How far to the nearest physician?

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Abstract

Meeting the need for physician care outside of urban centres has long been a health policy concern. The challenges of providing such services in these areas stem from relatively fewer physicians and greater travel distances. In 1993, nearly all (99%) residents of large urban centres (with one million or more people) were less than 5 km from the nearest doctor. But outside of urban centres, only 56% of residents were situated that close to a physician.

As well, proximity to physicians varied with income in less urbanized and rural areas, but not in more urbanized areas. And while Canadians in the southernmost parts of the country enjoyed very short distances to a physician, in northern latitudes, physicians tended to be much farther away. For instance, in 1993, at 65-69^0 north latitude, with 3,974 people for every physician, nearly two-thirds of the population (64%) was 100 km or more from the nearest doctor. By contrast, below 45^o north latitude, which includes Halifax, Toronto and all of southwestern Ontario, the population to physician ratio was 476, and 91% of the population was within 5 km of a physician.

Using the Canadian Medical Association's 1993 address registry of physicians, this article analyses the distance to the nearest physician (57,291 physicians) from a representative point within each of Canada's 45,995 census Enumeration Areas. Distance to the nearest physician by their specialty is also considered.

Key words: *health services accessibility, medically underserved area*

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When Canadians need to see a doctor, the cost of physician services is not a barrier. Each province and territory issues a health insurance card to all its residents that allows them to go to the doctor or clinic of their choice. Physicians providing insured services bill the provincial or territorial government, not their patients. These physicians are usually paid on a fee-for-service basis according to a schedule negotiated between every provincial and territorial government and the medical association in that jurisdiction.

However, travel distance may restrict some people's access to health services. Research on the pattern of physician service utilization has found "distance-decay" effects. The use of services tends to decline as the distance to a physician increases, especially in rural areas.[1,2]

Since the majority of Canadians live in urban areas, it is not surprising that in 1993 close to 87% of Canadians were less than 5 km from a physician. Nonetheless, another 12% were at least 5 km but less than 25 km away, and almost 2% had to travel 25 km or more.

This article examines the proximity of the population to physicians by calculating the aerial distance to the nearest physician from a representative point within each of Canada's 45,995 Enumeration Areas (EAs) (see *Methods*). These results are analyzed by community size, EA income, latitude north, and province or territory.

Geographic proximity to physicians is, of course, just part of the health care challenge facing residents outside of urban centres. Related issues, such as the quality and mix of facilities and the availability of emergency treatment, are not discussed here.

Methods

Data source

The population and income data analyzed in this article are from the 1991 Census. Population counts are from the 100% sample ("short-form" questionnaire); the income data are based on the 20% sample ("long-form" questionnaire).

It was not possible to calculate distance to the nearest physician for each individual. Instead, small geographic areas—census Enumeration Areas (EAs)—were considered. Each EA has a representative point that was used to represent the location of all the EA residents. The latitude and longitude of each representative point were obtained from the 1991 Geography Attributes File of the Geography Division of Statistics Canada.[3]

For this article, the postal codes from 57,291 physician mailing addresses were obtained from the Canadian Medical Association's Physician Master File for summer 1993. These addresses were assumed to refer to the location where physician services were provided. Using the Postal Code Conversion File (PCCF) and the Geocodes/ PCCF software, each physician was assigned the latitude and longitude of the representative point for the EA or block-face that corresponded to his or her mailing address postal code.[4-6] When the postal code referred to a post office box or rural post office, somewhat different methods were used.

For post office boxes in urban areas, all the postal codes within a given Forward Sortation Area (FSA) were considered. (The FSA is the postal service area represented by the first three characters of the postal code.) The average latitude and longitude of the representative points for all the EAs within the FSA were calculated. Given the limited area served by most urban FSAs, this approximate location was usually no more than 1 km from any possible point in the FSA.

For rural postal codes, the EA in which the post office was located was selected, along with the latitude and longitude of its representative point. It was assumed that a physician's practice was more likely to be located in the village centre, along with the post office, rather than in the outlying areas served by the same rural postal code.

Analytical techniques

The aerial distances from each EA representative point to the nearest physician were measured. If the calculated distance was 0.5 km or less, 0.5 km was arbitrarily assigned as the distance. One aim of this assignment was to eliminate distances of 0 km, which would occur when both physician and population were assigned the same representative point, as would happen outside of urban centres when the physician and population were coded to the same EA.

To calculate means and medians, these distances were weighted by the population of each EA. Because mean (average) distances are heavily influenced by outliers and are more suitable for non-skewed distributions, the analysis is based on medians, although mean distance is provided as a supplementary measure (Appendix, Tables A to C).

Distance to the nearest physician was tabulated at several geographic levels. EAs were grouped by province or territory, community size, and latitude. Latitude north was classified as follows: 40-44° (e.g., southwestern Ontario, Toronto, Halifax); 45-49° (e.g., St. John's, Saint John, Montreal, Ottawa, Winnipeg, Vancouver, Victoria); 50-54° (e.g., Regina, Saskatoon, Calgary, Edmonton); 55-59° (e.g., Churchill, Fort McMurray); 60-64° (e.g., Whitehorse, Yellowknife); 65-69° (northern parts of the Yukon and middle parts of the Northwest Territories); and 70°+ (northernmost part of the Northwest Territories).

To analyze distance to nearest physician by income, EAs were first classified as being in "more urbanized areas" (CMA/CA population of generally 50,000 or more) or "less urbanized and rural areas" (generally smaller CAs and non-CMA/CA areas). EA income was based on a derived variable from the 1991 Census—Income Per Person–Equivalent (IPPE)—which takes into consideration the economies of scale possible when two or more people share a household (see *Income Per Person-Equivalent*). EAs in both groups (more urbanized areas, and less urbanized and rural areas) were ranked by income and classified into "area-based" income quintiles.

Population to physician ratios were also calculated. Lower ratios generally indicate greater availability of physicians.

Limitations

Aerial distance to the nearest physician is a rather crude indicator of geographic accessibility to physician services and clearly underestimates the overland distance patients must travel on city streets and country roads. As well, considering distance alone ignores other elements of access to physicians. In addition, proximity and access are not necessarily synonymous, nor does access create equal health outcomes. Moreover, the nature of medical attention that individuals need will vary according to characteristics such as sex, age, and culture, as well as health status.

