42 per cent do so.

Among the younger age cohorts, those under 30 years of age, Newfoundland and Alberta again are in the most favoured position having 19.5 per cent and 12.4 per cent respectively in this age cohort. On the other hand, in half of the provinces (Prince Edward Island, Manitoba, Saskatchewan, New Brunswick and Nova Scotia) at least one-quarter of the dentists resident there are over 60 years of age, hence, in those provinces one in four of the dentists is virtually of retirement age.

One in every eight of Canada's dentists (12.9 per cent) is over the "normal" retirement age of business and industry, that is, has passed his 65th birthday. The over-all picture for Canada, however, obscures the true position of the individual province and not all provinces share this "over-age" group equally. One in five of Manitoba's dentists fall into the "over 65" age group whereas only one in twenty of the Newfoundland dentists do so.

In part, the uneven distribution of the various age groups among the provinces is a reflection of the pattern of recruitment of dentists in the provinces or, at least, the recruitment of dentists, whatever their geographic origin, to locate their practices in the individual provinces. On this basis some provinces (Newfoundland, Alberta, Quebec and Ontario) have been more successful in recruiting younger dentists, those under 40 years of age, to practise there than others, e.g., Saskatchewan, Nova Scotia and Prince Edward Island. At the same time re-location patterns and British Columbia's favourable position in this respect, as noted above, are reflected in the high proportion of its dentists who are in the 40 – 49 age cohort, double that of the same age cohort in Prince Edward Island and one and a half times that of most of the other provinces except Nova Scotia.

TABLE 3–20

RE-LOCATIONS OF DENTISTS WITHIN CANADA, 1945–1961

To	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Total
From											
Nfld.	–	0	2	0	0	9	0	0	2	0	13
P.E.I.	0	–	1	0	0	3	0	0	0	0	4
N.S.	2	6	–	5	0	10	1	0	3	4	31
N.B.	2	0	3	–	4	3	0	1	0	0	13
Que.	0	0	4	3	–	23	9	0	9	8	56
Ont.	3	1	12	7	9	–	49	20	23	68	192
Man.	0	0	0	0	0	12	–	6	6	13	37
Sask.	0	0	0	0	1	10	13	–	24	18	66
Alta.	0	0	1	0	0	12	11	12	–	41	77
B.C.	0	0	0	0	2	4	4	1	12	–	23
Total	7	7	23	15	16	86	87	40	79	152	512

Source: Canadian Dental Association.

TABLE 3–21

NET LOSS/GAIN BY PROVINCE FROM INTERPROVINCIAL MIGRATION OF DENTISTS, 1945–1961

Province	Number Moved To	Number Moved From	Net Loss/Gain
Newfoundland	7	13	–6
Prince Edward Island	7	4	+3
Nova Scotia	23	31	–8
New Brunswick	15	13	+2
Quebec	16	56	–40
Ontario	86	192	–106
Manitoba	87	37	+50
Saskatchewan	40	66	–26
Alberta	79	77	+2
British Columbia	152	23	+129

Source: Canadian Dental Association.

TABLE 3–22

DISTRIBUTION OF DENTISTS RESIDING WITHIN CANADA, BY AGE, CANADA AND PROVINCES, DECEMBER 31, 1962

Age Group	Canada (6,000)	Nfld. (41)	P.E.I. (31)	N.S. (191)	N.B. (133)	Que. (1,404)	Ont. (2,515)	Man. (321)	Sask. (197)	Alta. (459)	B.C. (704)	Yukon/ N.W.T. (4)
	%	%	%	%	%	%	%	%	%	%	%	(No.)
Under 25.....	1.3	–	–	1.5	0.7	0.7	1.6	2.1	3.0	1.5	0.9	–
25 – 29.....	9.9	19.5	3.2	6.3	8.3	9.6	10.9	9.7	4.6	12.4	8.0	–
30 – 34.....	11.9	14.6	9.7	5.8	10.5	13.2	11.5	10.3	10.1	14.6	11.5	(1)
35 – 39.....	14.7	19.5	12.9	14.1	15.8	15.6	14.1	12.7	13.2	16.8	15.3	–
40 – 44.....	15.6	14.6	12.9	20.9	15.8	15.5	13.4	14.4	13.2	18.3	21.2	(2)
45 – 49.....	8.7	4.9	3.2	10.5	6.0	8.9	7.6	7.1	11.7	8.9	12.2	–
50 – 54.....	5.9	4.9	12.9	6.8	4.5	7.7	5.2	6.0	7.6	5.7	4.9	–
55 – 59.....	7.2	2.4	12.9	7.3	8.3	7.5	7.7	6.5	6.1	5.4	6.3	–
60 – 64.....	8.9	2.5	19.3	7.9	9.0	10.7	8.9	8.1	10.1	5.0	8.0	(1)
65 – 69.....	7.6	4.9	6.5	5.8	6.8	6.9	9.0	8.1	9.2	6.6	4.7	–
70 – 74.....	2.8	–	6.5	5.2	6.0	1.7	2.7	5.6	5.6	1.5	3.1	–
75 and over	2.5	–	–	6.3	3.7	1.4	2.6	8.7	2.0	1.3	1.4	–
Unknown.....	3.0	12.2	–	1.6	4.6	0.6	4.8	0.7	3.6	2.0	2.5	–
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	(4)

Source: Canadian Dental Association.

The general age distribution of all dentists in Canada also reflects two other important influences, viz.: (i) the economic depression of the nineteen thirties and the years of World War II; and (ii) the influx of veterans into the profession under the Post-War Rehabilitation Plan. (Needless to say as one goes up the age scale chronologically the proportions are bound to drop off due to natural causes such as death and illness and to retirement.)

The three age cohorts 45 – 49, 50 – 54 and 55 – 59 reflect the first influence noted above since all these C.D.A. members as well as their non-dentist fellows in these age groupings were of university age during the two crisis periods of 1929–1938 and 1939–1945, periods when a small proportion of Canadians attended university (cf. p. 14). The age cohorts 40 – 44 and 35 – 39 on the other hand represent some of those dentists (i) whose university career was cut short by World War II but who were young enough to take advantage of the Canadian Government's Post-War Rehabilitation Plan and returned to university and (ii) others whose war-time service made them eligible to pursue training which, under pre-World War II conditions they would not have received.[1] After the end of the war 788 veterans successfully completed their dental education under the rehabilitation plan and this figure represents 26 per cent of all Canadians graduated from Canadian dental schools from 1946 to 1962 inclusive, the peak years being 1950, 1951 and 1952, that is, from five to seven years after the end of the war.

One other important aspect of the age distribution is that of the relationship between the age of the practitioner and productivity. In a recent study of dental practice wherein net income and mean hours worked per week were compared for the various age cohorts of dentists, the authors state:[2]

> Of major significance is the sharp drop in income from age 50 onward even though the reduction in hours worked is gradual.

That is, they believe that increasing age results in decreasing productivity. This is important from a manpower point of view in Canada where over one-third of all dentists are over 50 and where the situation in the individual provinces varies from a high of 58 per cent in Prince Edward Island and two other provinces, Manitoba and Saskatchewan, have over 40 per cent aged 50 and over and Newfoundland and Alberta have as small proportions as 15 and 25 per cent respectively.

DENTAL SPECIALISTS

Most of the 5,868 dentists in Canada in 1962 were general practitioners in private practice and only about 700 or 12 per cent of all Canadian dentists do not

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[1] Thirty-seven per cent of those successfully completing their dental studies under the D.V.A. plan began their training under this scheme by studying for their Matriculation *after* war service. Personal communication, Department of Veterans Affairs, Research and Statistics Division.

[2] *Survey of Dentistry, 1958, op. cit.*, p. 9.

fall into this category (Table 3–23).[1] (Since the organization of dental practice, the emergence of the specializations and the relationships between and among the general practitioners and the specialists is the subject matter of another report –– that of Professor Oswald Hall –– only those aspects which appear to bear directly upon manpower problems will be treated here.)

TABLE 3–23

TYPE OF DENTAL PRACTICE, CANADA, 1962

	Number	Per Cent
General Practitioners[1]	5,170	88.1
Qualified Specialists	227	3.8
Health Services (full-time)[2]	248	4.3
Federal Health Departments[3]	223	3.8
All fields	5,868	100.0

[1] There may be a slight overlap between the number of dentists in Health Services (full-time) and the number in Federal Health Departments. For example, some of the 23 dentists employed by the Department of National Health and Welfare may be among the dentists noted in the Health Services because of the nature in which the relevant statistics are recorded. The information on the former group was obtained from the chiefs of the dental divisions of the federal departments while the Health Services data were obtained from the registrars of the provincial dental associations. The possible overlap in the table will tend to reduce the number shown as actually in private practice.

[2] Includes dental schools, hospital service, school dental service and public health.

[3] Includes National Defence, National Health and Welfare and Veterans Affairs.

Source: Canadian Dental Association.

The proportion of Canada's dentists who are qualified specialists is 3.8 per cent of all dentists. This figure compares favourably with that of the dental profession in the United States and Sweden, where the comparable figures are 3.8 and 3.3 per cent respectively.[2] Those included as specialists in Canada are only those with recognized qualifications in their speciality. This needs to be mentioned because many general practitioners do in fact "specialize". That is, patients attracted to them and whom they attract may come to them primarily for one type of service or may be of a particular age grouping, for example, all children. This, however, does not qualify them for inclusion in our table above.

When international comparisons are attempted other problems arise: in Canada the Canadian Dental Association recognizes three dental specializations, viz., orthodontics, oral surgery, and periodontics which in some countries more are recognized and in other countries fewer are recognized. For example, Sweden like Canada, recognizes three specializations but in the United States four additions are made to those recognized in Canada. They are paedodontics, prosthodontics, oral pathology and public health.

[1] The 1962 C.D.A. Register is used here since no specialist breakdown for the 1963 membership is available at the time of writing although the total for 1963 has been used in the analysis earlier in this chapter.

[2] This figure for the U.S.A. was obtained from Kesel, R.G., *op. cit.*, p. 127. The Swedish was obtained in a personal communication from the Secretary, Swedish Dental Society, 1963.

GEOGRAPHIC DISTRIBUTION

The dental specialists like the dentists in general are distributed unevenly among the provinces (Table 3–24) and there is a marked concentration of them in the larger urban areas. Two of the provinces, Newfoundland and Prince Edward Island, have no resident dental specialists and New Brunswick and Saskatchewan only have two each, both orthodontists in each instance.[1] Ontario has the lion's share with 54 per cent and the provinces of Quebec and British Columbia follow with 17 and 12 per cent respectively.

TABLE 3–24

PROVINCIAL DISTRIBUTION OF QUALIFIED SPECIALISTS, CANADA, 1962

Specialty[1]	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Total
Orthodontics.....	0	0	4	2	26	67	5	2	10	11	127
Oral Surgery	0	0	2	0	8	34	4	0	4	7	59
Periodontics.....	0	0	1	0	4	16	1	0	0	2	24
Paedodontics	0	0	1	0	0	6	1	0	2	7	17
Total Number ..	0	0	8	2	38	123	11	2	16	27	227
Total Per cent .	0	0	3	1	17	54	5	1	7	12	100

[1] Paedodontics is included here because, while it is not recognized by the Canadian Dental Association, it is recognized in some provinces as a specialty.

Source: Canadian Dental Association.

The urban-rural distribution of dental specialists follows the usual distribution pattern of specialized services in most fields, that is, a high concentration in the larger urban areas. The distribution of the members of three of the specializations recognized in Canada is shown in Table 3–25. In each speciality more than three-quarters of the specialists are found in cities of over 250,000 population and in oral surgery and orthodontics almost half are located in Canada's two largest cities, Montreal and Toronto. Sixty per cent of the periodontists are found in these two cities alone. This means that to a large extent specialized dental services are not readily available to that 47 per cent of Canada's population which is resident in rural areas and in urban areas with populations of less than 30,000 people.[2]

INCREASE IN NUMBERS

The proportion of the dentists in Canada who are specialists is growing (Table 3–26) but a comparison of the numbers of specialists in the various fields in 1952 and 1962 shows that the various specializations are growing at different

[1] The province of Newfoundland does not certify any dental specialists.

[2] Dominion Bureau of Statistics, *Census of Canada 1961,* Advance Report No. AP–4, (28.6.62),Ottawa: Queen's Printer, 1962, p. 1.

rates (Table 3–27). In Canada orthodontics has shown a considerable increase at the expense of oral surgery and periodontics while paedodontics has more or less held its own. It is interesting to note that in the United States periodontics too has shown the sharpest drop; orthodontics, oral surgery and paedodontics all showing a slight increase. In the United States there was an actual drop in absolute terms of periodontists between 1952 and 1960, from 366 to 307.

TABLE 3–25

DISTRIBUTION OF QUALIFIED DENTAL SPECIALISTS BY CITY SIZE, CANADA, 1962[1]

City Size	Specialities		
	Oral Surgeons (59)	Orthodontists (127)	Periodontists (24)
	%	%	%
1,000,000 and over	45	48	60
250,000 – 999,999	42	28	33
50,000 – 249,999	13	21	7
30,000 – 49,999	—	2	—
Less than 30,000	—	1	—
All cities	100	100	100

[1] Not all certified specialists are members of the specialty sections of the Canadian Dental Association. An extra registration fee must be paid for membership in one of the sections for those eligible.

Source: Canadian Dental Association, *Directory, 1962*, Toronto: Canadian Dental Association, 1962, pp. 95–98.

TABLE 3–26

GROWTH IN PROPORTION OF DENTISTS WHO ARE SPECIALISTS, CANADA (1952–1962) AND U.S.A. (1952–1960)

	Canada		United States	
	1962 (5,868)	1952 (5,071)	1960 (101,700)	1952 (101,293)
	%	%	%	%
Qualified Specialists	3.8	2.5	4.1	2.5
Non-specialists	96.2	97.5	95.9	97.5
Total	100.0	100.0	100.0	100.0

Source: Canadian data: Canadian Dental Association; U.S. data: *Proceedings of the Workshop on the Future Requirements of Dental Manpower and the Training and Utilization of Auxiliary Personnel*, University of Michigan, W.K. Kellogg Foundation Institute, 1962, abridged from Tables 1 and 2, p. 119.

TABLE 3–27

GROWTH IN SPECIALIZATIONS, CANADA (1952–1962) AND U.S.A. (1952–1960)

Specialization	Canada		United States	
	1962 (227)	1952 (126)	1960 (4,170)	1952 (2,584)
	%	%	%	%
Orthodontics	56	48	50	48
Oral Surgery	26	28	28	26
Periodontics	10.5	16	7	14
Paedodontics	7.5	8	5	3
Prosthodontics	–	–	7	7
Oral Pathology	–	–	1	1
Public Health	–	–	1	–[1]
Total	100.0	100	99	99

[1] Less than 0.5 per cent.

Source: Canadian data: Canadian Dental Association; U.S. data: *Proceedings of the Workshop on the Future Requirements of Dental Manpower and the Training and Utilization of Auxiliary Personnel*, University of Michigan, W.K. Kellogg Foundation Institute, 1962, abridged from Tables 1 and 2, p. 119.

The changing proportion of specialists in each of the three specializations recognized in Canada may reflect the changing importance of the fields due to increased demands for certain types of specialist services, increased dental knowledge and changes in dental education. It also reflects the mean net income of the specialists in the various fields (Table 3–28). That is, orthodontists, members of the fastest growing field, earned the highest mean net income ($17,190) in 1958 and periodontists, members of a field which appears to be declining, earned the least ($11,725). The latter figure represents a net income of only 16 per cent more than the general dental practitioners earned in the same year whereas the orthodontists earned 70 per cent more than their non-specialist colleagues.[1]

TABLE 3–28

MEAN NET ANNUAL INCOME OF SPECIALISTS AND GENERAL PRACTITIONERS, CANADA, 1958

	Mean Gross Income	Mean Net Income	Net as Per Cent of Gross
	$	$	%
General Practitioner	19,334	10,114	52.3
Orthodontist	27,516	17,190	67.4
Oral Surgeon	24,475	14,683	60.0
Paedodontist	24,976	13,958	55.9
Periodontist	21,156	11,725	54.5

Source: Canadian Dental Association, *Survey of Dental Practice, 1958.*

[1] The equivalent figures for these specialists and the general practitioners in the United States are 76 per cent and 51 per cent. Kesel, R.G., *op.cit.*, Table 16, p. 128.

WOMEN DENTISTS

No profession in Canada is legally either a male or a female occupation.[1] Most professions, however, have tended to attract one rather than the other of the two sexes. For example, the profession of engineering in Canada may be deemed to be a male profession because of its high proportion of men (99.5 per cent); and, nursing a female profession because of the high proportion (99.6 per cent) of the profession's members who are women.[2] School teaching at the secondary level on the other hand has a sizeable proportion of both men and women, 60 and 40 per cent respectively.[3] Dentistry in Canada is essentially a male profession since less than two per cent (1.6 per cent) of the members of the Canadian Dental Association are women. This phenomenon of "maleness" in the dental profession, however, is not universal. An international comparison of the proportion of dentists who are women in various countries illustrates this dramatically (Table 3–29). Canada places well near the bottom of a list of 25 countries beginning with the Baltic country of Lithuania where 96 per cent of the country's dentists are women.

Considering women to be as yet an untapped source of potential recruits for the profession, it was felt worthwhile to gather some information from the few women who are presently practising dentistry in Canada. It is hoped that these data outlining the "way of life" of the women dentists, married and otherwise, will help to dispel many apprehensions and at the same time provide a firm basis of knowledge for any discussions concerned with this area of recruitment.

There are in Canada 97 women who have their names on the C.D.A. Register. Each of these dentists was mailed a questionnaire asking them about their general and professional education, their hours of work and type and conditions of practice, family background, marital status, etc. Seventy-five of the 97 returned completed questionnaires.[4] This is considered to be a good response rate in any survey, particularly so in a mail survey.

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[1] Only in the Province of Quebec is there legislation which does not permit free entry to a profession because of gender. Male nurses are not permitted to register in the professional nurses' association but according to the Canadian Nurses' Association at the time of writing a bill is before the Quebec Legislature to amend this situation and the "nursing schools there, anticipating the outcome, have already begun to report the presence of male students for the first time".

[2] The information on the engineers was obtained from the Economics and Research Branch of the Department of Labour, Ottawa, who have a continuing study of professional scientific manpower in Canada. The figure above is from their 1959 survey. The data on the Registered Nurses was obtained from the Canadian Nurses Association, Ottawa, and pertains to 1961.

[3] Dominion Bureau of Statistics data from the Educational Statistics Division, Ottawa. These proportions would be changed considerably, of course, if the elementary school teachers were included.

[4] In response to the form one dentist wrote a letter to the Commission in which she gave a brief description of her history, etc., but did not send in a form; another of the women dentists was interviewed in person. Of these two only the latter was included in the forms analysed.

TABLE 3–29

PERCENTAGE OF DENTISTS IN VARIOUS COUNTRIES WHO ARE WOMEN – 1958

Country	Per Cent
Lithuania	96
Latvia	93
Finland	80
Russia	71
Greece	50
Denmark	40
Israel	29
France	25
Sweden	25
Norway	23
Netherlands	15
West Germany	13
Belgium	10
Japan	10
Switzerland	10
Luxembourg	8
Great Britain	8
Italy	6
Australia	5
Austria	4
Mexico	3
Canada	*2*
South Africa	1
New Zealand	1
United States	1

Source: Hollingshead, Byron S., (ed.), *Survey of Dentistry*, American Council on Education, Washington, D.C., 1961, Appendix C, p. 528.

This high response rate plus the similarity of non-respondents to respondents as far as ethnic origins and location of practice are concerned (Tables 3–30 and 3–31) allows one to place considerable confidence in any observations and generalizations made on the basis of the data contained in the completed forms.

ORIGINS AND MARITAL STATUS

Almost one-half (47 per cent) of the respondents had degrees from foreign (including the United Kingdom) dental schools and had been qualified to practise elsewhere before migrating to Canada –– in some cases they had been qualified to practise in more than one country. Only eight of this previously qualified group did not practise before coming to Canada and entering a Canadian dental school.

Over two-thirds of the women dentists in Canada were born outside of North America, one-half of whom were born in one of the Baltic countries of Latvia, Lithuania and Estonia. This high proportion is a reflection of the position of

women in the dental profession in the countries of their birth (cf. Table 3–29). The importance of this cultural and occupational phenomenon is further emphasized when it is noted that one-third of those who were "born elsewhere" and received most of their education in North America, had come to Canada either before entering elementary school or at some time during their pre-university career. (Most of this group were born in the Baltic states, primarily Latvia.) That is, they came to Canada as immigrant children.

TABLE 3–30

PLACE OF BIRTH OF ALL WOMEN DENTISTS ON CANADIAN DENTAL ASSOCIATION REGISTER AND OF THOSE WHO COMPLETED QUESTIONNAIRES

Place of Birth	Universe[1]		Respondents[2]	
	No.	Per Cent	No.	Per Cent
Canada	28	29	22	29
United States	2	2	2	3
Baltic Countries	35	36	26	35
Other European	23	24	17	23
United Kingdom	6	6	6	8
Middle East	1	1	1	1
Asia	1	1	1	1
Unknown	1	1	–	–
Total	97	100	75	100

[1] All women on Canadian Dental Association Register.

[2] Women on Canadian Dental Association Register who completed questionnaires.

Source: Canadian Dental Association and Survey of Canadian women dentists carried out by Bruce A. McFarlane for the Royal Commission on Health Services.

TABLE 3–31

LOCATION OF PRACTICE OF ALL WOMEN DENTISTS ON CANADIAN DENTAL ASSOCIATION REGISTER AND OF THOSE WHO COMPLETED QUESTIONNAIRES

Province or Region Where Presently Practising	Universe[1]		Respondents[2]	
	No.	Per Cent	No.	Per Cent
Atlantic Provinces	5	5	4	5
Quebec	16	17	13	17
Ontario	58	60	46	61
Prairie Provinces	9	9	6	8
British Columbia	9	9	6	8
Total	97	100	75	99

[1] All women on Canadian Dental Association Register.

[2] Women on Canadian Dental Association Register who completed questionnaires.

Source: Canadian Dental Association and Survey of Canadian women dentists carried out by Bruce A. McFarlane for the Royal Commission on Health Services.

Dentistry as a possible life work for Canadian-born women appears to have diminished through time. One-quarter of the Canadian-born women dentists are over 60 years of age and of the 50 respondents who have graduated since 1951 only *six* were born in Canada (Tables 3–32 and 3–33). A similar tendency in the United States has caused one researcher to comment: "The percentage of American-born women entering dentistry is nearing the vanishing point".[1]

TABLE 3–32

AGE OF WOMEN PRACTISING DENTISTRY BY PLACE OF BIRTH

Age	Total[1]			North American Born		Born Elsewhere	
	No.	Per Cent	Per Cent	No.	Per Cent	No.	Per Cent
Under 29	12	16	(11)	1	4	11	22
30 – 39	21	29	(27)	7	29	14	27
40 – 49	23	31	(24)	7	29	16	31
50 – 59	10	13	(13)	3	13	7	14
60 and over	8	11	(22)	6	25	2	4
No information	1	1	(3)	–	–	1	2
Total	75	101	(100)	24	100	51	100

[1] Figures in brackets are comparative percentages for *all* (6,000) dentists in Canada, December 31, 1962.

Source: Canadian Dental Association and Survey of Canadian women dentists carried out by Bruce A. McFarlane for the Royal Commission on Health Services.

TABLE 3–33

YEAR OF GRADUATION AT DENTAL SCHOOL WHICH QUALIFIED RESPONDENTS TO PRACTISE IN CANADA, BY PLACE OF BIRTH AND SECONDARY SCHOOL EDUCATION

Year of Graduation	Total	North American Born and Educated	Born Elsewhere	
			Educated Elsewhere	Educated in North America
	No.	No.	No.	No.
1961 and later	15	2	6	7
1956 – 60	21	1	14	6
1951 – 55	14	3	10	1
1941 – 50	8	7	–	1
1931 – 40	3	3	–	–
1921 – 30	7	6	1	–
No information	7	2	4	1
Total	75	24	35	16

Source: Survey of Canadian women dentists carried out by Bruce A. McFarlane for the Royal Commission on Health Services.

[1] Talbot, Neil Snow, "Women in Dentistry: Why Not More Women Dental Students", *J.D. Edcn.*, March 1961, p. 17.

It has frequently been said that "women are wasted in the dental profession because as soon as they are trained they marry and leave the field".[1] The data gathered in this survey do not support this contention. During the period 1919–1962 there were 132 women graduates from Canadian dental schools. Ninety-three of the 97 women dentists on the Register of the C.D.A. graduated from a dental school in Canada; the educational qualifications of the other four were recognized as equivalent to the Canadian and they were granted a licence without having to attend dental school in Canada. Hence, 70.4 per cent of the 132 women graduates in dentistry from Canadian dental schools since the graduating class of 1919–1920 are still in practice. Considering that some of the others may have been lost to the profession through death, illness, emigration or some other cause in this 42-year period, it is doubtful — since no accurate figures are available — if the proportion of male graduates since 1919–1920 still in practice is markedly higher than 70 per cent.

Three-quarters of all the respondents are or have been married (Table 3–34). It appears that most of these women have been able to handle the dual role of professional and housewife (or mother), and, marriage and children have not made it impossible for them to continue their professional career. Instead of dropping out of the profession these dentists seem to have made a number of adaptations to a "normal" practice and still others — including the unmarried — have followed a career which the male dentists seem to have avoided.

TABLE 3–34

MARITAL STATUS, FAMILY COMPOSITION, AND AGE OF CHILDREN, WOMEN DENTISTS

	No.	Per Cent
Single	14	19
Married, no children	13	17
Married with children under 18 years	33	44
Married with children over 18 years	11	15
No information	4	5
Total	75	100

Source: Survey of Canadian women dentists carried out by Bruce A. McFarlane for the Royal Commission on Health Services.

[1] An actual statement made to the researcher by a dentist in the company of four other dentists all of whom supported the statement. The following item contained in the Canadian Dental Association's *Governor's Letter*, August 20, 1963, suggests that while some women may have followed this pattern at one time, some changes have taken place:

> Mrs. Miriam Dorrance of Vancouver has been named to the Canada Council, Prime Minister L.B. Pearson has announced. Mrs. Dorrance, who gave up her career as a dentist many years ago to raise her family, says (in a Vancouver newspaper story): "I wouldn't give up my profession today — women don't do that anymore". Before her marriage Mrs. Dorrance was Alberta's only practising woman dentist, 1921 to 1924 ..... she graduated in dentistry at Toronto in 1921.

TYPES OF CAREERS AND ADAPTATIONS TO "NORMAL" PRACTICE

One dental career in which women abound and men do not is dental public health, including school dentistry.[1] Thirty per cent of the respondents are engaged in public health: 17 per cent whose major dental activity is public health and 13 per cent who work in public health on a part-time basis in conjunction with other activities (Table 3–35).[2] This contrasts sharply with male participation rates in these same programmes, 2.1 per cent and 1.1 per cent respectively.[3]

TABLE 3–35

PARTICIPATION OF WOMEN DENTISTS IN PUBLIC HEALTH SERVICE, CANADA, 1962

	Total		Educated in North America				Educated Elsewhere	
			Graduated Dental School:					
			1951 or Later		Pre–1951			
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Major activity in field of public health.....	13	17	6	29	4	21	3	8
Other practice but works part-time in public health.....	10	13	6	29	–	–	4	11
Sub-total in public health today.....	(23)	(30)	(12)	(58)	(4)	(21)	(7)	(19)
Previously worked in public health.....	16	21	–	–	6	31	10	29
No information on previous or part-time public health work	6	8	1	5	3	16	2	6
Never worked in public health	30	40	8	37	6	31	16	46
Total.....	75	99	21	100	19	99	35	100

Source: Survey of Canadian women dentists carried out by Bruce A. McFarlane for the Royal Commission on Health Services.

The dentists put forward a number of reasons why they entered the public health service, some explicit and some implicit. The two most frequently expressed were (i) their liking for children's dental work, and (ii) convenience.

Both the single and the married dentists cited their liking of children, the opportunity for working with children and their desire to contribute to the dental education of the children as important attractions in the public health field. One respondent expressed at length what many stated in more cryptic form:

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[1] Throughout this section on the women dentists the term public health will always include the school dental service unless stated otherwise.

[2] One-half of all the women dentists have spent some time in public health dentistry.

[3] "Dental Personnel in Canada, 1962", *J. Canad. D.A.*, Vol. 28, No. 7, July 1962.

> I have also found my position in a clinic gives me the opportunity and the time to increase my knowledge of children's operative dentistry. I can work without undue stress or pressure from an overload of patients and can spend enough time with child to satisfactorily complete my dental procedures and to ensure that each child has knowledge of correct preventive dentistry – and a good approach to any future dental appointments.

In the second case above (convenience), many of the married women dentists stated that the fixed hours enable them to practise dentistry and handle their family affairs, especially if they have school-age children. For this latter group, if they are in the school dental service, their summer holidays coincide with those of their children; the same thing holds for their hours of work. Some typical comments follow:

> I like working with children and also having children of my own I found this type of work enabled me to be with my own family more than private practice would have allowed me.

> As a salaried employee I am able to ... choose the hours I wish to work so that I can devote time to my home and family as well as to my profession.

Another reason not quite so obvious and certainly never stated, was that participation in public health, especially part-time, appears to help the women dentists get established in a "normal" practice and minimizes any real or supposed resistance on the part of the public to seek out the services of a woman dentist. Almost 60 per cent of the younger age group –– those who were educated in North America and graduated since 1951 –– are engaged in public health either full- or part-time. This compares with 21 per cent of the pre-1951 Canadian graduates who work in public health, all on a full-time basis; none of this older group works part-time in public health. An additional 31 per cent now in private practice report that they previously worked in public health on a part-time basis.

It appears, then, that participation in dental public health work and the school dental service is an adjustment which the married woman dentist makes to the exacting demands of a combined career of professional practice and marriage; and, for both the single and the married women dentists it provides them with an opportunity to work with children. In addition, if they participate on a part-time basis after graduation it assists them in launching a career in the world of private practice.

While the foregoing was concerned with the public health service it must be borne in mind that four-fifths of all the women dentists –– single and married –– are in private practice. This includes, of course, those who work in public health service or lecture at a dental school on a part-time basis. It does not include those who are full-time faculty members at the universities (Table 3–36). These women dentists in private practice tend to have careers not too dissimilar to their male colleagues in terms of number of hours worked per week (Table 3–37), although it is true that the married women dentists modify or adapt their practice

somewhat because of their added responsibilities. Thirty-five per cent of those in private practice work 41 hours or more per week, this compares with the "average" work week of 41 hours for all dentists.[1] In addition to this, 69 per cent work five or more days per week, and 60 per cent work more than 47 weeks per year (Tables 3–38 and 3–39). According to the C.D.A.'s *Survey of Dental Practice*, the average dentist works 46 – 47 weeks per year.[2]

TABLE 3–36

WOMEN DENTISTS AND THEIR TYPE OF PRACTICE – MAJOR ACTIVITY IN FIELD OF DENTISTRY, CANADA, 1962

	No.	Per Cent
Private practice	60	80
Individual	47	63
Partnership	2	3
Associate	8	10
Sharing expenses	3	4
Public health service[1]	13	17
University teaching	2	3
Total	75	100

[1] Includes school dental services.

Source: Survey of Canadian women dentists carried out by Bruce A. McFarlane for the Royal Commission on Health Services.

TABLE 3–37

NUMBER OF HOURS PER WEEK WORKED BY WOMEN DENTISTS IN PRIVATE PRACTICE AND PUBLIC HEALTH SERVICE, CANADA, 1962

Hours per Week	Total[1]		Private Practice		Public Health	
	No.	Per Cent	No.	Per cent	No.	Per Cent
49 or more	8	11	7	12	–	–
41 – 48	16	21	14	23	2	15
33 – 40	21	28	15	25	6	46
25 – 32	22	29	18	30	3	23
9 – 24	4	5	3	5	1	8
8 or less	2	3	2	3	–	–
No information	2	3	1	2	1	8
Total	75	100	60	100	13	100

[1] The hours of the two dentists who are not in private practice or in public health are included in the total.

Source: Survey of Canadian women dentists carried out by Bruce A. McFarlane for the Royal Commission on Health Services.

[1] *Survey of Dental Practice, 1958, op. cit.*, p. 9.

[2] *Ibid.*, p. 9.

TABLE 3–38

NUMBER OF DAYS PER WEEK WORKED BY WOMEN DENTISTS IN PRIVATE PRACTICE AND IN PUBLIC HEALTH, CANADA, 1962

Number of Days	Total[1]		Private Practice		Public Health	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
5½ – 6	16	21	15	25	1	8
5	36	48	26	43	10	76
4½	14	19	14	23	–	–
3 – 4	6	8	4	7	–	–
Less than 3	1	1	–	–	1	8
No information	2	3	1	2	1	8
Total	75	100	60	100	13	100

[1] The number of days worked by the two dentists who are not in private practice or in public health are included in the total.

Source: Survey of Canadian women dentists carried out by Bruce A. McFarlane for the Royal Commission on Health Services.

TABLE 3–39

WEEKS WORKED PER YEAR BY WOMEN DENTISTS IN PRIVATE PRACTICE AND PUBLIC HEALTH, CANADA, 1962

Weeks Worked	Total[1]		Private Practice		Public Health	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
50 or more	7	9	5	8	2	15
48 – 49	38	51	29	48	8	62
46 – 47	20	26	17	28	2	15
44 – 45	5	7	4	7	1	8
Less than 44	2	3	2	3	–	–
No information	3	4	3	5	–	–
Total		100	60	99	13	100

[1] The two dentists not in private practice or public health are included here.

Source: Survey of Canadian women dentists carried out by Bruce A. McFarlane for the Royal Commission on Health Services.

In general, Canadian women dentists, like their male colleagues, are located primarily in urban areas (Table 3–40).[1] (This includes those in private practice as well as those salaried dentists in public health, school dentistry and

[1] Only those who completed a questionnaire are included in the table. Of those women dentists who did *not* respond only two have home addresses in cities smaller than 100,000, only one of which could be considered a small town; 17 of the other 22 live in the three major metropolitan areas.

university lecturing.) Two-thirds of these dentists are resident in the three metropolitan areas of the country, viz., Toronto, Montreal and Vancouver in that order of frequency. Toronto alone accounts for 43 per cent of all women dentists in Canada. In all, over 80 per cent, no matter what their type of career, are resident in an urban area.

TABLE 3–40

RURAL-URBAN DISTRIBUTION OF WOMEN DENTISTS IN PRIVATE PRACTICE AND PUBLIC HEALTH, CANADA, 1962

Location of Practice	Total[1]		Private Practice		Public Health	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Urban	51	67	40	67	9	69
Suburban	12	16	11	18	1	8
Small town	8	11	7	12	1	8
Rural	2	3	2	3	–	–
No information	2	3	–	–	2	15
Total	75	100	60	100	13	100

[1] The two dentists not in private practice or public health are included here.

Source: Survey of Canadian women dentists carried out by Bruce A. McFarlane for the Royal Commission on Health Services.

The women dentists in private practice, with the exception of the specialists, and no matter where they are located, tend to have "normal" practices; that is, they do not "specialize" in women or children as *may* be the case with women physicians. The type of patients, whether adults or children, which comprises the major part of the practice of the general practitioners is shown in Table 3–41. On the other hand, 84 per cent of the dentists in

TABLE 3–41

PROPORTION OF WOMEN DENTISTS' PATIENTS WHO ARE ADULTS, IN PRIVATE PRACTICE AND PUBLIC HEALTH, CANADA, 1962

Proportion of Adults	Total[1]		Private Practice		Public Health	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
70% or more	17	23	16	27	1	8
51 – 69%	12	16	11	18	1	8
50%	7	9	7	12	–	–
31 – 49%	12	16	12	20	–	–
30% or less	21	28	10	17	11	84
No information	6	8	4	7	–	–
Total	75	100	60	101	13	100

[1] The two dentists not in private practice or public health are included here.

Source: Survey of Canadian women dentists carried out by Bruce A. McFarlane for the Royal Commission on Health Services.

public health service (including the school dental service) treat mainly children —— in many cases, as noted earlier, one of the stated reasons why they were attracted to this type of dentistry. It is interesting to note that, while the numbers are small, it appears that the non-Canadian born dentists tend to recruit their patients, primarily adult, from among immigrants living in the cities to whom, because of their European background, women dentists are no novelty. This may account, in part, for the high proportion (almost one-half) of those in private practice whose patients are mainly adults.

In order that they may combine family life and a professional career in private practice there are a number of adaptations which the married women, especially those with children, make to "normal" practice. Some of the more important are listed below:

(i) locating their dental office in or near their home;

(ii) restricting their schedule of office hours as well as limiting the number of hours worked per week;

(iii) careful planning of the office work and the family routine; and,

(iv) limiting the type of office they open or join.

The number of dentists with whom we are concerned here is small but each of the above adjustments was mentioned by a number of the married respondents. Needless to say, some of the dentists made mention of more than one of the above, while roughly a quarter considered that no adaptations were necessary.

Some of the respondents noted that they had set up their dental office in or near their home. This, they believed, enabled them to play the two roles of dentist and housewife more effectively.

Another adaptation which they make is to limit somewhat the number of hours which they spend at their practice and/or to devise a schedule of office hours which is in keeping with their family responsibilities. The average number of hours per week worked, as reported by these respondents, is 33, whereas the average number worked by the remainder is 42 (Table 3–42). The other side of this adaptation is that of scheduling their hours of practice. These adaptations are many and ranged from a few who only practised in the afternoon to others whose work took place only when the children were at school and after the children had gone to bed in the evenings.

Any attempt to play two such demanding roles —— housewife and professional —— simultaneously calls for a great deal of careful planning and organization both at the office and in the home. Many were assisted in the home by paid housekeepers and other help, and, in their own phrase "an understanding spouse". At the office they tended to limit their practice to certain types of work. That is, in some instances a few refer some of their patients needing a specific type of dental care to their colleagues.

TABLE 3–42

NUMBER OF HOURS WORKED PER WEEK BY WOMEN DENTISTS WITH CHILDREN UNDER 18 YEARS AND THOSE WITHOUT CHILDREN, CANADA, 1962

Hours per Week	With Children Under 18 Years		Without Children[1] Under 18 Years	
	No.	Per Cent	No.	Per Cent
49 or more	3	9	3	8
41 – 48	5	15	11	29
33 – 40	9	27	12	31
25 – 32	12	37	9	24
9 – 24	2	6	1	3
8 or less	2	6	–	–
No information	–	–	2	5
Total	33	100	38	100

[1] This category includes 14 who were single, 13 who were married with no children and 11 whose children were over the age of 18. Excluded from the analysis are four for whom there was no information on marital status and/or age of children.

Source: Survey of Canadian women dentists carried out by Bruce A. McFarlane for the Royal Commission on Health Services.

The fourth adaptation noted above is one which is made in relation to the husband's occupation or profession. That is, when in private practice some are associated with another dentist as a partner, or sharing expenses, or as an "associate" (not salaried but receiving a proportion based on the work which they perform in the dental office). Twenty-two per cent of the general practitioners organize their practice in this manner, four of whom work with their dentist husbands, two others, both single, have just recently embarked on a career of private practice. The foregoing arrangements help them to be mobile because in almost all these instances, with the exception perhaps of the two partnerships, the major expense of equipping the dental offices has been borne by their professional colleague. Hence, if a change in location from one city to another or from one part of the country to another is advantageous to the husband's career, the married woman dentist is not made immobile because of a heavy financial investment in dental office equipment.

A number of the comments made by these dentists appear below. They illuminate the way in which they are able to adapt themselves, their practice and their family life to the trials of playing a dual role.

> To maintain a practice and family life I opened an office in a residential area in the same house where I live.
>
> I have to begin practice earlier than most men, i.e., 8 a.m., in order to fulfill my home duties and spend adequate time with my children.
>
> I work shorter hours than normal, limit my practice somewhat, i.e.,

hand over most of my ... work to the dentist with whom I associate, give most of my ... work to another colleague because I haven't enough time to do this type of work effectively. If I worked longer hours I would not do this.

I practise part-time —— three afternoons and two evenings per week; belong to no organizations or clubs and devote the remainder of time to home and children.

I make very little adaptation though I am *inclined* to refuse emergencies if it will interfere with my time at home.

Should my husband wish to leave his present job and move to another city, it would be easier for me to wind up my present practice as associate and start again in the next city.

I am in associate practice because of a reluctance to be tied to present location, as this would inhibit my husband's actions should he wish to leave the area.

I have had to reduce my practice time to three hours per morning in order to fulfill my home duties and spend adequate time with my children; and, take patients late at night after the children have been put to bed.

In this chapter the geographic and age distributions of the dentists in Canada have been examined and various reasons put forward to explain the varied distribution within and between the provinces. Of particular importance to this study was the serious disparity between the rural and the urban distribution of the dentists and an analysis was made of the reasons why rural areas appear to be avoided by the dentists. The age distribution too is of some consequence because a high proportion ——one in three—— of Canada's dentists are over 50 years old, a period in the dentist's career which is marked by decreased productivity. (It should be noted that the analysis in Chapter 2 and early in the present chapter did not take this factor into account when the population-dentist ratios were being examined; at that time productivity was assumed to be equal for all dentists. Thus, the ratios in the earlier analyses are actually inflated in terms of the real service which might be provided by the dentists.)

A subsequent section dealt with the qualified dental specialists, their geographic distribution and their concentration in the larger urban centres. It was noted that not all of the specializations are growing at the same rate.

The women dentists, who comprise a very small proportion (less than 2 per cent) of all Canadian dentists were examined very closely and an analysis made of the data contained in the completed questionnaires which 77 per cent of all the women dentists returned in response to a mailed survey. The high proportion of them who were born in Europe reflects the important role of women in the dental profession in their countries of origin. Of interest too was the finding that 30 per cent of them are engaged, either full- or part-time, in the public health services;

their high rate of participation being in marked contrast to that of their male counterpart. Some comments were made about the manner in which many of these dentists coped with the dual occupational roles of housewife and dentist; and, the adjustments and adaptations which they made in each sphere were noted.

The chapter which follows will be concerned with an assessment of the demand for dental manpower resources, an examination of the factors which affect demand for dental services, and the changing demographic aspects of Canadian society, especially size and location of the population, educational and occupational changes, and the changing age and sex structure and the impact of these factors upon the demand for dental services. In addition, the present state of the provision of dental services to public assistance recipients will be examined.

CHAPTER 4

DENTAL SERVICES:

NEED, DEMAND AND SUPPLY

Dental authorities everywhere are in general agreement that the need for dental health care is universal. That is, everyone at some time in his life has need of some form of dental treatment. That not everyone who has need of treatment demands it, is, of course, a truism! and, it is an empirical fact that if all those who needed treatment also demanded it, their demands could not, at present, be met.

This chapter will examine the need for dental services as reflected in the prevalence and incidence of dental disease or ill health, the type of dental services needed and some of the changes which appear to be affecting need. The demand for service by some of those in need will be examined and the factors which affect demand will be analysed. In addition, the supply of dental services to those who demand them, and those who should and may in the future demand them, is considered.

NEED FOR DENTAL SERVICE

It has been said that the need for dental service in Canada is almost universal although no comprehensive data are available showing the number of people suffering from dental disease. Describing this situation as it pertains to the United Kingdom the authors of one study report:

> Dental disease is one of the most common of all kinds of illness, and one that causes a good deal of pain and misery, inconvenience and economic loss. It can also – though here the evidence is less assured – open the way to other kinds of illness.
>
> Broadly, two types of dental disease are distinguished, decay of teeth (dental caries) and disease of the soft supporting tissues (peridontal disease); additionally there is faulty and irregular positioning of teeth (malocclusion). The population at risk is

> everyone in the country, for even the very young and very old, if toothless, can suffer from gum trouble.[1]

While no complete statistics on the dental health of the whole Canadian population are available – hence, none showing the proportion of the population suffering from dental disease – various surveys carried out in Canada, the United States and the United Kingdom do indicate the prevalence and incidence of certain dental diseases and help in determining the level of need for dental services. In general, the dental health statistics available in Canada tend to provide more data on the state of dental health of school-age children than that on the adult population.

To improve the level of knowledge in this area and to assist the governmental authorities concerned, the Canadian Dental Association has developed and published information about a National Dental Health Index:

> The National Dental Health Index provides comparative data falling into four main classes:
>
> 1.) relative prevalence of dental caries
>
> 2.) relative prevalence of periodontal disease
>
> 3.) relative prevalence of malocclusion
>
> 4.) relative degree of treatment accomplished.
>
> In 1961, it was possible to inaugurate the collection of data in representative municipalities of between 5,000 and 100,000 population for school children in six Canadian provinces.[2]

Some of the findings in this study which are suggestive of the dental health of Canadian children between ages 7 and 13 inclusive, follow:

1. Thirteen per cent of all those in the survey had no dental defects; this national average contains Ontario with a high of 23.7 per cent and Quebec with a low of 4.2 per cent.[3]
2. Over three-quarters of the children had some caries defects. By age 13, 98 per cent of this group had one or more teeth decayed.
3. Fifty per cent of them had lost at least one deciduous tooth prematurely due to lack of treatment.
4. Over 40 per cent had lost one or more permanent teeth.
5. They had a national average of 3.37 teeth (deciduous and permanent) needing treatment – range: Ontario, 2.35, P.E.I., 4.37.

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[1] Moser, C.A., Gales, Kathleen, and Morpurgo, P.W.R., *Dental Health and Dental Services: An Assessment of Available Data*, Nuffield Provincial Hospitals Trust, London: Oxford University Press, 1962. p. 3.

[2] This information and the résumé of the findings is taken from the *Canadian Dental Association*, brief submitted to the Royal Commission on Health Services, Ottawa, March 1962, p. II–2.

[3] *Ibid.*, a footnote states that "The data provided in Ontario came mainly from regions where a trained dental health officer was availalable to do the examinations and hence had been operating an educational program for some time. If the data are not completely typical for Ontario it is due to the success of the educational programs".

6. Less than 1 per cent of this group who were in need of space-maintainers (40 per cent of the sample) were using them to guard against "drifting of teeth after a premature deciduous tooth loss and to prevent closing of the space into which the permanent tooth must erupt".
7. Thirty per cent of the national sample were assessed as having poor oral hygiene – range: Ontario, 17.0 per cent and Manitoba, 49.3 per cent.
8. Sixteen per cent showed objective signs of gingival inflammation.
9. Almost half (48.9 per cent) of the children were assessed as having "one or more types of occlusal abnormality", but less than 1 per cent were receiving orthodontic treatment.

Other Canadian studies and surveys result in equally distressing findings[1] Professor MacGregor in a recent paper commented on a Public Health Survey in Ontario which showed that by the time the children in Ontario have reached 13 "they average 33 decayed tooth surfaces", and, commenting on a study carried out in the U.S.A., said:

> In a study of 119,000 school children in St. Louis it was disclosed that 51 per cent had dento-facial abnormalities, of which, according to estimate, at least 80 per cent might have been prevented.[2]

The St. Louis findings are not an isolated incident for Dr. Wesley O. Young commenting on the dental health of children in the U.S.A. notes:

> Among the 10 per cent of children under five years of age who visit the dentist, only one out of three is free of untreated carious lesions; one out of ten has eight or more cavities. One child out of five needs orthodontic treatment for afflictions ranging from faulty alignment of the teeth to severe facial deformity. Furthermore one out of every 800 children is born with a cleft lip or palate, which is next to clubfoot as the most common defect at birth.

He also states that:

> Estimates of the occurrence in children of malocclusion serious enough to warrant treatment range from 20 to 80 per cent. A reasonable estimate would be that half of the school-age population need some kind of treatment (orthodontic) and that one out of five children had an orthodontic problem that could be considered severe.[3]

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[1] Grainger, R.M., and Sellers, A.H., "The Welland and District Dental Health Program", *Canadian Journal of Public Health*, Oct. 1952, and Coburn, C.I., and Grainger, R.M., "Health Education in Relation to Dental Care Needs and Demand in the Elgin–St. Thomas Health Units Area", *J. Canad. D.A.*, January 1957. *See also Manitoba Dental Association*, brief submitted to the Royal Commission on Health Services, Winnipeg, January 1962, Appendices I and XVI.

[2] MacGregor, S.A., "Whithout Prejudice", *Canadian Doctor*, June 1962, p. 2.

[3] Young, Wesley O., "Dental Health", in Hollingshead (ed.) *op. cit.*, pp. 5–6. *See also ibid.*, pp. 14–20.

Studies with children in the United Kingdom reveal a similar situation and the authors of one report write of the "high incidence of caries" in a sample of 17,500 children examined in 1955 and 1956[1].

Need for dental services among Canadian adults is not as well documented as for children but the studies that do exist suggest the poor state of dental health among the adults. In an examination of 670 civil servants (368 females and 302 males) Mehta, Grainger and Williams found that four-fifths of both males and females were suffering from *Simplex Periodontitis* and that one-sixth of the men and one-tenth of the women showed evidence of *Complex Periodontitis.*[2] In addition, the researchers noted that two-thirds of all the men and one-third of all the women had poor oral hygiene.

In a nation-wide household survey in the U.S.A., the U.S. Department of Health, Education and Welfare reported the following "selected findings", quoted at some length here since they probably reflect a similar condition in the dental health of Canadians:[3]

> Loss of teeth occurs most often as the result of two of the most common diseases affecting the American people – dental decay and periodontal disease. During his lifetime, nearly every person has one or both of these ailments, and when treatment is too long delayed, tooth loss results. Accrued tooth loss in individuals leads ultimately to edentulousness – total loss of permanent teeth – and the number and distribution of edentulous persons provide an index to both the prevalence of dental disease and the extent of dental neglect in the U.S. population.
>
> Based on health interviews conducted by the U.S. National Health Survey during July 1957 and June 1958, there were approximately 22 million edentulous persons in the United States – 13 per cent of the population of the nation. A person was classified as edentulous if he had lost all of his permanent teeth, regardless of whether or not he wore dentures.
>
> Only 4 per cent of persons 25–34 years of age were edentulous, but the per cent was higher in each succeeding age group, reaching 67 per cent for persons 75 years of age and over. In each of the age groups, the proportion edentulous was slightly higher for women than for men.

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[1] Moser, *et al., op. cit.*, p. 5 in reference to a study by Bransby, E.R. and Forrest, J.R., "The Dental Condition of Children in Seven Areas in England and Wales as shown by the Base-line Dental Examinations made in Connection with the Fluoridation Demonstration Studies", *Monthly Bulletin of the Ministry of Health and Public Laboratory Service*, Vol. 17, 1958, p. 28.

[2] Mehta, M.M., Grainger, R.M. and Williams, C.H.M., "Periodontal Disease among Adults", *J. Canad. D.A.*, Vol. 21, 1955, p. 617.

[3] *Health Statistics*, from the U.S. National Health Survey, U.S. Department of Health, Education, and Welfare, Series B – No. 22, p. 1.

Rural areas had a somewhat higher per cent of edentulous persons than did urban areas and the proportion edentulous was substantially higher in the white population than in the non-white population.

In general, the proportion edentulous was smaller among members of high income families than among members of low income families, and smaller for persons in families where the head of the family had at least one year of college than for persons where the head of the family had less education.

A market research project examining health practices of Canadians, carried out by a large soap manufacturer, reports the following data illustrated below in tabular form.[1]

WHETHER ANYONE IN HOUSEHOLD HAS DENTURES[1]

	Maritimes (107)	Quebec (433)	Ontario (559)	Prairies (266)	B.C. (141)	Total (1,506)
	%	%	%	%	%	%
Claimed someone in household had dentures	71	76	58	64	63	66
Claimed no one in household had dentures	27	22	39	35	37	32
No answer	2	2	3	1	–	2
Total	100	100	100	100	100	100

[1] Including housewife.

WHETHER HOUSEWIFE HAS DENTURES

	Maritimes (107)	Quebec (433)	Ontario (559)	Prairies (266)	B.C. (141)	Total (1,506)
	%	%	%	%	%	%
Housewife claimed she had:						
All her own teeth	42	35	53	50	54	46
Partial dentures	31	17	24	17	25	22
Total dentures	24	46	20	31	21	30
No answer	3	2	3	2	–	2
Total	100	100	100	100	100	100

[1] Proctor and Gamble market research survey. "The study was based on a mailed questionnaire across the country. There is a slight bias present in that a higher proportion of replies were received from high income groups than from lower income groups."

The level of dental health of the nation is not necessarily a static thing but is subject to change. Improved oral hygiene through dental health education, increased knowledge of the aetiology of dental diseases and the fluoridation of public water supplies have had and will have some effect upon the need for dental services of the whole population. For example, the d.e.f.[1] and D.M.F.[2] rates can change with the addition of fluorides to the water supplies.[3] In the same manner dental health education can be successful in encouraging proper care of the teeth and improving, in general, personal hygiene practices,[4] both reduce the need for, or, at least, change the nature of the needs for, dental service. This latter point is introduced because as one dentist has pointed out:

> I am convinced that if fluoridation were instituted in all communal water supplies we should enjoy a significant reduction in caries. However, we must face the fact that the more teeth we retain the greater will be the likelihood of increased needs for dental treatment as the population grows older. We know, for instance, that after the age of twenty-five, more teeth are lost because of periodontal disease than from all other causes combined. Periodontal disease is, as you know, something like dandruff. In order to have dandruff you've got to have hair. In order to have periodontal disease you've got to have teeth. Therefore, if people have lost teeth because of caries at an early age, they certainly do not require periodontal treatment when they are older.[5]

The excerpts from various sources quoted earlier in this section and the findings of other surveys and research reported here suggest, in general terms, the level of dental health in Canada and hence, the level of need for dental services. But, they also suggest the lack in Canada of a comprehensive set of statistics on the dental health and treatment needs of the population as a whole.

DEMAND FOR AND UTILIZATION OF DENTAL SERVICES

Not everyone who has need of dental care utilizes the available services, hence the demand is less than the need. In Canada estimates differ as to the

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[1] An index for measuring dental health. It refers to the state of primary teeth in the mouth, "decayed, indicated for extraction, filled".

[2] An index for measuring dental health. It refers to the state of the permanent teeth, "decayed, missing, filled".

[3] Young, *op. cit.*, pp. 15–16. *See also* Castaldi, C.R., Quigley, W.A. and Zacherl, W., *The Camrose-Wetaskiwin Dental Health Survey*, Faculty of Dentistry, University of Alberta, 1963, mimeo. *Also*, Castaldi, *et al.*, *The Edmonton Fluoridation Survey*, Department of National Health and Welfare, Project No. 608–7–13, University of Alberta, 1963.

[4] Young, *op. cit.*, pp. 32–44. *See also*, Pelton, Walter J., and Bothwell, Ruth D., "The Need and the Demand for Dental Care", *The Michigan Study*, pp. 12–13.

[5] Personal communication from the Registrar of one of the Provincial Dental Associations. *See also* Pelton, *op. cit.*, p. 13.

proportion of the population receiving dental care. The Canadian Sickness Survey reports that "about one in seven persons visited the dentist during 1950–51".[1] The C.D.A. brief states that "in any given year only about one-third of the population visits a dentist".[2] In the United States the U.S. Health Survey showed that when asked: "How long has it been since you went to a dentist?", 23 per cent of the population responded with time periods of less than 6 months and 14 per cent from 6 to 11 months. Approximately 43 per cent of the population reported time periods of one year or more, with an additional 18 per cent indicating that they had never been to a dentist.[3]

There are a number of factors which appear to affect the demand for and utilization of dental services, the most important of which are age and sex, levels of income and education, general social class values and area of residence, i.e., whether rural or urban.

AGE AND SEX

There is a marked variation in the utilization of dental services by age and sex. The Canadian Sickness Survey showed that three-fifths of those who visited the dentist, in the period covered by the Survey, were women. In addition, it showed that both men and women in the 15–24 age group had the highest proportion of any age group visiting the dentist (women considerably more than men) and with increasing age the proportions of both men and women visiting the dentist dropped (Table 4–1).[4] The drop in utilization of dental services was not as great for women however, and in the age cohort 25–44 the proportion of women visiting a dentist was one-and-a-half times as great as that of men. Hence, between the ages 15 and 44 inclusive, the women in the survey sample utilized the dental services to a much greater extent than did the males.[5] Bearing in mind the high social value placed in our society on feminine physical beauty, in which the appearance of the teeth plays an important part, it is not surprising that the pattern of utilization is as it is. This finding, associated as it is with the cosmetic aspects of dentistry, is further supported by evidence in the Mehta, Grainger, and Williams study of civil servants wherein the males through all age groups consistently showed a higher per cent with poor oral hygiene, a good index of general dental care (Table 4–2).

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[1] The Department of National Health and Welfare and The Dominion Bureau of Statistics, *Illness and Health Care in Canada: Canadian Sickness Survey, 1950–51*, Ottawa: Queen's Printer, 1960, p. 54. Hereafter this study will be referred to in this report as *Canadian Sickness Survey*.

[2] *Canadian Dental Association, op. cit.*, p. 9.

[3] *Health Statistics*, from the U.S. National Health Survey, U.S. Department of Health, Education, and Welfare, Series B—No. 14, Washington, 1960, p. 1.

[4] The high proportion of edentulous persons in the 65 and over age group can easily account for the small percentage who visit a dentist.

[5] Similar findings are reported in the *Health Statistics*, Series B—No. 14, *op. cit.*, Table 2, p. 12.

TABLE 4–1

DENTAL CARE BY AGE AND SEX, CANADA, 1950–51[1]

	Under 15		15 – 24		25 – 44		45 – 64		65 and Over		All Ages	
	Male (2,100)	Female (2,016)	Male (1,007)	Female (1,042)	Male (1,932)	Female (1,971)	Male (1,246)	Female (1,170)	Male (533)	Female (521)	Male (6,819)	Female (6,720)
	%	%	%	%	%	%	%	%	%	%	%	%
With Dental Care	13	14	18	24	14	22	10	11	5	3	13	17
Without Dental Care	87	86	82	76	86	78	90	89	95	97	87	83
Total	100	100	100	100	100	100	100	100	100	100	100	100

[1] All population figures in thousands.

Source: The Department of National Health and Welfare and the Dominion Bureau of Statistics, *Illness and Health Care in Canada: Canadian Sickness Survey, 1950–51,* Ottawa: Queen's Printer, 1960, developed from Tables 108 and 109, pp. 189–190.

TABLE 4–2

PERCENTAGE OF ONTARIO CIVIL SERVANTS WITH POOR ORAL HYGIENE BY SEX AND AGE, 1955

	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	Total
	%	%	%	%	%	%	%	%	%
Male.....	40.0	51.0	60.6	63.4	88.8	70.2	82.3	82.3	67.3
Female.....	16.4	16.6	13.3	28.5	37.5	48.2	56.2	54.1	33.8
Average	28.2	33.8	36.9	45.9	63.2	59.2	69.2	68.2	50.5

Source: *Canadian Dental Association*, brief submitted to the Royal Commission on Health Services, Ottawa, March 1962, as taken from Mehta, M. M., Grainger, R. M., and Williams, C. H. M., "Periodontal Disease Among Adults", *J. Canad. D. A.*, Vol. 21, 1955, p. 617.

LEVELS OF INCOME AND EDUCATION

All studies concerned with demand and utilization of dental services emphasize the fact that demand and utilization of these services varies with income and education at all ages.[1] The Canadian Sickness Survey reports that:

> The distribution of persons with dental care in various income groups indicated that compared with the low income group many more persons in the medium and high income groups received dental care per 1,000 population and in the high (upper) income group it was about two-and-a-half times as large as the one for the low income group. This discrepancy was particularly marked in the case of children under 15. Four times as many children in the high (upper) income group as in the low income group received dental care. Within each income group the age-sex distribution of persons with dental care was, by and large, similar to the distribution found for all incomes. It was, however, noticeable that in the upper bracket of the high income group the highest rate per 1,000 population was recorded for children under 15, and the subsequent age groups had decreasingly lower rates...
>
> The average number of dental visits increased consistently from one income group to the other. The average number of dental visits per 1,000 population for the upper high income group was more than three times as great as the comparable average for the low income group. Those persons in the low income group who visited the dentist had an average of less than two visits per person while the persons in the high income group (upper) had a comparable average of over two-and-a-half visits per person.[2]

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[1] *The Canadian Sickness Survey, op. cit.*, pp. 54–55; *Health Statistics*, Series B–No. 14, *op. cit.*, pp. 4–5; Young, *op.cit.*, pp. 22–24; Pelton, Walter J., and Bothwell, Ruth D., *op.cit.*, pp. 12–15.

[2] *The Canadian Sickness Survey, ibid.*, pp. 54–55.

The data contained in Table 4–3 bear this out dramatically. The U.S. Health Survey reports in a similar vein:

> The proportion of persons whose last dental visit had been within the year varied markedly with income, from a low of 19 per cent among persons in families with annual incomes under $2,000 to a high of 54 per cent among persons in families with incomes of $7,000 or more. The proportion of persons who had never been to a dentist was greatest, 24 per cent, among persons with family incomes under $2,000 and least, 10 per cent, for persons in the "$7,000 and over" family income group ... the differences among the income groups were consistent throughout the different age groups in the population.[1]

TABLE 4–3

PERSONS WITH DENTAL CARE PER THOUSAND BY AGE GROUP AND INCOME LEVEL, 1951

Age Group	Low Income[1]	Medium Income	High Income	
			Lower	Upper
Under 15	63	122	200	267
15 – 24	153	207	222	254
25 – 44	118	174	239	209
45 – 64	85	103	109	..
65 and over[2]	..	..	..	..
All ages	84	143	188	218

[1] Low Income: Under $1,500; Medium Income: $1,500–2,999; High Income (Lower Level): $3,000–4,999; High Income (Upper Level): $5,000 and over.

[2] Too few people over 65 with dental care in sample.

Source: The Department of National Health and Welfare and the Dominion Bureau of Statistics, *Illness and Health Care in Canada: Canadian Sickness Survey, 1950–51*, Ottawa: Queen's Printer, 1960, p. 55.

There is very strong evidence then to support the thesis that demand for and utilization of available dental services increases with increasing income.

The studies quoted from above also report on the close association between the level of education achieved by the head of the family and the demand and utilization of dental services.[2] The U.S. Health Survey is quoted here at some length since comparable data do not seem to be available for the Canadian scene:

> When persons are classified according to the educational attainment of the head of the family, a pattern similar to that for family income is apparent. The proportion of persons who visited

[1] *Health Statistics*, Series B–No. 14, *op. cit.*, p. 4.

[2] *Ibid.*, p. 5–6; Pelton, *op. cit.*, p. 14; Young, *op. cit.*, pp. 23–24; *see also* C.D.A. brief, *op. cit.*, p. V–5, and Kriesberg, L. and Treiman, B.R., "Socio-Economic Status and the Utilization of Dentists' Services", *Journal of the American College of Dentists*, Vol. 27, September 1960, pp. 147–165.

the dentist within a year prior to the interview was lowest, 17 per cent, in the educational group with less than 5 years of school, and highest, 57 per cent, in the educational group which consisted of persons in families whose head of the family had completed at least one year of college. The proportion of persons who had never visited a dentist decreased with increasing education from 29 per cent where the head of the family had less than 5 years of education to 13 per cent where the head of the family had at least one year of college. The same strong relationship between education of family head and time interval since last dental visit appeared in each of the separate age groups.

...From the data presented, it appears that both family income and education of family head are independently related to the dental care variable. Within income groups, the proportion of persons visiting a dentist in the past year increased with education. Within education groups, the proportion of persons with recent dental care was directly related to amount of family income. The proportion of persons who never visited a dentist varied inversely with income and education within each age group.[1]

TABLE 4–4

PER CENT DISTRIBUTION OF PERSONS BY TIME INTERVAL SINCE LAST VISIT ACCORING TO EDUCATION OF FAMILY HEAD[1]

Time Interval Since Last Dental Visit	Education of Family Head				
	Under 5 Years (12,836)	5 – 8 Years (50,497)	9 – 12 Years (72,483)	College (28,485)	Unknown (4,067)
	%	%	%	%	%
Less than 6 months .	10.4	16.1	24.7	37.0	13.2
6 – 11 months	6.2 (16.6)	10.1 (26.2)	15.7 (40.4)	19.8 (56.8)	8.7 (21.9)
1 year	10.4 (27.0)	13.8 (40.0)	15.1 (55.5)	13.7 (70.5)	12.7 (34.6)
2 – 4 years	16.3 (43.3)	16.9 (56.9)	14.3 (69.8)	8.9 (79.4)	14.7 (49.3)
5 years or over	23.9 (67.2)	21.9 (78.8)	11.0 (80.8)	5.9 (85.3)	17.6 (66.9)
Never	28.9 (96.1)	18.4 (97.2)	17.5 (98.3)	13.2 (98.5)	22.7 (89.6)
Unknown	3.8 (99.9)	2.8 (100.0)	1.8 (100.1)	1.5 (100.0)	10.4 (100.0)
Total	99.9	100.0	100.1	100.0	100.0

[1] Cumulative percentages in brackets.

Source: U.S. Department of Health, Education, and Welfare. *Health Statistics*, Series B-No. 14, Washington, D.C., 1960, Table 12, abridged, p. 21.

[1] *Health Statistics*, Series B–No. 14, *op. cit.*, p. 5.

No comparable data on educational background of family head and demand appear to be available for Canada but in view of the basic similarities of the two cultures (that of the U.S.A. and the Canadian) there is little reason to believe that the Canadian pattern of visiting the dentist by educational background is "better" than that in the U.S.A. – see Table 4–4 for U.S.A. data. On the contrary, if this aspect follows other social patterns it is likely that the proportions, by educational background, visiting the dentist in any one year in Canada are lower than the proportions doing so in the U.S.A.

Since level of education and level of income are so closely associated in the highly industrialized countries it is not surprising that one finds such a marked similarity in the pattern of demand and utilization when levels of income and education are compared. But these tend also to be associated in a much more fundamental sense in a whole system, which, for want of another phrase, may be called a system of class values. The various attitudes towards health care and the differing patterns of behaviour associated with dental hygiene are reflections of these social values. Hence, it is not unreasonable to expect that differing behaviour and attitudes concerning dental care and oral hygiene will be related to the socio-economic status of the individuals and their families in the communities concerned.

Badgley and Hetherington in their study of Wheatville and the utilization of health services noted the important role that social class played in the utilization of available health services including the dentists (Table 4–5).[1] It is interesting to note there was little difference in the per cent of Social Class I and II individuals and those contained in Classes V, VI and VII who utilized a doctor's services, being 88 per cent and 89 per cent respectively. In the case of the dentist comparable figures were 60 per cent and 45 per cent respectively. Similarly Earl Lomon Koos in his study of 500 families in Regionville and their health habits and attitudes towards dental care noted the important role which social class played not only in the utilization of dental services but also in the nature of the treatment received.[2]

Koos divided his 500 families into three socio-economic status groups, viz: Class I which was composed of "the successful people in Regionville", the professional people and "the upper crust in town"; there were 51 families in this group, approximately 10 per cent of the sample and only three of the 51 families did not have a family dentist. Class II contained the major proportion of Regionville's workers "some of whom were very highly skilled"; there were 335 families classified as Class II, 65 per cent of the sample, but almost half (47 per cent) had no family dentist. Class III, composed primarily of the unskilled, many of whom were "frequently unemployed", contained 128 families, one-quarter of the sample, and 87.5 per cent of whom had no family dentist.

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[1] Badgley, Robin F., and Hetherington, Robert W., "Medical Care and Social Class in Wheatville", *Canadian Journal of Public Health*, Vol. 53, October 1962.

[2] Koos, Earl Lomon, *The Health of Regionville: What People Thought and Did About It*, Columbia University Press, New York, 1954. The next few paragraphs are based primarily on Koos' findings.

TABLE 4–5

REPORTED UTILIZATION IN 1960 OF SELECTED HEALTH PERSONNEL IN WHEATVILLE BY SOCIAL CLASS POSITION OF RESPONDENTS: BY PER CENT[1]

Personnel	Social Class Categories		Average
	I – II[2]	V – VII[2]	
	%	%	%
Doctor	88	89	88
Sanitary Officer	60	73	63
Dentist	60	45	49
Public Health Nurse	28	31	30
Chiropractor	8	13	11

[1] Refers to at least one contact with cited personnel during 1960. Multiple contacts not cited here.

[2] Class position established by using the Blishen scale as found in Blishen, B.R., "The Construction and Use of an Occupational Class Scale", *Canadian Journal of Economics and Political Science*, 1958, Vol. 24, p. 521.

Source: Badgley, Robin F., and Hetherington, Robert W., "Medical Care and Social Class", *Canadian Journal of Public Health*, Vol. 53, Oct. 1962, Table I.

The type of dental treatment received – and probably demanded in the case of the Class III patients – also reflects the class-related differences in dental health care and the differences in perception which cause the members of the various classes to accept or reject "what is thought professionally to be necessary for health" (Table 4–6). Whereas 57.1 per cent of those members of Class III who went to the dentist went to have their teeth extracted, only 9 per cent of Class II patients did so, and none of the Class I patients received this type of treatment. Of this phenomenon Koos says "...Class III and, to some extent, Class II respondents regarded the dentist essentially as an extractor of useless teeth". In the same way over half the Class I patients visited the dentist for prophylaxes, 37 per cent of Class II did so but only 14 per cent of those from Class III received this treatment.

TABLE 4–6

PERCENTAGE DISTRIBUTION OF TYPES OF DENTAL TREATMENT BY SOCIAL CLASS MEMBERSHIP

Type of Treatment	Total	Class I	Class II	Class III
	%	%	%	%
Prophylaxis[1]	38.2	52.3	37.3	14.3
Emergency Repair	46.1	45.5	49.4	26.2
Prosthesis	3.7	2.2	4.5	2.4
Extraction[2]	12.0	–	8.8	57.1
Total	100.0	100.0	100.0	100.0

[1] Including dental services found to be needed during prophylaxis.

[2] This category includes only those cases in which the patient had tooth extracted after having neglected earlier condition. Extractions associated with emergency repair or prosthesis not included.

Source: Koos, Earl Lomon, *The Health of Regionville: What People Thought and Dit About It*, New York: Columbia University Press, 1954, Table 15.

Some of the quotations taken from Koos' interviews with the populace of Regionville are very enlightening in terms of the expressed value placed on dental health care by the various socio-economic status groups and these are reflected in the patterns of utilization noted above.

> Oh, we go to the dentist if there's anything wrong, like having a tooth pulled. But we don't go regular. There's just too many other things that has to come first... You've got to go to the doctor, sometimes, but the dentist – you can get along without him much better. (Class III housewife)
>
> I wouldn't say we had no dentist, no. If one of us has to have a tooth pulled, we go – if it can't be pulled at home. If a tooth's loose, there's no reason to fork over money to pay for pulling it . . .Oh, you go to whatever one can take you. It don't really make any difference – they're all alike, I think. (Class III housewife)
>
> My folks just never had any truck with dentists 'less they had to, and I don't either. (Class III)
>
> I was brought up to look after my teeth, and I do it, even if I have to give up something I want very much... (Class II)

Those in Regionville who had not visited a dentist within the last year were asked why they had not done so and 60 per cent answered that they "could not afford cost of dental care" (Table 4–7). But, as noted in the quotations above, cost within certain limits is relative and is related to the value which the individuals place upon the particular service concerned.

TABLE 4–7

REASONS FOR NOT VISITING DENTIST WITHIN PAST YEAR

	No.[1]	Per Cent
Could not afford cost of dental care	128	60
Waiting to have mouth condition change before having needed treatment	33	15
Physical illness prevented treatment	16	7
Teeth were less important than other things	15	7
Couldn't stand physical pain	3[2]	2
Use out-of-town dentist to whom they went every two years	2	1
No reason given	20	9
Total	217	101

[1] 82 Class II members, 132 Class III members and only 3 Class I members.

[2] All Class I women.

Source: Koos, Earl Lomon, *The Health of Regionville: What People Thought And Did About It*, New York: Columbia University Press, 1954, adapted, p. 124.

A number of studies have reported that even when the economic barrier to dental service has been removed many do not utilize the available services. Nyswander's study of a group of New York parents found that 12 per cent of them

did not see the necessity of having their children's teeth cared for even though it had been pointed out to them that it was free.[1] Other studies of the members of trade unions and their families who are covered for dental care by the unions, show that less than half utilize the services but as Young has pointed out "... the availability of dental service without charge encouraged this group, belonging to a segment of society which usually seeks very little dental care, to pull itself up to near the national average".[2] Moser, Gales and Morpurgo note that only 54.2 per cent of the school children in England and Wales in 1959 who were found to require dental treatment (two-thirds of those inspected) actually received treatment.[3] With the data at their disposal they were unable to determine why such a large per cent requiring treatment failed to receive it, but it might well be that social attitudes towards health care in general on the part of the parents may have affected it; some, of course, they suggest, may have been treated by the family dentist.

This is not to suggest, of course, that the actual cost of dental service is not a deterrent. It is.[4] This was brought out forcibly in the U.S. Health Survey study noted above where within *each* educational group the proportion seeking and using dental services varied according to income. Another example may be taken from British experience after "free" dental service for all, regardless of means, was introduced. The data in Table 4–8 relate to the cost to public funds of dental services provided under the National Health Scheme in England and Wales, 1948–54, broken down into two main categories, viz., "Prior approval" and "Other work".[5] The heavy demands made upon "Prior approval" dental work

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[1] Nyswander, Dorothy, *Solving School Health Problems*, (New York: Commonwealth Fund, 1942), p. 213, as found in Young, *op. cit.*, p. 24.

[2] Young, *op. cit.*, pp. 23–24.

[3] Moser, Gales and Morpurgo, *op. cit.*, pp. 18–19. It is estimated that of 12,000 children eligible for dental benefits under the Newfoundland Children's Dental Health Plan in 1960 approximately 60 per cent utilized the Service.

[4] *Manitoba Dental Association*, *op. cit.*, describes some of its population as "dental indigents". These are the large group of people who "while not eligible for social allowances, do not possess the resources to provide for any financial outlay beyond the necessities of life. The children of this group comprise 20 per cent of children in the elementary school system in the City of Winnipeg". The authors of the brief base their finding on the *Report of Child Dental Services*, Department of Health, City of Winnipeg. Dr. John Pedler, Chief of the Toronto General Hospital's dental clinic and Professor of Radiology, Faculty of Dentistry, University of Toronto, in a newspaper interview said: "A very conservative estimate of the dentally indigent in this city would be 10 per cent, or 150,000 people. Many of these have marginal incomes enough to provide for their families, but not enough to get dental care." Landsberg, Michele, "No Teeth, No Job, Plight of Poor Causes Concern to Dentists." *Globe and Mail*, Toronto, June 12, 1963, p. 11.

[5] Regarding "Prior approval" work the Guillebaud Committee stated: "Dentists (under the National Health Service) are required to prepare estimates showing the scope and cost of the treatment necessary for those patients whom they accept, and where these estimates provide for the supply of dentures (and certain other work), the *prior approval* of the Dental Estimates Board must be obtained before the work is commenced. Dentists may however carry out a wide range of treatment, including emergency treatment and nearly all conservative work, without obtaining prior approval." Para. 515, p. 175, my italics. In addition, they state: "The Dental Estimates Board consists of a Chairman and Vice-Chairman who are both dental practitioners, and seven members of whom five are dental practitioners." Para. 522, p. 177.

(primarily dentures) compared to "Other work" in the early years of the National Health Scheme represent a back-log of major dental needs which many people in Britain could not afford (or, at least, were unwilling to meet out of funds allocated to competing needs) under the pre-N.H.S. organization of private dental practice.[1] Within a few years after this heavy demand for "Prior approval" work had been met the "Other work" which includes conservative work has shown a steady increase. In part, of course, the introduction of charges, albeit minor (from £2 to £4.5s.) for dentures in the fiscal year 1951–52 may have had some effect in reducing the cost of "Prior approval" work to the public funds and as a Report from the Ministry of Health puts it:

> The subsequent introduction of charges probably contributed to some extent, however, to a further fall in the gross cost by inducing persons either to defer obtaining dentures or to continue with unsatisfactory sets longer than they would have done had replacement been free.[2]

TABLE 4–8

THE PROPORTION OF NET COST TO PUBLIC FUNDS OF THE DENTAL SERVICE (ENGLAND AND WALES) BY PRIOR APPROVAL WORK AND OTHER WORK, 1948–1954

	1948–49[1] (£ 39m)	1949–50 (£ 50m)	1950–51 (£ 46m)	1951–52 (£ 38m)	1952–53 (£ 27m)	£ m. in 1948–49 prices 1953–54 (£ 29m)
	%	%	%	%	%	%
Prior approval.....	79	74	70	55	41	38
Other work	21	26	30	45	59	62
Total.....	100	100	100	100	100	100

[1] Annual rate – interpolated from the 270 days for which the National Health Service operated.