The physicians included in this article were those registered with the Canadian Medical Association as of summer 1993. The addresses in the directory may not fully reflect the geographical availability of physicians. Some may practice in more than one location, including occasional days in northern or isolated areas, while others may not work full time or may not see patients at all (if they are engaged in research or administration). A relatively small number of postal codes may refer to the physicians' home addresses, which could yield underestimates of population to physician ratios in more affluent areas. Because of incomplete, inaccurate or missing postal codes, 1.0% of physician records could not be coded to CMA/CA size, and 1.2% could not be coded to EA income quintile.

For this article, EA representative points were used for population locations. Distance to the nearest physician was not calculated for every person. Since residents may be located anywhere within an EA, some people will be somewhat closer to the nearest physician than others. Because many EAs included only institutional residents for whom no income data were collected on the census, and other EAs had so little population that data tabulated by income were suppressed, 0.8% of the total population could not be coded to EA income quintile.

In rural areas, it was assumed that physicians located their practices in village centres where the post office is situated. The net effect of this assumption combined with the technique of using EA representative points to represent a group of residents is unknown. Because rural postal codes cover relatively large areas compared with their urban counterparts, and because rural populations are more dispersed, the implications are far more consequential for estimates in rural areas.

Longer distances outside urban centres

Meeting the need for physician care outside of urban centres (non-CMA/CA areas) has long been a health policy concern (see *Definitions*).[7-13] The challenges of providing such services in these areas stem from relatively fewer physicians and greater travel distances. In 1993, non-CMA/CA areas had 23% of Canada's population, but only 9% of the country's physicians. Consequently, the ratio of people to physicians in these areas was higher than in urban centres. For example, large urban centres with one million or more residents had 390 people per physician. Outside urban centres, there were 1,175 people for every doctor (Chart 1; Appendix, Table A).

The smaller the community, the farther the distance to the nearest physician. Only 56% of residents outside of urban centres were less than 5 km from a physician in 1993. Nearly all (99%) residents of large urban centres with one million or more people were this close to a doctor (less than 5 km).

In addition, for specialized physician care, residents outside of urban centres have to travel much farther than do other Canadians. Most (86%) of the 5,300 physicians in non-CMA/CA areas were in general practice or family medicine. The remaining 730 were specialists, who accounted for just 3% of all specialists in Canada.

Big city—short distance

People living in large urban centres are generally not far from a doctor. At least 90% of the people in almost all of Canada's 25 CMAs were less than 5 km from the nearest physician. The proportions were slightly lower for Halifax (88%) and Saint John (82%) (Appendix, Table B).

Canada's three largest CMAs, Toronto, Montreal and Vancouver, had 32% of the population, but 39% of the country's doctors. Together, urban centres of 100,000 or more had 63% of the population, but 77% of physicians.

Definitions[14]

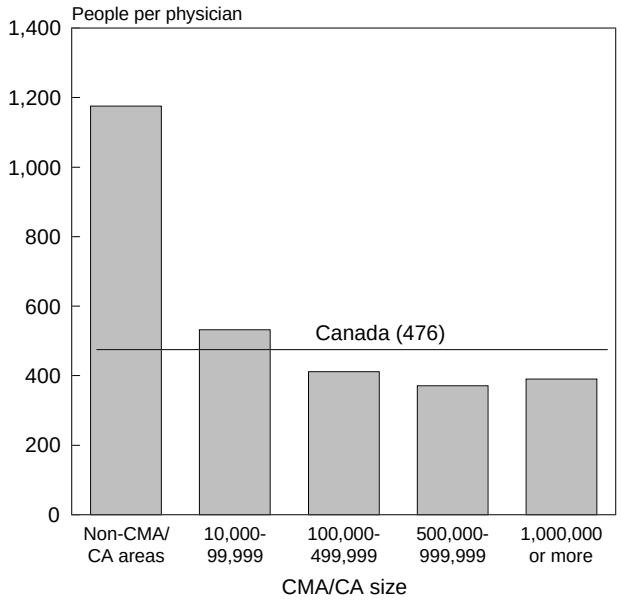
Enumeration Area (EA): The general approach adopted by the census to organize geographical data is to use a "building block" system, where smaller geographical units may be added together to form larger units, which in turn form even larger units, until they all add up to the total of Canada. The smallest unit in this system is the Enumeration Area—the geographic area canvassed, or enumerated, by one census representative. In rural areas, an EA can cover relatively wide reaches of land, but in urban areas, it is usually several city blocks. Each EA has a representative point that is used to provide a single longitude and latitude for the EA.

Census Metropolitan Area (CMA): A large urban centre consisting of an urbanized core, with 100,000 or more inhabitants in that core (based on a previous census), and adjacent urban and rural areas that have a high degree of economic and social integration with the urbanized core. Once an area is designated as a CMA, it maintains that status even if its core population falls below the 100,000 threshold. In 1991, there were 25 CMAs in Canada.

Census Agglomeration (CA): A small urban centre consisting of an urbanized core, with 10,000 or more inhabitants but less than 100,000 in that core (based on a previous census), and adjacent urban and rural areas that have a high degree of economic and social integration with the urbanized core. When the core of a CA attains a population of 100,000, the urban centre is re-designated as a CMA. In 1991, there were 115 CAs in Canada.