Source: *Report of the Committee of Enquiry into the Cost of the National Health Service*, (Guillebaud Committee), Cmd. H.M.S.O., London, 1956, Table 23, p. 24.

Levels of income and education and, in general, position in the social class structure, determine then to a great extent the degree of demand for and the utilization pattern of dental service irrespective, relatively speaking, of need.

AREA OF RESIDENCE

The demand for and utilization of dental services varies from one province to the other in Canada and differs considerably between rural and urban areas. The Canadian Sickness Survey data show that in their survey year (1950–51) 38

[1] *Ibid.*

[2] *Ibid.*

persons per 1,000 population in Newfoundland reported a dental visit whereas in British Columbia six times as many did so, i.e., 226 per 1,000 of the population in the West Coast province.[1] In part, as the C.D.A. brief points out, these differences appear to be related to the "availability of dental personnel and per capita disposable income".[2] In a previous section of this chapter the impact of level of education upon demand was demonstrated and since the median years of schooling of the population not attending school in 1951 also varied by province, education may be presumed to have had its effect. The data in Table 4–9 compare these three and the percentage population reporting dental visits in the various regions.

TABLE 4–9

PERCENTAGE POPULATION REPORTING DENTAL VISITS, POPULATION-DENTIST RATIO, PER CAPITA PERSONAL DISPOSABLE INCOME AND MEDIAN YEARS OF EDUCATION, BY REGION, 1950–51

Region	Per Cent Population Reporting Dental Visits	Population-Dentist Ratio	Per Capita Personal Disposable Income	Median Years of Education for Population
	%		$	
Newfoundland.....	3.8	16,714	546	7.3
Maritime Provinces.	14.4	3,799	717	8.6
Quebec	8.3	3,460	871	7.9
Ontario	18.0	2,126	1,222	9.6
Prairie Provinces ..	17.3	3,154	1,203	9.4
British Columbia...	22.6	2,203	1,234	10.0

Source: *Canadian Dental Association, Canadian Sickness Survey*, p. 188, *Dominion Bureau of Statistics, National Accounts Income and Expenditure*, 1951; Dominion Bureau of Statistics, Statistical Review of Canadian Education, Census of Canada 1951, Ottawa: Queen's Printer, Nov. 1957, Reference Paper No. 84, Table 16, p. 36.

All of the factors cited above also seem to have their effect upon the urban and rural populations causing the former to demand and utilize the dental services to a greater extent than the latter.[3] While no comprehensive data are available for Canada the U.S. Health Survey says of the United States:

> Comparing the three residence groups (urban, rural non-farm and rural-farm), the data show that the proportion of people who had been to a dentist in the past year was greatest among urban residents, 39

[1] The *Canadian Sickness Survey*, p. 188. *See also Canadian Dental Association, op. cit.*, pp. V–3 and V–4.

[2] *Canadian Dental Association, op. cit.*, Appendix V, p. 3.

[3] "According to the 1951 Census Canada's urban dwellers had spend more years in school than those in rural areas". Dominion Bureau of Statistics, Education Division, *Statistical Review of Canadian Education, Census, 1951*, Ottawa, 1958, p. 36. While the complete data are not yet available for the 1961 census year, the over-all pattern appears to be the same as in 1951, despite the general increase in the number of years at school for the Canadian population as a whole. Cf. Table 5–12, this study.

per cent, and smallest among rural-farm residents, 27 per cent and 36 per cent among rural non-farm.[1]

(The per cent distribution for those who visited and those who did not visit a dentist are shown in Table 4–10 below.) The statistics issued by the Saskatchewan Department of Public Health do offer some hint as to the differences in urban-rural utilization of dental services in Canada.[2] Their statistics cover the utilization of dental services by public assistance beneficiaries. There are no charges for services except partial payments for dentures, hence, financial ability *per se* is not a deterrent to seeking service. Their data show that the larger the size of the community (city, town, village or rural) the greater was the degree of utilization of dental services among the public assistance beneficiaries (Table 4–11); and, the smaller the size of the community the less likely the treatment was to be restorative (e.g., fillings).

TABLE 4–10

PER CENT DISTRIBUTION OF PERSONS BY TIME INTERVAL SINCE LAST DENTAL VISIT ACCORDING TO RESIDENCE

Time Interval Since Last Dental Visit	Urban	Rural Non-Farm	Rural Farm
	%	%	%
Less than 1 year	39	36	27
1 year or more	43	42	45
Never	16	20	25
Unknown	2	2	2
Total	100	100	99

Source: *Health Statistics*, The U.S. Department of Health, Education, and Welfare, Series B–No. 14, Washington, D.C., 1960, Fig. 3, p. 3 adapted.

The levels of income and education, and the relative non-availability of dentists in rural areas (c f. Chapter 3) are all very important factors in this pattern of differential utilization. Equally important however, are the generalized attitudes in the rural areas towards dental health practices. The following two examples, in quotation form, while not providing unequivocal support for this thesis, are suggestive of rural attitudes towards dental care:

> ...on one of my visits to a local area [I] decided to find out what makes the town have a poor attitude towards matters of Public Health. It happened that I was stimulated to carry out my personal survey by the fact that the girl who served me breakfast in a rather tidy restaurant had a mouth showing decayed and missing teeth. I visited five or six stores in the neighbourhood trying to find out why this girl would be so indifferent about her appearance. The excuses were many and varied. 'She couldn't afford to do better'. 'The dentists

[1] *Health Statistics*, Series B–No. 14, *op. cit.*, p. 3.

[2] Saskatchewan, Department of Public Health, Medical Services Division, *Statistical Tables*, Regina, Sask., 1960, Table D5.

were robbers'. 'The salaries were poor'. 'False teeth were better anyway' – and so and so on. This experience taught me that the main issue here evolved around something that seems to have disappeared in our present day society, namely: 'sense of values'[1].

I've heard of instances (lack of demand in rural areas) in Alberta, Northern Ontario and Newfoundland just recently. One dentist up north started motoring into the rural area regularly (one day per week). At first he was flooded with emergency work. It then seemed to decrease. The people seemed to not want regular, conservative care or to prefer to travel to the nearest town having a dentist. The dentist has stopped his weekly visits. This type of tale is typical, but I've never seen any empirical data to back it up'[2].

TABLE 4-11

UTILIZATION OF DENTAL SERVICES BY TYPE OF SERVICE AND RESIDENCE OF PUBLIC ASSISTANCE BENEFICIARIES, SASKATCHEWAN, 1960–61

Type of Service	All Residences	Place of Residence			
		City	Town	Village	Rural
	Number of Services				
All services	18,526	7,147	3,171	3,068	5,140
Fillings	7,728	3,519	1,080	1,246	1,883
Extractions	8,606	2,761	1,661	1,442	2,742
Dentures	2,172	862	429	371	510
Complete dentures[1]	1,120	373	228	199	320
Repairs	690	312	142	113	123
Relines	273	132	40	53	48
Partial dentures	89	45	19	6	19
Other	20	5	1	9	5
	Rate per 1,000 Beneficiaries				
All services	567.7	671.1	516.3	523.7	514.9
Fillings	236.8	330.5	175.9	212.7	188.6
Extractions	263.7	259.3	270.4	246.2	274.7
Dentures	66.6	80.9	69.8	63.3	51.1
Complete dentures[1]	34.3	35.0	37.1	34.0	32.1
Repairs	21.2	29.3	23.1	19.3	12.3
Relines	8.4	12.4	6.5	9.0	4.8
Partial dentures	2.7	4.2	3.1	1.0	1.9
Other	0.6	0.4	0.2	1.5	0.5

[1] Upper or lower denture.

Source: Saskatchewan, Department of Public Health, Medical Services Division, *Statistical Tables*, Regina, Sask., Dec. 1961.

[1] MacGregor, *Rural Ontario and Its Health Problems*, *op. cit.*, p. 12.

[2] *Canadian Dental Association*, personal communication from the Director, Bureau of Economic Research.

In the first instance above Professor MacGregor said, in essence, that some of the rural population which he encountered were not blessed with urban middle class values which place great stress and importance on good dental hygiene. The second case reported appears to support the first as well as supporting Koos' statement, noted earlier, regarding the working class population of Regionville who "regarded the dentist essentially as an extractor of useless teeth", that is, someone to see when emergency treatment is needed.

These negative attitudes towards dental care are probably as important as the relative lack of dental personnel because as Badgley and Hetherington point out:

> The survey in Wheatville suggests that even if health services are not available locally, individuals (primarily those in social Class I and II) are prepared to travel to other centres to obtain them...[1]

SUPPLY OF DENTAL SERVICES

The actual distributions of dentists in Canada by province, by counties, and by urban and rural areas were treated at some length in Chapters 2 and 3. In general, it was estimated that Canada, *vis-à-vis* many of the countries with which she is usually compared, is suffering a shortage of dentists, i.e., has a less favourable population-dentist ratio. It was noted too that the shortage was more acute in some areas of the country than others, suggesting that maldistribution is another important factor determining the supply of dental services. Since this situation exists it is necessary to ask how the actual demands for service in Canada are being met.

The *Survey of Dental Practice, 1958*, showed that "Canadian dentists serve 1,000 patients each", this figure, needless to say, was not uniform among the provinces (Table 4–12).[2] In addition, the population-dentist ratio for each province varies, hence, *if* everyone in each province demanded service, the proportion of the population who could be served would show marked variation between the provinces. For example, in Newfoundland, only one in every 10.8 persons could be served whereas at the other end of the scale one person in every 2.4 could be treated in either Alberta or Ontario (Table 4–12) if the number presently served by each dentist in each of the provinces were maintained. If the national average of 1,000 patients per annum were attained by each province, then in some provinces the number served would be increased and in some, Alberta, Saskatchewan, Quebec and New Brunswick, the number served would be lowered.

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[1] Badgley and Hetherington, *op. cit.*

[2] *Survey of Dental Practice, 1958, op. cit.*, p. 13.

TABLE 4–12

AVERAGE NUMBER OF PATIENTS SERVED PER DENTIST, POPULATION-DENTIST RATIO AND NUMBER OF PATIENTS SERVED PER ANNUM IF DEMAND UNIVERSAL, BY PROVINCIAL AVERAGE AND THE NATIONAL AVERAGE, 1958

Province	Number of Patients Served Per Dentist	Population-Dentist Ratio	Universal Demand	
			No. of Potential Patients Per Patient Served (Provincial Rate)	No. of Potential Patients Per Patient Served (National Rate)
Newfoundland	951	10,341	10.8	10.3
Prince Edward Island	429	2,912	6.7	2.9
Nova Scotia	928	3,670	3.9	3.6
New Brunswick	1,169	4,496	3.8	4.4
Quebec	1,037	3,652	3.5	3.6
Ontario	972	2,378	2.4	2.3
Manitoba	918	3,504	3.8	3.5
Saskatchewan	1,378	4,211	3.0	4.2
Alberta	1,158	2,825	2.4	2.8
British Columbia	846	2,352	2.9	2.3
Canada	1,000	2,985	2.9	2.9

Source: Canadian Dental Association, *Survey of Dental Practice, 1958*, a booklet compiled from data contained in *J. Canad. D.A.*, Vol. 25, October, November and December 1959, p. 13.

The foregoing, of course, pre-supposes universal demand and equi-distribution of the population and the dentists within any one province. Both of these fall far short of being met. The demand, as we saw earlier, varies by and within the provinces and there is a wide inter- and intra-provincial variation in distribution of dentists.

Many of the dentists themselves are uncertain whether there is a shortage of dentists or not and in a recent survey in British Columbia over one-half (53.3 per cent) of the dentists claimed that there was no need for more dentists in their province (Table 4–13).[1] The differences in attitudes towards this aspect of the supply of dental manpower are related to the age of the dentist-respondents (Table 4–14) and the location of their practices (Table 4–15). (The population-dentist ratio for the particular region has a bearing upon the latter.) The dentists' attitudes towards the supply of dentists are also related to the demands being made upon them in their own practices and 11 per cent of all the dentists in the British Columbia Survey claimed that they were "not busy enough" (Table

[1] McCombie, F., and Stothard, D., A *Measurement of Demand for Dental Services, British Columbia, 1962* (Mimeo.), Health Branch, Department of Health Services and Hospital Insurance, Victoria, B.C., 1962 (mimeo. draft made available through the courtesy of the authors).

4–16). In like manner, the differences in responses may be attributed to the dentists' ages (Table 4–16) and the location of their practices (Table 4–17). The 40–49 year old dentists appear to be at the age when their services are in great demand and, not unexpectedly, the services of the dentists in areas with unfavourable population-dentist ratios are in great demand. By the same token, it is not surprising that the "under 30" dentists feel that there is not enough work; they are not long out of dental school and are in the process of building up a practice.

TABLE 4–13

DENTISTS' APPRAISAL OF NEED FOR MORE DENTISTS, B. C., 1962

Need for More Dentists	Number	Per Cent
Yes	170	37.1
No	244	53.3
Not stated	44	9.6
Total	458	100.0

Source: McCombie, F., and Stothard, D., *A Measurement of Demand for Dental Services, British Columbia, 1962*, (mimeo. draft), Health Branch, Department of Health Services and Hospital Insurance, Victoria, B.C., 1962, adapted from Table IV.

TABLE 4–14

DENTISTS' APPRAISAL OF NEED FOR MORE DENTISTS, BY AGE OF DENTIST, B.C., 1962

Need for More Dentists	Age of Dentists				
	Under 30 (58)	30–39 (179)	40–49 (125)	50–59 (53)	60 and Over (45)
	%	%	%	%	%
Yes	37.9	42.5	34.9	35.8	23.3
No	56.9	52.5	54.5	49.1	53.4
Not stated	5.2	5.0	10.6	15.1	23.3
Total	100.0	100.0	100.0	100.0	100.0

Source: McCombie, F., and Stothard, D., *A Measurement of Demand for Dental Services, British Columbia, 1962*, (mimeo. draft), Health Branch, Department of Health Services and Hospital Insurance, Victoria, B.C., 1962, adapted from Table IV.

TABLE 4–15

DENTISTS' APPRAISAL OF NEED FOR MORE DENTISTS, BY LOCATION OF PRACTICE, B.C., 1962

Need for More Dentists	Location of Practice						
	Greater Victoria (57)	Vancouver Island (29)	Greater Vancouver (220)	Fraser Valley (68)	Okanagan (37)	Kootenays (20)	Northern (26)
	%	%	%	%	%	%	%
Yes	33.3	65.5	31.8	35.3	16.2	65.0	73.1
No	52.7	34.5	54.6	61.8	78.4	30.0	26.9
Not stated ...	14.0	–	13.6	2.9	5.4	5.0	–
Total ...	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: McCombie, F., and Stothard, D., *A Measurement of Demand for Dental Services, British Columbia, 1962*, (mimeo. draft), Health Branch, Department of Health Services and Hospital Insurance, Victoria, B.C., 1962, adapted from Table IV (b).

TABLE 4–16

DENTISTS' APPRAISAL OF OWN PRACTICE, BY AGE OF DENTIST, B.C., 1962

Pressure of Practice	Age of Dentist					
	Under 30 (58)	30–39 (179)	40–49 (123)	50–59 (53)	60 and Over (43)	Total (458)[1]
	%	%	%	%	%	%
Too busy to treat all patients....	12.1	26.3	30.1	28.3	14.0	24.5
Can treat all patients but pressure too heavy.....	13.8	20.1	22.8	15.1	14.0	18.8
Volume just right.....	51.7	41.9	39.8	47.2	62.7	45.4
Not busy enough	22.4	11.7	6.5	7.5	9.3	10.9
Not stated.....	–	–	0.8	1.9	–	0.4
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

[1] Including two no age stated.

Source: McCombie, F., and Stothard, D., *A Measurement of Demand for Dental Services, British Columbia, 1962*, (mimeo. draft), Health Branch, Department of Health Services and Hospital Insurance, Victoria, B.C., 1962, adapted from Table III (a).

TABLE 4–17

DENTISTS' APPRAISAL OF OWN PRACTICE
BY LOCATION OF PRACTICE, B.C., 1962

Pressure of Practice	Greater Victoria (57)	Van-couver Island (29)	Greater Van-couver (220)	Fraser Valley (68)	Okanagan (37)	Kootenays (20)	Northern (26)
	%	%	%	%	%	%	%
Too busy to treat all patients.....	22.8	41.4	20.4	29.4	16.2	45.0	26.9
Can treat all patients but pressure too heavy	17.5	37.9	11.8	23.5	13.5	35.0	42.3
Volume just right.....	47.4	13.8	54.6	35.3	62.2	15.0	26.9
Not busy enough.....	12.3	6.9	12.3	11.8	8.1	5.0	3.9
Not stated.....	–	–	0.9	–	–	–	–
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: McCombie, F., and Stothard, D., *A Measurement of Demand for Dental Services, British Columbia, 1962*, (mimeo. draft), Health Branch, Department of Health Services and Hospital Insurance, Victoria, B.C., 1962, adapted from Table III (b).

DENTAL HEALTH SERVICES

The public health services also provide an additional source of dental care for Canadians. Approximately 7.4 per cent of all Canadian dentists are associated with the health services on either a full-time (4.1 per cent) or a part-time (3.3 per cent) basis (Table 4–18). This is one-and-a-half-times the proportion associated with the health services a decade earlier. (It should be noted that the above figures do not include those dentists in the federal health departments, their numbers and changes are noted in Table 4–19, but see also Footnote 1, Table 3–23.)

International comparisons in this area – dental health services – are difficult because of the differing nature of the organization of general dental services in various countries. Some countries such as Canada and the United States depend primarily upon private practitioners operating under a "free enterprise" system. Whereas others such as Sweden and the United Kingdom depend primarily upon government sponsored health services. An attempt has been made below however, to determine the proportion of all dentists in Canada, the United Kingdom and the United States who are engaged in the various health services as defined as such in Canada. Table 4–20 gives the statistical details of the comparison.

TABLE 4–18

NUMBER OF DENTISTS IN DENTAL SCHOOLS, HOSPITAL SERVICE, PUBLIC HEALTH AND SCHOOL DENTAL SERVICE, CANADA, 1952 AND 1962

	Dental Schools		Hospital Service		Public Health		School Dental Service		Total	
	1962	1952	1962	1952	1962	1952	1962	1952	1962	1952
Full Time	57	25	55	32	72	37	64	37	248	131
Half Time	55	30	59	6	2	8	72	68	188	112
Full-Time Equivalent[1].....	84.5	40	84.5	35	73	41	100	71	342	187
Per Cent of Total Full Time	51	45.5	48	84	97	82	47	35	57	54
Per Cent of Total Half Time	49	54.5	52	16	3	18	53	65	43	46
Full Time and Part Time as Per Cent of all Dentists	1.9	1.0	1.9	0.7	1.2	0.8	2.3	2.0	7.4	4.7
Full-Time Equivalents as Per Cent of all Dentists	1.4	0.7	1.4	0.6	1.2	0.8	1.7	1.4	5.8	3.6

[1] Two half-time dentists have been reckoned as equivalent to one full-time dentist.

Source: Canadian Dental Association.

TABLE 4–19

DENTISTS EMPLOYED FULL TIME BY FEDERAL HEALTH DEPARTMENTS

	1962	1952
National Defence	164	128
National Health & Welfare	23	10
Veterans Affairs	36	40
Total	223	178

Source: Canadian Dental Association.

TABLE 4–20

DENTISTS IN CANADA, THE UNITED KINGDOM, AND THE UNITED STATES, BY TYPE OF EMPLOYMENT

Type of Employment	Canada, 1962 (5,868)	U.K., 1962[3] (15,501)	U.S.A., 1961 (106,000)
	%	%	%
Dental Schools	1.4[1]	1.6	0.9
Armed Forces	2.8	2.8	6.1
Other Federal Departments	1.0	–	
School Dental Service	1.7[1]	7.7	0.4[4]
Hospital Services	1.4[1]	10.9	
Public Health	1.2[1]	–	
Private Practice	91.9	3.2	92.4
General Dental Services	–	73.5 (76.7)	–
Total	101.4[2]	99.7	99.8

[1] The half-time personnel have been included here as their full-time equivalent, i.e., two half-time dentists have been reckoned as one full-time dentist.

[2] Adds to more than 100 per cent since some of those in private practice also serve on a part-time basis in the Dental Schools, the School Dental Service, Public Health and in the Hospital Service (See also Table 3–23, footnote 1).

[3] The Assistant Secretary of the British Dental Association in a personal communication to the C.D.A. stated: "A large number of those working in the Hospital Services are working part-time and are probably employed in the remainder of their time in the General Dental Services and about 900 of those in the General Dental Services also give some of their time to sessional work in the School Dental Services."

[4] Includes "dental positions such as state and local health departments, industry and dental societies". *The Michigan Study, op. cit.*, p. 18.

Source: Canadian Dental Association; British Dental Association; *Proceedings of the Workshop on the Future Requirements of Dental Manpower and the Training and Utilization of Auxiliary Personnel*, University of Michigan, W.K. Kellogg Foundation Institute, 1962, p. 18.

The United Kingdom has the lowest proportion in private practice even if those participating in the General Dental Services (National Health Service) are included as private practitioners. The major differences between the three countries are those which surround the dentists' participation rates in the School Dental Service and the Hospital Service. In the United Kingdom almost one-fifth (18.6 per cent) are associated with these services whereas in Canada only three per cent are. The statistics for Canada and the United States are not clear cut because some of the dentists listed in the table as federal employees are affiliated in one way or another with both of these services.

In Canada the utilization rate of the dental health services by those eligible as beneficiaries of provincial public assistance varies from province to province among the five provinces which have a scheme whereby the patients receive treatment from their own dentists and the province pays all or part of the bills. In the provinces for which figures are available the utilization rates were as follows: Ontario 38 per cent, Manitoba 18.8 per cent, Saskatchewan 20 per

cent and Alberta 20 per cent.[1] The utilization rate of this "free" service in Manitoba is 5.2 per cent below the estimated per cent of the general population of Manitoba who see a dentist in any one year. [2] In part, this may be due to the selection process, that is, those who are presently eligible for dental service under the Manitoba Medicare scheme belong primarily to a disadvantaged group in terms of income and educational achievement, both factors which influence utilization of dental services. The Medicare scheme minimizes the impact of the former but has no effect upon the latter. In addition, the impact of age upon the utilization of available dental health services is important here. In Alberta the utilization rate varied between 9.3 per cent for Old Age Pensioners and 51.3 per cent for those eligible as *dependents* of Mother's Allowance recipients – all young people (children are covered to age 16 and, if still attending school, to 18 years of age). In Saskatchewan although the percentages were higher the pattern was the same, viz., 11 per cent of those 60 or over and 56 per cent for dependents of Mother's Allowance recipients.

Each of the 10 provinces provides some type of limited school dental service and in most cases the services are concerned primarily with examination, reporting need for treatment to parents, dental health education for both parents and students, and the provision of treatment to the "needy" – children of indigents, low income groups, and orphans. In Nova Scotia and Prince Edward Island it also includes the use of dental hygienists to provide topical fluoride applications. The Newfoundland Children's Dental Health Plan, financed by the provincial government and administered by the Dental Division of the Newfoundland Department of Health, has been in operation for seven or eight years. Forty of Newfoundland's 42 dentists (who are paid for their services) provide the dental benefits (examinations every six months, fillings and extractions) for all school children between the ages of five and eight who live in an area where there is a dentist available to provide the services.

In general, all of the school dental programmes are hampered by a serious shortage of dental health personnel (dentists, dental hygienists and dental assistants) in their service.[3] It is noteworthy that in the formal organization of most of these school dental schemes the dental hygienists play an important role, although they are few in number. The situation in Prince Edward Island is a good example, the Department of Health scheme calls for three dental hygienists to provide the type of services outlined above, education, examination, parental

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[1] *Canadian Dental Association, op. cit.*, Appendix XIII, pp. 1–5a; *Manitoba Dental Association, op. cit.*, p. 18.

[2] This figure of 5.2 per cent is taken from the Manitoba brief and is based on an estimated utilization rate of 24 per cent. This estimation is somewhat less than the utilization rate of 27.3 per cent shown in the Canadian Dental Association brief, Table IV–4, p. IV–3.

[3] For example, Halifax with 18,000 school children has one full-time dentist and two part-time in its School Dental Service.

notification and topical application of fluoride. In 1962 there were none available.[1] The data below illustrate the severity of the problem in the City of Winnipeg – where the only school dental service in Manitoba is located – even if *only* the school-age children of indigent parents are to receive comprehensive treatment.[2]

1961 Staff	*Ideal Staff Requirements, 1961*
4½ Full-Time Dentists	11 Full-Time Dentists
5 Dental Assistants	2 Dental Hygienists
3 Clerks	11 Dental Assistants
1 Director	5 Clerks
	1 Stenographer
	1 Director

A further type of dental health service is provided by the use of mobile clinics which serve the outlying and more remote areas of the various provinces. Six provinces, Prince Edward Island, Nova Scotia, Ontario, Manitoba, Alberta and British Columbia, have mobile units or the provincial authorities make transportable dental equipment available to the dentists. "In rural areas, children in Grades 1 and 2 are accepted for treatment at a mobile dental unit...." in Prince Edward Island.[3] The C.D.A. brief claims that there are two mobile units which operate in Nova Scotia when staff are available. There are two railway coach mobile clinics in Ontario and in addition there are three Red Cross dental coaches. In the case of the latter however, there are some serious problems, as pointed out below:

> We have three Red Cross Dental Coaches serving the remote areas of Northern Ontario. We have an agreement with the Royal College of Dental Surgeons that these coaches will not be stationed within twenty-five to thirty miles of a resident dentist. They are to provide dental care for children only. In the early years of the venture when the salary to the dentist and his wife was Six Thousand Dollars, it was not too difficult to secure required personnel, but as the years went by, we found it becoming increasingly difficult to encourage a recent graduate to take up this challenge and today, even by raising the salary to Ten Thousand it looks as if we are going to have to take the coaches off the road.... Another problem that is upsetting is the fact that we are getting more and more communities pleading for the services of the dental coach. Some of these requests come from towns and villages that once had a resident dentist.[4]

In Manitoba "Mobile clinics go to a community at the request of some group or organization who agree to sponsor them and to pay a set per diem rate for the

[1] *Canadian Dental Association, op. cit.*, Appendix X, p. 2.

[2] *Manitoba Dental Association, op. cit.*, Appendix IX.

[3] *Prince Edward Island Dental Association*, brief submitted to the Royal Commission on Health Services, Charlottetown, November 1961, p. 4.

[4] MacGregor, *Rural Ontario and Its Health Problems, op. cit.*, pp. 1–2.

service provided. This per diem rate may be reduced by the government if it causes undue hardship."[1] These clinics like those in Ontario operate in areas where there is no regular dental care available and their visits "are not repeated on a continuing basis except in the Town of Churchill".[2] In Alberta and British Columbia the Departments of Health supply transportable dental equipment and in Alberta the Dental Association provides a number of dentists who have volunteered their services for one to three weeks "sometimes at a personal financial loss".[3] In British Columbia the dental services are made available through the provision of four externships each year and "Each extern serves under the direction of a regional dental consultant during his nine to twelve months' assignment."[4]

The Dental Health Services – for public assistance recipients, the school dental service and the mobile clinics – provide dental services then only for a very limited segment of the total Canadian population. In the first case, the health services for public assistance recipients, which provides primarily for the less fortunate in Canadian society, the utilization rate is low and in the other two cases, lack of dental health personnel seriously hampers the present operation of the schemes, hence, leaves little opportunity or promise for future expansion under prevailing conditions, financial and otherwise.

HOSPITAL DENTAL SERVICES

Of the 1,375 recognized Canadian public, federal and private hospitals and related institutions and facilities in operation at anytime in 1962, only 14, or 1 per cent, possessed dental facilities approved by the C.D.A. (All of those approved are located in the larger metropolitan areas, viz: six in Toronto, four in Montreal, two in Vancouver, one in Winnipeg, and one in Hamilton.) This is not to say that the other hospitals supplied no dental services but only these 14 met the C.D.A. standards. Evidently a number of those not "acceptable" report that they have dental facilities, but as one dentist sees it:

> Looking at lists of services offered by various hospitals, one finds Dental Departments quite generally mentioned, yet children are coming from all over Ontario to the Hospital for Sick Children centre [one of the 14 accepted] for treatment. One would find the answer was that the department described in the survey on examination consisted of a room in the basement of a hospital, usually without a window, which the administration found too big for a broom cupboard, but big enough to house a dental chair and to be used for the extraction of teeth only. This can hardly be referred to as a dental department.[5]

[1] *Manitoba Dental Association, op. cit.*, p. 12.

[2] *Ibid.*, p. 12.

[3] The *Alberta Dental Association*, brief submitted to the Royal Commission on Health Services, Edmonton, February 1962, p. 12.

[4] *The College of Dental Surgeons of British Columbia and the British Columbia Dental Association*, Joint Submission to the Royal Commission on Health Services, Vancouver, February 1962, p. 14.

[5] MacGregor, *Without Prejudice, op. cit.*, p. 6.

In the United States on the other hand "about one-third (2,323) reported in 1958 that they had a dental service".[1] Whether these would meet the "accepted" standards set by the C.D.A. is unknown. In a 1959 survey of the hospitals having dental services however, 18.4 per cent of those whose replies were usable (1,004) reported a full-time dentist on staff and 1.6 per cent (16 hospitals) reported having 50 or more dentists on staff.[2] As noted in Table 4–18, the total number of dentists in Canada reporting either full-time or part-time association with a hospital was 114, of whom 55 were full-time and 59 part-time or a full-time equivalent of 84.5 dentists (assuming the part-time to be half-time). A number of other dentists of course, do limited voluntary work at the hospitals but the amount of dental service provided in this fashion is unknown.

In general, then, the amount of dental services provided in Canadian hospitals is very limited.[3]

Many of the Canadian hospitals which provide these services provide them not for the general public but solely for the patients in the hospital – they have no out-patient dental facilities. Referring to this situation, Dr. John Pedler in a newspaper interview said,

> I feel hopeless and despairing when I encounter such cases [an unemployed white collar worker in need of dentures]. When people come to the clinic, and I explain that it serves only the hospital's patients, they ask me where they can go for help. There's absolutely nowhere. I'm horrified by the situation.[4]

In the same article it is claimed:

> Clinics at five Toronto hospitals are extremely limited in facilities, intended for the service of patients in the hospital, and are not free. The University of Toronto clinic is a teaching arm of the Faculty of Dentistry, and is not free. For the person not on welfare, there is no possibility of free or even low-cost dental care. For welfare patients, the wait is sometimes long: Dr. Pedler mentioned the case of one woman who will have to wait three or four months for treatment, although the city has agreed to pay for her dentures.[5]

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[1] Kesel, Robert G., *Dental Practice*, in Hollingshead (ed.), *op cit.*, p. 158.

[2] *Ibid.*, p. 158.

[3] See MacGregor, *Without Prejudice*, *op. cit.*, for a general critique of this situation.

[4] Landsberg, Michele, *op. cit.*; Dr. John Pedler at the time of the interview was Chief of the Toronto General Hospital's Dental Clinic and Professor of Radiology, Faculty of Dentistry, University of Toronto.

[5] *Ibid.*

ILLEGAL DENTAL SERVICES

While no exact data are available of the extent of illegal practice of dentistry each of the provinces has enacted laws which forbid the practice of dentistry other than by qualified and recognized dentists and frequent prosecutions are made. An examination of the number of prosecutions and convictions in one of the provinces (Quebec) gives some hint as to the quantity of dental services offered in this way:

Repression of Illegal Dental Practice[1]

Of course all illegal dental technicians have not been brought before the courts, but this committee has succeeded in obtaining a condemnation in nearly all cases which were drawn to its attention. Here is the report of this committee on its activity from July 1st 1959 to July 1st 1960:

Cases won	89
Cases inscribed	14
Warrants served	3
Warrants to be served	4
Cases to be inscribed	22
Cases being investigated	18
Incarcerated	3

The College keeps a constant watch but it is necessary that the dentists who know of complaints cooperate with the central Board or with the confrères who are in charge in the various regions. We must have facts, and not only suppositions: it is impossible to proceed in court on the basis of mere probabilities.

Committee on the Suppression of Illegal Practice[2]

Complete results for the fiscal year, July 1, 1960 – June 30, 1961 are as follows:

Convictions	139[3]
Cases withdrawn	4
Cases dismissed	16
Fines paid	$22,050.00

In the Province of Ontario the Royal College of Dental Surgeons of Ontario share an inspector with the Royal College of Pyhsicians and Surgeons and publish an Inspector's Report annually in the Proceedings of the Royal College of Dental Surgeons. A documentation of the convictions recorded under the Dentistry Act from 1947 to 1962 inclusive is listed below:[4]

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[1] College of Dental Surgeons of the Province of Quebec, *Informations*, Montreal, July 1960, p. 9.

[2] *Ibid.*, November 1961, p. 4.

[3] The names of the convicted, the town where they were convicted, the date of conviction and the amount of individual fines paid are listed in *ibid.*, pp. 4–6.

[4] Made available through the good offices of the Registrar-Secretary.

Period	*Convictions*
April 30, 1947 to April 30, 1948	11
April 30, 1948 to April 30, 1949	4
April 30, 1949 to April 30, 1950	4
April 30, 1950 to April 30, 1951	8
April 30, 1951 to April 30, 1952	3
April 30, 1952 to April 30, 1953	4
May 1, 1953 to May 14 1954	8
April 30, 1954 to April 30, 1955	6
April 30, 1955 to April 30, 1956	5
1956–1957	3
1957–1958	13
May 1, 1958 to April 30, 1959	9
May 1, 1959 to April 30, 1960	6
May 1, 1960 to December 31, 1960	4
May 1, 1961 to December 31, 1961	9
January 1, 1962 to December 31, 1962	2
Total (1947–1962)	99

While the number convicted in Ontario over the 16-year period is considerably smaller than the number convicted in Quebec in the two-year period noted in the data above, it does not necessarily follow that *more* illegal practice takes place in Quebec, for as the Registrar-Secretary of the Royal College of Dental Surgeons said in an interview,

> I suspect that they spend a great deal more time and money searching out illegal practice in Quebec than we do in Ontario. It's a matter of one's philosophy, I suppose. Whether you go after them relentlessly or charge them only when their illegal services are being offered and accepted too blatently, is a moot point. We are attempting to spend a great deal of time educating the public to seek out only those services which are authorized by the College. In either case I think that both Ontario and Quebec are solving their problem by the means which they think most appropriate.[1]

It should be borne in mind that most of the services (usually the taking of impressions, the provision of dentures and dealing with the public directly) which were offered by those convicted of illegal practice in Ontario and Quebec have been legally offered by non-dentists at one time or another in some of the provinces (cf. pp. 163–170).

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[1] Personal interview with the Registrar-Secretary.

DENTAL SPECIALIST SERVICES

In a previous chapter the geographic distribution of the dental specialists and hence, the availability and supply of their services, was discussed. In addition, the marked concentration of these services in the larger urban areas was noted. That the need is great for these services in Canada is unassailable (cf., pp. 76–77). This is particularly true in the case of orthodontists, a large measure of whose work is supplied to children and teenagers referred to them by general practitioners.

In a recent study a dentist examined 1,000 cases from his father's (an orthodontist) files.[1] He noted that most of the patients were primarily from what the sociologist would call middle and upper-middle class families. Dr. Fisk analysed the cases in terms of dental age (i.e., age according to dental development) and found that:

> The dental age range of the majority of cases seeking treatment was from seven to fifteen years with the greatest number occurring at twelve years. There were a greater number of females than males seeking treatment after the dental age of ten years.[2]

Orthodontists however do not feel that this is a satisfactory situation and would prefer the age at the initial request for orthodontic services to be much younger than it is. The author of the above study states:

> It should be stressed that at present the treatment of malocclusion consists mainly of palliative or corrective procedures instituted during the terminal stages of development. From a public health viewpoint, prevention should be the ultimate goal.[3]

This, of course, would mean that a much higher proportion of young children should be examined at an earlier age or, at least, a higher proportion of them referred for orthodontic examination at an earlier age. A more extensive system of "free" school and pre-school dental services with referral facilities at the general practitioners' or public health dentists' disposal and some hope that the children so referred would receive the needed examination and orthodontic treatment might accomplish the stated recommendations of the orthodontists.

In addition to the 127 orthodontists noted in Table 3–24 there are a number of other dentists who devote more than half their time to orthodontics, an

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[1] Fisk, Ross O., "When Malocclusion Concerns the Public", *J. Canad. D.A.*, Vol. 26, July 1960.

[2] *Ibid.* For need of early treatment *see also* F. Popovich, "Preventive and Interceptive Orthodontics", *J. Canad. D.A.*, Vol. 28, February 1962.

[3] Fisk, *op. cit.*

additional 27 in 1961 according to one source,[1] plus an unknown but probably limited number of general practitioners who do some orthodontic work.[2] While no empirical data for the orthodontist's case load are available for Canada, Kesel points out that "orthodontic correction for a patient usually requires more than one year of active treatment" and that orthodontists in the United States predict that by 1969, using auxiliary personnel, the orthodontist's "active case load will be between 126 and 150 cases".[3] Assuming that the 154 Canadian orthodontists, as described above, treat the maximum of 150 cases at present and that the majority of their cases are between the ages of five and fourteen, then 23,100 between these ages are receiving active treatment. The 1961 Census shows that 21.58 per cent of the population or 3,935,521 persons in Canada were aged 5 – 14 inclusive. It has been estimated that "not fewer than one-fifth and perhaps as many as one-half of the child population have or will develop malocclusions".[4] If we assume the lower estimate, for sake of argument, hence probably including the majority of cases *most* in need of orthodontic treatment, then in 1961 there were 787,104 children in the age cohort 5 – 14 in need of specialist care. Since only 23,100, at best, could have received this care because of orthodontic manpower resources, then 97 per cent of this age group *most* in need of care are unlikely to have been treated.

The 5 – 14 age group as a proportion of the total population in the projected estimations (1961–1991) being used by the Commission is never greater than the 21.58 per cent noted above; actually, the proportion drops off to 20.3 per cent by 1967 then rises again until it reaches 21.51 per cent by 1991.[5] However, unless there is a substantial increase in the per cent of dentists who are certified orthodontists or of dentists who "specialize" then the supply of orthodontic services available will continue to remain alarmingly below the need, if not necessarily the demand.[6] The situation in the United States is very similar and has led one of the authors in the *Survey of Dentistry* to state:

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[1] *Orthodontic Directory of the World*, Twenty-first Edition, 1962, wherein it includes orthodontists in exclusive and non-exclusive practice. "The names of those men engaged in non-exclusive practice are restricted (1) to those men in localities where there is no one in exclusive practice or (2) to those who have had adequate training and whose practice includes at least fifty per cent of the practice in exclusive practice of orthodontics or (3) to a non-exclusive practitioner who is devoting more than fifty per cent of his time to the practice of orthodontics and who has been recommended by others in the exclusive practice of orthodontics from his locality."

[2] Kesel, *op. cit.*, pp. 129–30, wherein he states, "Most dentists are unprepared to perform this service to treat improperly positioned teeth because the dental school curriculum does not provide the time necessary to teach the theory and practice of orthodontics. Moreover, many dental educators regard advanced education and training as essential to mastering the complexities of the etiology, diagnosis, and treatment of severely disturbed occlusions".

[3] *Ibid.*, p. 131.

[4] *Ibid.*, p. 129.

[5] Stukel, A., "Population Projections, 1961–1991", Appendix E, in Brown, T.M., *Canadian Economic Growth*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1965.

[6] Those factors which are likely to change *need* into *demand* for specialist services in the coming years will be discussed in a subsequent section of this chapter. Stukel, A., "Population Projections, 1961–1991", Appendix E, in Brown, T.M., *Canadian Economic Growth*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1965.

> In order to improve dental health for a larger number through the prevention and correction of malocclusion, more education in interceptive orthodontics should be provided for all dental students and dentists. The early detection of occlusal impairment in children and the application of preventive or simple corrective measures could reduce the number of complicated cases. Much more research into orthodontic treatment methods is needed in order to determine how this service can be made available to more people. [1]

CHANGES IN NEED, DEMAND AND SUPPLY OF DENTAL SERVICES

Throughout this chapter the needs, demands and supply of dental services have been viewed in terms of the present situation or the immediate past. What of the future?

The twentieth century in Canadian terms has been one characterized by rapid social, economic, and technological change all of which have had a tremendous impact upon the dental services and the profession and upon the attitudes of Canadians towards them.

The present period is one marked by comparative affluence and, paradoxically, a relatively high level of unemployment. The Canadian population is becoming ever more urbanized and increasing scientific and medical, including dental, knowledge is changing the age distribution of the population and changing the nature of dental care needs. Technological change in the form of improved transportation facilities has brought formerly remote populations within comparatively easy reach of town and city; in the form of improved dental equipment, it has introduced the high speed drill, with all its productivity advantages, into common usage. The general educational level of the Canadian population is rising and a larger proportion of the population is receiving improved dental health education, both factors which lead to increased appreciation of good oral hygiene, and consequently increased demands for dental care. In addition, the introduction of prepaid health insurance on the one hand and of government sponsored medicare schemes on the other have all increased the demand for available services. In terms of supply the changing pattern of the organization of dental practice from individual practices to "group practices" and from "one chair" offices to multiple chair offices and, the increased utilization of auxiliaries, all have increased the productivity of dentists.[2] But, at the same time, the increasing popularity of or, at least, the ability of certain "new" fields in science and technology to attract recruits from the limited proportion of the population presently eligible to enter university and professional education and training is limiting recruitment to the dental profession and hence, in the long run, directly affecting the supply of dental services.

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[1] Kesel, *op. cit.*, p. 131.

[2] Cf. Chapter 6.

CHANGES IN NEED

Numerous scientific studies have illustrated that the controlled fluoridation of public water supplies probably has the potential of changing the level and nature of dental care needs of the total population more than any other single factor.[1] In Canada, as of 1963, 20.1 per cent of the total Canadian population were living in municipalities with controlled fluoridation. In addition, an estimated 0.6 percent were living in areas where the drinking water contained natural fluorides (mainly in Saskatchewan and Ontario) raising the total proportion to approximately 20.7 per cent. The provincial variation, exclusive of those in the natural fluoride communities, is shown in Table 4–21.

TABLE 4–21

PROPORTION OF TOTAL PROVINCIAL POPULATION IN MUNICIPALITIES WITH CONTROLLED FLUORIDATION, 1963

Province	Per Cent
Newfoundland	1.2
Prince Edward Island	0.0
Nova Scotia	23.7
New Brunswick	0.0
Quebec	5.4
Ontario	37.6
Manitoba	55.3[1]
Saskatchewan	25.5
Alberta	3.9
British Columbia	4.2
Total	20.1

[1] This extremely high proportion may be accounted for by the fact that most of Greater Winnipeg which contains over 50 per cent of the total population of the province has controlled fluoridated public water supplies.

Source: The Health League of Canada, Toronto, September 12, 1963.

The efficacy of the fluoridation of public water supplies in the reduction of dental caries is beyond dispute.[2] (Tables 4–22, 4–23, and 4–24 illustrate fluoridation's caries-reducing effects.)

[1] See Grainger, R.M., Nikiforuk, G. and Paynter, K.J., *Dental Health and Fluorides*, a submission to the Ontario Fluoridation Investigating Committee, 1959, wherein is contained an extended bibliography. *See also* Marier, J.R., Rose, Dyson, and Boulet, M., "Accumulation of Skeletal Fluoride and its Implications", *Archives of Environmental Health*, Vol. 6, May 1963, pp. 664–671, and a rebuttal to this article issued by the Council on Research, Canadian Dental Association, Toronto. Dr. Don W. Gullett, Secretary, Canadian Dental Association, in a message accompanying the rebuttal writes, "There is nothing in the original papers which they (Marier et al.) have cited as references, or in their suggestions, that would warrant a delay in instituting the fluoridation of water supplies as a caries prophylaxis measure".

[2] Grainger, *et al.*, *ibid.*

TABLE 4–22

PERCENTAGE OF CHILDREN HAVING CARIES-FREE PERMANENT TEETH IN THREE CANADIAN CITIES, 1948 AND 1959

Age Group	Sarnia[1]		Brantford[2]		Stratford[3]	
	1948	1959	1948	1959	1948	1959
	%	%	%	%	%	%
9 – 11	6.1	8.1	5.7	43.8	52.1	49.9
12 – 14	0.6	2.3	1.2	18.7	27.2	28.1

[1] Sarnia, a city with a negligible amount of fluoride in the water supply.

[2] Brantford introduced controlled fluoridation of the public water supply in 1945.

[3] Stratford has a naturally fluoridated water supply.

Source: *Canadian Dental Association* brief submitted to the Royal Commission on Health Services, Ottawa, March 1962, Table XI–5; and Department of National Health and Welfare, *Dental Effects of Water Fluoridation Report*, Ottawa: Queen's Printer, 1959, p. 7.

TALBE 4–23

COMPARISON OF CHILDREN'S TEETH IN TWO ALBERTA TOWNS, CAMROSE AND WETASKIWIN, 1963

Age	Average Number of Decayed, Extracted, and Filled Teeth, per Child (Deciduous)		Average Number of Decayed, Extracted, and Filled Teeth per Child (Permanent)		Decay Free Permanent Teeth		Decay Free Deciduous Teeth	
	Camrose[1]	Wetaskiwin[2]	Camrose	Wetaskiwin	Camrose	Wetaskiwin	Camrose	Wetaskiwin
					%	%	%	%
6	7.2	2.2	0.6	0.3	40	80	10	37
7	8.2	2.5	2.4	0.3	20	79	3	38
8	8.0	2.4	4.1	0.5	3	53	0	24
9	6.5	3.4	4.0	0.7	4	52	3	25
10	5.9	2.0	4.4	0.7	5	45	0	22
11	–	–	6.1	2.3	6	33	–	–

[1] Water supply had low levels of fluorine, .01 to 0.5 parts per million of fluorine.

[2] Water supply contained 1.2 to 2.0 parts per million of fluorine.

Source: Faculty of Dentistry, University of Alberta, *The Camrose-Wetaskiwin Dental Health Survey*, 1963 (mimeo.). Table developed from their findings.

TABLE 4-24

GRAND RAPIDS – MUSKEGON FLUORIDE STUDY
DENTAL CARIES RATES IN GRAND RAPIDS FOR DECIDUOUS (D.E.F.) AND PERMANENT (D.M.F.) TEETH BEFORE AND AFTER 10 YEARS OF FLUORIDATION

Age Last Birthday	No. of Children		Total d.e.f.		Per Cent Reduction in d.e.f.	Total D.M.F.		Per Cent Reduction in D.M.F.
	1944	1954	1944	1954		1944	1954	
4.....	323	77	4.19	2.12	49			
5.....	1,633	529	5.37	2.50	53			
6.....	1,789	561	6.43	2.95	53	0.78	0.19	76
7.....	1,806	751	6.29	3.26	48	1.89	0.69	64
8.....	1,647	567	5.78	3.31	43	2.95	1.27	57
9.....	1,639	477	4.59	3.00	35	3.90	1.97	50
10.....	1,626	515	2.84	2.35	17	4.92	2.34	52
11.....	1,556	499	1.35	1.32	2	6.41	2.98	54
12.....	1,685	260	0.47	0.44	6	8.07	3.87	52
13.....	1,668	224	0.18	0.18	0	9.73	5.05	48
14.....	1,690	250				10.95	6.78	38
15.....	1,511	240				12.48	8.07	35
16.....	1,107	198				13.50	9.95	26

Source: Grainger, R.M., Nikiforuk, G., and Paynter, K.J., *Dental Health and Fluorides*, submission to the Ontario Fluoridation Investigating Committee, (mimeo.), Toronto, November 1959, Table X compiled by them from (i) Arnold, F.A., "The Use of Fluoride Compounds for the Prevention of Dental Caries", *Internat. D.J.*, Vol. 7, 1957, p. 54; and (ii) Arnold, F.A., Dean, H.T. and Knutson, J.W., "Effect of Fluoridated Public Water Supply on Dental Caries Prevalence", *United States Public Health Reports*, Vol. 71, 1956, p. 652.

While the dental profession in Canada generally has publicly supported the fluoridation of public water supplies the general voting public has not been as quick to support the plebiscites which, if a majority voted "Yes" for fluoridation, would have enabled its introduction into their respective municipality. In the last few years fluoridation plebiscites have been lost, that is, the majority of votes have been "No" in such cities as Calgary, Ottawa and Charlottetown, and in British Columbia three plebiscites held in December 1960 were unsuccessful in introducing fluoridated water. In Alberta 35 plebiscites have been held in recent years with the following results:[1]

No. of plebiscites over 66 2/3 per cent in favour	13
No. of plebiscites over 60 per cent in favour	19
No. of plebiscites over 50 per cent in favour	27
No. of plebiscites under 50 per cent in favour	8
Total vote in 35 plebiscites – in favour 56 per cent	

In many of the quasi-political campaigns which preceded these plebiscites pressure groups representing the interests of both sides of the question were in action attempting to sway or change the public attributes towards or against the fluoridation issue. One major argument used by the anti-group was that the ingestion of "too much" fluoride caused mottling of the enamel of the teeth. Scientific research evidence has shown that an excess of fluorides in the drinking

[1] *The Edmonton Fluoridation Survey, op. cit.*, p. 3.

water, whether controlled or natural, will cause fluoresced teeth ("endemic hypocalcification, or hypocalcification and hypoplasis of the enamel").[1] The concentration of fluoride in the water has to be relatively *high* however, at least four times the prescribed concentration, i.e., over 4 parts per million instead of the recommended 1 ppm. to be "dangerous". The data contained in Table 4–25 are the result of a study designed to determine the level of added fluoride which would inhibit dental caries, yet, at the same time, "eliminate the complication of mottled teeth".[2] There was a marked reduction in caries (approximately 65 per cent) "with no fluorosis of esthetic significance" when there was a fluoride content of about 1.0 ppm.[3]

TABLE 4–25

SUMMARY OF DENTAL CARIES FINDINGS IN 7,257 SELECTED WHITE SCHOOL CHILDREN, AGE 12 TO 14 YEARS, IN 21 CITIES OF 4 STATES IN RELATION TO THE FLUORIDE (F) CONTENT OF THE PUBLIC WATER SUPPLY

City and State	No. of Children Examined	Per Cent of Children Caries Free	Average No. of D.M.F. Teeth per Child	F. Conc.[1] (p.p.m.) Public Water Supply
Galesburg, Ill.	273	27.8	2.36	1.9
Colorado Springs, Colo.	404	28.5	2.46	2.6
Elmhurst, Ill.	170	25.3	2.52	1.8
Maywood, Ill.	171	29.8	2.58	1.2
Aurora, Ill.	633	23.5	2.81	1.2
East Moline, Ill.	152	20.4	3.03	1.2
Joliet, Ill.	447	18.3	3.23	1.3
Kewanee, Ill.	123	17.9	3.43	0.9
Pueblo, Colo.	614	10.6	4.12	0.6
Elgin, Ill.	403	11.4	4.44	0.5
Marion, Ohio	263	5.7	5.56	0.4
Lima, Ohio	454	2.2	6.52	0.3
Evanston, Ill.	256	3.9	6.73	0.0
Middletown, Ohio	370	1.9	7.03	0.2
Quincy, Ill.	330	2.4	7.06	0.1
Oak Park, Ill.	329	4.3	7.22	0.0
Zanesville, Ohio	459	2.6	7.33	0.2
Portsmouth, Ohio	469	1.3	7.72	0.1
Waukegan, Ill.	423	3.1	8.10	0.0
Elkhart, Ind.	278	1.4	8.23	0.1
Michigan City, Ind.	236	0.0	10.37	0.1

[1] No additional benefit was observed when the concentration of fluoride in water exceeded this (1.0 p.p.m.) level.

Source: Grainger, R.M., Nikiforuk, G., and Paynter, K.J., *Dental Health and Fluorides*, submission to the Ontario Fluoridation Investigating Committee, (mimeo.), Toronto, November 1959, Table VII compiled by them from (i) Dean, H.T., Jay, P., Arnold, F.A. and Elvove, E., "Domestic Water and Dental Caries", *United States Public Health Reports*, Vol. 56, 1941, p. 761; and (ii) Dean, H.T., Arnold, F.A., and Elvove, E., "Domestic Water and Dental Caries", *United States Public Health Reports*, Vol. 57, 1942, p. 1155.

[1] Grainger, Nikiforuk and Paynter, *op. cit.*, p. 21.

[2] *Ibid.*, p. 24.

[3] *Ibid.*, pp. 24–25.

Surveys have been carried out in Alberta designed to determine the reasons why people vote for or against the fluoridation issue. Their findings support, in general terms, the findings of the National Opinion Research Center's findings in the United States, one of the most important of which is that older people are not as likely to favour fluoridation as younger people. Some selected findings of the Alberta study are listed below:

People over fifty are more likely than people under fifty to be opposed to fluoridation but are not more likely to have a definite opinion on the issue.

People with children under eighteen are more likely to be in favour of fluoridation than are those with no children in this category but both groups are equally likely to have a definite opinion on the issue.

The more years of education, the more likely that the opinion will be in favour of fluoridation and the opinion definite.

The higher the occupational status, the more likely the opinion will be in favour of fluoridation and the opinion definite. Occupation does not differentiate those "for" and "against" with "age of children" categories.

Non-property owners are more likely to be in favour of fluoridation than are property owners but with age controlled the difference does not hold.

Property owners are more likely than non-property owners to vote on fluoridation.

There is non-significant tendency for voting turn-out to increase with age.

The more years of education, the greater the turn-out.

There is no significant difference between Protestants and Catholics in the direction of opinions of fluoridation but the Protestants are significantly more likely to have a definite opinion on the issue.

Fundamentalists are more likely to have an "anti" opinion than are other Protestants.

A religious interpretation of fluoridation which might be called the "pure water" theme is characteristic of approximately twenty per cent of the "anti" opinions of fluoridation.

Voters who live in areas of the city where the dental health of school children is poorest registered an average vote of 52 per cent against fluoridation in three plebiscites. Where the middle and high socio-economic groups of children live, the average vote in three plebiscites

was 65 per cent and 78 per cent respectively in favour of fluoridation.

Where voter support for fluoridation is low there is also a low turn-out of voters.[1]

There are other methods for treating the teeth with fluorides, none of which, of course, has such universal coverage as that of treating the public water supplies.[2] In addition, none has proven as effective or as inexpensive in terms of dental man-hours as the controlled fluoridation scheme.

1. The topital application of sodium fluoride has shown a 20–40 per cent reduction in caries but unless the applications are continued over a number of years they appear only to postpone the onset of caries. In addition, dental office time of from 20 to 30 minutes per topical application is required for this treatment to be effective, and this treatment appears to be less effective in reducing caries in adults than in children.
2. The topical application of solutions of stannous fluoride has proven more effective than sodium fluoride but again similar objections may be raised.
3. The use of stannous fluoride in dentifrice has had good results in both children's and young adults' teeth but results appeared to be lasting only under supervised brushing conditions.
4. The taking of "salt" tablets containing some fluorides has shown some positive results but since this involves what in effect is self-medication dependent upon remembering to take the tablets continuously it is not as effective as drinking fluoridated water.

In general then, despite a certain public resistance to the scientific findings, fluoridation results in a marked reduction in caries, the most common of dental diseases, hence a reduction in the amount of restorative dental work required of the dentists. It does not follow, however, that if everyone had access to fluoridated water supplies that there would be any change in *need* for dental services but, rather, it appears that there will be a change in the *nature of the dental needs*. As one research team saw it:

> ...it seems probable that fluoridation, like so many discoveries, may in the process of meeting one need, create new needs of equal or greater magnitude. When fewer teeth are lost or damaged by decay, more youngsters will reach maturity with teeth which warrant periodontal and other maintenance care [cf. p. 80]. Later on when rehabilitation becomes necessary, full mouth reconstruction will be more frequently indicated, and edentulousness may be postponed for many years, perhaps an entire lifetime.[3]

The dental health of the nation will be vastly improved by the general introduction of controlled fluoridation of public water supplies although the virtually universal

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[1] *The Edmonton Fluoridation Study, op. cit.*, pp. 9–12, abridged.

[2] The following paragraph is based primarily on Grainger, Nikiforuk and Paynter, *op. cit.*

[3] Pelton and Bothwell, *op. cit.*, p. 13.

need for dental services, albeit different, will still exist. In the future new scientific research may discover other chemicals and new knowledge which will raise the general level of dental health but, at present, fluoridation appears to be the only factor which can seriously affect need, as described above.

CHANGES IN DEMAND

There are a number of social and economic factors likely to lead to some changes in the level of demand for dental services in the future.

The continued raising of the general level of education of the adult population and the consequent acquisition of a new set of social values (essentially middle-class values) by a segment of society which formerly received only a minimal education will have considerable impact in the future on demand for dental services. In addition, increased level of education tends to lead in the industrial nations to increased levels of income, therefore increased demand for service.

Another factor not completely unrelated to the foregoing is the rapid process of urbanization in Canada – before World War II 65 per cent of the population could be classified as non-urban, today the balance has reversed and the trend continues unabated. Because of this a smaller proportion of the population will be considered to be "isolated" and not within easy reach of a dentist or dental clinic. Urbanism is also a way of life and bears with it a new set of social values for those recently migrated from the rural areas and, as noted earlier in this chapter, greater demands for dental service by the urban population than by the rural are a reflection of these differing attitudes.

The increasing prevalence of prepayment insurance programmes and post-payment (essentially instalment plan purchasing of dental services) health plans, including dentistry, will likely lead to greater demand for dental services when the initial outlay of large sums for these services at time of treatment is no longer necessary.

Needless to say a government sponsored medicare plan operating with the support of the dental profession as in Great Britain, Sweden and Norway, among others, will lead inevitably to greater demand for services.[1] Since most of these plans usually introduce free dental care in stages, beginning with young school-age and pre-school-age children (except for the United Kingdom where complete coverage was introduced at once) the full impact of the resulting demand for services is eased. It will continue to increase, however, as the age for which coverage is available increases by stages and as those school-age children who were in at the beginning grow into adulthood and continue the good dental health practices learned at school.

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[1] See Tequer, Goran, *Social Security in Sweden*, (from the Swedish Manuscript by Rudy Feichtner), The Swedish Institute, Tiden; Almquist and Wiksells, Uppsala, 1956, esp. pp. 39–52; Fleisher, Wilfred, *Sweden's Welfare State*, New York: J. Day and Co., 1956, esp. p. 155; *also*, Nelson, George R., (ed.), *Freedom and Welfare*, Ministries of Social Affairs of Denmark, Finland, Iceland, Norway and Sweden; Copenhagen, 1953, wherein are outlined the details and history of the various dental health schemes in Scandinavia. Considerable space is devoted to the school dental health programmes.

This latter point is also associated with the increased impact of dental health education programmes which lead inevitably to greater demands for care and as Grainger and his associates have pointed out, it leads to improved dental health albeit placing greater pressure upon the local dentists to meet the demands being made upon them:

> Since the dentists were fully employed at the start of the program, it is presumed that the increase in dental services for children was made possible by a deferral of treatment for adults in many instances, but perhaps to a large extent it was due to early dental care when incipient lesions could be readily treated, thus avoiding time-consuming operations occasioned by neglect. In this manner more patients per dental man-hour could be accommodated.[1]

CHANGES IN SUPPLY

There are a number of factors which affect the supply of dental services. Some are related to the individual dentist himself and others more generally to the dental profession. The dentist's utilization of "up to date" dental office design and dental instruments,[2] the mode of his practice – whether solo or group[3] – and, as we shall see in Chapter 6, his utilization of auxiliary personnel all contribute to the level of supply of dental services. All of these raise the productivity of the available manpower, hence increasing the supply of services without an increase in the number of dentists.

An additional factor of the greatest importance is the ability of the profession to attract new recruits; this will be dealt with in a subsequent chapter.

This chapter has been an analysis of the present need, demand and supply of dental services in Canada and of the social, economic, technological, and other forces which affect them. An attempt was made to determine those elements which, because of social change in general, will have some impact upon need, supply and demand. In the following chapter the problems of recruitment to the dental profession will be discussed and an examination made of the process of recruitment to dentistry.

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[1] Coburn, C.I., and Grainger, R.M., "Health Education in Relation to Dental Care Needs and Demand in the Elgin-St. Thomas Health Unit Area", *J. Canad. D.A.*, Jan. 1957; *see also* Grainger and Sellers, *op. cit.*

[2] *The Michigan Study*, *op. cit.*, pp. 157–165.

[3] *Ibid.*, p. 159.

CHAPTER 5

RECRUITMENT

In the modern world the process of recruitment to an occupation is a very complex one because of the number of factors and their inter-relations which may influence an individual's final choice of a career. This is particularly true of recruitment to the professions because of the length of time involved in acquiring professional status.

Numerous studies have attempted to describe the process of recruitment and to determine the factors which operate in the selection process, particularly as it pertains to the professions and other elite occupations. Recruitment to dentistry has been the subject matter of these studies on a number of occasions.[1] In most of the studies concerned with these high status occupations a number of factors which seem to deter or induce potential recruits have been examined. Notable among these are those factors over which the would-be recruit has little or no control such as family background, socio-economic status of the family, and his or her rural or urban background; and, others which pertain to the occupation itself, such as the prestige and status accorded it by the general public, the nature of the work involved, and the conditions under which the work is performed. In this chapter recruitment to the dental profession will be examined in the light of these previous studies.

SOCIO-ECONOMIC STATUS AND RECRUITMENT

In Canada the acquisition of professional status is the result, among other things, of a lengthy and expensive university education.[2] Dentistry is no excep-

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[1] *Report of the Committee on Recruitment to the Dental Profession*, McNair Committee, Cmd. 9861, H.M.S.O. London, 1956; More, Douglas M., "The Dental Student – Choice of a Career in Dentistry", *Journal of the American College of Dentistry*, March, 1961; others will be noted in the course of the chapter.

[2] Nursing (R.N. level) and chartered accountancy (C.A. level) are the only two generally recognized professions in Canada wherein one can obtain professional standing without full-time attendance at a university. Both of these two professions are at present attempting to change this for some of their members and require a university education (no longer recognizing its "equivalent") as a prerequisite for entry, hence, limiting entry only to those whose parents can provide their children with a university education. Some few Canadian-trained engineers do enter their profession by what the professional associations call "the back door to engineering", that is, without a university degree.

tion. Indeed, if only the costs while in dental school are included training for dentistry is *more* expensive than for any other profession (Table 5–1).

TABLE 5–1

TOTAL EXPENDITURES OF CANADIAN UNDERGRADUATE STUDENTS, ACADEMIC YEAR 1961–62 (DBS)

	Single Students		Married Students
	At Home	Not at Home	
	$	$	$
Arts,[1] Science, Commerce	986	1,411	2,125
Education	917	1,244	2,108
Engineering	1,010	1,553	2,165
Law	1,233	1,756	over 3,000
Medicine	1,503	1,926	over 3,000
Dentistry	1,542	2,064	over 3,000
Pharmacy	1,180	1,492	2,166
Total	1,109	1,509	over 3,000

[1] Excluding Classical Colleges in Quebec.

Source: Dominion Bureau of Statistics, *Daily Bulletin*, Catalogue No. 11–001, vol. 31, No. 205, October 25, 1963, p. 2.

TABLE 5–2

COST OF FOUR YEARS' DENTAL SCHOOL EDUCATION FOR STUDENTS GRADUATING IN 1963

Year	Dental School					
	Dalhousie	McGill	Montreal	Toronto	Manitoba	Alberta
	$	$	$	$	$	$
1959–60	791	1,005	837	779	850	729
1960–61	864	905	853	988	900	836
1961–62	903	1,000	850	923	906	790
1962–63	1,053	1,000	850	915	1,038	963
Total	3,611	3,910	3,390	3,605	3,694	3,318

Source: Canadian Dental Association and Deans of Canadian Dental Schools.

It requires a minimum of approximately 17 to 18 years of schooling to obtain a first degree in dentistry and it has been estimated that the cost of only the four-year dental school portion of this education for the 1963 graduating classe ranged from $3,318 per student at the University of Alberta to $3,910 per student at McGill University (Table 5–2).[1] (The tuition fees alone account for approximately 50 per

[1] The 17–18 years of schooling are composed of the following: 11 or 12 years, depending upon the province, to *junior* matriculation standing, then two additional years, one of which, leading to *senior* matriculation or its equivalent, is in many cases taken at high school, and the other taken at university is essentially a pre-dental year; then, finally, the four years of dental school.

TABLE 5-3

COST OF DENTAL SCHOOL EDUCATION FOR STUDENTS, GRADUATING IN 1963, BY YEAR

	Item	Total	Year			
			1959–60	1960–61	1961–62	1962–63
		$	$	$	$	$
1. Dalhousie University ..	Tuition	1,905	420	450	450	585
	Investments ..	1,096	256	256	275	309
	Text-books ...	239	51	64	59	65
	Supplies	76	19	19	19	19
	Incidentals ...	295	45	75	100	75
	Total	3,611	791	864	903	1,053
2. McGill University	Tuition	2,100	600	500	500	500
	Investments ..					
	Text-books ...	1,810	405	405	500	500
	Supplies					
	Incidentals ...					
	Total	3,910	1,005	905	1,000	1,000
3. University of Montreal	Tuition	1,775	425	425	450	475
	Instruments ..					
	Text-books ...	1,615	412	428	400	375
	Supplies					
	Incidentals ...					
	Totals	3,390	837	853	850	850
4. University of Toronto ..	Tuition	2,413	550	663	600	600
	Instruments ..					
	Text-books ...	1,192	229	325	323	315
	Supplies					
	Incidentals ...					
	Total	3,605	779	988	923	915
5. University of Manitoba	Tuition	1,775	450	450	425	450
	Instruments...	1,050	250	250	250	300
	Text-books ...	388	100	100	100	88
	Supplies	206	25	50	31	100
	Incidentals ...	275	25	50	100	100
	Total	3,694	850	900	906	1,038
6. University of Alberta ..	Tuition	1,630	390	390	425	425
	Instruments...					
	Text-booj s ...	1,688	339	446	365	538
	Supplies					
	Incidentals ...					
	Total	3,318	729	836	790	963

Source: Canadian Dental Association and Deans of Canadian Dental Schools.

cent of the total costs.) It should be noted that these figures do not include room and board and other incidental living expenses; when they are included the estimated range of costs rise from $5,718 at the University of Alberta to $7,390 at the Université de Montréal. Itemized breakdowns including living expenses and the estimated costs of the pre-dental programmes are contained in Tables 5–3 and 5–4. Needless to say, these high costs seriously limit the proportion of Canada's families who can support one of their children in a course leading to professional qualification in dentistry, even if they had the desire to do so.

TABLE 5–4

COST OF PRE-DENTAL AND DENTAL EDUCATION AT CANADIAN DENTAL SCHOOLS FOR STUDENTS GRADUATING IN 1963

Item	Dental School					
	Dalhousie	McGill	Montreal	Toronto	Manitoba	Alberta
	$	$	$	$	$	$
Pre-dental						
Tuition	900	900	425	410	325	290
Text-books	120	100	30	50	50	125
Supplies			20	100	50	
Incidentals				60	100	
Sub-total	1,050	1,000	475	620	525	415
Room and Board	1,276	1,500	1,200	600	420	600
Total[1]	2,236	2,500	1,675	1,220	945	1,015
Dental						
Tuition	1,905	2,100	1,775	2,413	1,775	1,630
Instruments	1,096				1,050	
Text-books	239	1,810	1,615	1,192	388	1,688
Supplies	76				206	
Incidentals	295				275	
Sub-total	3,611	3,910	3,390	3,605	3,694	3,318
Room and Board	3,152	3,305	4,000	2,400	2,000	2,400
Total	6,763	7,215	7,390	6,005	5,694	5,718
Grand Total	9,089	9,715	9,065	7,225	6,639	6,733

[1] There is a wide variation in pre-dental education costs because in some provinces it is possible to obtain one year of university credit at a public high school. The costs for the pre-dental years are based on costs for undergraduate education in the 1962–63 academic year.

Source: Canadian Dental Association and Deans of Canadian Dental Schools.

The financial background of the present dental students and their fathers' or guardians' occupations are shown in Tables 5–5 and 5–6. The occupational background of the dental students' fathers in comparison with the occupational background of the total Canadian labour force supports the findings in other studies which have reported on the social origins of the members of professions and other elite occupations.[1] That is, a high proportion of the members of the professions are recruited from families located in the higher strata of society, usually the middle classes. In this instance, 56 per cent of the dental students come from families where the head of the household is in a profession (22.8 per cent), is a senior officer in a firm (10.7 per cent) or is the owner of a business (22.8 per cent). These three groupings represent only 18.2 per cent of the total Canadian labour force. It is not surprising however, that the social origins of the dental students do not reflect the social origins of the whole population. As noted earlier the financial ability needed to undertake the lengthy education leading to professional status in dentistry is not equally distributed throughout the population (neither, of course, is the familial support and tradition, the personal ambition and the motivation).

TABLE 5–5

APPROXIMATE ANNUAL INCOME OF CANADIAN DENTAL STUDENTS' PARENTS, 1961

Income	Per Cent
$	
Under 4,000	22.7
4,000 – 6,000	27.8
6,000 – 8,000	16. 9
8,000 – 10,000	12.1
10,000 – 15,000	11.8
15,000 – 20,000	5.1
Over 20,000	3.6

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963.

Dental students receive financial support for their studies from a number of sources but only 20 per cent of it comes from sources other than their own or their families' resources – one-half of this 20 per cent in the form of loans (Table 5–7). Over one-half of the present body of dental students reported considerable financial indebtedness. It is noteworthy too that only 4 per cent, that is, 37 of the 941 in the survey, were attending dental school on a scholarship!

[1] For example, Porter, John, "The Economic Elite and the Social Structure of Canada", *C.J.E.P.S.* Vol. 23, August 1957, pp. 376–94. An extensive bibliography on this subject is contained in Caplow, Theodore, *The Sociology of Work*, pp. 319–20.

TABLE 5–6

DENTAL STUDENTS' FATHERS' OCCUPATIONS COMPARED TO MALE LABOUR FORCE AND TOTAL LABOUR FORCE

	Father's Occupation (944)	Male Labour Force (4,582,476)	Total Labour Force[1] (6,305,630)
	%	%	%
Professionals	22.8	7.7	9.9
Physicians/Surgeons	6.8	.4	.3
Dentists	4.9	.1	.1
Engineers/Architects	2.6	1.0	.7
Pharmacists	.7	.1	.1
Lawyers	.7	.3	.2
Accountants	1.5	.6	.5
Professors	.4	.2	.2
Teachers	2.9	1.2	2.8
Clergymen	1.0	.4	.3
Other Professionals	1.3	3.4	4.7
Managers/Officials/Executives	10.7	10.5	8.6
Owners of Business	22.8		
Clerical	2.4	7.1	13.2
Agricultural	7.8	12.5	10.3
Manufacturing/Mechanical	6.3	29.6	24.7
Construction	2.2		
Transportation/Communication	2.5	7.7	6.3
Personal Services	.9	4.5	9.4
Other Service	1.0	4.3	3.2
Labourer	3.9	6.4	5.0
Other	16.7[2]	9.7	9.4

[1] Total does not include those in "occupation not stated".

[2] Including 4 per cent in "commercial and financial".

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963; Dominion Bureau of Statistics, *Census of Canada, 1961*, Labour Force, Occupations by Sex.

TABLE 5–7

AVERAGE AMOUNT SPENT ON EDUCATION DURING YEAR BY SOURCE OF FUNDS, PERCENTAGE OF STUDENTS MENTIONING SOURCE AND DISTRIBUTION OF TOTAL AMOUNT SPENT BY ALL STUDENTS

Source of Funds[1]	Average Amount		Students Mentioning Source	Percentage of Total Amount Spent
	Mean	Median		
	$	$	%	%
Parents	818	660	57	23
Savings	628	400	26	8
Earnings during year	608	377	20	6
Earnings during summer	719	600	66	24
Wife's earnings	2,335	2,400	15	19
Scholarships	489	460	17	4
Student loan funds	523	500	22	6
Other loans	688	500	11	4
Other	1,010	600	12	6

[1] Fifty-one per cent of the students reported some financial indebtedness. The average (mean) amount per reporting student was $1,905. The median was $1,150.

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963.

The actual cost of an education leading to professional status in dentistry is such then as to act as a serious deterrent to recruits and over half (54 per cent) of the dental students themselves reported, among other reasons, that "cost of education" was one reason why more people do not enter dentistry. This is a very important consideration when there is a shortage of dental manpower in Canada and when the proportion of Canadian university students who are dental students has declined considerably in the last two decades (cf. Table 2–11).

SIZE OF HOME TOWN AND RECRUITMENT

In an earlier chapter (Chapter 3) it was noted that there is a relationship between the size of the community from which the dental student is recruited and where he locates his practice after graduation. This was deemed to be of considerable importance because there is a serious shortage of dental manpower in the smaller communities and about 60 per cent of the recruits from these areas do not return to practise in the same or similar sized communities. The data used in Chapter 3 refer to a study carried out at the University of Toronto and were based on an analysis of the ultimate destination of all dental graduates of the University practising in Canada who graduated between 1931 and 1960 inclusive. Another study conducted by the Canadian Dental Association concerned with *all* recent graduates (between 1956 and 1961 inclusive) practising in Canada supports in general terms the findings of the Grainger study.[1] The C.D.A.'s findings suggest that while the attractive force of the small town to recruits from the small towns is slightly stronger when all recent graduates are considered than when only the

[1] Canadian Dental Association, *Survey of Recent Graduates* (mimeo.), 1963.

University of Toronto graduates were examined half of them still do not return to a small community (Table 5–8). However, 30 per cent of those recruited from the medium-sized communities take up their practice in a small town, and slightly more than one in five of those recruited from the bigger cities locate in smaller communities. This latter group actually represents one-quarter (24 per cent) of the recent graduates presently practising in both the medium-sized cities and the small towns and rural areas (Table 5–9).

TABLE 5–8

RECENT GRADUATES AND UNIVERSITY OF TORONTO GRADUATES, BY SIZE OF HOME TOWN AND SIZE OF CITY OF RESIDENCE

Size of City of Residence	Size of Home Town					
	Under 10,000		10,000–99,999		100,000 and Over	
	Recent Graduates[1]	Grainger Study[2]	Recent Graduates	Grainger Study	Recent Graduates	Grainger Study
	%	%	%	%	%	%
Under 10,000	49	43	30	13	13	8
10,000 – 99,999....	13.5	28	49	68	10	12
100,000 and over ...	36.5	29	21	19	77	80
No answer.....	1	–	–	–	–	–
Total	100	100	100	100	100	100

[1] Recent Graduates: Survey data based on a questionnaire sent to all graduates from Canadian dental schools 1956–1961 inclusive.

[2] Grainger Study: Graduates from the Faculty of Dentistry, University of Toronto, 1931–1960 inclusive.

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963; *Canadian Dental Association*, brief submitted to the Royal Commission on Health Services, Ottawa, March 1962, Appendix XIX.5., Table XIX.3.

TABLE 5–9

RECENT GRADUATES BY SIZE OF CITY OF RESIDENCE AND SIZE OF HOME TOWN

Size of Home Town	Size of City of Residence		
	Under 10,000 (140)	10,000 – 99,999 (114)	100,000 and Over (279)
	%	%	%
Under 10,000.....	44	15	17
10,000 – 99,999	30	60	11
100,000 and over	24	24	71
No answer	2	2	1
Total	100	101	100

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963.

The reasons why more rural and other recruits are not attracted to practise in rural and other small communities have already been treated. There is another aspect, however, which is of considerable import, that is, the generally small proportion of dental students recruited from the smaller communities. The data in Table 5–10 bear this out; the large- and medium-sized communities supply more than their share of recruits to dentistry and the small communities supply less than would normally be expected.