Chart 1

People per physician, by CMA/CA size, Canada, 1993

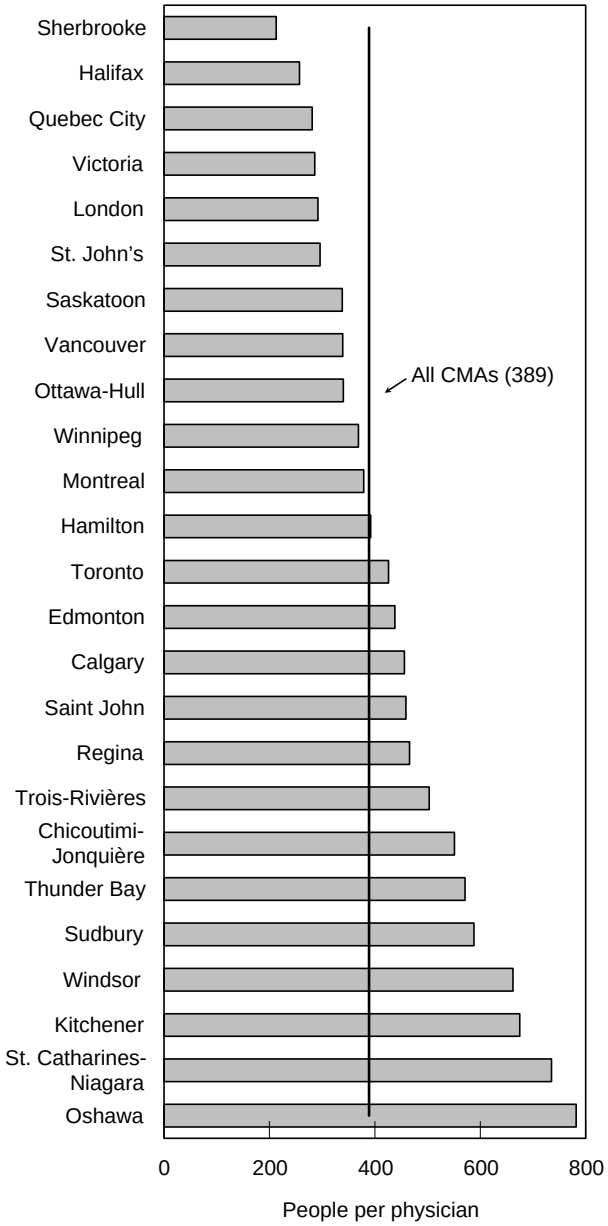


Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

The average population to physician ratio among CMAs was 389. The CMAs with the highest number of people per physician included Oshawa (782), St. Catharines-Niagara (735), Kitchener (675), and Windsor (662). On the other hand, Sherbrooke (213), Halifax (257), Quebec City (281), Victoria (286) and London (292) had ratios considerably below the CMA average (Chart 2).

Chart 2

People per physician, Census Metropolitan Areas, Canada, 1993



Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

A low ratio does not necessarily mean greater availability of physicians. For example, 14 of the 15 CMAs with the lowest population to physician ratios have a faculty of medicine in the area. Some of the physicians employed in these institutions are engaged in teaching, administration and/or research rather than treating patients.

Income a factor in less urbanized and rural areas

In the more urbanized areas of Canada, physicians are concentrated in the most affluent EAs (see *Income Per Person-Equivalent*). About 40% of all physicians in these more urbanized areas were located in "high-

Income Per Person-Equivalent

EA income was based on a variable derived from the 1991 Census—Income Per Person-Equivalent (IPPE)—which takes into consideration the economies of scale possible when two or more people share a household. It uses the distribution of household sizes in an EA to adjust for the bias introduced by more conventional measures such as average household income.

EA-level income information available from the census includes average household income (total EA income divided by the number of private households in that EA) and average personal income (total EA income divided by the population aged 15 and over in that EA). However, these two indicators do not account for the number of people per household. Two people sharing a residence do not require twice the income of a person living alone to maintain the same standard of living. Thus, an EA with relatively low average personal income, but many multi-person households, may have a standard of living similar to an EA with relatively high average personal income but many one-person households. The calculation of IPPE adjusts average household income for the bias introduced by the unequal distribution of household sizes across EAs.

These person-equivalents were originally intended for use on family data (for the calculation of low-income cut-offs), although in this article they were applied to household data. Since most households have only one family, this application was assumed to have had little effect. IPPE is calculated as follows:

IPPE = total household income in an EA / person-equivalents,

where person-equivalents =
1.00 (number of one-person households) +
1.36 (number of two-person households) +
1.72 (number of three-person households) +
1.98 (number of four-person households) +
2.30 (number of five- or more person households).

A more detailed description is available from the authors on request.

income EAs" (the highest quintile).[a] This disproportionate distribution resulted in a population to physician ratio of 193 in high-income EAs, which was less than half the ratio for the other quintiles (Chart 3). Despite this, income bore little relationship overall to the distance to the nearest physician in more urbanized areas. In 1993, 98% of residents of both high- and low-income EAs (highest and lowest quintiles) were within 5 km of the nearest physician.

In less urbanized and rural areas, physicians also tend to concentrate in high-income EAs, but to a much lesser degree. About 25% of all physicians in these areas were located in high-income EAs in 1993, where the population to physician ratio was 621, well below the average of 797 for all less urbanized and rural areas (Chart 3).

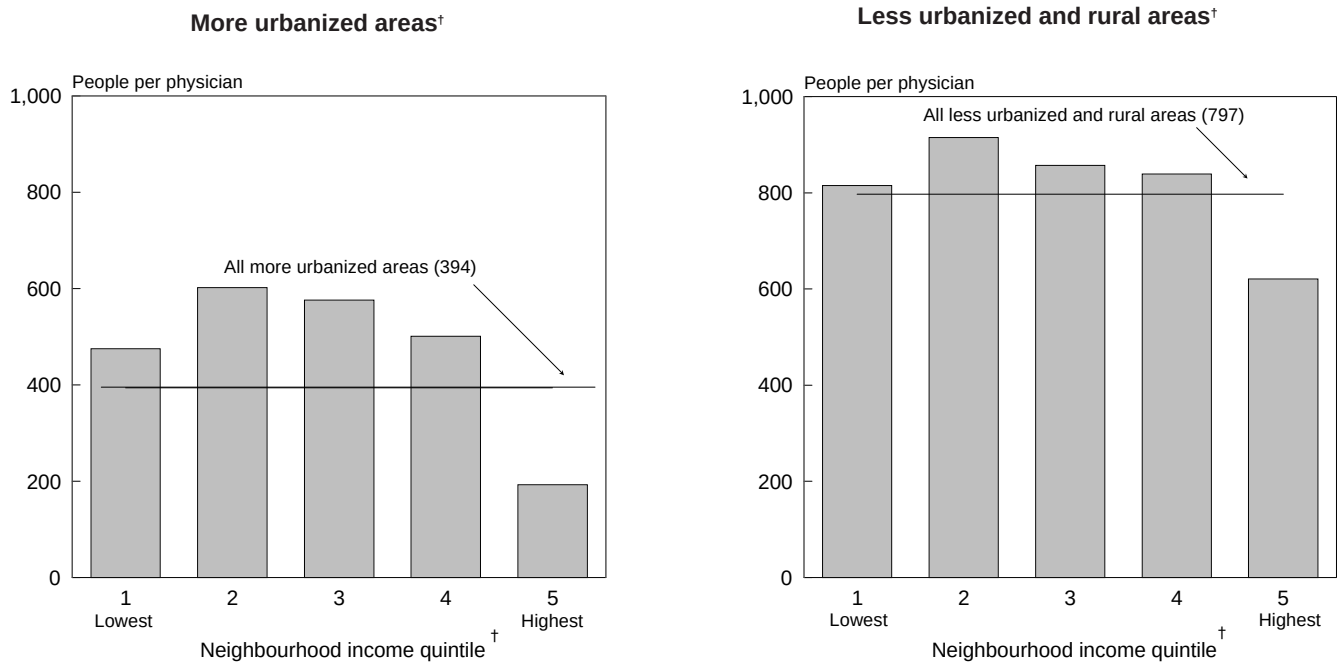
As well, residents of low-income EAs in less urbanized and rural areas tend to be farther away from the nearest physician. In 1993, 55% of residents of EAs in the lowest quintile were less than 5 km from a physician (Chart 4). By contrast, in high-income EAs, 76% of the population was less than 5 km from the nearest physician.