TABLE 5–10

PROPORTION OF DENTAL STUDENTS, RECENT GRADUATES, AND TOTAL POPULATION BY SIZE OF HOME TOWN

City Size	Dental Students (535)	Recent Graduates (941)	Total Population (18,238,247)
	%	%	%
Under 10,000	27	24	41
10,000 – 99,999	21	26	15
100,000 and over	52	48	43
No information	–	2	–
Total	100	100	99

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963, and *Survey of Recent Graduates*, Dominion Bureau of Statistics, *Census of Canada*, 1961, Ottawa: Queen's Printer.

There are a number of reasons why this is so. On the one hand all the dental schools in Canada are located in big cities and 43 per cent of the dental students are attending a dental school in their home town (Table 5–11), hence, minimizing the costs of a dental education (cf. Table 5–1). On the other hand, the income of the urban population is, in general terms, higher than that of the rural population, thus enabling them to finance a university education more easily. A not unimportant reason of course is the differential value placed on education in the rural and urban areas and the educational opportunities available to the residents in these two areas. The data in Table 5–12 show the proportions of residents from the rural and urban areas aged 15 to 19 years still attending school. This age cohort has been selected since this is the age group normally attending high school, hence the group from which recruits to university and dentistry would normally be sought. The smaller proportion of "drop-outs" from school in the urban areas is obvious.

TABLE 5–11

STUDENTS' HOME TOWN IN RELATION TO DENTAL SCHOOL

	Per Cent (941)
In same city	43
In same province	33
In different province	24
Total	100

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963.

TABLE 5–12

PER CENT OF THE POPULATION AGED 15–19 IN SCHOOL, RURAL AND URBAN, CANADA, 1951[1]

Age	Total	Rural			Urban
		Total	Farm	Non-Farm	
15	75.8	70.4	66.6	76.0	80.6
16	55.3	49.1	45.6	54.3	60.4
17	36.5	31.3	29.6	33.6	40.5
18	22.3	18.4	18.2	18.7	25.0
19	13.3	9.8	9.7	9.9	15.4

[1] The 1951 Census data are used here because only group data are available as yet for the 1961 census year. The 1961 data show that while there has been a general increase in the proportion of this age group attending school, the proportion of urban youth (60 per cent) aged 15–19 inclusive attending school is still greater than the proportion of rural youth (55 per cent), both farm (57 per cent) and non-farm (54 per cent), attending school. *Census of Canada*, 1961, "Schooling by Age Groups", Series 1.3–6, 29–10–63, Table 99, p. 1.

Source: Dominion Bureau of Statistics, *Statistical Review of Canadian Education*, Census of Canada 1951, Reference Paper No. 84, 1958.

In a recent attempt to attract more recruits from the rural and smaller communities, the Ontario Dental Association, with some assistance from the Guidance Department of Ontario Department of Education, carried out an active recruitment campaign among high school students in some communities in Eastern Ontario. The results and relative non-success of their campaign led the recruiters to question the quality and the level of education afforded to the high school students in these smaller communities.

> Students of the 11th, 12th and 13th grades with an average of over 70% were invited to banquets in their respective towns. The speaker [a visiting dentist] at these attempted to encourage these students to think in terms of higher education and pointed out the advantages of dentistry as a career – illustrated with coloured slides. In the Easter holidays those [43 students] who showed an interest in dentistry as a career were picked up and taken to Toronto by bus. They were billeted in homes of dentists in Toronto and shown through the dental faculty at a time when students were busily engaged in different departments. They were given a banquet at Hart House where entertainment and a speaker was provided. The following day they were returned to their homes and three prizes of $75, $50 and $25 were offered to the students who could write the best Essay on dentistry's contribution to the community.
>
> Two such projects have been carried out in rural Ontario and 12 students contacted have already registered in dentistry [only five have been accepted]. We have had some success... In almost all instances [of non-success] we find that it is a question of not being able to jump the hurdle of the 13th grade departmental examinations.
>
> A few examples might be quoted:
>
> (1) Student (A) Christmas Report – 78%
> 13th Grade Dept. exams – one failure
>
> (2) Student (B) Christmas Report – 73%
> 13th Grade Dept. exams – very poor showing
>
> (3) Student (C) Christmas Report – 92%
> 13th Grade Dept. exams – 72%
>
> (4) Student (D) Christmas Report – 76%
> 13th Grade Dept. exams – 60%
>
> (5) Student (E) Christmas Report – 70%
> 13th Grade Dept. exams – 60%[1]

The final section of the above quotation suggests the differential standards set by: a) the local school authorities (teacher, etc.) who set the Christmas examinations, and, b) the Department of Education authorities who are responsible for the Grade 13 examinations. Needless to say, it is one's standing on the latter set of examinations which determines eligibility for university entrance. This aspect of the problem of recruitment led the researchers to ask:

> Are the teaching standards in elementary and secondary schools of rural Ontario adequate to assure the academic standing of students desirous of entering university?
>
> Does the question of teachers' salaries and lack of specialists in

[1] MacGregor, *Rural Ontario and Its Health Problems, op. cit.*, pp. 5–6.

academic subjects in rural areas influence the 13th grade results?

Does the close contact between teacher, parent and board members in rural areas tend to result in more automatic promotion in rural areas than urban?

Are there fewer academically interested parents in rural areas and does this come to mean less motivation for higher education in the home?[1]

The analysis in this section suggests that to attract a higher proportion of recruits to dentistry from the rural areas a higher proportion of the rural youth will have to remain on in school and, if one accepts the implications arising out of the rural recruitment scheme noted above, higher standards of teaching and scholarship will have to be introduced into the rural and small town school systems. These should result in a higher proportion of students eligible for university entrance and hence eligible recruits for dentistry.

WHEN THE DECISION IS MADE TO ENTER DENTISTRY

Although a great deal has been written about it not too much is known about the importance for recruitment of the age when the decision to enter a particular occupation has been made. One of the major problems in understanding the decision-making process and the age factor is that most of the data available are retrospective and the final decision may be viewed in retrospect as a long-time choice rather than, as may be the case, only one of many alternatives held at an earlier period. It is also unlikely that an early choice, made while at elementary school for instance, is never questioned or challenged by other choices and alternatives as the chooser progresses through high school and college.

There are certain early decisions however, which must be made, either consciously or unconsciously, by the would-be recruit to the professions. The prospective dentist has to remain on in school beyond the minimum school-leaving age; the academic (college preparatory) rather than the vocational course has to be followed and the science rather than the arts programme selected. The first of these decisions is made in Canada at either age 15 or 16, depending upon the province, when most students are in their second or third year of high school; the second is usually made a little earlier, when the student is 14 or 15, that is, in the first or second year of high school; the third decision is not as important as either of the other two, since, if university entrance requirements have been met, any deficiencies in academic background can be made up in the pre-dental year(s) if necessary.

The data contained in Tables 5–13 to 5–17 are all concerned with the point in time when the decision was made to become a dentist as reported by those students presently studying in the Canadian dental schools.

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[1] *Ibid.*, p. 9.

The decision appears to have been made earliest – that is, while still in high school – by those from the big cities (Table 5–13), by those whose home town contained a dental school (Table 5–14), by those whose high school and undergraduate marks were comparatively low (Tables 5–15 and 5–16), and by those whose fathers' incomes were in the middle range (Table 5–17).

TABLE 5–13

TIME OF DECISION TO ENTER DENTISTRY AND SIZE OF HOME TOWN

Time of Decision	Size of Home Town			Total (941)
	Under 10,000 (250)	10,000–99,999 (199)	100,000 and Over (481)	
	%	%	%	%
Before High School .	6	7.5	7	7
Early High School ..	9	11.5	13	12
Late High School ...	29	31.0	38	35
In College	41	35.5	30	34
After College	14	12.5	11	12
No Information	–	1.5	1	1
Total	99	99.5	100	101

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963.

TABLE 5–14

TIME OF DECISION TO ENTER DENTISTRY AND LOCATION OF DENTAL SCHOOL

Time of Decision	Lives in Same City as Dental School (402)	Lives in Same Province as Dental School (301)	Lives in Different Province (223)	Total (941)
	%	%	%	%
Before High School	8	6	6	7
Early High School	13	8	14	12
Late High School	37	36.5	27	35
College	30	36.5	39	34
After College	12	13	13.5	12
No Information	1	1	–	1
Total	101	101	99.5	101

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963.

TABLE 5–15

TIME OF DECISION TO ENTER DENTISTRY AND HIGH SCHOOL MARKS

Time of Decision	High School Marks			
	75% and Over (295)	66–74% (488)	60–65% (140)	50–59% (8)
	%	%	%	No.
Before High School	7	7	6	(1)
Early High School	14	11	9	(1)
Late High School	27	39	42	(1)
In College	39	33	29	(4)
After College	14	10	14	(1)
Total	101	100	100	(8)

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963.

TABLE 5–16

TIME OF DECISION TO ENTER DENTISTRY AND UNDERGRADUATE MARKS

Time of Decision	Undergraduate Marks			
	75% and Over (135)	66–74% (455)	60–65% (281)	50–59% (39)
	%	%	%	%
Before High School	5	6	10	5
Early High School	7	12	13	16
Late High School	24	30	44.5	57
In College	47	37	27	16
After College	15.5	14	6	6
Total	99.5	99	100.5	99

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963.

Canadian high school students in the larger cities have greater access to vocational guidance teachers and officers and contact with dentists, consequently they probably know more about the available opportunities in the various professions. Thus, they are more able to make a realistic decision regarding their future career. If they live in a university town they are even more likely to have knowledge, from both formal and informal sources, about the university courses and the careers which they lead to.

In a recent study of 582 boys "in college preparatory courses in seven New Jersey high schools" Lefcowitz and Irelan noted that as a possible career:

> ...dentistry fares well among boys who, whatever their innate ability, are formally classified as low school achievers. Why is this true? One possibility is that we are observing the results of upward social aspirations on the part of boys who have some doubts of their own abilities. Dentistry's high status may be appealing to ambition while a belief that it is less demanding of the individual makes it seem a more accessible occupation than such a supposedly exacting field as medicine.
>
> If this is a correct interpretation of the situation, then the association between ability and relative interest in dentistry would probably be stronger in the senior than in the junior year. Seniors, facing the imminent necessity for taking at least the first step in securing a job and/or training for it, would be more realistic about the choices open to them.
>
> The data reported ... support this idea. Relative interest in dentistry is greatest among low ability seniors ... than for any other category of students.[1]

TABLE 5–17

TIME OF DECISION TO ENTER DENTISTRY AND FATHER'S INCOME

Time of Decision	Income							
	Under $4,000 (204)	4,000–6,000 (249)	6,000–8,000 (151)	8,000–10,000 (108)	10,000–15,000 (104)	15,000–20,000 (46)	20,000 and Over (32)	No Information (47)
	%	%	%	%	%	%	%	%
Before High School	6	6	2	9	12	13	3	6
Early High School	6	11	18	12	17	11	3	8.5
Late High School	36	38	39	35	30	26	31	21
In College	33	33	32	36	30	48	53	23
After College	18	12	9	6	11	2	9	32
No Information	2	–	–	1	–	–	–	8.5
Total	101	100	100	99	100	100	99	99

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963.

[1] Lefcowitz, Myron J., and Irelan, Lola M., *Interest in Dentistry: A Pilot Study of High School Students*, Social Studies Branch, Division of Dental Public Health and Resources, Public Health Service, U.S. Department of Health, Education, and Welfare, Washington, D.C. n.d. (mimeo.), pp. 7–8.

The data in Table 5–15, showing the early decision of the low high school achievers, tend to support Lefcowitz and Irelan's findings. It may well be that the motivation engendered by this early commitment to dentistry enabled the students concerned to persevere despite such relatively unpromising high school grades (65 per cent and below). The same may be assumed to be the case of those who had a poor academic record in their pre-dental years (Table 5–16), 56 per cent of whom made an early choice compared to only 24 per cent of the high achievers at university who had made a similarly early choice.

The dental students who come from the highest and the lowest income groups (Table 5–17) tended to make their decision to enter dentistry at a later point in their academic career than did the others. The dental students from the poorer families were probably unable to make any realistic decision because of the financial commitment involved whereas the richer students were probably more able to delay making their occupational decisions because of the wider range of alternatives open to them (cf. pp. 120 – 125).

Lefcowitz and Irelan commenting upon the manner in which socio-economic status of the family affected the high school students' attitudes towards dentistry as a possible future career said:

> In general, boys with low social positions compared with middle and high status students are less interested in the two health professions ... only the high ability seniors, of whom there are only a few, express a great deal of interest in a health career. Lacking personal or family financial resources, these low status boys may be expressing a realistic appraisal of their chances for pursuing the extended training necessary to a career in dentistry or medicine. This realism is tempered by those with high ability who can consider the possibility of scholarships or the like.
>
> Therefore, it seems reasonable to suggest that high motivation ... has, by the senior year, selected out the lower status boys who want to go as far as they can – and therefore prefer the generally more prestigious occupation of medicine.
>
> For middle and high status boys the pattern is different. For both of these categories low ability seniors express the largest relative interest in dentistry ... In general this pattern results from considerably lesser interest in medicine among these students as compared with other middle and high status respondents. These sons of fairly well-off fathers can probably expect at least some financial support from their families. Approaching the point at which an occupational decision has to be made, these lower ability boys lower their aspirations vis-à-vis medicine, but maintain and even increase, as in the case of middle status students ... their interest in dentistry.[1]

[1] Lefcowitz and Irelan, *ibid.*, pp. 8–9.

OTHER FACTORS AFFECTING RECRUITMENT

PRESTIGE OF THE OCCUPATION

The prestige of an occupation has long been known to be a major element in inducing or deterring recruits. While it is true that the professions in general are considered to be high status occupations there is a rank order within this category of occupations which appears to be based upon the prestige as reflected in the public image of the occupation. This image which potential recruits and their families have of the profession does not have to correspond to the reality of the situation but since it colours their attitudes it has a direct bearing upon recruitment.

Numerous studies have attempted to rank occupations by the prestige accorded to them and international comparisons of occupational rankings have also been carried out. In most of these studies the independent fee-taking professions, law, medicine and dentistry, have tented to rank near the top. In part, as Caplow points out, the prestige accorded these professions is due to the "popular belief that self-employment is superior to employment by others",[1] their advantageous position being based upon their "freedom" and in many instances their pecuniary rewards.[2]

More and Kohn in a study of 3,578 students entering dental schools in the United States in 1958 noted the importance of prestige of the profession as a factor in the recruitment of these students.[3] Eighty per cent of the students checked the prestige of the profession as one reason for their choice. A number of elements were combined in this prestige rating and were generally closely associated with their reasons for entering the profession, viz., the autonomy of the dentist, the monetary rewards of the occupation, the opportunity to provide a service for others, and the manual dexterity involved in dental practice.

This group of dental recruits while granting dentistry a high rank on a prestige of occupations scale placed their profession "lower" than medicine but "higher" than law. The high school students in the Lefcowitz and Irelan study also placed dentistry "lower" than medicine but considered it a realistic alternative if their plans to enter medicine did not materialize.[4]

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[1] Caplow, *op. cit.*, p. 46.

[2] *Ibid.* Caplow commenting upon the disproportionate rewards accorded to physicians mentions that a recent study by Professor Oswald Hall has indicated "that a highly coercive system of promotion and status-fixing operates in many corners of the medical system" and that the rewards are related more to "the monopoly position of their occupational organizations than with individual independence", p. 46.

[3] More, Douglas M., and Kohn, Nathan Jr., *op. cit.*

[4] Lefcowitz and Irelan, *op. cit.*

It should be noted however, that the North-Hatt study of occupational status found that law and dentistry received equal rating in the eyes of the general public, thus placing dentistry in a comparatively strong competitive position.[1] But dentistry is not only in competition for able recruits with medicine and law. It is also in competition with most other professions and with the large and rapidly expanding number of new and highly publicized scientific and technological occupations (e.g., occupations engaged in space technology and research). As the prestige of these newer fields is rising rapidly dentistry's competitive position as based on prestige is constantly being threatened.

AUTONOMY

The opportunity to be one's "own boss" appears to be a very important ingredient in the dental student's choice of dentistry as a career. Research findings on this point are quite consistent. Eighty per cent of the More and Kohn's respondents checked this item as being an important reason why they were entering dental school; 61 per cent of the 1958–59 applicants to dental schools in the United States gave it as a reason;[2] one in three of the present body of dental students in Canada reported it as a reason why they entered dentistry;[3] and, one in five of practising dentists in Canada cited it as the "reason for encouraging suitable young people to consider dentistry as a career".[4]

Hence, the great traditional importance placed on "individual autonomy", "independence", and "being one's own boss" by the present body of dentists and dental students in Canada should be borne in mind – in recruitment terms – if any changes in the structure and organization of dental practice are planned.

INCOME

The level of income which may be expected is an important consideration to anyone – and his family – contemplating entry into an occupation for which a lengthy and expensive education and training is necessary. The relative importance of "expected income" as an inducement or deterrent to recruitment is difficult to assess but, in general among the professions, those with the highest prestige tend also to be those with the highest monetary rewards.

In the recruitment study conducted by the C.D.A. conflicting reports regarding the adequacy of the dentists' incomes were received from the respondents and one-third (34.3 per cent) of those who would encourage "suitable young people to

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[1] North, Cecil C., and Hatt, Paul K., "Jobs and Occupations: A Popular Evaluation", *Opinion News*, September 1947, pp. 3–13.

[2] Mann, William R., "Dental Education", Hollingshead (Ed.), *op. cit.*, p. 268.

[3] Canadian Dental Association, *Survey of Dental Students*, *op. cit.*

[4] National Recruitment Committee of the Canadian Dental Association, *Recruitment Reporter*, Toronto, vol. 1, No. 6, Dec. 18, 1961, p. 3.

TABLE 5–18

AVERAGE INCOME OF CANADIAN TAXPAYERS BY OCCUPATION AND RANK OF DENTISTS' INCOME, 1948–1959

Year	Doctors and Surgeons	Independent Engineers and Architects	Lawyers and Notaries	Dentists	Accountants	Other Professionals	Dentists' Rank
1948	8,274	7,455	8,309	5,395	–[1]	4,171	(4)[1]
1949	9,009	10,428	9,533	5,748	–[1]	4,888	(4)[1]
1950	9,881	10,955	9,641	6,202	–[1]	4,311	(4)[1]
1951	9,975	9,628	10,214	6,287	8,171	4,225	5
1952	10,522	12,266	9,222	7,112	8,026	4,197	5
1953	11,258	10,289	9,955	7,485	8,096	4,580	5
1954	11,891	12,059	11,925	7,896	8,672	4,900	5
1955	12,166	14,007	12,243	8,554	9,315	5,411	5
1956	13,053	13,640	12,617	9,230	9,940	5,729	5
1957	13,978	14,581	13,244	10,234	10,879	5,711	5
1958	15,264	14,260	13,163	10,662	10,627	6,281	4
1959	15,737	14,983	14,123	11,605	11,033	6,476	4

[1] Accountants not separated.

Source: Department of National Revenue, *Taxation Statistics*, 1950–1961.

consider dentistry as a career" would do so on the basis that there is a "good income" in dentistry. On the other hand, 41.5 per cent of those who would not encourage the young to enter dentistry would not do so because of the "inadequate income".[1]

Dentists in private practice in Canada were the fourth highest income earners in 1958 and 1959 (Tables 5–18 and 5–19) following doctors and surgeons, independent engineers and architects, and lawyers and notaries. While they have not always maintained this fourth position, since 1948 they have never dropped below fifth place. In the United Kingdom among the professions, dentists in 1955–56 ranked third in mean incomes and second only to medical consultants in median incomes (Table 5–20); similarly comparative figures for the United States show the independent dentist (sole proprietor) to be in an equally favourable position (Table 5–21). In addition to this, 50 per cent of the independent dentists in Canada in 1959 earned more than $10,000 per annum whereas only three per cent of all taxpayers in Canada fell into this category (Table 5–22).

TABLE 5–19

AVERAGE INCOMES OF CANADIAN TAXPAYERS BY OCCUPATION, 1959, AND PER CENT INCREASE OVER AVERAGE INCOMES OF 1958

Occupation	Average Income 1959	Increase over Average Income 1958
	$	%
Physicians and surgeons	15,737	3.10
Engineers and architects	14,983	5.07
Lawyers and notaries	14,123	7.29
Dentists	11,605	8.84
Accountants	11,033	3.82
Other self-employed professionals	6,476	3.65
All others	4,037	2.62

Source: *J. Canad. D.A.*, Vol. 27, No. 12, December 1961, Table 1, p. 797.

If level of income expected has any effect upon recruitment to a profession, then dentistry is in a singularly favourable position in Canada.

There is, however, one modifying factor in this highly favourable picture of the dentists' earning power. That is, the marked fall in income with increasing age. The data contained in Table 5–23 illustrate this phenomenon for independent dentists in Canada and the United States. (Little information is available on the income of salaried dentists in the various countries because, in general, they are few in number. While they earn less in their younger years their pattern of earning is unlikely to follow that of the independent practitioners. Their income is likely to rise with increasing age and seniority and the taking on of additional adminis-

[1] *Ibid.*, pp. 3–5.

trative duties.) The position in the United Kingdom is similar and an editorial writer summed it up thus:

> The [Pilkington Commission] report showed, on the basis of its survey for 1955–56, that until they were about 40 years old dentists in general practice could earn more, in most cases substantially more, than members of any other profession surveyed by the commission. But from the age of about 45–50 dentists' earnings fell off quite sharply, so that their total career earnings over the age-span 30–65 were only £79,000 – the same as those of general medical practitioners, but less than those of consultants, actuaries, barristers, English solicitors, and graduates in industry.[1]

This aspect of the dentist's earning capacity may have some impact upon recruitment because at that point when a youth is considering dentistry as a possible career his dentist-father or the family dentist from whom he seeks advice may well have moved into this low-income phase of his dental career.

TABLE 5–20

RANK OF PROFESSIONS ACCORDING TO AVERAGE INCOME, GREAT BRITAIN, 1955–56

Occupation	Rank	
	By Mean Income	By Median Income
Medical		
General Medical Practitioners	5	3
Consultants	1	1
Senior Hospital Medical Officers	7	5
Dental		
General Dental Practitioners	3	2
Others		
Accountants	8	8
Actuaries	2	4
Barristers	6	10
Solicitors	4	6
Architects	13	13
Surveyors	9	12
Engineers	12	11
University Teachers	11	7
Graduates in Industry	10	9

Source: *Royal Commission on Doctors' and Dentists' Remuneration 1957–60 Report*, London, H.M.S.O., Cmnd. 939, p. 44.

[1] *The Economist*, London, Vol. 194: 981, March 12, 1960.

TABLE 5–21

NUMBER OF BUSINESSES, NET PROFIT, AND MEAN NET PROFIT, U.S.A., 1958–59

Industrial Group	Businesses with Net Profit		
	Number of Businesses	Net Profit (000's)	Mean Net Profit[1]
		$	$
Offices of physicians and surgeons ..	128,695	2,233,257	17,353
Engineering and architectural services	29,100	192,699	6,622
Legal services	106,944	771,345	7,213
Offices of dentists and dental surgeons[2]	78,943	878,537	11,129
Accounting, auditing, and bookkeeping services	78,356	307,841	3,929

[1] This column does not appear in the original table.

[2] U.S. data are broken down according to whether the business is a sole proprietorship, a partnership or a corporation. Dental services are listed separately only under sole proprietorships.

Source: Statistics of Income 1958–59, *United States Business Tax Returns*, U.S. Internal Revenue Service, USGPO Washington, July 1958 – June 1959.

TABLE 5–22

PERCENTAGE DISTRIBUTION OF DENTISTS AND OF ALL TAXPAYERS, BY INCOME CLASS, 1959

Income Class	Per Cent		Cumulative Per Cent	
	Dentists	All Taxpayers	Dentists	All Taxpayers
Under $2,000	2.3	15.6	2.3	15.6
$2,000 – 3,000	2.9	20.9	5.2	36.5
$3,000 – 4,000	2.3	23.8	7.5	60.3
$4,000 – 5,000	5.7	17.9	13.2	78.2
$5,000 – 6,000	8.0	9.3	21.2	87.5
$6,000 – 7,000	5.6	4.6	26.8	92.1
$7,000 – 8,000	4.9	2.5	31.7	94.6
$8,000 – 9,000	7.8	1.4	39.5	96.0
$9,000 – 10,000	6.3	0.9	45.8	96.9
$10,000 – 15,000	28.9	1.9	74.7	98.8
$15,000 – 20,000	16.4	0.5	91.1	99.3
$20,000 – 25,000	5.2	0.3	96.3	99.6
$25,000 and over	3.7	0.4	100.0	100.0

Source: *J. Canad. D.A.*, Vol. 27, No. 12, December 1961, Table 2, p. 797.

TABLE 5–23

AVERAGE NET INCOME OF NON-SALARIED DENTISTS, BY AGE

Age	Income	
	Canada, 1958	U.S.A., 1958
	$	$
Under 25	2,639	–
25 – 29	8,506	6,371
30 – 34	12,167	13,085
35 – 39	12,098	16,366
40 – 44	11,666	16,333
45 – 49	12,044	15,124
50 – 54	10,701	15,275
55 – 59	9,888	13,585
60 – 64	7,526	12,198
65 – 69	6,515	9,316
70 – 74	4,912	7,371
75 and over	1,402	6,133

Source: Canadian Dental Association, *Survey of Dental Practice*, 1958, a booklet compiled from data contained in *J. Canad. D.A.*, Vol. 25, October, November and December, 1959, p. 5; Hollingshead, Byron S., (ed.), *Survey of Dentistry*, American Council on Education, Washington, D.C., 1961, Appendix Table B:11, p. 491.

SERVICE

The desire to work for people and the opportunity to be of service to others is a reason frequently given by dentists, dental students and applicants to dental schools to explain their liking for the profession. It is difficult to determine however, just how important this factor is in recruitment. One element is important however, that is, the auspices under which the dentists are able to provide this service! Whereas 80 per cent of the dental applicants in the United States study noted above had a desire to serve, 89 per cent wanted to serve in private practice – although 38 per cent did mention service on a hospital staff, 10 per cent in the public school system and 10 per cent in the public health field (they were permitted to give more than one preference).[1] In the C.D.A. study of dental students 31.1 per cent mentioned that they chose dentistry because of "a desire to work with people" but only 0.2 per cent of the respondents in the *Survey of Recent Graduates* were serving in a dental public health field.[2]

DESIRE TO WORK WITH HANDS

The desire to work with their hands is another frequently mentioned reason for selecting dentistry as a career, but like "service" it is difficult to determine

[1] Mann, *op. cit.*, p. 289.

[2] *Survey of Recent Graduates, op. cit.* Evidently dental students do not connect their desire "to work with people", with public health service. This does not, of course, contradict the fact that they like "to work with people".

the full importance of this factor for recruitment. Three out of five applicants to the United States dental schools gave "desire to work with hands" as a reason for choosing dentistry and almost two-thirds (Table 5–24) of the Canadian dental students gave it as a "reason" – twice as many of the dental students cited this reason as cited any other single reason. It should be noted however, that with the rapid strides being made in dental instrument technology (e.g., high-speed drills) and the increasing utilization of dental auxiliaries (assistants, hygienists, and technicians) and their services much of the purely mechanical hand work is being passed on by the dentists to the members of these other occupations. If this trend continues the dentist by passing on the more routine mechanical work will be able to employ his supervisory and diagnostic skills to better advantage, hence, reducing the importance of "hand work" to the professional. This does not mean to say however, that this factor will be any less important as a motivating force for recruitment, although its actual relevance in the occupation may be diminishing.

TABLE 5–24

REASONS WHY DENTAL STUDENTS CHOSE DENTISTRY, CANADA, 1961

Reason	Per Cent of all Answers (941)	Per Cent Giving Each Answer
Desire to work with hands	22.3	65.8
Interest in course	12.2	36.0
Desire to be own boss	11.7	34.7
Good future	11.5	34.0
Monetary advantages	11.3	33.3
Desire to work with people	10.6	31.1
Prestige	9.9	29.3
Security	3.5	10.2
Need for dentists	2.8	8.0
Good hours and working conditions	1.4	4.1
Second choice after medicine	1.3	3.7
Don't know	.2	.7
Other	1.3	3.7

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963.

COST OF SETTING UP A PRACTICE

It has been claimed that a major deterrent to possible recruits to dentistry is the high cost of setting up a practice *after* the dentist has just completed a long, hard and expensive university education. One authority claims that the recruit to dentistry:

> ...desirous of taking up dentistry is faced with a financial outlay of $10 to $12,000 to complete the course. He is then faced with another $7 to $10,000 to set up practice. In all, he may be $17,000 in debt before he earns any money and after he gets out of debt he must plan for his own retirement.[1]

[1] MacGregor, *Rural Ontario and Its Health Problems, op. cit.*, p. 12.

While the above statement was probably exaggerated to bring home a point in a forcible manner the new graduate entering private practice is actually faced with considerable expense for dental instruments, equipment, supplies, etc. (It was reported to the researcher by the Deans of the Dental Schools in Canada that some of the instruments purchased by the new graduate while he was a student will be of service in his new office; in part, it was felt that the higher costs for dentistry compared to medicine could be accounted for by the money spent on the purchase of dental instruments.)[1] The data in Table 5–25 refer to the expenditures of recent graduates and Table 5–26 shows the sources of their funds for the financing of their new practice.

TABLE 5–25

AVERAGE COST OF ESTABLISHING A PRACTICE AND PERCENTAGE OF RECENT GRADUATES REPORTING EXPENDITURES, BY SPECIFIED ITEMS

Item	Per Cent Reporting Expenditure		Average Cost	
	Of those reporting any expenditures	Of total respondents	Mean	Median
	%	%	$	$
Instruments	94.0	73.1	1,298	500
Supplies	90.0	70.1	1,376	714
Equipment	89.7	69.8	6,330	6,500
Furniture	81.5	63.4	450	300
Business equipment	82.3	64.0	377	250
Renovations	73.1	56.9	1,052	600
Other	27.3	21.3	866	350
			aggregate 11,749	9,214
Total	100.0	77.8		
			average 9,822	9,500

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963.

TABLE 5–26

RECENT GRADUATES AND METHODS OF FINANCING NEW PRACTICE

Method	Per Cent of all Respondents Mentioning	Per Cent of all Methods Mentioned
Purchased on Time Payment Offered by Seller	60.4	35.4
Borrowed Money from Bank	52.1	30.5
Borrowed Money from Relative or Friend	29.9	17.5
Used own Funds	24.1	14.1
Other	4.2	2.5

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963.

[1] Personal communications from the Deans of all the Canadian Dental Schools.

Three dental supply and equipment firms supplied the following estimates for the cost to the 1962 graduates who were setting up a non-specialist practice:

	Cost in Toronto	*Rural Ontario*	*Other Parts of Canada*
Firm A	$5,000 – 8,000	Approximately the same	Only shipping costs extra
Firm B	$7,000 – 9,000	" " "	" " " "

	Cost in Western Canada	*Western Rural Area*
Firm C	$12,000 – 15,000	Only freight cost extra

The letter from one of the firms is quoted at some lenth below since it describes in some detail the nature of the expenses faced by the new graduate:

> The approximate cost to last year's graduates was between twelve and fifteen thousand dollars. We have found that it is most essential and particularly so for a new graduate to have two operating rooms identical for his ease of operation and to help him to equalize the time problem that has to be met due to the fact that the young fellows are slower operators than a man who has been in practice for a while. Also a third room for future expansion must be considered due to the great need today for auxiliary personnel and the availability in the near future of Hygienists. Should a new graduate be fortunate to be able to get a Hygienist or an associate dentist to work with him, then we find that eighteen thousand dollars is a fairly accurate figure.
>
> We do not find that it is more expensive for a new dentist setting up in a rural area. His only additional cost is the small amount of freight from . . . to the destination of his new practice. This amount is negligible when you consider the savings that are normally made in most cases on lower rental expenses and personal expenses. In many cases, rental arrangements can be made that produce a considerable saving for the over-all yearly expense and as a rule the rural area offers a lower cost of living for the Dentist and his family.
>
> Our firm has an instalment plan, whereby the new graduate may spread this purchase over a period of three years with a minimum of down payment of 10 per cent. He may also arrange to finance his equipment, instruments and supplies on a Ritter finance plan or a C.A.C. investment plan. Either one of these can be spread over up to seven years or any number of years between to fit the new graduates' pocket book budget.
>
> All of the above mentioned plans are figured on 6% finance interest which is quite a low and favourable interest. It is also possible for the new graduate to include on a C.A.C. or Ritter contract his dental equipment, instruments, and supplies plus reception room furniture, business office furniture, plumbing and suite alterations if these would present a more favourable rental arrangement from a landlord.

These two arrangements also have a 10% down payment, but new graduates in most cases can start with little or no down payment if there is no history of a poor credit rating.

The costs to the new graduate of setting up a practice then are considerable whether one accepts the very conservative estimate of $5,000 or the high of $18,000 for a most up-to-date office after the design which the dental associations believe is in keeping with modern practice and the concept of dentistry as a team working together in an office.[1] Whether this factor has deterred anyone seriously considering dentistry from entering dental school is unknown.

TABLE 5–27

FACULTY OF OFFSPRING BY FATHER'S OCCUPATION

Faculty	Father's Occupation				
	Lawyers and Notaries[1] (112)	Pharmacists (65)	Physicians and Surgeons (194)	Engineers (203)	Dentists (57)
	%	%	%	%	%
Law	*74*	6	13	21	16
Pharmacy	3	*58*	4	2	5
Medicine	11	15	*54*	12	16
Engineering	5	8	9	*45*	25
Dentistry	3	3	7	4	*33*
Education	4	9	13	16	5
Total	100	99	100	100	100

[1] Includes Judges and Magistrates.

Source: Based on data supplied by Dominian Bureau of Statistics.

PERSONS INFLUENCING CHOICE OF CAREER

Family

Family tradition and father's occupation have long been known to have a direct effect upon the recruitment pattern in the professions. Numerous studies of self-recruitment have noted the degree to which certain professions are inherited.[2] But in Canada the level of self-recruitment in dentistry is low in comparison with other professions. That is, a smaller proportion of dentists' offsprings are attracted to their fathers' profession than other professionals' offsprings are attracted to their fathers' professions (Table 5–27). When viewed from the vantage point of a Dominion Bureau of Statistics sample of the whole student body the picture is much the same, that is,

[1] Wilson, *The Michigan Study, op. cit.*, pp. 55–56; *see also The Michigan Study*, Report of Committee Three: "Increasing the Efficiency of Dental Practice", pp. 157–168.

[2] See Hall, Oswald, "The Stages of a Medical Career", *American Journal of Sociology*, Vol. 53, Jan. 1948; Kalsall, R.K., "Self-Recruitment in Four Professions", Chapter II in D.V. Glass (ed.), *Social Mobility in Britain*, London, 1954.

Sample Size	
1,000	1 in 10 of the Medical Students had fathers who had studied Medicine
998	1 in 12 of the Law Students had fathers who had studied Law
496	1 in 12 of the Pharmacy Students had fathers who were Pharmacists
2,103	1 in 20 of the Engineering Students had fathers who were Engineers
500	1 in 25 of the Dental Students had fathers who were Dentists

In the Survey of Dental Students 5 per cent of them had fathers who were dentists (see Table 5–6), this figure is slightly higher than the D.B.S. survey sample. In a similar study in the United States, 7.5 per cent of the applicants to dental school had fathers who were dentists and 7.1 of the dental students' fathers were dentists. These figures for self-recruitment in dentistry are all below those of the other major professions.[1]

TABLE 5–28

PERSONS INFLUENCING DENTAL STUDENTS IN CANADA, 1961, AND APPLICANTS TO DENTAL SCHOOLS IN THE U.S.A., 1958–59, TO ENTER DENTISTRY

Person	Per Cent of Dental Students Mentioning Canada	Per Cent of Applicants Mentioning United States
Dentist	49.6	49
Parents or Relatives	39.3	–
Father	–	35
Mother	–	29
Other Relative	–	20
Self	32.8	75
Friends	12.1	–
Classmates in College	–	16
Classmates in High School	–	5
Guidance Counsellor	6.5	6
Physician	3.1	11
Others	.3	–
College Teacher	–	12
High School Teacher	–	9
Predental Adviser in College	–	8

Source: Canadian Dental Association, *Survey of Dental Students* (mimeo.), 1963; Hollingshead, Byron S., (ed.), *Survey of Dentistry*, American Council on Education, Washington, D.C., 1961, Table 87, p. 268.

[1] Mann, *op. cit.*, p. 286.

Dentists

The data in Table 5–28 show the persons reported to have influenced dental students in their choice of dentistry as a career, for both the United States and Canada. In each instance half of the students reported that a dentist or dentists had influenced them, but in the recruitment survey conducted by the Canadian Dental Association approximately one dentist in five would not encourage young people to enter dentistry.[1] Similarly, the McNair Committee reported:

> We were disturbed to learn from the Dental Board, the British Dental Association and many of the dental witnesses that the majority of dentists in general practice would be unwilling to advise any young person to make dentistry his career.[2]

This negative attitude on the part of the dentists themselves may account in part for the relatively low level of self-recruitment in the dental profession.

Guidance Counsellor

Guidance in the high schools does not appear to have played a very important role in the recruitment of dental students to date in either Canada or the United States, and one of the authors of the *Survey of Dentistry* says of this situation in the United States:

> Booklets, counselling services, aptitude tests, and career days appear to have had little effect, and every effort should be made to realize the full potential of these aids to recruitment.[3]

It must be borne in mind however that in Canada, at least, the Guidance Department in the high school with a fully qualified guidance officer is a relatively new departure, so that good liaison between the professional association, the local dental societies, the dentists and the guidance departments might bring about some change to improve the situation. One evening per year "career night" stints are not enough and they are likely to have little more impact than they have had to date, even with the advent of the qualified counsellor.[4]

SEX OF THE RECRUITS

In a previous chapter it was noted that the proportion of Canadian women who were dentists is very small in comparison to most European countries (cf. Chapter 3). Why are there so few women recruits to dentistry in Canada?

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1 *Recruitment Reporter, op. cit.*, p. 6.

2 McNair Committee, *op. cit.*, p. 11.

3 Mann, *op. cit.*, p. 269.

4 Hall, Oswald, and McFarlane, Bruce A., *Transition from School to Work*, Department of Labour, Ottawa: Queen's Printer, 1963, pp. 67–74.

Nell Snow Talbot has carried out extensive research on this problem in the United States and she reports the following:

> When asked to explain why so few women enter dentistry, more women dentists [one-third] mentioned lack of information and misapprehension concerning the study and practice of dentistry than any other reason ... Because there are so few women dentists, most girls never consider dentistry. If they think of it at all, they think of it as a man's profession. Many have the impression that dentistry is limited to technical performance or that it requires great physical strength. Respondents also believed that the length of time required to complete a dental education and the attendant expenses were chief deterrents. Parents usually cannot or will not spend so much money on the education of a daughter. If financial support is available and the girl is willing to devote a number of years to her education, she may look more favourably upon other professions because the mass media have glamourized them. Other respondents pointed out that the first interest of most girls is marriage, and that many girls believe that a professional education and a career will make marriage less likely. A few respondents suggested that other potent reasons are discouragement by dental colleges, opposition by male members of the profession, and prejudice on the part of the public. A small number mentioned technical requirements and the belief that girls lack digital skills.
>
> Not unexpectedly, respondents suggested that the most effective means of recruiting more women for dentistry would be to provide more information, not only to girls in college, but also to girls in the elementary and high schools, to high school and college counsellors, and to the public ... Only as the public becomes accustomed to women dentists will the number of young women entering the profession increase appreciably. Parents and sons, as well as daughters, need education on the subject.
>
> More than one-fourth of the responding women dental students reported that their parents had opposed their choice of dentistry as a profession ... Respondents pointed out that television, radio, magazines, and newspapers glamorize women physicians, but women dentists receive little attention in mass media.[1]

Little can be added to this excellent exposition of the problems surrounding the recruitment of women to the profession; while it was written of the United

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[1] Talbot, Nell Snow, "Women in Dentistry", Appendix C, Hollingshead, *op. cit.*, pp. 558–559. *See also* by the same author "Women in Dentistry: Why not more Women Dental Students?", *Journal of Dental Education*, March 1961.

States there is no reason to believe that it would not be applicable here in most if not all of its particulars.[1]

In this chapter those factors which appear to influence people to select one profession rather than another have been examined. In addition, the various characteristics of the dentists and the dental students have been analysed in an attempt to understand the process of recruitment as it pertains to the dental profession. It is hoped that the analysis from this vantage point will provide a basis for an expanded recruitment programme. The chapter which follows will look at the growing field of dental auxiliaries, their utilization by the dentists and the importance of their role.

1 A medical educator has suggested that women might help to augment this failing supply. He said, "If the number of women attending university does, in fact, increase, it may in the near future become a question of policy, for some medical schools, at least, to decide what proportion of women students they wish to admit. There have not yet been enough applicants to make this a serious question in any medical school, but as Canada grows more cosmopolitan and the European influence becomes stronger, it is my belief that a larger proportion of university women will be drawn into medical schools and ultimately into the practice of medicine". Stevenson, L.G., in Dunton and Patterson (Eds.), *op. cit.*, p. 77.

CHAPTER 6

DENTAL AUXILIARIES

The dentists in the course of their practice are directly assisted by a number of workers in ancillary fields. This is not surprising because as the Guillebaud report sees it:[1]

> When there is a shortage of trained manpower in any field of professional work, it is a well established practice to seek some means of developing the simpler duties to ancillary workers who can ease the burden on the professional man.

Most professions have followed this path and in many fields, particularly in the applied sciences, e.g., engineering and medicine, a wide variety of supporting occupations, especially technicians (laboratory, radiology, electronic, engineering, etc.), have arisen to ease the burden on the professionals and permit them to go ahead with those duties and tasks requiring their full professional capacity and ability. In the United States and Canada studies which have been carried out attest to the advantages, productive and financial, which accrue to the dentists who employ auxiliary personnel.[2]

It is difficult to determine when the first auxiliaries were employed by dentists in Canada. Kesel reports that in the United States:[3]

> The first dental assistants were men or boys, and in 1885, when Dr. Edmund Kell af New Orleans employed a young lady to assist him in his office, his colleagues were profoundly shocked. Although the reaction to Dr. Kell's innovation was immediate and unfavorable, he continued to utilize the services of his female assistant, and it gradually became apparent that this arrangement was quite advantageous. Other dentists followed suit, and soon the presence of a

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[1] *Report of the Committee of Enquiry into the Cost of the National Health Service, op. cit.*

[2] Canadian Dental Association, The Relationship of Dental Auxiliaries to Increased Productivity and Income, *J. Canad. D.A.*, Vol. 27, Toronto, July 1961, pp. 446–448. Baird, K.M., D.D.S., Shillington, G.B., D.D.S., B.Sc., Protheroe, D.H., D.D.S., M.P.H., Pilot Study on the Advanced Training and Employment of Auxiliary Personnel in the Royal Canadian Dental Corps: Preliminary Report, *J. Canad. D.A.*, Vol. 28 No. 10, 1962, pp. 627–638. Kesel, R.G. in Hollingshead (ed.), *op. cit.*, pp. 151–153.

[3] Kesel, *ibid.*, p. 208.

> placard in the dentist's window announcing 'Lady in Attendance' shed an aura of gentility about the dental office that found wide public acceptance.

It would not be unreasonable to suppose that their use followed shortly after in Canada.

The dentists' supporting team in Canada is composed of three main types of auxiliary personnel, viz., the dental hygienist, the dental assistant, and the dental technician.[1] The first two of these three fields are, at present, feminine occupations whereas the third is primarily masculine although there are some female, usually European trained, dental technicians.[2]

The following sections will describe the education and training, and the duties of each of these auxiliaries. The education, training and duties of the three occupations will be treated separately, and a subsequent section will treat the impact of these three occupations on the dentists' productivity.

DENTAL HYGIENIST

The dental hygienist, a university educated and legally qualified person, is the most recent addition to the dental health team in Canada. In the United States the first dental hygienists were graduated in 1915 at the Fones Dental Clinic in Bridgeport, Conn., but the first class of Canadian-trained dental hygienists were not graduated until 1953, when five graduated from the University of Toronto. Since the inception of the two-year course in the academic year 1951–52, 89 dental hygienists have been graduated from the Course in Dental Hygiene, Faculty of Dentistry, University of Toronto and two other dental schools, at Dalhousie University and the University of Alberta, now have undergraduate classes in progress and expect to graduate their first classes in the spring of 1963 (Tables 6–1 and 6–2). While the other three dental schools in Canada have not yet begun to train them they all have the possibility under consideration, albeit at different stages of progress towards that end:[3]

> We have high hopes of establishing a programme in Dental Hygiene this Fall 1963 and we have everything ready to do so, except the appointment of a Director... We plan to accept 10 to 15 students annually in this programme which is being financed initially by a $50,000 grant from the W.K. Kellogg Foundation.
>
> Au sujet de votre question relative aux hygiénistes dentaires, la Faculté est en voie d'élaborer un programme d'études. L'acceptation

[1] The term Denturist has been adopted by some dental technicians.

[2] Dentists in the Armed Services of the United States and Canada do have men assisting them whose duties correspond roughly to those of the dental hygienist.

[3] Personal communications from the deans of the three dental schools. The University of Manitoba began training in the 1963–64 academic year.

officielle du projet n'a pas encore été agréé par les autorités de l'Université. Si un tel projet venait à se réaliser ce ne serait pas avant deux ou trois ans.

The Faculty does not presently train dental hygienists. It is expected that as soon as present limitations of space are lifted a programme designed to do so will be instituted. No estimate of a starting date could be made at this time.

TABLE 6-1

GRADUATES AND EXPECTED GRADUATES IN DENTAL HYGIENE, CANADA, 1951–52 TO 1962–63

Year of Graduation	Dalhousie[1]	Toronto	Alberta[1]	Total
Graduates				
1951–52	–	–	–	–
1952–53	–	5	–	5
1953–54	–	6	–	6
1954–55	–	8	–	8
1955–56	–	9	–	9
1956–57	–	8	–	8
1957–58	–	14	–	14
1958–59	–	9	–	9
1959–60	–	6	–	6
1960–61	–	8	–	8
1961–62	–	16	–	16
Total graduates	–	89	–	89
Expected graduates				
1962–63	5	38	19	62
Total (graduates and expected graduates)	5	127	19	151

[1] First class entered 1961–62.

Source: Canadian Dental Association.

TABLE 6-2

DENTAL HYGIENE ENROLMENT, CANADA, 1962–63

School	First Year	Second Year	Total
Dalhousie	12	5	17
Toronto	50[1]	38	88
Alberta	22[2]	19	41
Total	84	62	146

[1] One student has dropped out since year started.

[2] Two students have dropped out, bringing the total enrolment in first year to 81.

Source: Deans of Dental Schools.

The formal duties of the dental hygienists are wide and varied and covered by law. The actual duties which she performs are however, to a great extent determined by the needs and attitudes of her employers. The main duties carried out in a general dental practitioners office will probably be quite different to those carried out in a dental public health agency. Also some dentists will permit her to work up to the legal limits of her certification, others will tend to use her as a well educated clerk.[1]

In general, "the dental hygienist is concerned with the prevention of dental and oral disease through educational activities and through the provision of certain treatment procedures".[2] These duties may be subsumed under four general titles, viz., (i) professional-clinical service; (ii) technical-mechanical; (iii) clerical-administrative; and (iv) educational.

The professional-clinical service which she is permitted to perform is carefully governed by provincial legislation and is all supposed to be carried out under the supervision of a dentist. This service may include dental prophylaxis -- the scaling and polishing of the patient's teeth; the application of topical fluorides; and "taking of impressions of the mouth from which artificial dentures can be made".[3] In other words, the dental hygienist performs many of these dental operations which have become routine and fairly standardized. She may also act as a general chair-side assistant to the dentist during the performance of his duties.

The technical-mechanical aspects of her duties include exposing, processing, and mounting X-ray films and the carrying out of certain dental laboratory processes. The latter might include cementing and facing of pontics, and making minor adjustments to prosthetic appliances (although it seldom does, according to Canadian Dental Association officials).[4]

The dental hygienists' duties, categorized above as clerical-administrative, are those procedures of an office and business-financial nature which are designed to make the non-technical side of the dentist's office more efficient -- scheduling appointments, the recall of patients, bookkeeping, keeping office records, etc.

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[1] For further details see Oswald Hall, *Utilization of Dentists in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer *(in press)*.

[2] Canadian Dental Association, *Dental Hygiene: A Career for Women*, Toronto.

[3] Dunn, W.J., "Manpower in Dentistry – The Dental Hygienist", *J. Canad. D.A.*, Vol. 27, January 1961, p. 19.

[4] "Broadly speaking, Canadian dental hygienists are permitted to perform prophylaxes, apply topical fluorides, render first aid when required, take and develop radiographs, and act as dental health educators. In Manitoba, The Dental Association Act assented to on March 26, 1960 makes provision for an addition to the recognized procedures: 'taking of impressions of the mouth from which artificial dentures can be made, determining and recording the relationship of one jaw to another and repairing minor cracks in artificial dentures and replacement of broken or lost teeth in artificial dentures'." *Ibid.*

Her role as educator has two facets. On the one hand she is to teach the patient the proper care of teeth and in general make the patient more aware of good dental health practices. On the other hand her university education ostensibly equips her to educate the public at large (particularly in groups) on dental health problems; this role will probably become increasingly important as dental public health departments expand and the number of practising dental hygienists increases.

The extent to which the dental hygienist performs one or more or all of these duties depends, in the final analysis, upon the opportunities which the dentists, who employ her, provide. It will be seen as we examine the duties undertaken by the other auxiliaries that the hygienists' duties actually cross those of the other dental auxiliaries and even those of the dentist. In fact, she is now able by law to perform tasks which until a short time ago in Canada were restricted solely to the dentist.

The entrance qualifications for the courses in dental hygiene at the three Canadian universities -- the only places where girls can receive this training in Canada -- are similar to those required for entrance into the general pass degree courses. That is, the potential recruits must meet the general admission requirements of the universities and at Dalhousie University and the University of Alberta the admission requirements are identical with those required for entrance into the degree programme for Arts and Science. At the University of Toronto however, the admission requirements are:[1]

> Nine papers of the Ontario Grade XIII (or equivalent) chosen from prescribed groups, with at least 50 per cent in each paper. Although slightly higher than the eight-paper requirement for senior Matriculation, this is considerably below the 60 per cent average demanded for nearly all pass degree courses in this University, including General Arts.

It may be said that because of the entrance requirements at Dalhousie and Alberta their courses in dental hygiene are competing with all other faculties for that small group of able girls who have successfully graduated from high school. Whereas at the University of Toronto there *might* be a tendency for those not accepted in the regular programmes to be attracted to the course where they are eligible. For some time it appeared that there were not enough recruits for the course at Toronto and one authority in a panel discussion said as recently as September 1960:[2]

> The University of Toronto has a capacity of 50 students per class but unless there is a startlingly dramatic upsurge in applications the course of study will continue with classes far below the maximum.

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[1] Personal communication from the Dean.

[2] Dunn, W.J., *op. cit.*, p. 19.

Certainly the facts at that time led naturally to his statement -- only eight dental hygienists had graduated in the spring of 1960 and 16 had passed from the first year to the second year at the same time. The class which entered their first year shortly after the panel discussion however, contained 41 new students and the class entering first year one year later (1962–63) was filled to capacity with 50 students! At the present time the Dean of the Faculty of Dentistry is able to report:[1]

> There is no shortage of recruits. On the contrary, we were obliged to turn away a number of qualified applicants this year, although this was the first occasion.

The Dental Faculty at the University of Alberta which started its programme only two years ago has had no shortage of recruits and[2]

> Qualified candidates have been refused admission to the programme. The lack of facilities has not been the only reason the enrolment must be curtailed. The difficulty in obtaining staff and also the limited students' financial assistance has had some influence on the enrolment numbers.

On the other hand Dalhousie University reports a shortage of qualified recruits and states that "No qualified recruit has had to be turned down".

There are a number of factors which affect recruitment to any course at a university. One which seems to be important here is the geographical location of the school where the course is taken. In part, the location of the school determines the girls who are likely to consider the course. The residential distribution of the dental hygienists presently attending the three Canadian courses is shown in Table 6–3. The pattern seems to be similar to that of the dentists, that is, the University of Toronto acts as a provincial institution and 93 per cent of its students in dental hygiene come from Ontario. The University of Alberta attracts 14 per cent from outside the province, mainly from the adjoining province of Saskatchewan; and Dalhousie University, while attracting half of its students in dental hygiene from Nova Scotia, attracts students from each of the other three Atlantic Provinces -- distances between the major points in the Atlantic Provinces however, are small.

Girls recently graduated from high school who may be interested in following a career in dental hygiene but who do not live near a school (at least in the same province) may question the value of the course when it means leaving home with all the attendant expenses. If they do leave home to go to university, they and their parents may feel that they might as well spend an additional year away

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[1] Personal communication from the Dean.

[2] Personal communication from the Dean.

at university and obtain a B.A., B.Sc., or a B. Comm. degree, all of which carry some cachet in our society; in addition, they are not quite as narrow and vocationally orientated. (The latter point, of course, may carry considerable favour, for dental hygiene, with the parents.) That is, the social prestige or social acceptance of the Dental Hygiene Certificate or Diploma to the uninitiated may not be such as to act as an incentive for the potential recruit to forego the honours of a university degree in favour of a certificate. Hence, the narrow social acceptance of the certificate, and consequently, the occupation, in conjunction with the geographical distribution of the schools may well limit further recruitment to 'locals' for some time unless, of course, attractive bursaries and other financial incentives are introduced.

TABLE 6–3

RESIDENTIAL DISTRIBUTION OF DENTAL HYGIENISTS IN CANADIAN DENTAL SCHOOLS, 1962–63

Residence	Dental School			
	Dalhousie	Toronto	Alberta	Total
Newfoundland	1	–	–	1
Prince Edward Island	2	–	–	2
Nova Scotia	8	–	–	8
New Brunswick	4	–	–	4
Quebec	–	–	–	–
Ontario	2	82	1	85
Manitoba	–	–	–	–
Saskatchewan	–	4	5	9
Alberta	–	1	35	36
British Columbia	–	1	–	1
Canada	17	88	41	146

Source: Canadian Dental Association.

The Government of Alberta has already moved in that direction — this may account in part for the large number of qualified recruits — and students enrolled in the Dental Auxiliary (Alberta) course are eligible for the following assistance:

(a) subsistence allowance of $75 per month during the two academic years plus the same amount during any part of the summer months when attendance at classes or practical training is required. The charges for room and board — single room — are $75 per month at the University.

(b) Tuition fees for the two years of training. These amount to $324.50 per annum.

(c) Book allowance of approximately $25. Text books are estimated at $50.

The students will be expected to purchase and supply their own instrument kits and white uniforms at an estimated cost of $150–175. All of these benefits however, are only open to those students training under this plan who will be employed in the local health units of Alberta for a two-year period following graduation. Those students who wish to follow a career in fields aside from the public health service are enrolled at their own expense.

Another restriction on recruitment to dental hygiene are those regulations and the negative attitudes on the part of a sizeable proportion of the dental profession which limit recruitment to females. This is not formally true of the course at the University of Alberta but in their admission requirements they state: "The program of study is open to men and women but it is particularly suited to women".[1]

A number of arguments have been put forward by the proponents of this policy and the most important one –– to those opposing the introduction of male hygienists –– is that the male hygienist will be more difficult to control. W.J. Dunn in a paper which opposed this restrictionist policy stated the case of the 'women-only' group in these terms: [2]

> The male would be more likely to operate beyond the scope of his legal authority or locate in areas independent of the supervision of a dentist thus creating problems in enforcement of the Dentistry Acts.

Dr. Dunn claimed that "the enforcement of regulations would be much more easily accomplished than it is at present with our illegal practitioners, especially in view of the fact that such personnel [dental hygienists] have so much more to lose".[3] A similar stand has been taken by some dentists in the United States who claim that:[4]

> Since there is no scientific basis on which this opinion (more illegal practice by males) can be documented, the conclusion may be an erroneous assumption. This type of discrimination is one which the dental profession cannot afford to practise.

In the United States lawyers were consulted on this problem and were of the opinion that "a young man qualified educationally and morally" who made application to one of the schools and was refused could "have prompt recourse to the courts". The lawyers felt that most test cases, along these lines, had been used against legislation attempting to restrict women but "it is obvious that the test could be used conversely".[5]

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[1] University of Alberta, *Announcement, 1962–63*, Edmonton, p. 4.

[2] Dunn, *op. cit.*, p. 22.

[3] *Ibid.*

[4] Campbell, Ralph H., B.S., D.D.S., "To What Extent Should the Duties of Dental Auxiliaries be Expanded", *The Michigan Study, op. cit.*, p.77.

[5] *Ibid.*, pp. 77–78.

While all of this is true it is not likely that the young men will be willing to spend two years at the university level for a diploma when, for an extra year's study and attendance, they can obtain a university degree which opens up a wide range of occupations to them. So despite any change in legislation it is unlikely that recent high school male graduates will be attracted to the field any more than they are to nursing. There is one other group of men however, who those in the profession feel will be attracted to dental hygiene. These are the dentists qualified elsewhere whose qualifications are not recognized in Canada and who would have to attend a dental school for at least two years before they were eligible to sit for the licensure examinations. It is believed that they would have the requisite knowledge to pass the dental hygiene examinations, would apply to take them, pass them, then practise beyond the procedures considered legal for the dental hygienist. Dunn's statement above regarding the control of illegal practice is most applicable here.

The subject matter covered in the courses provided for the dental hygienists is wide and varied ranging through the social sciences, the humanities, the biological sciences, public speaking, commercial courses, and clinical and laboratory practice (Appendix 1). Members of the dental profession hope that these courses will equip the dental hygienist to take her place in the dental team alongside the dentist in much the same position that the registered nurse holds vis-à-vis the physician. Whether these highly educated dental hygienists as they increase in numbers will be willing to continue in this subservient position is unknown. Certainly the relationship between the physicians and the registered nurses has shown serious signs of strain of late, due, among other things, to the virtual lack of autonomy on the part of the nurses in the face of increasing educational, technical-clinical and administrative demands being made upon them.[1]

It might be well to ask at this point whether two years of concentrated study and training beyond senior matriculation and at the university level is needed for the limited type of duties which the dental hygienists are permitted to perform. This raises a number of possibilities, some of which follow:

1. to continue the two-year course at present, perhaps making it more clinical, and legally expanding the procedures which the dental hygienist may perform (cf., pp. 174–182);[2]
2. to extend the course for a year at the university, say to a B.Sc. (Dental Clinician) level, and expand her duties even further than in number 1 above; and,

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[1] Hughes, Everett C., Hughes, Helen MacGill, and Deutscher, Irwin, *Twenty Thousand Nurses Tell Their Story*, J.B. Lippincott Co., Philadelphia, 1958. Reismann, Leonard, and Rohrer, John, *Change and Dilemma in the Nursing Profession*, New York: G.P. Putnam's Sons, 1957.

[2] Dunn, *op. cit.*, p. 21.

3. to train the dental hygienists in a technical-vocational school or institute, either at the secondary or post-secondary school level, that is, immediately beyond junior matriculation, and permitting them to perform duties similar to those which they do at present. This course could be combined with a type of in-service training or "internship" in a dental health centre, a hospital dental services department or in a dentist's office. This would also minimize the present problems of geography which beset recruitment; that is, training could be carried out in any centre large enough to have a hospital, a technical-vocational school and some qualified dentists.

The first of the three possibilities of course, would require a minimum amount of rearrangement, because all that would be necessary would be to seek legal means of changing those procedures permitted to the hygienist and then make minor adjustments to the dental hygiene course curriculum. In the second instance above, major changes would have to take place, both in the nature of the training and the attitudes of the dental profession towards another type or class of practitioner in dentistry.

The third approach appears to be the most *efficient* method of training large numbers of dental hygienists within a reasonably short-time period. At the present time new facilities for technical and vocational education are being developed throughout Canada, spurred in no small measure by the support of the federal government which is providing 75 per cent of their cost. This heavy investment is designed in part to "catch" some of the high proportion of intelligent high school students who drop out of school before completing their course — approximately 60 per cent are "drop outs" in this sense. The I.Q.'s of those who drop out are very similar to those who continue and complete high school.[1] Hence, two sources of recruits might be tapped, viz., the present source of high school graduates plus many of the potential drop outs who may have the incentive to remain on to the junior matriculation level when the prospect of a dental hygienist's certificate has been presented to them.

DENTAL ASSISTANTS

Dental assistants are and have long been important members of the dental team and in 1962 it was estimated that there were approximately 4,700 working full time and 300 working on a part-time basis in Canada.

In general there are two basic types of dental assistants, categorized here by the nature of their primary duties in the dental office: (i) the secretary-receptionist; and (ii) the chair-side assistant. Neither of these two categories is

[1] Hall, Oswald, and McFarlane, Bruce, *op. cit.*, pp. 15–16.

mutually exclusive and most dental assistants combine the duties of both. It is only in the larger offices or clinics that the two as distinct occupational types may be found.

In a survey carried out in 1960 to determine the utilization of dental assistants by Canadian dentists, McCutcheon using a list of "27 random duties" had his respondents check those which were "part of their own every-day experience".[1] The results are listed in Table 6–4. The analysis of the data led the researcher to write:[2]

TABLE 6–4

DUTIES PERFORMED BY DENTAL ASSISTANTS IN CANADA

Clerical Duties	Per Cent Performing	Chairside Duties	Per Cent Performing
Greeting patients	97	Instrument sterilization	99
Tefephone answering	95	Seating patient	98
Arranging appointments	95	Care of instruments	97
Ordering supplies	94	General chairside assisting	96
Maintenance of office records	88	Minor cleaning	95
Laundry arrangements	87	Mixing amalgam	94
Operating recall system	84	Mixing cements	93
Billing	84	Preparation of bracket table	90
Typing letters	73	Preparation of operation room	85
Running messages	74	Passing instruments	83
Paying office bills	73	Preparation of impression materials	80
Banking	70	Minor laboratory procedures	68
Writing up charts	61	Major cleaning	39
		Bookkeeping	75

Source: McCutcheon, James, D.D.S., M.S.D.. "Manpower in Dentistry – The Dental Assistant", *J. Canad. D.A.*, Vol. 27, Jan. 1961, p. 11.

> It would seem that the definition of a dental assistant by McGehee, True and Inskipp is not so completely out of keeping with the facts when it is said that 'the only duties of the dentist are those which the assistant cannot, or is not allowed by law, to do'.

Since there are, in Canada at present, no facilities where the dental assistants –– the largest single proportion of dental auxiliaries –– may receive formal instruction on a full-time basis, outside of the Armed Forces, an attempt was made in the same survey to determine how the respondents had been trained for their

[1] McCutcheon, James, D.D.S., M.S.D., "Manpower in Dentistry –– The Dental Assistant", *J. Canad. D.A.*, Vol. 27, Januarv 1961, p. 10.

[2] *Ibid.*

job.[1] Over three-fifths had had no training whatever for the dental phase of their jobs outside of on-the-job training in a dental office. The others "had had some course or combination of courses for the dental assistant, dental nurse, dental hygienist, or registered nurse".[2] No mention is made of how they acquired those skills which take up a sizeable proportion of their time, i.e., the secretarial-administrative duties. It is not unlikely that many of them had had previous office experience or had received some training at a high school or business college. The educational background of the sample is shown in Table 6–5.[3]

TABLE 6–5

EDUCATIONAL BACKGROUND OF DENTAL ASSISTANTS, CANADA, 1960

	Per Cent (201)
Elementary school incomplete	5
Completed elementary school	20.5
Junior matriculation	48
Senior matriculation	20
Attended university	4.5
Others	2
Total	100.0

Source: McCutcheon, James, D.D.S., M.S.D., "Manpower in Dentistry – The Dental Assistant", *J. Canad. D.A.*, Vol. 27, Jan. 1961, p. 9.

In order to assist the dentists by providing them with trained dental assistants a number of the local dental societies in the larger urban areas have started evening classes to train them. A brief description of the membership of one of these classes, whose records were made available to the author by the organizers, follows.

The six-month course (October 9 to March 21) consisting of 42 lectures costs the students $75 and text-books are provided free by the dental society. An outline of the 1962–63 course is contained in Appendix 2. During the present course twelve dentists, specialists and general practitioners, and four dental assistants, are acting as instructors for the theoretical, clinical and day-to-day routine dental matters; and, a chartered accountant, a representative of the Bell Telephone Company, and two representatives from dental supply houses gave specialized instructions on accounting in dental practice, telephone usage, and the function and care of dental equipment respectively.

[1] The Royal Canadian Dental Corps has a four-week concentrated training programme for their dental assistants. Since the writing of this study three courses for dental assistants have been started. See Appendix 3.

[2] McCutcheon, James, *op. cit.*

[3] *Ibid.*, p. 9.

On the completion of the course the students write an examination and, if successful, certification is granted by the Royal College of Dental Surgeons of Ontario.[1] In the 1961–62 course 21 of the 26 girls who started the course received certification, the other five either failed their examinations or dropped out before completing the course.

Twenty of the 23 formal applicants for the present course were accepted, and one has since dropped out.[2] (Those not accepted "did not pass the screening" by the two dentists and the two dental assistants on the selection board. Qualification for entry was based on "the possibility that they would get jobs after the course".)

Over one-half of the students in the present course were working for dentists when the course began — a number for over five years — and within six weeks half of the remainder obtained jobs as dental assistants. The former group, it appears, were actually only seeking certification for skills which they already possessed.

The educational background of the group is comparatively high, three-fifths having obtained a junior matriculation or better (Table 6–6). Of particular interest is the fact that a number of the older students (from 35 to 44) were married, not working as dental assistants, and all taking the course to prepare themselves for re-entry into the work world now that their children had reached their teens (three of this group had their senior matriculation!). This category of women may provide an excellent source of able recruits in the future.

TABLE 6–6

EDUCATIONAL BACKGROUND AND AGE OF STUDENT DENTAL ASSISTANTS

Age	Number of High School Years Completed				Further Education	Total
	One or Less	Two/ Three	Four	Five		
Less than 20	–	1	3	–	–	4
20 – 24.....	–	–	3	–	–	3
25 – 29.....	–	3	1	–	–	4
30 – 34.....	1	–	1	1	–	3
35 – 39.....	–	1	–	–	1	2
40 – 44.....	1	–	1	–	1	3
Total.....	2	5	9	1	2	19

Source: Ottawa Dental Society, 1963.

[1] A practical examination was first held in 1963.

[2] There were 40 enquiries although only 23 application forms were completed.

While the foregoing may be a description of an atypical course it follows in general outline the data gathered in the McCutcheon study noted above and hence leads this researcher to believe that the membership in the courses in other cities probably resemble this group fairly closely.

It is noteworthy that no male dental assistants are employed in dental offices although the Royal Canadian Dental Corps trains and utilizes the services of both male and female dental assistants to good effect. Many of the women, all Royal Canadian Air Force personnel, eventually leave the service and, it is believed by the Dental Corps, find work in the offices of civilian dentists.

DENTAL TECHNICIANS

The dental technicians have a long history of work in association with the dentists. Originally of course, the dentist did all his own prosthetic and appliance work and many of the older dentists still do much of their own. It was as long ago as 1854 in the United States however, "that the idea of a 'central' dental laboratory (outside the dental office) was conceived" but it was not until 1887 that the "industry" was founded.[1]

The basic duties of a dental technician consist "of the extra-oral technical services involved in the fabrication of prostheses and appliances *on the basis of written prescriptions from the dentist*".[2] The dental technician then has taken over, or has had passed on to him, many of the technical duties formerly performed exclusively by the dentist, particularly that of dental appliance fabrication.

In this process a number of changes have taken place. Probably the first step was for the dentist to engage a technician to work in his office exclusively, then the dental technician opened his own workshop or laboratory and began to work for more than one dentist. The shift to the larger production unit with a more elaborate division of labour followed naturally in terms of efficiency and increased work. This separation of the two functions, professional and technical, has led to a serious problem of control for the profession, namely, that of controlling the activities of the dental technicians. The active concern which the profession has with 'illegal practice' on the part of the dental technicians attests to this lack of

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[1] Neilson, J.W., D.D.S., M.S., "Manpower in Dentistry – The Dental Technician", *J. Canad. D.A.*, Vol. 27, January 1961, pp. 15–16.

[2] *The Michigan Study, op. cit.*, p. 148, their italics.

control.[1] It is interesting to note that as the laboratories have grown in size there are two sources of control over illegal practice which assist the dental profession to see that the regulations of the Dentistry Act are complied with, viz., (i) the dental profession and (ii) the dental technicians' employers who are themselves dental technicians and who do not wish such adverse publicity. When the laboratory is on a small scale, for instance, a one-man operation, illegal practice appears to be difficult to uncover.[2]

Closely allied to the organizational changes which have developed in the milieu wherein the dental technician has worked is the change which has taken place in the occupation itself, that is, in the services which the dental technicians believe they can provide and which have to be passed by the provincial legislatures before they are actually permitted to provide some of them.

In many of the provinces dental technicians have attempted to obtain the right to deal directly with the public rather than solely working to a dentist's prescription. They have had this right at one time or another in three provinces although it is only in Alberta under the *Certified Dental Mechanics Act, 1961,* that the dental technicians have the right to make and fit dentures directly for the public. In 1959 in Saskatchewan they were granted the right to work directly for the public providing the patient produced a certificate of oral health but this right was taken away a year later. Similarly, in British Columbia, Division 10 of the General Regulation pursuant to the Dental Technicians' Act of 1960 granted certain dental technicians the right to work directly for the public (provided they had had 12 years of experience, 7 of which had been spent in illegal practice, that is, dealing directly with the public!). The Supreme Court of British Columbia subsequently declared Division 10 *ultra vires,* hence the dental technicians lost the right to deal directly with the public.

The exact number of dental technicians in Canada is difficult to determine because of the problem of determining who is a dental technician. In part, this comes about because of the nature of the various provincial organizations representing these men and their lack of a clear-cut mandate to represent the whole group; in part it is related to the changing nature of the industry itself. The number of small and one-man laboratories, while still predominant, is declining and the larger laboratories with their elaborate division of labour are on the increase.

The eight provincial associations of dental technicians in Canada — there are no associations in Newfoundland and Prince Edward Island — were contacted and asked for information regarding the numbers of members, qualifications for membership, etc. Only four of the associations replied, Quebec, Ontario, Saskatchewan, and Alberta.

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[1] Neilson, *op. cit.*, p. 14. *See also* pp. 105–106, this study.

[2] A number of dentists and dental technicians mentioned this aspect to the researcher.

The Association of Dental Technicians of the Province of Quebec, L'Association des Techniciens Dentaires de la Province de Québec, was founded in 1944 and presently has a membership of 360. There are, according to the Secretary, "about 40 dental technicians who practise for Dental Surgeons" who are not members of the Association but who "will have to become members of our Association according to the new amendments of the (Dental Technicians') Act". Another source lists 375 as being the number engaged in dental laboratory work in Quebec, excluding those who work in dental laboratories "operated as a subsidiary activity by dentists" (Table 6–7).[1]

TABLE 6–7

NUMBER OF DENTAL LABORATORY ESTABLISHMENTS AND NUMBER OF EMPLOYEES IN TECHNICAL AND SUPERVISORY POSTS, BY SEX AND PROVINCES, CANADA, 1960

Province	Establishments	Employees				Total Employees
		Supervisory and Office		Technical Employees		
		Male	Female	Male	Female	
Newfoundland	1					
Prince Edward Island	3	11	3	–	1	15
Nova Scotia	14	18	1	20	7	46
New Brunswick	14	14	–	6	3	23
Quebec	153	177	9	186	3	375
Ontario	158	206	30	371	98	705
Manitoba	29	42	6	65	20	133
Saskatchewan	18	23	3	35	3	64
Alberta	24	37	4	40	22	103
British Columbia	85	102	13	120	21	256
Canada	499	630	69	843	178	1,720

Source: Dominion Bureau of Statistics, "Scientific and Professional Equipment Manufacturers, 1960", *Annual Census of Manufacturers*, Ottawa: Queen's Printer, 1962, pp. 15 and 16.

The Governing Board of Dental Technicians of Ontario reports that there are "approximately 235" registered dental technicians in Ontario, that is, men who are legally qualified to set up a dental laboratory of their own. As in the case of Quebec, the figures differ somewhat from those in the table developed from the Dominion Bureau of Statistics' material.

The Secretary-Treasurer of the Province of Saskatchewan's Association reports that there are 54 registered dental technicians in Saskatchewan, none of whom are women, and 10 registered students, 2 of whom are women. Only

[1] Dominion Bureau of Statistics, "Scientific and Professional Manufacturers, 1960". *Annual Census of Manufacturers*, Catologue No. 47–206.

registered dental technicians may legally use the term "Dental Technician" or "Registered Dental Technician" to describe themselves in Saskatchewan. To qualify for registration a candidate must be 21 years of age, have worked for at least 4 years with a Dental Technician and have passed an examination conducted by the University of Saskatchewan. Eight of the registered dental technicians work alone or in firms where they are the only dental technician; 9 firms or partnerships employ 2 each; 5 firms employ 3 each; 1 firm has 4 dental technicians; and finally one large firm has 9 dental technicians in its employ (note: owners are included in the figure). The Saskatchewan data are also at variance with the tabular data.

The Secretary-Treasurer of the Alberta Society of Dental Technicians reports that their Association represents "20 out of 46 registered technicians in the province", all 46 of whom may legally operate their own dental laboratory. Here too the data differs from that in the table.

The confusion in number of dental technicians and registered dental technicians also arises because of the changed nature of the organization of the industry, that is, a number of the skilled technicians — of whom some are registered and some are not — may be working in a dental laboratory owned by one registered dental technician rather than on their own.

TABLE 6–8

NUMBER OF ESTABLISHMENTS AND NUMBER OF EMPLOYEES BY TYPE OF OWNERSHIP, DENTAL LABORATORIES, CANADA, 1960

Type of Ownership	Establishments Number	Employees Number	Mean Number of Employees
Individual ownership	404	851	2.1
Partnership	56	240	4.2
Incorporated company	39	629	16.0
Total	499	1,720	3.4

Source: Dominion Bureau of Statistics, "Scientific and Professional Equipment Manufacturers, 1960", *Annual Census of Manufacturers*, Ottawa: Queen's Printer, 1962, p. 17.

There is a wide range in the size of the establishments where the dental technicians are employed, ranging from the one-man establishments to some which employ 70 or more people (Table 6–8). In the course of the present research a number of laboratories of varying size were visited and the work organization and personnel of two of these, one large and one small, are described below. During these visits, particularly to the larger firms, the reason why there is a problem of definition for the dental technicians became clearer as did the reason why the growth in absolute numbers of registered dental technicians has not increased as rapidly as the industry itself.

LABORATORY NUMBER 1

This laboratory had ten workers including the two partners, both registered dental technicians.[1] They employed four "skilled technicians", one semi-skilled operative for repetitive work, two technician trainees including one girl, and one delivery boy. Five of the eight engaged in technical work are immigrants, the other three, including the partners are all Canadians and relatives. (The semi-skilled worker and the delivery boy are Canadian-born.) According to one of the partners all of his skilled technicians, if they wished to become registered dental technicians and hence open their own laboratories, could join an evening "Study Club". This experience plus their day-to-day work could fit them to write and pass the examinations set by the Governing Board of the Dental Technicians of Ontario. This laboratory was a little too small for any great degree of specialization although one or two of the four technicians were "gradually becoming specialists".

LABORATORY NUMBER 2

This is a very large dental laboratory with approximately 140 employees of whom 100 are on direct production, the remainder are primarily clerical-administrative except for 12 girls who drive the delivery cars. The occupational breakdown of those engaged in the technical branch of the organization follows:[2]

1 Owner (Registered Dental Technician)

14 Department Heads (4 Registered Dental Technicians)

12 Technicians (1 Registered Dental Technician)
- set-up men
- inlay men
- designers
- gold technicians
- ceramicists

44 Specialists

13 Trainees

4 Semi-skilled

12 Dispatch Group (Receiving and Planning Department)[3]

According to the owner, a registered dental technician, most of the department heads and skilled technicians in his employ could become registered dental technicians "quite easily if they were interested in opening up on their own" whereas the "specialists", all very highly trained on only one or two phases of

[1] That is, with provincial certification.

[2] The terminology is that used by the firm concerned.