For people in low-income areas in less urbanized and rural Canada, the difficulties stemming from longer distances to doctors may be compounded by a lack of transportation. For instance, in rural areas, a 10-km trip to the doctor is relatively easy for a vehicle owner, but may be troublesome for others. According to the 1993 Household Income, Facilities and Equipment Survey, about 24% of households in rural areas with an income of less than $15,000 did not own a vehicle, compared with about 2% of those whose income was $30,000 or more.[15] In addition, the availability of public transit tends to be limited in rural locales.

[a] *The extent to which this reflected physicians' home address instead of their practice is unknown.*

Chart 3

People per physician, by degree of urbanization and EA income, Canada, 1993



Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

† *See Definitions and Methods.*

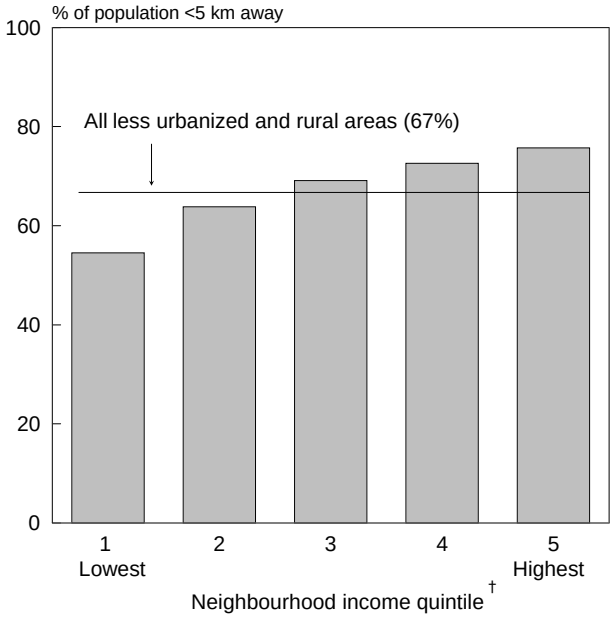
Latitude north

Since many residents of Canada's more northerly regions are located in widely dispersed communities and rural areas, it is not surprising that the population to physician ratio and distance to the nearest physician increase with latitude north (Map). For instance, in 1993, at 65-69° north latitude, with 3,974 people for every physician, nearly two-thirds of the population (64%) was 100 or more km from the nearest doctor (Charts 5 and 6).

No physicians were normally in residence above 70° north latitude to serve the 3,300 people living there. The entire population was 150 or more km away from the nearest physician, and the median distance was 839 km. However, physicians may still have been available in these remote areas through temporary assignments or rotation programs. As well, medical services may have been provided by clinics staffed by nurses.

Chart 4

Percentage of population less than 5 km from a physician, by EA income, less urbanized and rural areas,† Canada, 1993



Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

† *See Definitions and Methods.*

By contrast, in Canada's southernmost areas (below 45° north latitude), which include Halifax, Toronto and all of southwestern Ontario, the population to physician ratio was 476, and 91% of the population was within 5 km of a physician. The area from 45° to 49° north latitude, which includes Montreal, Vancouver, Ottawa, Calgary, Regina and Winnipeg, had a somewhat lower population to physician ratio (448) than did the area south of the 45th parallel, but a slightly smaller percentage of the population (87%) was within 5 km of a physician.

Northwest Territories and Yukon

The Northwest Territories (1,068) and the Yukon (695) had high population to physician ratios. But despite these high ratios, median distances to the nearest physician were relatively short: 1.2 km in the Northwest Territories and 2.1 km in the Yukon. In the Yukon, where the majority of the population (64%) lives in Whitehorse, 68% of residents were less than 5 km from a physician. In the Northwest Territories, where the population is more dispersed, 57% were less than 5 km from a physician, but 31% were 150 km or more away.

Both territories have high concentrations of Aboriginal people. About half (51%) the population of the Northwest Territories and 14% of the Yukon population reported single Aboriginal origins to the 1991 Census.[b] The Medical Services Branch (MSB) of Health Canada has made arrangements to serve Aboriginal people residing in more remote areas of the territories.[16] Many MSB facilities in remote Aboriginal communities are the only source of medical care within hundreds of kilometres.

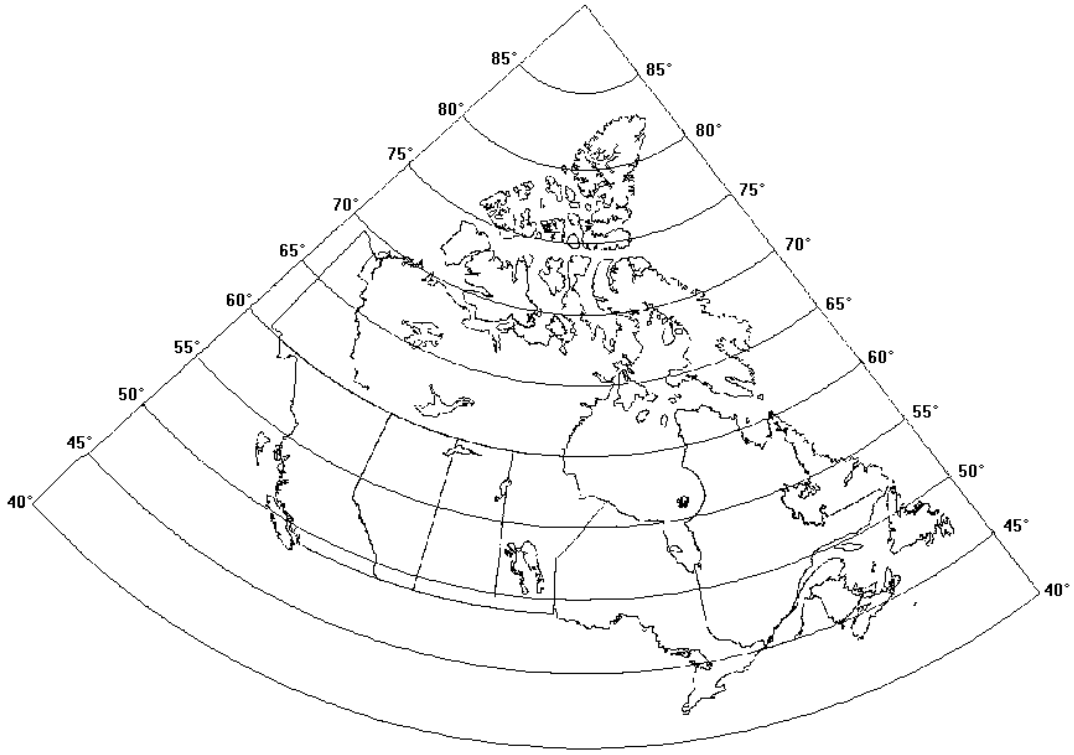
The provinces

As might be expected, population to physician ratios are high in provinces where many residents live in small communities or rural areas. For instance, in 1993, Prince Edward Island had the highest provincial ratio (721). Ratios were also high (over 600 people per physician) in New Brunswick and Saskatchewan (Chart 7). British Columbia enjoyed the lowest ratio (404),

[b] *Respondents to the Census may report more than one ethnic origin. Thus, it is possible for one person to have a combination of Aboriginal and non-Aboriginal origins, or more than one type of Aboriginal origin.*

Map

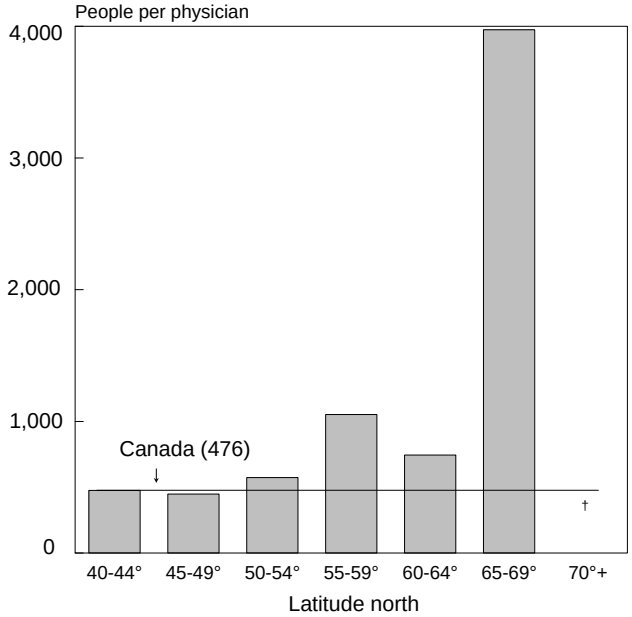
Canada with degrees of latitude



Source: *Geography Division, Statistics Canada*

Chart 5

People per physician, by latitude north, Canada, 1993

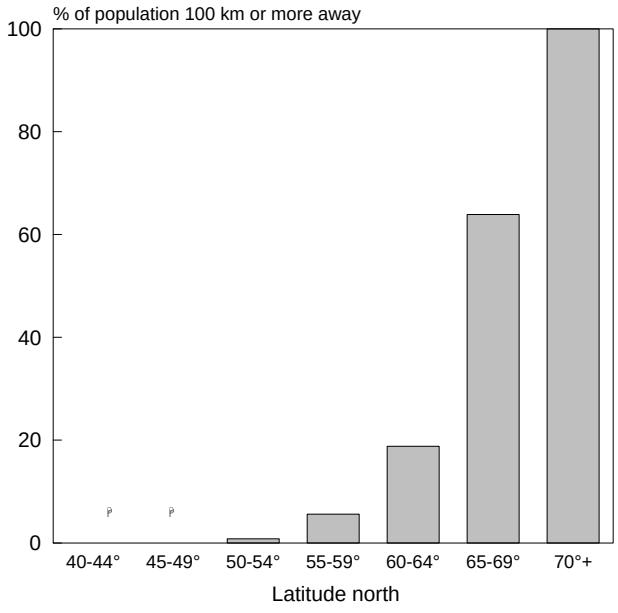


Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

† *No physicians normally reside at 70°+ north latitude.*

Chart 6

Percentage of population 100 km or more from a physician, by latitude north, Canada, 1993



Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

† *All population within 100 km of a physician.*

and only two other provinces, Quebec (447) and Nova Scotia (439), had ratios below the Canadian average.

Provincial differences in the proportion of residents less than 5 km from a physician were more striking and reflected the relative extent to which the population is concentrated in large urban centres in each province. In British Columbia, Quebec and Ontario, 91% of residents were less than 5 km from a physician. By contrast, in Nova Scotia, despite the low population to physician ratio, only 70% of residents were less than 5 km from the nearest physician. And in Saskatchewan, Prince Edward Island and New Brunswick, less than 70% were less than 5 km away (Chart 8).

Rurality was also evident in the percentages of provincial populations that were 25 km or more from the nearest physician. At 12%, the percentage was highest in Saskatchewan. The figure was 5% in Manitoba, and 4% in both Newfoundland and Alberta.

In Ontario, with 10 million people and 21,000 physicians, just 0.4% of the population was 25 or more km away from the nearest doctor. But although small in proportion, this meant that approximately 40,000 Ontario residents were 25 or more km away from a physician (compared with 24,000 in the Northwest Territories).

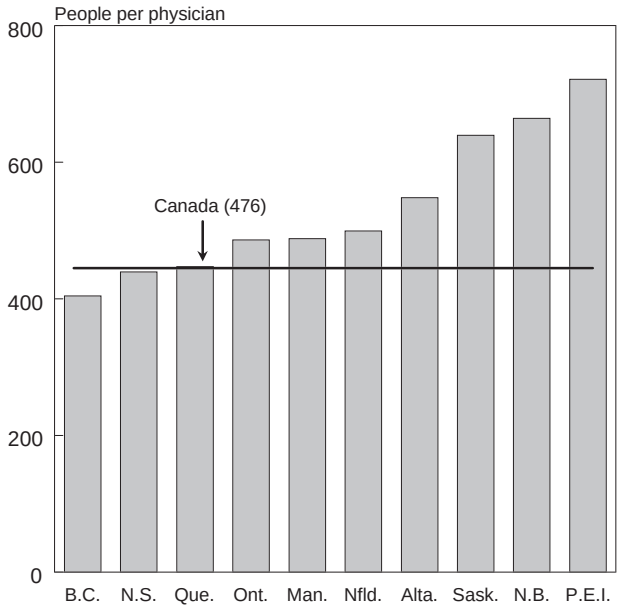
Medical specialties

Canada's health care system relies extensively on general practitioners to provide medical care and make referrals to specialists. They are the gatekeepers of the health care system; patients usually may not consult a specialist unless referred by a general practitioner. In 1993, just over half of Canada's physicians (55%) were in general practice or family medicine, and 86% of the population was within 5 km of a general practitioner. However, distances to specialists varied widely (Appendix, Table C).