[3] Only one of these is "highly trained". The Receiver and Router has to translate and breakdown the dentists' prescriptions into specific operations and then make up a "route card" which determines the personnel in the laboratory who work on the particular piece. He also determines the number of hours each operation should take and hence, to a certain extent determines the cost of the work. One of the others 'checks' the route card and determines the actual materials to be used, locates them, then sends on the 'pan' with the work. Three of this group are typists, who type out the dentists' prescriptions. Six are girls who receive and send out the packages from and to the dentist, in essence, packers, one is an 'office' boy. None of these except the Receiver and the Checker is likely to move beyond his or her present job.

the work "are unlikely to become R.D.T.s for reasons of efficiency and dollars and cents". That is, they have mastered certain operations and it makes for greater efficiency for the firm if they remain on these operations; for their own part they would have to take a sizeable cut in wages if they wanted to become "trainees" and prepare themselves for the dental technician status. Hence, a number of potential dental technicians (in the all-round sense) are channelled off into "specialist" areas rather than receiving the experience necessary for them to become registered dental technicians, their very skilfulness at certain operations limiting their chances of advancement.

Of particular importance to any manpower study is the source of the skilled craftsmen and recruits for the industry. In Laboratory Number 1 above, five of the eight technical personnel were immigrants, three of the skilled technicians and the two trainees. In Laboratory Number 2 "ninety per cent of those employed on the technical side are immigrants, about 10 per cent from the United Kingdom and the other 80 per cent from Europe". This ratio also extends to the trainees, *all* of whom are European-born! Noteworthy too is the important part played by women in the larger firms. In Laboratory Number 2, 15 of the 44 specialists were women, all European-born; five of the 13 trainees were women, all European-born; and, 2 of the 12 technicians were women, again European-born, one of whom was the only registered dental technician among this group.[1] The figures contained in Table 6–9 give the proportion of female employees engaged on the technical side in dental laboratories in Canada, the figures do not however include supervisory personnel, most of whom are men, hence the proportion of females is raised.

TABLE 6–9

PROPORTION OF MALE AND FEMALE TECHNICAL EMPLOYEES IN DENTAL LABORATORIES, CANADA AND PROVINCES, 1960

	Male	Female	Total	Total
			%	No.
Newfoundland	–	(1)		
Prince Edward Island	–	–		
Nova Scotia	74.0	26.0	100	27
New Brunswick	66.6	33.4	100	9
Quebec	98.5	1.5	100	189
Ontario	79.0	21.0	100	469
Manitoba	76.5	23.5	100	85
Saskatchewan	92.0	8.0	100	38
Alberta	65.0	35.0	100	62
British Columbia	85.0	15.0	100	141
Canada	82.5	17.5	100	1,020

Source: Dominion Bureau of Statistics, "Scientific and Professional Equipment Manufacturers, 1960", *Annual Census of Manufacturers*, Ottawa: Queen's Printer, 1962, p. 16.

[1] About 11 per cent of the full-time dental laboratory technicians in the United States of America are women according to Knudtzon, Kermit F., "Problems Related to Increased Training of Auxiliary Personnel", *The Michigan Study, op. cit.*, p. 104.

All of the registered dental technicians interviewed in Ontario, owners and employees, stressed the problem of recruitment and training. In order to find trained people the larger firms recruit overseas, and at the time of the visit to Laboratory Number 2 that firm had placed advertisements in German newspapers and one of their employees on a vacation visit there was empowered to hire "as many as he can get hold of".[1] The smaller firms too find that when they go on the open market for people the few trained people they find available "are nearly all Europeans". The same conditions apply when they attempt to find trainees. It was claimed that most native-born Canadians, male and female, with the amount of education deemed necessary for a trainee dental technician ("three or four years of high school" was the phrase usually used) were "not interested" and preferred to drive the delivery cars or take jobs as office boys if they were interested in employment in the industry at all. In Laboratory Number 2 the 12 girls driving the delivery cars were all Canadian-born. The wages for the unskilled beginners in the laboratory above range from $45–50 per week depending upon the age of the beginner.

Most of the dental technicians trained in Canada learned on-the-job by working with fully qualified technicians, and although the term apprenticeship was frequently encountered it is unlikely that their training was an apprenticeship in the more *formal* sense of the term.

In order to improve the quality of the training of the dental technicians, in view of the more elaborate work which they are being called upon to perform, a number of the provincial associations are making available part-time and evening classes in theory and practice for the dental technician trainees. These courses in conjunction with the apprenticeships may in the future also act so as to limit entry to the occupation.

In Ontario the Governing Board of the Dental Technicians of Ontario has "a fully equipped lab and starting this Fall [1963], will have courses to upgrade technicians in industry".[2] In Alberta, a new technical school opening soon in Edmonton "will have courses for the Dental Technicians training in theory and practical work".[3] The Secretary of the Quebec Association reports that:[4]

> To become a member, one has to fulfil all the requirements of the Pedagogic By-Laws [Appendix 4]. The course consists of 5 years of studies divided into two parts, theoretical and practical. The first part consists of lectures, etc., given in our classrooms in the evenings and the second part of practical work executed under the

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[1] They are also assisted by one of their suppliers of alloys who has extensive European contacts.

[2] Personal communication from the Secretary.

[3] Personal communication from the Secretary.

[4] Personal communication from the Secretary.

> supervision of a Certified Dental Technician. When the student has succeeded in his fifth year examination, he is eligible to become a member of our Association providing he is a Canadian Citizen. Until now, dental technicians who were working for dental surgeons were not obliged to be members of our Association, but in the very near future, only members and Registered Students will have the right to execute any phase of dental prosthetics.

While these evening and part-time study courses are being made available to the "apprentice" dental technicians, on-the-job training appears to be the type of training favoured by the occupation's leaders. It might well be that one or two strategically placed two-year full-time courses at technical-vocational schools with an additional in-service 'practical' year's experience (as a paid employee) would prove to be a more efficient supply system for training dental technicians. It might also add some uniformity to the training and in addition relieve the experienced dental technicians, who are not trained technical school teachers, for their regular duties.

TABLE 6–10

AVERAGE GROSS INCOME AND INDEX OF PRODUCTIVITY BY NUMBER OF EMPLOYEES, 1958

Number of Employees	Average Gross Income	Index of Productivity
0	$10,758	100
0.1 – 0.4	15,591	145
0.5 – 1.4	19,652	183
1.5 – 2.4	25,313	235
2.5 – 3.4	26,668	248
3.5 or more	27,028	251

Source: *J. Canad. D.A.*, Vol. 27, July 1961, Table 1, abridged.

PRODUCTIVITY

The previous section outlined in a general way the duties and the area of work in which each of three types of dental auxiliary personnel are able to contribute. Research has shown that there is a relationship between a dentist's productivity and his utilization of two of these types of dental auxiliaries (the dental hygienist and the dental assistant) if (i) gross or net income is used as a measure of productivity (Tables 6–10 and 6–11); or, if (ii) mean number of patients or mean number of patient visits are used as measures of productivity (Table 6–12).[1]

[1] Canadian Dental Association, "Survey of Dental Practice, 1958", *J. Canad. D.A.*, Oct., Nov., and Dec. 1959. *See also* Hollingshead (ed.), *The Survey of Dentistry, op. cit.; The Michigan Study, op. cit.;* Baird, K.M., *et al., op. cit.*

TABLE 6-11

AVERAGE NET INCOME, BY NUMBER OF EMPLOYEES, 1958

Number of Employees	Average Net Income
0	$ 6,096
0.1 – 0.4	9,560
0.5 – 1.4	10,302
1.5 – 2.4	13,236
2.5 – 3.4	14,056
3.5 or more	14,054
Average all dentists	10,453

Source: *J. Canad. D.A.*, Vol. 27, July 1961, Table 2, abridged.

TABLE 6-12

MEAN NUMBER OF PATIENTS AND MEAN NUMBER OF PATIENT VISITS BY NUMBER OF EMPLOYEES, U.S.A., 1962

Number of Employees		Mean Number of Patients	Mean Number of Patient Visits
Full Time	Part Time		
0	0	742	2,272
0	1	710	2,376
0	2	1,095	2,742
1	0	1,166	3,014
1	1	1,242	3,182
1	2	1,404	3,237
2	0	1,530	3,174
2	1	1,607	4,005
3	0	1,931	3,929

Source: *Proceedings of the Workshop on the Future Requirements of Dental Manpower and the Training and Utilization of Auxiliary Personnel*, The University of Michigan, W.K. Kellogg Foundation Institute, 1962, p. 161.

The data contained in the tables above clearly illustrate the impact that the utilization of dental auxiliaries has upon productivity whether measured in financial or human terms. The productivity of a dentist working with auxiliaries is considerably greater than the dentist who works alone hence his earning power is greater. Also, he is able to provide a much greater number of treatment services than the assistant-less dentist. For example, the dentist with between "2.5 and 3.4 employees" in 1958 had a mean net income of $14,056 and a productivity index of 248, that is, he earned about 2.3 times as much as and "he gave about two and half times as many treatment services as the dentist working without assistants".[1]

[1] "The Relationship of Dental Auxiliaries to Increased Productivity and Income", *J. Canad. D.A.*, *op. cit.*

This increase in productivity is even more clearly illustrated when a breakdown of the office equipment (i.e., number of dental chairs) and the number of auxiliary employees is made as in Table 6–13. In this instance, the peak productivity as represented by the highest mean net income was obtained by those dentists whose offices contained three dental chairs and who employed two assistants, one working as a chair-side assistant and one as a secretary-receptionist (the duties of these assistants are frequently interchangeable).

TABLE 6–13[1]

1958 MEAN INCOME – NUMBER OF CHAIRS AND EMPLOYEES

	Mean Gross Income	Mean Expense	Mean Net Income	Net as Per Cent of Gross
1 Chair, No Employees	$10,165	$ 3,929	$ 5,917	58.2
1 Chair, 1 Secretary or Receptionist	16,978	7,276	9,586	56.5
1 Chair, 1 Assistant	18,388	7,944	9,933	54.0
2 Chairs, No Employees	13,909	5,519	7,186	51.7
2 Chairs, 1 Secretary or Receptionist	22,728	10,085	11,782	51.8
2 Chairs, 1 Assistant	23,163	9,938	11,910	51.4
2 Chairs, 1 Assistant and 1 Secretary or Receptionist	26,717	12,075	13,514	50.6
2 Chairs, 2 Assistants	27,535	12,230	15,231	55.3
2 Chairs, 1 Technician and 1 or 2 of the following: Assistants, Secretaries or Receptionists	26,621	11,295	14,996	56.3
2 Chairs, 1 Hygienist and 1 or 2 of the following: Assistants, Secretaries or Receptionists	29,086	13,670	15,415	53.0
3 Chairs, 1 Assistant	28,485	12,622	15,003	52.7
3 Chairs, 2 of the following: Assistants, Secretaries or Receptionists	31,492	14,323	15,768	50.1
3 Chairs, 1 Hygienist and 1 or 2 of the following: Assistants, Secretaries or Receptionists	27,223	13,262	13,960	51.3
4 Chairs, 1 or more employees other than Dentists	40,876	28,975	11,907	29.1
4 Chairs, 1 Dentist and 1 or more other employees	...	...	...	...

[1] Private Practitioners only.

Source: Canadian Dental Association, *Survey of Dental Practice, 1958*, a booklet compiled from data contained in *J. Canad. D.A.*, Vol. 25, October, November and December, 1959.

TABLE 6–14

PERCENTAGE OF DENTISTS EMPLOYING NUMBER AND TYPE OF PERSONNEL[1]

Number and Type of Personnel	Unknown[2]	B.C.	Alta.	Sask.	Man.	Ont.	Que.	N.B.	N.S.	P.E.I.	Nfld.	Canada
No Employees..	15.4	2.9	5.1	8.7	3.8	11.6	27.6	21.6	24.6	45.5	4.2	12.9
One Assistant..	61.5	60.4	62.5	50.5	36.8	51.2	30.3	35.1	32.3	36.3	37.5	48.0
One Secretary...	7.7	12.2	7.7	16.5	22.6	14.7	19.4	27.0	23.1	18.2	41.7	15.8
One Assistant & One Secretary	–	7.9	4.7	6.8	10.4	5.7	4.7	5.4	3.1	–	–	5.8
Two Assistants	–	4.0	3.6	3.9	5.7	1.6	1.0	2.8	–	–	–	2.2
One Part-time Assistant....	–	7.2	8.2	9.7	14.2	8.5	7.7	5.4	9.2	–	4.2	8.3
One Technician & One Asst...	15.4	3.6	3.6	–	.9	3.6	5.0	2.7	3.1	–	8.3	3.6
Other	–	1.8	4.6	3.9	5.6	3.1	4.3	–	4.6	–	4.1	3.4
Total.....	100	100	100	100	100	100	100	100	100	100	100	100

[1] Private Practitioners only.

[2] No information as to province.

Source: Canadian Dental Association, *Survey of Dental Practice, 1958*, a booklet compiled from data contained in *J. Canad. D.A.*, Vol. 25, October, November and December, 1959.

Unfortunately, not all of the dentists utilize the services of the auxiliaries to this extent (Table 6–14). One dentist in eight in Canada in 1958 did not have the services of an assistant and two-thirds of all the dentists had only one assistant, either chair-side or secretarial. (It has been predicted that by 1975 in the United States only one dentist in 12 –8 per cent– will be working alone, less than half will have one employee, one in three dentists will have two employees, one in eight will have three, and three in every 100 dentists will have four or more employees. It has been estimated that this increase in the utilization of auxiliaries will raise the 1955 over-all production index of 183 to 225.)[1] It is not difficult to understand why dentists in Canada fail to utilize the services of the dental hygienists: there are so few of them, approximately one to every 70 dentists. In addition, their geographic distribution across the country acts as a further limiting factor (Table 6–15). The reasons for the dentists, resistance to and limited use of the other auxiliaries is not as clear. One of the reasons, of course, may be that the low salaries and conditions of work offered to potential recruits deters bright girls from coming forward. Dean McCutcheon's report pointed out some of the major grievances made by his respondents, all dental assistants working in 1959 in dentists' offices:[2]

[1] Hollingshead (ed.), *op. cit.*, p. 482.

[2] McCutcheon, *op. cit.*, pp. 10–11.

overtime work;

withholding salary for absence due to illness;

failure to provide meals when overtime work is required;

assignment of menial tasks ("We are glorified charwomen");

desire for a union ("Why take a course at this pay -- we need a union").

TABLE 6-15

GEOGRAPHICAL DISTRIBUTION OF DENTAL HYGIENISTS, 1962

Province	Number Practising
Newfoundland	0
Prince Edward Island	0
Nova Scotia	5
New Brunswick	0
Quebec	0
Ontario	58
Manitoba	1
Saskatchewan	7
Alberta	4
British Columbia	8
Canada	83

Source: *J. Canad. D.A.*, Vol. 28, July 1962.

He noted that the "starting weekly salary in present position" was $34.37 and the "present average weekly salary" was $49.28. These salaries were being offered at a time when the average wage for women in clerical positions of intermediate grade in Montreal, Toronto, Winnipeg and Vancouver was $55.03,[1] and the average wage in a common semi-skilled occupation (key-punch operator) was $60.35[2] Telephone operators in 1959 in the same cities earned a weekly average of $50.79[3].

The Royal Canadian Dental Corps, because of a shortage of dental officers, has carried out a number of pilot studies to determine how better and increased

[1] Tables 89, 90, 91, 92, "Wage and Salary Rates in Manufacturing", *Wage Rates, Salaries and Hours of Labour, 1959*, Economics and Research Branch, Department of Labour, Ottawa: Queen's Printer, 1959. Since only 4 large cities are used the weekly wage quoted above is probably inflated.

[2] *Working and Living Conditions in Canada*, Ottawa: Queen's Printer, 1962, Table 9, p. 34.

[3] *Wage Rates, Salaries and Hours of Labour, 1959, op. cit.*

usage of auxiliary personnel could improve the dental officers' productivity. Some of the major findings which they have reported to date confirm that the use of basic clinical technicians -- the Army equivalent of a civilian dental hygienist -- and a specially trained advanced clinical technician improved the efficiency of the dental office (Tables 6–16 and 6–17). They have been able to report that:[1]

TABLE 6–16

EQUIVALENT DENTAL OFFICER HOURS PERFORMED BY THE CLINICAL TECHNICIAN

Operation	Number	Equivalent Dental Officer Time Per Operation In Minutes[1]	Equivalent Dental Officer Hours
Prophylaxis	36	30	18.0
Radiographs	58	3	2.9
Multiple Amalgam Restorations	56	15	14.0
Single Amalgam Restorations	64	10	10.7
Synthetic Restorations	28	12	5.6
Temporary Cement Restorations	3	10	.5
Impressions	6	10	1.0
Total	251	–	52.7

Equivalent dental officer hours per duty day = $\frac{52.7}{13.5}$ = 3.9 hours[2]

[1] Time it would take for a dental officer to perform that operation or portion of the operation performed by the clinical technician.

[2] The Study was in progress for 13½ days.

Source: Baird, K.M., D.D.S., Shillington, G.B., D.D.S., B.Sc., and Protheroe, D.H., D.D.S., M.P.H., "Pilot Study on the Advanced Training and Employment of Auxiliary Personnel in the Royal Canadian Dental Corps: Preliminary Report", *J. Canad. D.A.*, Vol. 28, 1962, p. 632.

> The clinical technician (advanced) performed dental treatment equivalent to nearly four dental officer hours per 6½-hour working day, which means in effect that the dental officer-clinical technician team achieved 10½ dental officer hours in a 6½-hour day, an increase of 61.5 per cent,

and,

> The increase in productivity during the study period when evaluated by time points per duty day was 90.7 per cent over the previous

[1] Baird, *et al.*, *op. cit.*, p. 633.

quarter and 95.8 per cent over the 14 duty days immediately prior to the study.

Before examining the R.C.D.C. pilot study any closer a brief look will be taken at the personnel concerned, the basic clinical technician and the advanced clinical technician.

TABLE 6-17

A COMPARISON OF THE TIME POINTS VALUE OF DENTAL SERVICES BEFORE[1] AND DURING THE STUDY, R.C.D.C., 1962

Time Points per duty day during study	131.6
Time Points per duty day, 14 days prior to study	67.2
Time Points per duty day, previous quarter	69.0
Per cent increase over previous 14 days	95.8
Per cent increase over previous quarter	90.7

[1] Probably a more accurate evaluation or comparison of productivity before and during the study can be obtained by comparing the time points value of dental services performed. Time points are weighted values based on the average times required to complete the various dental operations and are used by the Royal Canadian Dental Corps to assess dental officer productivity. The increase in the productivity during the study period using these values was 95.8 per cent over the previous 14 days and 90.7 per cent over the previous quarter. In actual fact the increase in productivity may be greater than shown since a normal seven-and-a-half hour day was worked during the periods prior to the study compared to six-and-a-half hours during the study.

Source: Baird, K.M., D.D.S., Shillington, G.B., D.D.S., B.Sc., and Protheroe, D.H., D.D.S., M.P.H., "Pilot Study on the Advanced Training and Employment of Auxiliary Personnel in the Royal Canadian Dental Corps: Preliminary Report", *J. Canad. D.A.*, Vol. 28, 1962, p. 633.

There are 22 Dental Technicians (Clinical) -- to use their proper military trade title -- in the Armed Services, four of whom are women from the R.C.A.F. and 18 men from the R.C.D.C.[1] These basic clinical technicians all began their career as dental assistants, after having completed a 4-weeks training course. (The dental assistant is the basic trade for "other ranks" in the R.C.D.C.) After serving as dental assistant for sometime they were selected, on the basis of previous performance, to take the basic clinical technicians course which consists of the following:[2]

(a) a 24-week course which included a study of anatomy, dental anatomy, histology, embryology, bacteriology, physiology, first aid, pharmacology, dental pathology, dental radiology, oral hygiene, patient management and clinical practice;

[1] Figures as of June 1962.

[2] Baird, *et al.*, *op. cit.*, p. 630.

(b) a minimum of 30 months on-the-job training and experience; and,

(c) a further four-week course to round out their training and education.

The work carried out in the Armed Services by these personnel is considered by the R.C.D.C. to be similar to that carried out in civilian practice by the dental hygienists. It should be noted further that the minimum educational requirement to enlist in the Canadian Army, and hence be eligible for the dental technician (clinical) training, is "Grade 8, Ontario, or its equivalent", that is, successful completion of elementary school. In addition, the potential army recruit has to reach certain standards on the various aptitude tests and tests of ability which are administered at time of enlistment. The Canadian Army does, of course, attract many recruits other than those with the minimal educational qualifications.

The dental assistants selected by the R.C.D.C. to train as clinical technicians are those whose work as dental assistants and whose service record, aptitude and ability tests results, and general attitude warrant the opportunity to receive the extra training. Their work in the Corps is "concerned almost entirely with the preventative side" of the dental service supplied by the Corps, and in this their use has been highly successful.[1]

In part, their very success has led the R.C.D.C. to state:[2]

> The importance of dental health education and preventative dentistry in the Forces is fully recognized but the growing backlog of restorative treatment nevertheless remains a problem of major concern. As in civilian life, there has been a shortage of dental officers and it has not been possible to keep up with the increasing demand for treatment. It is true that our auxiliary personnel have been of great assistance in coping with the demand but they cannot be expected to reduce the pressing requirement for dental officers whose skills they can only augment. It was felt, however, that possibly the responsibilities of the auxiliaries could be extended to include procedures which would not only be beneficial in the preventative program but would contribute to the restorative program as well. In this way the dental officer would be relieved of certain of the more routine operations and would be free to devote more of his time to a side of the service which actually required his level of training, judgment and experience. Such time-consuming procedures would be delegated to an auxiliary with a lesser training but with a high level of technical skill along certain well-defined lines. It would be the first step toward establishing the validity of the concept of the dental health team in utilizing more fully the professional skills of the dentist.

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[1] *Ibid.*, p. 627.

[2] *Ibid.*, pp. 627–628.

The considerations noted in the quotation above have led the R.C.D.C., as an experiment, to train one of their basic clinical technicians ("an outstanding clinical technician") as an advanced clinical technician. This initial training was carried out on an informal basis with a view to developing a curriculum for the future training of more basic clinical technicians to this advanced level.

The procedures which it was felt could be delegated to the advanced clinical technician and for which he was trained are listed in Table 6–18. These were all assessed and selected on the basis that "the advanced procedures which could be delegated must be based on a purely mechanical approach to standard techniques which would be acceptable to the majority of patients".[1] This was deemed desirable by the R.C.D.C. because:[2]

TABLE 6–18

ADVANCED PROCEDURES DELEGATED TO A CLINICAL TECHNICIAN

Clinical Fields	Delegated Procedures
Operative Dentistry	Application of the rubber dam Selecting, contouring, placing and removing of matrix bands Packing, carving and finishing amalgam restorations Placing, carving and finishing various types of temporary cements
Partial Denture Prosthodontics	Impressions for Study casts Final impressions Simple interocclusal records Tooth shade selection
Complete Denture Prosthodontics	Preliminary impressions Preliminary bite relations (carving and fitting of bite blocks prior to interocclusal registration by the dental officer)
Periodontics[1]	Periodontal packs Home care instructions

[1] These procedures are in addition to prophylaxis and scaling for which the basic clinical technician was trained.

Source: Baird, K.M., D.D.S., Shillington, G.B., D.D.S., B.Sc., and Protheroe, D.H., D.D.S., M.P.H., "Pilot Study on the Advanced Training and Employment of Auxiliary Personnel in the Royal Canadian Dental Corps: Preliminary Report", *J. Canad. D.A.*, Vol. 28, 1962, p. 630.

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[1] *Ibid.*, p. 629.

[2] *Ibid.*

> There are definite boundaries beyond which the training of auxiliaries in such a program cannot and should not extend. For example, diagnosis and treatment planning are high professional achievements which require the training, knowledge and experience of a dentist. Similarly the removal or cutting of or injection of agents into human tissue as well as the actual responsibility for any treatment must remain the prerogative of the registered practitioner.

The findings, concerned with the increased productivity of the dental officers, contained in Tables 6–16 and 6–17 above, are the results of the pilot study conducted with the advanced clinical technician, a dental officer, and two dental assistants, one of whom was a chair-side assistant for the dentist and the other an aide for the clinical technician. The latter assistant's duties "were to assist the clinical technician as required, seat and dismiss patients, clean up and sterilize instruments after appointments, set out instruments for the next operation and perform other tasks which were presented".[1] In addition, three treatment rooms were used in the experiment, two were completely equipped dental rooms and the third contained X-ray and other dental instruments and materials. A steady flow of patients, all service personnel, was made available to this dental team.

The results of the foregoing study were very gratifying to the R.C.D.C. and illustrate very effectively the increased productivity in dental care which can be obtained by the rational use of a closely co-ordinated dental team, rational breakdown of work components, and the careful examination and consideration of dental office procedures.[2]

It must be borne in mind that the strict control which the Forces can exact over their personnel's time and activities as patients is not available to a dentist in private practice, nor probably to the dentist in a clinic. Further, the negative sanctions which the military can apply for a patient's tardiness and hence ensure a steady flow of patients and maintain a strict time scheduling as in their experiment probably make the "61.5 per cent improvement" more *real* in the Forces than in private practice. This fact does not, however, minimize the importance of their study and its implications for the extended and increased utilization of highly trained non-professional personnel.

These personnel, the basic clinical technician and the advanced clinical technician, are permitted to use their skill *only* in the Armed Forces. The basic clinical technicians'equivalent in civilian life, the dental hygienists, must have successfully completed a two-year university course at a recognized dental

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[1] *Ibid.*, p. 631.

[2] A programme for training dentists in similar procedures has been designed in the U.S.A. See Captains Heckel, J.C., and Rickey, J.E., *Training Program for Dental Officers in the Multiple Chair, Chairside Assistant Technique*, USPHS, U.S. Coast Guard Base, Alameda, California.

school in order to practise and, as mentioned in an earlier section, they are all women. Hence, this closes off any civilian opportunities for the male basic clinical technicians, despite their successful and very effective contribution under the direction of registered dentists in the R.C.D.C., because most of them have only "some high school education". Also, the women basic clinical technicians of the R.C.A.F. are "all warned that they'll not be able to practise what we teach them legally on civvy street" before they begin their training.

Needless to say, the new and experimental R.C.D.C. technician occupation of advanced clinical technician has no counterpart in civilian dental care in Canada, the only occupational group which resembles this new technician category (dental hygienist with extended duties) is the School Dental Nurse in New Zealand.

The New Zealand School Dental Nurse is another attempt to cope with the shortage of professional dental manpower by the use of ancillary personnel. The first School Dental Nurses were graduated in 1925.[1] Their course was started because of the serious shortage of dentists in general and particularly the shortage of dentists available to care for the dental needs of school-age and pre-school children. This condition was first brought to the public's attention in 1912 in a New Zealand Department of Public Health report and was further underlined by the nature of the dental defects found in the conscripts of World War I. After much acrimonious debate a school dental service was inaugurated and a plan for training dental nurses was instituted. An extension to the School Dental Service called the Adolescent Service was suggested on New Zealand's entry into World War II in 1939 when it was found "that 45 per cent of the young men called up for service were artificial denture cases".[2] This was the result, it was claimed, of the gap between the time when the youth was out of school and that point when he or she began earning his or her own living. Again, after some heated debate the Adolescent Dental Service was started in 1947.

The School Dental Nurses are employed and trained by the Department of Health who operate the school dental clinics. They are recruited from girls over 17 who hold a school certificate -- this would not permit them to enter a university without the writing of a matriculation examination, but would allow them entry into a teachers' training college. Their training lasts for two years, a total of 1,608 hours. In the first year they are in attendance for 824 hours, 36 per cent of their time is spent in lectures and 64 per cent in laboratory instruction; in the second year they attend for 784 hours, 11 per cent in lectures and 89 per cent in clinical instruction and practice.

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[1] Much of what follows on the School Dental Nurse in New Zealand is based on Fulton, J.T., *Experiment in Dental Care*, World Health Organization Monograph Series, World Health Organization, Geneva, 1951.

[2] *Ibid.*, p. 69.

The procedures and duties which they perform under the direction of a dentist from the Health Department are very broad and include:[1]

> ... examinations, prophylaxis, fillings, extractions, gum treatments, and dental health education for elementary school children.

An average of 715 children per nurse were cared for in the school dental clinics in 1949. These clinics are located, usually in the schools, throughout New Zealand and clinic "service was available to 97 per cent of all the elementary schools — both public and private — in New Zealand" in 1951.[2] Because of this extensive coverage it was found that "the average rural child in New Zealand is in as good dental health as his urban counter part"; a far cry from the situation in Canada.[3]

The plans to introduce the School Dental Nurse in the years shortly after World War I did not meet of course, with the whole-hearted approval of all the dentists but, at an executive meeting of the New Zealand Dental Association approval was given to the scheme introduced by the Chief Dental Officer of the Health Department. Despite the professions' early misgivings, by 1951 Fulton, after numerous discussions with dentists and officials of the Dental Associations, was able to report:[4]

> All of them think that the programme has been of great benefit to the children. Some criticism was voiced concerning materials used and techniques employed but nowhere was there any thought of discontinuing the Service. Of particular interest were the views of older dentists who were practising before the dental-nurse system began. They were positive that the children of today are vastly superior dental patients, with better mouths, better discipline, and better attitudes toward dental hygiene.

This attempt to introduce a dental auxiliary with legal rights to provide extensive dental service, albeit to school children and pre-school children, has proved to be quite successful and in part might help to minimize the serious effects of the unfavourable population-dentist ratio (2,600) prevalent in New Zealand.

Both of the foregoing successful attemps to increase dental productivity and increase the amount of dental services available in (i) Canada and (ii) New Zealand have serious implications for Canada, a country which is suffering from a reported shortage of dentists. Each of the attemps provides positive evidence, one albeit, on an experimental basis, that auxiliary personnel can be selected, trained and educated to perform many of the now standardized and routine duties

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[1] *Ibid.*, p. 84.

[2] *Ibid.*

[3] *Ibid.*, p. 8. Cf., pp. 90–94, this study.

[4] *Ibid.*, pp. 58–59.

of the dentists. In part, this process is following the footsteps of many other professions wherein the practitioners have cast off or passed on what Professor Hughes calls their 'dirty work' to those in "lesser" occupations below them.[1]

This chapter has described the duties, education and training of the auxiliaries, and the benefits, financial and productive, which accrue to the dentists who utilize the services of these auxiliaries in their practices. In addition, the utilization of two "special" types of auxiliary personnel (not in general use in Canada, viz., (i) the Advanced Clinical Technician in the Royal Canadian Dental Corps, and (ii) the School Dental Nurse in New Zealand) and their contribution and potential contribution to the dental health team were examined.

The analysis of the data gathered leads to a number of conclusions. Firstly, in order to raise their productivity and hence provide more adequate dental service to meet the present and expected rise in demand for these services more dentists will have to follow the lead of their colleagues who are making full use of dental auxiliaries. This may require special short-term courses for the dentists in the form of lectures on the multiple chair, chairside technique.[2] Secondly, any increase in the utilization of dental auxiliaries by the profession will require a substantial increase in the number of dental auxiliaries being trained.[3] Thirdly, in order to produce the large numbers of auxiliaries who will obviously be required if any serious attempt is made to meet the future demands for dental service, serious consideration should be given to the organization of programmes to train these personnel within the framework of the existing academic and technical-vocational secondary school system. Fourthly, some attention should be paid to the relationship between the high level of education and the dental procedures and areas of work which are prescribed for the dental hygienists. Either her education and training should be much shorter, much less demanding and rigorous and carried out in a different milieu than at present *or* her legal duties should be expanded in keeping with her superior educational achievements. Finally, an extensive recruitment programme designed to attract *both* male and female trainees to *all* types of dental auxiliary services must be carried out by the dental associations and societies, the dentists, the departments of health and the vocational guidance departments of the schools and the National Employment Service.

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[1] Hughes, Everett C., *Good People — And Dirty Work*, Lectures on Living, Series V, (National Committee for Mental Health, McGill University) Montreal, 1948. For instance, the physicians pass on their "dirty work" to the nurses who in turn pass on their "dirty work" to the hospital maids and assistants, and so on.

[2] Heckel and Rickey, *op. cit.*

[3] The attrition rate of trained personnel is an important factor. About 50 per cent of the 16,000 licensed dental hygienists in the U.S.A. are not practising. Campbell, *op. cit.*, p. 77.

CHAPTER 7

CONCLUSION

This study has been concerned with the supply of and demand for dental manpower in Canada. It was undertaken at a time when most official reports claimed that there was a serious shortage of dentists in the country, hence, a limited supply of dental services available to the public.

Underlying the supply side of the question is the basic assumption that the more favourable the population-dentist ratio which prevails the more able the profession is to meet the demands for dental services.

In Canada since the end of World War I there has been an increasing lack of improvement in the population-dentist ratio for the country as a whole, that is, the proportional increase in population growth during this period has exceeded the proportion of the population entering dentistry.

During this same period there has been a marked concentration of dentists in certain provinces and in the highly urbanized areas with a consequent decline in the availability of services in the rural and small town areas. The data gathered during the course of the research suggest that the maldistribution of dentists – between urban and rural areas – is likely to continue.

These findings appear to be two aspects of the problem of recruiting young people into the profession. On the one hand is the sheer problem of general recruitment to dentistry and on the other is the more specialized problem of recruiting dentists to provide their services in those areas lying beyond the large metropolitan districts.

The problem of recruiting people able to cope with a university education and professional training is a general one and not one faced by the dental profession alone. In addition, the individual decision to embark on a lengthy educational and training programme leading to professional status is the result of a long and not clearly understood process and of a wide variety of factors and influences, abilities and attitudes.

A major deterrent to recruitment in any profession is the financial cost of training. At present dental education in Canada is more expensive per annum than education in any other faculty. A general re-appraisal of the whole structure of financial assistance to universities, to the professional schools, and to the whole

student body is needed so that ability to attend a university in Canada will no longer be contingent upon ability to pay fees. The success of the students, including dental, sponsored by the Department of Veterans Affairs in the immediate post-war period sets a worthy example.

The proportion of Canadian university students who are dental students has declined considerably in the last two decades and during the last few years there has been an apparent shortage of "qualified" recruits, as reflected in the number of unfilled places at Canadian dental schools. This may, in part, be an artifact of geography since not every province has a dental school (the six dental schools are located in five provinces) and some students attend dental schools in the neighbouring states of the U.S.A. For example, British Columbia has no dental school as yet and approximately one-half of the Canadians studying dentistry in the U.S.A. are from that province. On the other hand, 10 per cent of the students who enter first year do not proceed to the second; this may well be a retlection of the academic quality of the students selected for training.

There is, nevertheless, a critical shortage of dentists hence serious consideration will have to be given to the opening of new dental schools and the expansion of the present facilities so that the proportion of the whole student body who are studying dentistry will not slip further back but will, if anything, recoup its former position and perhaps move ahead of it. (The location of any new schools should, of course, take into account the changing demographic conditions of the country and the firm belief on the part of the profession that the new schools *must* be located at a university which already has or will shortly have a medical faculty.)

This increase in facilities for dental education will become increasingly necessary if any type of government-sponsored dental care scheme is to be introduced because the expected increase in demand for dental services will result in an even more acute shortage of dental manpower than at present. In view of the length of time required to plan a new school, to build and equip the physical plant and to gather together a teaching staff, the authorities concerned should seriously consider re-introducing some form of accelerated classes or crash programme. That is, they should identify and recognize the period as one of *crisis*, comparable to the war-time and immediate post-war periods.

An important source of recruits which has some bearing upon the urban-rural maldistribution of dentists seems to have disappeared. That is, the rural area itself. A recruitment programme designed to increase the proportion of dentists serving in the rural areas should be introduced. As long as tuition fees and maintenance costs at university are paid by the individual student it may be possible to introduce a programme similar to that sponsored by the Royal Canadian Dental Corps wherein the Corps sponsors the students at university, and after graduation they are obligated to serve in the Corps for a stipulated period. In the case of the civilian-student, his or her sponsorship by a federal or provincial government agency would require that upon graduation the dentist under-

take to spend a period in a rural or other area designated by the sponsor. The Dental Students Bursary Plan recently introduced by the Ontario Department of Health contains the stipulation that:

> Every student who receives bursary assistance has an obligation to enter general dental practice, on completion of training, in a location in the Province of Ontario which is acceptable to the Minister of Health. Repayment of the bursary by the student will not be considered a cancellation of this obligation. The return in service will be one calendar year for each academic year of bursary assistance given.[1]

The efficacy of this new recruitment scheme bears careful watching. Even if only partially successful it might provide a basis for a national scheme of such bursaries. The introduction of such a plan, however, will not necessarily increase the proportion of rural recruits who come forward. A close look at the quality of the education provided at the secondary school level in rural Canada may suggest that major changes will have to take place before a marked increase in rural recruits will come about.

The provision of dental services for the rural areas might also be facilitated by the introduction of regional clinics established in outlying areas in much the same manner that the "consolidated" high schools have been introduced to provide better educational facilities for rural secondary school children. In the latter case, of course, school buses have provided the link between the client and the service. Dental clinic buses operating out of this regional clinic may provide a similar service by either bringing the clients to the service (the extensive ambulance service in the United Kingdom may act as a good example) or by taking the service to the clients, the more usual practice.

An important source of recruits to dentistry in many countries appears to have been neglected in Canada. An international comparison of the percentage of dentists who are women in various countries places Canada well near the bottom of the list. Since only slightly less than one-half of the high school graduates in Canada are women and, in general, their progress through school is one marked by success rather than failure or near failure, some attention should be paid to them as possible recruits for dentistry. This is particularly true of native-born Canadian girls: less than 30 per cent of the 97 women practising dentistry in Canada were born here. It is interesting to note, however, that almost half of those whose whole university and dental education was obtained in Canada were born outside the country, that is, came to Canada as immigrants. Most of these dentists came from the Baltic countries where dentistry is a "women's profession", so that recruitment to the profession in Canada is a reflection of the social values and the culture of their birthplace which has been passed on to them by their parents – despite the fact that they were resident in Canada.

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[1] Information Bulletin, *Dental Students Bursary Plan*, Ontario Department of Health.

This source of recruits should be considered because of the contribution they are presently making to the provision of dental public health services: almost 1 in 3 of the women dentists participates in the public health service including hospital and school dental services, in contrast to the 1 in 50 of their male colleagues who is associated with these services. This is a not unimportant consideration if an expansion in the school dental services and public health programmes in general is anticipated.