Usually, the more physicians in a specialty, the shorter the distance. For example, the median distance to any of the 3,415 psychiatrists was 2 km, and just 16% of the population was 25 km or more away from one. On the other hand, the median distance to the 464 dermatologists was 5 km, and about 30% of the

Chart 7

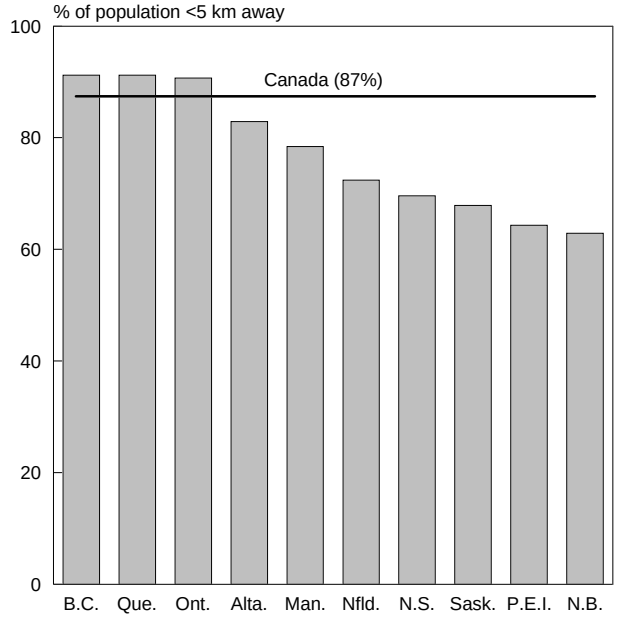
People per physician, by province, Canada, 1993



Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

Chart 8

Percentage of population less than 5 km from a physician, by province, Canada, 1993



Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

population had to travel 25 km or more. Of course, access to a specialist is more complex than to a general practitioner, involving not only distance, but also a referral, waiting time for an appointment, availability of technology, and other factors.

Implications

One objective of the publicly funded health care system has been to provide comparable access to health services for everyone.[17] The system was founded on the principle that "health services should be available to all Canadians wherever they are and whatever their financial means."[18] Potential barriers based on geographic location are relatively small in more urbanized areas. By contrast, in less urbanized and rural areas, distances are longer and differ somewhat by neighbourhood income. And distance to the nearest physician tends to increase with latitude north.

To some degree, persistent disparities in population to physician ratios by community size may stem from difficulties in attracting and maintaining physicians in less urbanized and rural areas. A national survey of physicians in rural practices and of those who had recently left rural areas identified morale problems related to long working hours, lack of personal opportunities, and insufficient professional support.[11] The burden is especially great for family physicians in rural areas who deal with problems that their counterparts in cities would readily refer to specialists.

Strategies to address this situation have included government and academic incentive programs, increased exposure of medical school students to rural practice, and organization of regional groupings of physicians to provide a critical mass of medical expertise.[7] The need for community involvement in attracting physicians to rural areas has also been recognized.

Financial incentives and the active recruitment of medical students have been used in an effort to adjust the geographic distribution of physicians.[7] However, the outcomes have been mixed. In Quebec, incentives such as bursaries, installation grants, higher rates of remuneration, and 20 days' paid leave each year for upgrading have not yielded the anticipated results.[12] Quebec physicians, particularly specialists, continue to concentrate in urban centres such as Montreal, Quebec City, and Sherbrooke.[12] Similarly, despite implementation of the Underserviced Area Program of Ontario, the number of physicians in these areas has not reached desired levels.[19]

Other strategies have been proposed to improve primary care in rural areas. For example, it has been suggested that the professional isolation of rural physicians might be reduced through continuing medical education and through telecommunications technology.[20] As well, the supply of rural primary care providers might be increased by lessening specialty and geographic differentials in physician income.

This article provides recent data on distance to the nearest physician and thereby quantifies what may be a problem for some Canadians. Unanswered here is whether travel distance to a physician is a deterrent to care. Patients who must travel a long way to a doctor may put off regular check-ups. Some may postpone visiting a physician for apparently minor ailments.

An analysis of health status and outcomes, by distance to the nearest physician, would help to answer these questions and build on the research presented here. To evaluate policies aimed at improving access to care, it would also be useful to examine changes over time in geographic proximity to physicians.[21] Data on distance to the nearest physician, combined with incidence data on diseases or health problems, could aid in the understanding of health care and public health issues.

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Appendix

Table A

People per physician and distance to nearest physician, by selected characteristics, Canada, 1993

Characteristics	Population		Physicians		Population per physician	Distance to nearest physician		% of population by distance (km) to nearest physician[†]					
						Mean	Median	<5	5-24	25-49	50-99	100-149	150+
		%		%		km					%		
Canada	**27,296,859**	**100.0**	**57,291**	**100.0**	**476**	**3.1**	**0.5**	**86.8**	**11.5**	**1.2**	**0.3**	**0.1**	**0.1**
Newfoundland	568,474	2.1	1,139	2.0	499	6.7	1.2	72.4	24.0	2.5	0.1	0.3	0.8
Prince Edward Island	129,765	0.5	180	0.3	721	4.4	3.0	64.3	35.7	-	-	-	-
Nova Scotia	899,942	3.3	2,048	3.6	439	4.0	0.5	69.6	29.3	1.1	-	-	-
New Brunswick	723,900	2.7	1,090	1.9	664	5.1	2.4	62.8	35.5	1.7	-	-	-
Quebec	6,895,963	25.3	15,435	26.9	447	2.0	0.5	91.2	8.2	0.3	0.1	0.1	-
Ontario	10,084,885	36.9	20,760	36.2	486	1.8	0.5	90.7	8.9	0.3	0.1	-	-
Manitoba	1,091,942	4.0	2,239	3.9	488	6.2	0.5	78.4	16.8	2.5	1.2	0.2	0.7
Saskatchewan	988,928	3.6	1,547	2.7	639	8.3	0.5	67.9	20.5	10.0	1.3	0.1	0.2
Alberta	2,545,553	9.3	4,641	8.1	548	3.9	0.5	82.9	13.5	2.9	0.5	0.1	-
British Columbia	3,282,061	12.0	8,118	14.2	404	2.3	0.5	91.2	7.2	1.1	0.3	0.1	-
Yukon	27,797	0.1	40	0.1	695	23.6	2.1	68.4	13.6	4.6	4.0	4.3	5.0
Northwest Territories	57,649	0.2	54	0.1	1,068	155.2	1.2	57.3	0.7	0.2	3.9	6.5	31.4
CMA/CA size[‡]													
1,000,000 or more	8,622,790	31.6	22,109	38.6	390	0.7	0.5	99.1	0.9	-	-	-	-
500,000-999,999	4,412,478	16.2	11,881	20.7	371	1.0	0.5	96.5	3.5	-	-	-	-
100,000-499,999	4,214,504	15.4	10,260	17.9	411	1.3	0.5	93.8	6.1	0.2	-	-	-
10,000-99,999	3,817,442	14.0	7,181	12.5	532	1.8	0.5	91.2	8.3	0.4	0.1	-	-
Non CMA/CA areas	6,229,645	22.8	5,302	9.3	1,175	10.2	3.8	55.6	37.4	4.7	1.1	0.4	0.8
CMA/CA size missing	…	…	558	1.0	…	…	…	…	…	…	…	…	…
More urbanized areas[‡]													
Income quintiles[§]													
All	17,918,831	100.0	45,524	100.0	394	0.9	0.5	97.1	2.9	-	-	-	-
1 (Lowest)	3,581,486	20.0	7,534	16.5	475	0.8	0.5	98.1	1.9	0.1	-	-	-
2	3,557,161	19.9	5,906	13.0	602	1.0	0.5	96.7	3.2	0.1	-	-	-
3	3,552,496	19.8	6,164	13.5	576	1.0	0.5	96.4	3.6	-	-	-	-
4	3,545,302	19.8	7,066	15.5	502	1.0	0.5	96.4	3.6	-	-	-	-
5 (Highest)	3,524,722	19.7	18,256	40.1	193	0.8	0.5	97.9	2.1	-	-	-	-
Income quintile missing	157,664	0.9	598	1.3	…	…	…	…	…	…	…	…	…
Less urbanized and rural areas[‡]													
Income quintiles[§]													
All	9,378,028	100.0	11,767	100.0	797	7.4	1.5	67.2	28.0	3.3	0.7	0.3	0.5
1 (Lowest)	1,912,480	20.4	2,350	20.0	814	14.2	3.4	54.5	33.9	6.5	2.5	0.8	1.8
2	1,860,652	19.8	2,033	17.3	915	8.1	1.8	63.8	31.8	3.3	0.5	0.1	0.5
3	1,873,236	20.0	2,187	18.6	857	5.9	1.5	69.1	27.5	2.7	0.3	0.3	0.1
4	1,860,220	19.8	2,217	18.8	839	4.4	1.3	72.6	25.2	1.9	0.2	-	-
5 (Highest)	1,802,032	19.2	2,902	24.7	621	4.3	1.1	75.7	21.9	2.1	0.2	0.1	-
Income quintile missing	69,408	0.7	78	0.6	…	…	…	…	…	…	…	…	…
Latitude north													
40-44°	8,754,188	32.1	18,372	32.1	476	1.4	0.5	91.3	8.7	-	-	-	-
45-49°	14,167,419	51.9	31,593	55.1	448	2.3	0.5	87.4	11.8	0.7	0.1	-	-
50-54°	3,989,181	14.6	6,946	12.1	574	6.2	0.5	77.2	16.7	4.5	0.8	0.3	0.5
55-59°	297,608	1.1	283	0.5	1,052	22.2	1.5	61.1	15.0	9.8	8.7	2.2	3.2
60-64°	69,304	0.3	93	0.2	745	47.0	1.3	69.6	6.0	2.0	3.7	4.7	14.0
65-69°	15,894	0.1	4	-	3,974	249.9	137.5	31.1	-	-	5.0	15.3	48.6
70+°	3,265	-	-	-	…	851.3	838.9	-	-	-	-	-	100.0

Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

† *In completed kilometres*

‡ *See Definitions.*

§ *See Methods.*

\- *Nil or zero*

… Figures not appropriate or not applicable

Table B

People per physician and distance to nearest physician, Census Metropolitan Areas, Canada, 1993

	Population	Physicians	Population per physician	Mean distance	% of population by distance to nearest physician	
					<5 km	≥5 km
				km	%	%
All CMAs	**16,665,360**	**42,867**	**389**	**0.9**	**97.4**	**2.6**
Toronto	3,893,046	9,130	426	0.7	98.8	1.3
Montreal	3,127,242	8,249	379	0.7	99.3	0.7
Vancouver	1,602,502	4,730	339	0.7	99.4	0.6
Ottawa-Hull	920,857	2,711	340	1.0	95.2	4.8
Edmonton	839,924	1,919	438	1.4	93.3	6.7
Calgary	754,033	1,655	456	1.0	97.4	2.7
Winnipeg	652,354	1,768	369	0.9	96.4	3.6
Quebec City	645,550	2,297	281	0.8	98.9	1.1
Hamilton	599,760	1,531	392	0.7	99.1	0.9
London	381,522	1,305	292	0.9	96.3	3.7
St. Catharines-Niagara	364,552	496	735	1.2	96.5	3.5
Kitchener	356,421	528	675	0.7	99.3	0.7
Halifax	320,501	1,249	257	1.8	87.5	12.5
Victoria	287,897	1,007	286	1.1	95.8	4.2
Windsor	262,075	396	662	1.0	96.2	3.8
Oshawa	240,104	307	782	0.9	96.5	3.5
Saskatoon	210,023	622	338	2.3	90.3	9.7
Regina	191,692	411	466	1.1	96.4	3.6
St. John's	171,859	581	296	1.4	95.2	4.8
Chicoutimi-Jonquière	160,928	292	551	1.6	92.2	7.8
Sudbury	157,613	268	588	1.6	92.0	8.0
Sherbrooke	139,194	654	213	0.9	97.0	3.0
Trois-Rivières	136,303	271	503	1.0	95.8	4.2
Saint John	124,981	272	459	2.7	82.4	17.6
Thunder Bay	124,427	218	571	1.7	92.7	7.3

Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*
Note: *In all CMAs, median distances to the nearest physician were 0.5 km. See Methods.*