The level of self-recruitment to the dental profession in Canada is much lower than that in many of the older professions. This may be due to the negative attitude held towards their own profession by at least 1 in 5 of the dentists. This suggests that the profession and individual dentists in particular will have to play a more important role in the publicising of their own profession as a possible career for able high school students. Because, as the McNair Committee points out, "other attempts to publicise it are bound to be handicapped" as "long as the majority of dentists are not good advocates of their profession". Any planned recruitment of this type will require a much closer liaison between the profession and the vocational guidance departments of the high schools than exists at present.

Between 1946 and 1960 immigration played a very important role in the supply of practitioners in most of the recognized professions in Canada *except* dentistry. Comparatively few dentists ever migrate to Canada. There may be many reasons for this such as the relatively good opportunities for dentists abroad, the Canadian immigration policy, or the attitude of the professional associations to the qualifications held by the immigrant dentist. Since most graduate dentists from abroad, with some few exceptions, are forced to spend at least two years at a Canadian dental school to re-qualify, migration to Canada is not a particularly inviting prospect. This is a very important and virtually untapped source of recruits which should be examined very carefully by the professional associations, societies and licensing bodies. Most of the other immigrant professionals (physicians, architects, etc.) and scientists (bio-chemists, physicists, etc.) trained in Europe and Britain are eligible after a minimum waiting period, to practise their profession or to teach in Canadian universities while their dentist colleagues suffer the indignity of being returned to the status of dental student.

The need for dental service appears to be universal. It is noteworthy, however, that those in Canada – as in the U.S.A. – seeking dental service are marked off from the general population in certain ways, viz., they tend to come from the higher income groups, have more education, and live in urban rather than rural areas – these three factors are not unrelated, of course.

There are a number of reasons why people in need of dental care do not seek dental service until an emergency arises. An examination of the social characteristics of those who do seek dental treatment, particularly preventive care, leads one to believe that financial reasons, above all others, lead to dental negligence. This has to be qualified, of course, because "ability to pay" for dental service is a social-psychological as well as an economic fact. In general terms, that large segment of our population (60 per cent or more) which, for want

of a better term, we call the working class (essentially the manual workers of our society as opposed to the non-manual or white collar group) do not utilize the dental services to the same extent as the middle classes. Occasionally the income of those in the "top earning" group of the working class is greater than the income of those in the "lowest earning" group of the middle class yet research has shown that they still have different consuming and spending patterns, i.e., different styles of life. In each case the style of life is more closely related to the social-occupation group to which they belong. To a large extent this is associated with the social values which these different groups hold. Middle class values tend to be those which dominate our society and included among them is a heavy emphasis on education, vocation and health. A certain amount "spills over" onto the working class but, in general, they do not value these elements to the same extent as the middle classes. While claiming to "recognize" the importance of education in vocational terms parents from the working class in Canada permit their children to drop out of school at the minimum school leaving age because they "can't afford it", despite the fact that education is "free". One can only assume that the same process operates as far as dental health care, particularly preventive, is concerned. This suggests that a certain amount of coercion is required, as in the case of the minimum school leaving age, to have parents look after the dental health of their offspring. The degree to which society is willing to do this, needless to say, depends upon the importance which is attached to dental and medical health by society, and the degree to which it is felt that it should be available to all regardless of cost or social attitude.

The preceding paragraph while pointing out the importance of social values is not meant to minimize the real importance of financial disability of a large proportion of our society where dental expenditures are concerned. The material presented in the chapter on demand for service clearly points out that the financial burden which accompanies dental treatment in Canada is too great for a sizeable proportion of the population to seek care other than of an emergency nature.

It has been estimated that in Canada each dentist presently serves about 1,000 patients per year and the present population-dentist ratio shows that only about one in three of those in need could obtain dental service if they demanded it. At the same time the general level of education received is rising in Canada, the proportion of rural to urban population is falling, and government-sponsored and other pre-payment schemes tend to be minimizing the actual financial burden of dental care. It can only be assumed then that demand for services will be increasing. This increased demand is also fostered by the dental profession in the course of their dental public health education programme in an attempt to raise the general level of dental health in Canada. Hence, greater and greater demands will be placed upon the limited services available.

There are a number of methods, in addition to and in conjunction with the increasing recruitment of dentists, by which the shortage of dentists may be

somewhat relieved and the supply of dental service increased. One important procedure is to attempt to increase the productivity of the individual dentist.

Research has shown that if either gross or net income is used as a measure of productivity there is a relationship between a dentist's productivity and his utilization of dental auxiliaries (many do not use them however). Yet, with the notable exception of (i) the university education and training offered to dental hygienists at three of Canada's six dental schools and (ii) the training given by the Royal Canadian Dental Corps for all their ancillary personnel few facilities exist for the formal instruction of civilian dental assistants and dental technicians.

The data contained in this study suggest that the education and training of the sub-professional auxiliaries, the dental hygienists, be re-examined very critically. Either the hygienist be legally permitted to utilize her high training cost clinical skills to a much greater extent than at present (cf., the New Zealand dental nurse or the Royal Canadian Dental Corps advanced clinical technician) or her training be consigned to the technical-vocational educational system. In the first instance, her training and education is extremely costly for the very limited services which she is permitted to perform. In the second, a sizeable proportion of intelligent high school students who might ordinarily drop out may be induced to continue their education if the prospect of a promising career in the health services were made financially accessible to them. Needless to say, for either of these two programmes to reach full potential the present formal and informal discrimination in the recruitment of dental hygienists on a basis of sex would have to be removed.

The other auxiliaries do not fare as well as the dental hygienists. The dental technicians serve an apprenticeship of sorts before they are qualified for licence. But if a continuous supply of dental technicians is to be maintained in Canada, without a continued reliance on trained immigrants from overseas, provisions for their training will have to be placed on a much more systematic basis. It should take its place as one of the alternative occupations taught in the rapidly increasing number of high-cost technical schools which are being built, largely with funds drawn from the federal exchequer.

There are at present – outside of the Armed Forces – no full-time training facilities for dental assistants, that large body of dental secretaries, receptionists and chairside attendants who contribute so much to the dentists' productivity.[1] Instead they are trained on-the-job by their very busy dentist-employer. There are in a few of the larger cities some evening courses sponsored by local dental societies to meet this need of formal instruction for the dental assistants. An inspection of the records of one presently in operation showed that over half the class of 20 had worked in a dentist's office for over a year before they began their course and seven of this group had worked as a dental

[1] See footnote 1, p. 161.

assistant for over three years. They were, in fact, simply providing themselves with paper qualifications for the position which they already held. This particular course nevertheless was providing an opportunity for the others, in a few cases married women whose offspring had or were about to "fly the nest", to acquire a set of skills very much in demand.

Now that one of the vocational schools in Ontario has introduced a course for girls in "restaurant service" to enable them to serve coffee to customers[1] and another has installed gasoline pumps and a course to train service station attendants and others plan to follow suit, it is not unreasonable to suppose that the Boards of Education in the various provinces in co-operation with the dental profession might seriously consider introducing a course to train dental assistants recruited from high school students following a short terminal course. (The local dental societies could continue with their very useful service of up-grading those on the job, by helping some transfer from one occupation to another and by helping some re-enter the labour market after some years of taking care of a household.)

If courses for both dental assistants and dental technicians were taught in the technical-vocational school system, one school centrally located (and containing the necessary training facilities) in various cities across the country could draw its students from a wide metropolitan area and its hinterland.

Up to this point the summary has been concerned with the increasing demand for dental services and means for alleviating the shortages evident in the various occupations associated with dentistry. All of these suggestions are designed to increase the supply of dental health care available so that the general dental health of the population may be raised. Another major long-term method of improving the dental health of the population without unduly increasing the demand for dental services has long been advocated by all of the dental authorities and dental associations: the controlled fluoridation of public water supplies.

The introduction of this type of programme to date has been surrounded with a great deal of controversy and acrimonious debate. In part, its non-introduction has been assisted by the peculiarities of the use of the legal-political system of plebescites to ratify its introduction. The evidence put forward to date by competent dental researchers leaves little justification for its non-introduction as a public health measure comparable to the pasteurization of milk, filtration of public water supplies, and compulsory vaccination against smallpox. In view of the state of the dental health of the population, the present lack of supply of dental services and the increasing demand for these scarce services the dental associations and the provincial and federal public health departments should take immediate action to see that the legal means is made available to make the fluoridation of public water supplies compulsory.

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[1] The R.S. McLaughlin Collegiate and Vocational Institute, Oshawa.

APPENDIX 1

PROGRAM OF STUDY AND DESCRIPTION OF COURSES FOR DENTAL AUXILIARIES

UNIVERSITY OF ALBERTA

PROGRAM OF STUDY

First Year	Second Year
213 Anatomy and Physiology	301 Educational Foundations
203 Dental Anatomy	305 Pharmacology
210 English	302 Pathology
202 Sociology	304 Bacteriology
205 Dental Roentgenology	313 Preventive Dentistry
204 Psychology	323 Ethics & Jurisprudence
223 Dental Materials	322 Dental Public Health
222 Histology	321 Dental Health Education
221 Biochemistry	324 First Aid and Safety Education
220 Nutrition	311 Office Assistance & Administration
221 Office Assistance & Administration	312 Dental Prophylaxis
212 Dental Prophylaxis	315 Dental Roentgenology
201 Public Speaking	Practical Teaching Experience

Source: *Announcement*, 1962–63, School for Dental Auxiliaries, Faculty of Dentistry, University of Alberta, Edmonton, pp. 6–10.

DESCRIPTION OF COURSES

First Year

Anatomy and Physiology 213 (2–2;2–2)[1]

A lecture and laboratory course designed to provide a basic knowledge of anatomy and an understanding of the normal functions of the human body.

The following systems will be covered – circulatory, respiratory, digestive, reproductive, endocrine, skeletal, nervous, urinary and excretory. A more concentrated study will be made of the structures of the head and neck with special emphasis on the functions of the oral cavity, mastication, speech. swallowing, etc.

[1] These figures denote the number of lecture and laboratory hours in each term, e.g., (2–2;2–2) means that the particular course calls for two hours of lectures and two hours of laboratory work in each week of each term; (2–3;0–0) means that there are two hours of lectures and three hours of laboratory per week in the first term and the course is not taken in the second term.

Dental Anatomy 203 (2–3;0–0)

A lecture and laboratory course designed to teach the student how to recognize, describe and reproduce tooth forms. The course will cover the structure, function and morphology of the teeth.

English 210 (3–0;3–0)

A course designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

Introductory Sociology 202 (3–0;3–0)

The sociological study of society, social institutions, group behaviour, personality formation and social change.

Dental Roentgenology 205 (1–0;0–0)

A course in the fundamental and elementary principles of dental roentgenology. The student will be required to spend time in the clinic learning the technical aspects of X-rays, i.e., the taking, processing and mounting of X-rays.

Psychology 204 (3–0;0–0)

An introduction to psychology, its material and fundamental laws, application and relations to other sciences with particular reference to children – habit formation, emotions, thinking, individual differences, learning, adjustment and motivation.

Public Speaking 201 (1–1;0–0)

A series of lectures on essentials and procedures in public speaking. The development of confidence before audiences by student participation in the preparation and presentation of short talks.

Dental Materials 223 (0–0;1–3)

A lecture and laboratory course to provide a general knowledge of materials (their properties, the preparation and manipulation) used in dentistry. The course will include impression compounds, gypsum and stone, inlay wax, investing and casting, alloys – gold and amalgam, cements.

Histology – Oral and Embryology 222 (0–0;2–1)

A lecture and laboratory course to provide a general knowledge of the elementary body tissues and structures. Particular emphasis will be placed on the development and structural characteristics of the head, face, oral cavity and teeth.

Food and Biochemistry 221 (0–0;2–3)

A lecture and laboratory course with an introductory review of inorganic and organic chemistry to facilitate the understanding of the basic biochemistry. Emphasis to be placed on food chemistry and its application in dentistry.

Nutrition 220 (0–0;2–0)

A course of instruction in the general food requirements for growth maintenance and repair of the body. Coverage of carbohydrates, fats, proteins, vitamins, minerals and water and their relation to dental health. Individual diet assessment and counselling and the application of this and nutrition factors in dental health education.

Clinical Dental Hygiene 212 (2–7;0–7)

A lecture, pre-clinical and clinical course of training given throughout the two years of study. The course will cover the techniques of oral prophylaxis as performed by the Dental Auxiliary within the limits of the law. The student will become familiar with the techniques of topical applications for the prevention of caries. The history and types of tooth brushes, tooth brushing methods and chairside instruction in proper oral hygiene will be studied.

Office Assistance and Administration 211 (1–1;1–1)

The course of study will continue throughout the two years of training and will relate theory and acquired knowledge from all phases of the dental Auxiliary Programme. The procedures of patient contact and management, chairside assisting, general office administration, economics, bookkeeping and patient counselling will be considered.

Second Year

Educational Foundations 301 (3–1;0–0)

An introduction to education. A course designed to give the student a general knowledge of the history of education. The various influences that have shaped and changed educational beliefs and philosophy: political, economic, social and religious. Reference to the growth and development of education in Canada and in the Province. Observation and practical teaching experience.

Open only to students in Dental Auxiliary Programme.

Pharmacology 305 (2–0;0–0)

A general knowledge of drugs by groups – uses, therapeutic action, dosage, etc. A knowledge of weights and measures and pres-

cription writing. Special emphasis will be placed on the basic drugs used in dentistry, the physical and chemical properties and their effect on the human body. A knowledge of dental anaesthetics – topical, local, general, antibiotics, sterilizing agents, astringents, emolients, antiseptics, basic anodynes, hemostatics, sedatives, stimulants, vasoconstrictors, dentifrices, dental adhesive products, detergents, mouth washes.

Pathology 302 (2–1;0–0)

A lecture and laboratory course to introduce general pathology with consideration given to the more common diseases affecting the human body. Clinical pathology of the diseases affecting the teeth and their supporting structures including consideration of oral manifestations of selected systemic disturbances. A knowledge of visual differentiation between normal and abnormal tissue, the ability to recognize normal and abnormal occlusion. A knowledge of physiological and pathological changes which affect the gingiva and the ability to recognize lesions of the hard and soft structures of the oral cavity.

Bacteriology 304 (3–1;0–0)

A lecture and demonstration course to give an understanding of the general principles involved in the study of micro-organisms with special emphasis on their application to the dental field. Consideration will be given to the classification and differentiation of micro-organisms, methods of isolation, growth and identification. General principles of asepsis, antisepsis and antibiosis and immunity will be discussed. Reference will be made to the epidemiology of diseases and the precautionary measures used to prevent the transmission of communicable diseases.

Dental Roentgenology 315 (0–2;0–2)

The fundamental and elementary principles of dental roentgenology were covered in the course "Dental Roentgenology 205". During the second year of training, the student will be required to spend time in the clinic learning the technical aspects of X-rays, i.e., the taking processing and mounting of X-rays.

Preventive Dentistry 313 (2–0;3–0)

Lecture, laboratory and clinical observation periods in the various divisions of the dental field. The preventive point of view will be stressed in operative and restorative dentistry, periodontics, orthodontics, paedodontics, oral diagnosis, oral surgery, hospital and home care, institutions and industry. The course will also include a series

of 15 lectures and seminars in the paedodontic division to acquaint the students with the dynamic process of mental and physical growth of children in order that they can better understand behaviour of children in the dental situation.

Ethics and Jurisprudence 323 (0–0;3–0)

A lecture course designed to give a knowledge of the theory and practice of preventive dentistry and public health with emphasis on the principles and problems of community health. The history and development of public health will be covered, including the role of the dental auxiliary in public health matters. The application of methods of prevention and control of oral disease which can be employed in public health programmes or individually will be studied. The course will give particular attention to health education and health administration at the federal, provincial and local levels.

Dental Health Education 321 (0–0;3–0)

A lecture course designed to give a basic knowledge of technique used in dental health education. The course will consider methods and available materials for dental health education, the preparation and presentation of dental health education for various age or interest groups in the school and community. The course will include the use of audio visual aids and it is expected that the student will have a working knowledge of a variety of these audio visual aids. The student will be expected to make critical reviews on various types of dental health education material available to the public.

Dental Hygiene and Prophylaxis 312 (0–7;0–7)

A continuation of the first year dental hygiene course. The second year will be devoted to clinical experience.

First Aid and Safety Education 324 (0–0;1–1)

The course will include instruction and practice in the basic principles of first aid as established by the St. John Ambulance Association or Canadian Red Cross. Safety education about the home, school and community with particular reference to the prevention of accidents that are injurious to the teeth and face will be covered.

Office Assistance and Administration 311 (1–0;0–3)

A continuation of the first year course, Office Assistance and Administration 211. The student dental auxiliary will receive practical experience in assisting by working with the dental student on the clinic floor. The practical application of procedures for patient contact and management, administration, and patient counselling will also be received in the dental hygiene clinic.

APPENDIX 2

COURSE FOR DENTAL ASSISTANTS, 1962–63

Schedule for the first term[1]

Date		*Subject*	*Lecturer*
October	9	The Dental Assistant and the Profession	Two Dentists[2]
	11	General Office and Patient Routine	Dentist
	16	Associations	Dental Assistant
	18	Your Voice is You (Telephone Usage)	Bell Representative
	23	Deportment and Good Grooming	Dental Assistant
	25	Terminology and Professional Records	Dentist
	30	Accounting in Dental Practice	Chartered Accountant
November	1	Supplies	Dental Assistant
	6	Function and Care of Dental Equipment	Supply House Representatives
	8	" " " " " "	" "
	13	Dental Hand Instruments and Their Care	Dental Assistant
	15	Dental Materials	Dentist
	20	" "	Dentist
	22	Golds and Gold Foil	Dentist
	27	" " " "	Dentist
	29	Dental Cements	Dentist
December	4	" "	Dentist
	6	Diet, Nutrition and Oral Hygiene	Dentist
	11	Pathology	Dentist
	13	Periodontology	Dentist
January	8	Review	Dentist

Schedule for the second term

January	10	Dental Anatomy and Physiology	Dentist
	15	" " " "	Dentist
	17	Orthodontics	Dentist
	22	"	Dentist
	24	Operative Dentistry	Dentist
	29	Pedodontics	Dentist
	31	Silver Amalgam Procedure	Dentist

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[1] Students were only permitted to write their final examinations if they attended 80 per cent of the lectures.

[2] Eight dentists and four dental assistants participated in the first term lectures; nine dentists participated in the second term lectures.

February	5	First Aid	Dentist
	7	Oral Surgery	Dentist
	12	Pharmacology	Dentist
	14	Bacteriology and Endodontics	Dentist
	19	" " "	Dentist
	21	" " "	Dentist
	26	Crown and Bridge Prosthodontics	Dentist
	28	Dental Radiology	Dentist
March	5	" "	Dentist
	7	Prosthodontics	Dentist
	12	"	Dentist
	14	Dental Public Health	Dentist
	19	Dental Research	Dentist
	21	Review	Dentist

APPENDIX 3

PROGRAMS FOR THE TRAINING OF DENTAL ASSISTANTS[1]

Until September 1963, there were no formal courses given to Dental Assistants in recognized educational institutions. Several years ago, the Faculty of Dentistry, University of Toronto, offered a course which was terminated in 1959. Several provinces have organized evening training programs for Assistants who are currently employed in dental offices. These courses generally are a two-hour lecture-demonstration type given once a week for approximately twenty weeks. The lecturers are members of the profession and an examination is held at the end of the program. The course outlines, compiled by the American Dental Association, have been generally used as a guide to the lectures given. This type of instruction has been offered for at least ten years in some areas. The Dental Nurses and Assistants Associations have been responsible for organizing and conducting this type of instruction.

In September 1963, three training programs for Dental Assistants were started. One is in a high school in the Toronto area, working in conjunction and advised by the Faculty of Dentistry, University of Toronto. One is in a Technical Institute in Edmonton, working in conjunction and advised by the staff of the Faculty of Dentistry, University of Alberta, and the third is in a Vocational Institute at Vancouver, working in conjunction and advised by the College of Dental Surgeons of British Columbia, and the offices of the Metropolitan Health Organization of the City of Vancouver.

The Ontario program is under the direction of the Scarborough Board of Education, and is offered at the West Hill Collegiate, Scarborough, Ontario. Details of the course are as follows:

Admission Requirements

1. The course is offered in Grades 11 and 12 of the four-year Science, Technology and Trades course.
2. Pupils who have obtained second-class honours at the end of Grade 10 of any branch may be admitted.
3. The course is planned to meet the requirements of Grades 11 and 12 as outlined in H.S.I. 1962–63, Province of Ontario.
4. A secondary School Graduation Diploma will be given at the end of Grade 12.

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[1] A Report to the Council of Education, Canadian Dental Association, prepared by Dean H.R. McLean, D.D.S., February 6–7, 1964.

Curriculum

The two-year program will be based on a 50–50 ratio.

i.e. – 50% basic high school course
– 50% dental

The course consists of a 40 period week and the basic course will be taken in the morning, the dental in the afternoons for Grade 11 and reversed for Grade 12.

Grade 11 – First Year Dental Assisting Course

1. Basic Course:

	Periods
(a) English	4
(b) History	3
(c) Commercial Skills (Typing, Bookkeeping, Business Arithmetic)	4
(d) Physical Education	2
(e) Science (Physics and Chemistry)	3
(f) Home Economics	4
	20 periods x 34 weeks = 680 periods per year

2. Dental Assisting:

	Periods		
	Lectures	*Laboratory*	*Total*
(a) Oral Biology 1			
i Bacteriology	30	30	60
ii Histology	19	19	38
iii General Anatomy	15		15
(b) Dental Anatomy	30	30	60
(c) Dental Materials	34	68	102
(d) Radiology	19	38	57
(e) Oral Hygiene and Public Health	7	8	15
(f) Psychology and Personality Development	30		30
(g) First Aid	15		15

(h) Dental Assisting

i	Equipment-use and care	7	8	15
ii	Operative Assistance	34	68	102
iii	Prosthodontia Assistance	9	10	19
iv	Oral Surgery Assistance	19	19	38
v	Orthodontia Assistance	9	10	19
vi	Charting Assistance	19	19	38
vii	Paedodontia Assistance	9	10	19
viii	Endodontia Assistance	9	10	19
ix	Periodontia Assistance	9	10	19
	Total Periods –	323	357	680

Grade 12 – Second Year Dental Assisting Course

1. Basic Course:

	Periods
(a) English	5
(b) Economics	3
(c) Commercial Skills (Typing, Bookkeeping, Business Arithmetic)	4
(d) Physical Education	2
(e) Science (Physics and Chemistry)	3
(f) Home Economics	3
	20 periods x 34 weeks = 680 periods per year

2. Dental Assisting:

Since this will not start until the session 1964–65, the allocation of periods has not been made. However, the total will be 680 periods as in the Grade 11 course. Part of the Laboratory time will be spent at the Faculty of Dentistry for clinical experience.

(a) Oral Biology 2

i Oral Pathology
ii Physiology

(b) Pharmacology

(c) Dental Materials

(d) Radiography

(e) Nutrition and Preventive Dentistry

(f) Ethics, Jurisprudence, Dental Organization, Public Relations

(g) Dental Public Health, Dental Research

(h) Dental Assisting

i Supplies, ordering and storage
ii Operative Assistance
iii Prosthodontia Assistance
iv Oral Surgery Assistance
v Orthodontia Assistance
vi Paedodontia Assistance
vii Charting Assistance
viii Endodontia Assistance
ix Periodontia Assistance
x Telephone, appointments, recall systems, keeping dental records and accounts.

The Alberta program is under the direction of the Department of Education. The course is offered at the Northern Alberta Institute of Technology. One dentist is employed half-time (mornings), and two Dental Assistants (one who is also a Registered Nurse) on full-time. Ten members of the Faculty of Dentistry at the University of Alberta are guest lecturers. During this first year of operation, the entrance requirement was Grade 11 (junior matriculation – Alberta), with no required academic standing or subject arrangement. There was no screening for the first class. The first forty applicants were accepted. The tuition for the ten-month program is $54.00. It will be recommended for the 1964–65 session, that an "A" standing in Grade 11 Science, Mathematics and English (60% will be required). Also, that the applicants will be screened as to their academic background and that the class number will be reduced to twenty-five. There is a possibility that consideration might be given to shortening the program to eight months instead of ten months – September to February at the Technical Institute on technics, and March and April at the University of Alberta Clinic. Approximately six clinical demonstrations have been given at the Institute by the Dental Staff of the University, showing the duties and team work of a trained Assistant operating with the dentists. The course outline is as follows:

		Lecture Hours/Week	*Lab. Hours/Week*
DA 101	Orientation History of Dentistry Ethics	1	
DA 102	Basic Sciences	2	
DA 103	Dental Materials	2	3
DA 104	Oral Anatomy	2	2

DA 106 A	Nutrition	1	
	B Psychology	1	
	C Dental Assisting Arts	5	
	D Dental Assisting Technics		4
DA 107	Practice Management	2	1
DA 108	Typing		3
DA 109	English	2	1
DA 110	Basic Health Science	1	
DA 111	Physical Education		2

DA 101 Introduction to the art of dental assisting and the role of dental assistants in the profession of dentistry. A series of lectures on each of Ethics and the History of Dentistry.

DA 102 Basic Science course consists of a series of lectures on each of the following: General Physiology of the Body, Pharmacology, Bacteriology, Oral Pathology, Roentgenology.

DA 103 *Dental Materials* – Includes lectures on the Composition of Dental Materials, Their Physical Chemical Composition, Limitations on Their Usage. Laboratory will provide opportunities to practise the technical procedures required in manipulating the various dental materials.

DA 104 *Oral Anatomy* – Consists of Lectures on the Anatomy of Teeth and Their Supporting Structures. Laboratory will consist of Tooth Drawing.

DA 106A *Nutrition* – Required Nutrients, Calories in the Diet, Food Facts, Diet Recommended, Etc.

DA 106B *Psychology* – General Considerations, Motivations of Patients, Psychology of Selling a Service, Personality Improvement, Factors Influencing Child Behavior, Parent Management, Child Management, Etc.

DA 106C *Dental Assisting Arts* – Theory on General Office and Patient Routine, Sterilization, Disinfection, First Aid, Public Health, Etc.

DA 106D *Dental Assisting Technics* – Practical aspects of Sterilization, Instrumentation, Equipment Care, Assisting Procedures, Etc.

DA 107 *Practice Management* – Instruction in Basic Procedures of Office Record-keeping, Patient Relationships and Dental Office Supplies, Etc.

DA 108 *Typing* – Basic Introductory Course in Typing – designed to bring students to a speed of 40 words (or more) per minute.

DA 109 *English* – Basic English Grammar, Spelling, Penmanship, Economics, Letter Form, Language Laboratory Skills, Etc.

DA 110 *Basic Health Sciences* – Human Anatomy, Human Behavior, Personal Hygiene, Basic Nursing Arts, Health, Etc.

DA 111 *Physical Education* – Organized Sports (both indoor and outdoor), Team Sports, Individual Activities, Etc.

The British Columbia program is under the administration of the Vancouver Board of School Trustees. The outline of the course is as follows:

Training Program:

This course covers the background knowledge and experience in clinical procedures needed for working as an assistant to a practising dentist. Classroom theory and demonstration will be given in well-equipped dental laboratories. In addition, there will be practical field work done in conjunction with the Dental Clinics of the Metropolitan Health Board.

Entrance Requirements:

Age – 18 or over
Education – Grade XII required, no specific course requirements
General – Competency in dealing with others. Good manual dexterity, maturity and good personal appearance essential.

Length of Course: 8 months

Fees: $15.00 per month

Dress: Uniforms supplied and laundered

Examinations: Periodically throughout the course

Course Content:

Dental assisting technics
Identification and care of instruments
Instrument assisting procedures
Care of patients
Operation of auxiliary equipment
Maintenance of dental office supplies
Laboratory technics
Mixing amalgams
Preparations of Porcelains
Sterilization technics
Care of hypodermic equipment
X-ray technics
Anatomy and Physiology
Equipment and Dental Materials
Anesthesia
First Aid
Bacteriology

Nutrition
Specialty branches
Pathology – Diseases
Pharmacology

Unit I *Introduction and the Profession* 2 hrs.
Audio Visual Aid – Movie – "Operation Teamwork" – EXCELLENT
Produced – American Dental Association

Unit II *Terminology* 24 hrs.
Speciality Branches – Sub Branches
Basic Dental Terminology
TEXT: Current Clinical Terminology – GOOD

Unit III *Anatomy & Physiology* 20 hrs.
Audio – Visions: Movie slides courtesy of the Dentist's Supply Co., N.Y.

Unit IV *Equipment – Supplies*
TEXT: Each student has S.S.W. Supply Catalogue
Ash Temple Supply Co. – Lecture on Supplies & Equipment

Unit V *Dental Materials* 25 hrs.
Rubber Dam – uses and applicator
TEXT: "The Dentist and His Assistant" – EXCELLENT

Unit VI *Preliminary Tray Set Ups* 20 hrs.
Movie – "American Dental Assoc." – Armamentariums

Unit VII *Sterilization* 20 hrs.

Unit VIII *Chairside Assisting* 200 hrs.

Unit IX *Anaesthesia* 15 hrs.
TEXT: Your Practice Management – GOOD

Practical Work:

Each student handed in the following:

1. 6,000 word thesis – subject "DENTAL HEALTH"
2. Anatomy – Tooth Carvings – Incisors, Bicuspids, Molars
3. Anatomy – Tooth Carvings – Class 1,2,3,4,5
4. Clinic presentation of choice on 1 branch of phase of dentistry

The following were chosen:

1. Teamwork in Operative Dentistry
2. Oral Surgery
3. Orthodontics
4. Office Management
5. Radiology

6. Rubber Dam Technics
7. Dental Health Education
8. Prosthodontia
9. Sterilization

From the details of the programs at the three centers of training, it would seem that consistency is lacking at present, although the British Columbia and Alberta courses are somewhat similar.

Comment:

1. That the efforts of those responsible for initiating formal training programs for Dental Assistants be commended, and
2. from the above details it would appear that we as an organization should do more to assist in co-ordinating a specific program.
   These courses will supply, in each area, a group of well trained assistants. In each instance, modification and improvements are planned following the first years experience.
   The minimum curriculum requirements in the B.C. and Alberta programs are junior matriculation. It would appear desirable to require Science, Mathematics and English, with a minimum average of 60%.
   In the Ontario two-year program, the training is integrated with Grades 11 and 12 – a 60% average requirement, and the subjects of Science, English and Commercial Mathematics is stipulated.
   At least two other high schools in the Scarboro area are planning similar programs.
   From this beginning, information for further programs is now available.

APPENDIX 4

RULES AND REGULATIONS[1]

By-Laws

Governing the Teaching of the Dental Technicians Association of the Province of Quebec

I. Admission to the Study of Dental Technology

1. In order to be admitted to the study of dental technology, each candidate must submit the following to the office of the Secretary-Treasurer of the Dental Technicians Association:–

   a) A written application.

   b) A satisfactory proof of good morals.

   c) A satisfactory proof certifying that he is not afflicted with any infirmity or illness which would render him unsuited to these studies or the practice of this art.

   d) A school certificate of at least the 11th year from a Primary High School recognized in the Province of Quebec. The English-speaking candidate must submit a Junior Matriculation Certificate from a recognized School in the Province of Quebec. Any candidate who does not possess a Certificate as specified shall produce an equivalence recognized by the Pedagogy Committee.

   e) As proof of his competence any candidate who does not fulfill the requirements of Article "d", must pass an examination on the teaching matters in these primary High Schools. The day, time and place of these examinations, also the questions to be asked, the mode of correction and the number of marks for each question; the percentage to be retained on each subject and on the whole; the right to take the examination over again – will be determined by the Pedagogy Committee, according to the customs in general use. The examiner or examiners will also be appointed by this Committee.

   f) The fee for this examination which will be defrayed by the candidate will be fixed by the Pedagogy Committee, but will not at any time exceed the sum of fifteen dollars. This fee must accompany each candidate's application.

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[1] Excerpt from *By-Laws of Pedagogy and Internal Management*, The Association of the Dental Technicians of the Province of Quebec, Montreal, pp. 7–13. The Secretary of the Association reported April 19th, 1963, that "major teaching amendments will be brought to our Pedagogic By-Laws in the very near future".

2. However, any person who, prior to the coming into force of the present By-Laws was already engaged as an apprentice or in the study of dental technology in this Province, or in the Armed Forces of Canada, will not be required to fulfill the conditions set out in paragraphs d, e, f, of the above By-Law No. 1. But this person will have to pass a theoretical or practical examination, or the two together, to determine in which year he or she should be classed. The Rules and Regulations governing these examinations are left to the discretion of the Pedagogy Committee, and the decision of the examiners appointed by the said Committee will be final.

3. An entry fee of $30.00 to be paid to the Secretary-Treasurer of the Association must accompany each application for the study of dental technology; and an entry fee of $15.00 must be paid to the Secretary-Treasurer of the Association by any person who, prior to the coming into force of this present By-Law was already engaged in the study of dental technology.

4. Any candidate having complied with the requirements of the present By-Laws of the Association, will be entitled to be registered as "Student" in the registers of the Association, and a Certificate (signed by the President and Secretary-Treasurer of the Association) authorizing such person to study dental technology in this Province will be awarded by the Association, and only the holders of such Certificate will have the right to study dental technology in this Province. This does not apply to students of Dental Faculties.

II. The Study of Dental Technology

5. Any student in dental technology must spend a study period of five years in a licensed surgeon dentist's establishment or that of a dental technician member of the Association, under a contract with the Association of Dental Technicians of the Province of Quebec. A copy of this contract must be kept on file by the Secretary-Treasurer of the Association.

6. Any person having a student of dental technology, is bound to supervise and direct the training of such student according to the Rules and Regulations established by the Pedagogy Committee, in such a way to enable him to acquire the necessary knowledge and training for the practice of the Art of Dental Technician.

7. Any student changing his place of apprenticeship shall immediately notify the Council of the Association.

PROGRAMME OF STUDIES
FOR THE ASPIRING DENTAL TECHNICIAN

8. The course of studies in dental technology, subdivided into five years, consists of theoretical and practical work, and is divided as follows:–

First Year

Practical work:	Casting of impressions; molding; polishing of gold, of acrylics and vulcanite; Sculpture of teeth; General survey of dental prosthesis.
Theory:	Elementary principles of physics and chemistry; Dental Morphology.

Second Year

Practical work:	Construction of base plates Mounting of models on articulator on simple and anatomic lines; Waxing of and packing of acrylic and vulcanite dentures; Preliminary work on the construction of bridges, crowns and inlays.
Theory:	More thorough study of physics and chemistry applicable to dental technology; Principles of general descriptive anatomy.

Third Year

Practical work:	Mounting of teeth on models; Construction of bars and clasps with wires; Continuation of work on crowns, bridges and inlays.
Theory:	More advanced anatomical studies, particularly of the head; Principles of metallurgy with more advanced study of that part of metallurgy applicable to dental technology; Elementary principles of applied mechanics.

Fourth Year

Practical work:	Final work on crowns, bridges, fixed and removeable; Construction and casting of bars and clasps.
Theory:	Applied mechanics applicable to reconstruction of the mouth; Fundamental principles of the arts, perspective, colours, physiognomy.

Fifth Year

Practical work:	Practical knowledge of ceramics; Construction of bridges and crowns in acrylic; Engineering principles of mouth restoration.
Theory:	Elementary principles on natural sciences; Economy relative to the administration of a Laboratory.

9. An annual examination shall take place for each year of study.

10. Theoretical studies will be given in special courses by appropriate schools, Universities, or by professors appointed by the Pedagogy Committee.

11. The place, day, time, questions for examinations and practical work to be done, the number of marks to be granted and the percentage to be obtained on each subject, will be set by the Pedagogy Committee. The examiners for these examinations will be appointed by the Pedagogy Committee.

12. Any person submitting themselves for examinations shall so advise the Secretary-Treasurer of their intention one month before the date set for the annual examination, and shall forward at the same time with such notice a sum of $15.00 to cover such examination expenses, with the exception of the final examination which will be $30.00.

13. An annual fee will be required, payable in advance, from each student in dental prosthesis, as follows:

$20.00 for the first year
$25.00 for the second year
$30.00 for the third year, and each of all subsequent years.

14. The Committee of Pedagogy will facilitate, by correspondence or otherwise, the study of theoretical subjects to students residing out of Montreal, who could not follow the regular courses.

15. The Pedagogy Committee, the quorum being of five members, will have the power, with the majority, to decide any teaching question which might come up and which has not been covered by the present Rules and Regulations.

16. The members of the Pedagogy Committee can, at will, assemble to dispose of any business pertaining to this Committee; adjourn and settle their meetings and procedures; determine by ordinary resolutions the place, the time, mode of delay for the calling of their regular or special meetings.

17. The manual or text books to be used by the students shall be chosen by the Committee of Pedagogy.

III. Admission to Practice

18. The candidate aspiring for admission to practise the art of Dental Technician, who wishes to pass his final examination, must give to the Secretary-Treasurer of the Association, a written notice to this effect, at

least one month before the date of the examination. This notice must be accompanied by a sum of $30.00 to cover the costs of the examination.

19. The only students admitted to the practice of the Art of Dental Technology will be those who are British Subjects, and have satisfied the requirements of the present By-Laws, and who have successfully passed the examinations on the matters enumerated by the By-Law No. 11.

20. With the consent of the Council of the Association of Dental Technicians of the Province of Quebec, may be admitted members of this Association, any dental technician who on June 3rd, 1944, was practising this art with competency and has neglected to submit an application to be admitted in the delay prescribed by the Act of Dental Technicians, providing he submits a written application to this effect before December 1st, 1945, and proves his competency to the satisfaction of the Committee formed to this effect.

    Any dental technician from the Province of Quebec presently in the Armed Forces of Canada can enjoy for a period of one year following his demobilisation, the same privileges granted by paragraph 1 of Article III, Section 5, of the Dental Technicians Act of the Province of Quebec. (8, George VI, Chapter 43).

    To pass upon applications for admission made after October 3rd, 1944, by virtue of the present Article, a Committee shall be formed in the same manner as described in Paragraph 2, Article III, Section 5, of the Dental Technicians Act of the Province of Quebec. The members of this Committee shall remain in office until their replacement.

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