Table C

Distance to nearest physician, by medical speciality, Canada, 1993

Specialty	Physicians		Distance to nearest physician		% of population by distance (km) to nearest physician†						
			Mean	Median	<5	5-24	25-49	50-99	100-199	200-299	300+
		%	km				%				
All physicians	**57,291**	**100.0**	**3.1**	**0.5**	**86.8**	**11.5**	**1.2**	**0.3**	**0.2**	**-**	**-**
General practice/Family medicine	31,311	54.7	3.2	0.5	86.3	12.0	1.2	0.3	0.2	-	0.1
Psychiatry	3,415	6.0	20.3	2.2	65.8	18.1	6.2	5.2	3.2	0.8	0.8
Internal medicine	2,290	4.0	19.0	2.5	64.0	20.6	6.1	5.4	2.7	0.3	0.8
Anesthesia	2,230	3.9	23.1	2.4	64.8	17.8	6.1	6.1	3.1	1.1	1.0
Pediatrics	1,918	3.3	20.6	2.5	64.0	17.8	7.2	6.6	3.1	0.8	0.7
General surgery	1,804	3.1	13.4	2.3	67.2	21.5	5.5	3.8	1.4	0.4	0.4
Diagnostic radiology	1,760	3.1	19.4	2.6	63.9	19.4	7.0	5.7	2.8	0.6	0.6
Obstetrics/Gynecology	1,599	2.8	19.9	2.8	62.4	19.7	7.4	6.4	2.7	0.6	0.7
Opthalmology	1,047	1.8	28.3	3.7	55.8	23.1	7.8	5.7	4.8	1.5	1.3
Orthopedic surgery	997	1.7	25.9	3.7	56.8	22.5	8.1	6.4	4.1	1.0	1.2
Cardiology	681	1.2	44.8	5.4	48.1	21.2	9.0	7.9	8.6	2.7	2.6
Otolaryngology	615	1.1	29.1	4.2	54.2	24.2	8.5	5.9	4.3	1.5	1.5
Anatomical pathology	572	1.0	31.0	4.9	50.2	25.1	10.2	7.3	4.6	1.4	1.4
Urology	559	1.0	28.4	4.5	52.7	25.3	9.0	6.1	4.6	1.1	1.2
Emergency medicine	482	0.8	52.5	6.8	43.0	26.7	8.7	7.2	6.3	3.9	4.3
Dermatology	464	0.8	44.9	5.3	48.6	22.5	8.6	8.0	6.1	2.9	3.2
Neurology	454	0.8	43.8	6.3	44.9	24.0	9.7	9.0	7.3	2.5	2.7
General pathology	439	0.8	35.5	5.0	49.9	23.2	8.9	7.5	7.2	1.9	1.4
Plastic surgery	392	0.7	41.7	5.8	45.8	23.9	9.9	9.7	5.4	3.0	2.3
Respiratory medicine	384	0.7	44.6	7.3	41.1	27.0	8.7	10.3	7.9	3.3	1.9
Gastroenterology	323	0.6	45.5	7.0	40.5	27.7	10.1	10.2	6.5	2.5	2.6
Community medicine	307	0.5	52.4	9.4	37.9	27.2	10.3	9.2	8.4	3.0	3.9
Radiation oncology	260	0.5	55.5	10.4	33.1	30.7	10.7	10.0	8.7	3.2	3.5
Haemotology	256	0.4	58.0	10.0	34.9	28.7	9.4	9.3	7.9	6.1	3.7
Endrocrinology/Metabolism	233	0.4	66.3	13.4	32.8	26.3	10.8	11.8	9.1	4.0	5.1
Rheumatology	224	0.4	68.9	9.6	34.8	28.2	9.5	8.8	7.8	4.3	6.5
Medical microbiology	221	0.4	77.4	13.3	31.6	27.4	8.7	11.9	8.9	3.8	7.8
Physical medicine	203	0.4	52.1	9.5	33.8	31.4	10.9	8.8	7.9	4.5	2.7
Neurosurgery	197	0.3	52.8	11.4	30.5	30.8	11.2	12.1	8.9	3.9	2.6
Cardiovascular/Thoracic surgery	191	0.3	63.2	13.3	28.8	30.3	12.3	11.7	8.0	4.7	4.2
Nephrology	189	0.3	66.8	12.5	29.8	31.3	8.2	10.6	9.7	5.7	4.8
Nuclear medicine	177	0.3	55.3	9.8	34.4	30.1	10.0	9.6	8.7	3.6	3.7
Vascular surgery	128	0.2	52.4	9.6	32.8	33.9	8.8	10.7	6.9	3.6	3.3
Medical oncology	105	0.2	74.5	15.6	26.7	30.5	9.8	13.9	9.6	3.8	5.6
Electroencephalography	103	0.2	298.2	51.3	14.5	22.2	13.0	9.3	6.7	4.2	30.1
Geriatric medicine	96	0.2	99.2	24.1	24.0	26.5	11.0	12.4	9.5	5.1	11.5
Clinical immunology	89	0.2	112.0	22.4	22.3	29.2	10.0	10.6	8.3	4.6	15.0
Infectious diseases	84	0.1	86.1	22.5	19.5	32.2	11.8	11.9	10.4	6.0	8.0
Medical biochemistry	83	0.1	104.3	25.9	20.3	29.2	10.3	12.2	12.0	4.6	11.4
Public health	75	0.1	160.8	29.1	18.3	29.2	10.8	11.5	9.0	4.4	16.8
Thoracic surgery	67	0.1	85.5	19.2	21.9	31.6	9.8	13.7	12.5	3.9	8.5
Physiatry	65	0.1	860.1	169.3	12.0	10.4	4.6	7.0	24.8	6.6	34.7
Haematological pathology	59	0.1	110.4	28.0	18.5	29.7	10.1	10.0	11.6	8.0	12.2
Pediatric general surgery	48	0.1	89.0	27.7	15.4	32.6	11.7	13.3	12.7	6.7	7.7
Occupational medicine	42	0.1	145.7	27.0	18.7	30.3	9.8	11.0	8.5	3.4	18.2
Neuropathology	26	--	111.5	41.2	11.6	31.6	10.2	14.2	11.7	9.3	11.2
Pediatric cardiology	12	--	195.0	65.7	8.4	26.7	9.0	14.1	13.0	8.1	20.7
Medical genetics	11	--	164.0	62.1	8.1	29.5	9.3	14.6	10.7	7.3	20.4
Cardiothoracic surgery	3	--	992.9	280.6	2.9	12.0	3.8	8.5	19.3	4.6	49.0
Pathology/Bacteriology	1	--	1,132.0	548.7	0.5	7.1	8.0	6.4	5.2	2.1	70.8

Source: *1993 Canadian Medical Association Physician Master File; 1991 Census*

† *In completed kilometres*

\- *Nil or zero*

-- *Amount too small to be expressed*