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# Physician:population ratios in British Columbia

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Contents


- Abstract
- Résumé
- Introduction
- Methods
- Results
- Discussion
- References


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## Abstract

Objective: To determine the physician:population ratio in British Columbia's health regions and in isolated rural communities in British Columbia.

Design: Analysis of data from the Medical Services Plan and data from the British Columbia 1996 census.

Results: The average family physician:population ratio across British Columbia is 1.06:1000. This ratio varies from 0.76:1000 (Peace Liard region) to 1.65:1000 (Vancouver region). The average total physician (family physician plus specialist physician):population ratio across British Columbia is 1.86:1000 This ratio varies from 0.91:1000 (Peace Liard region) to 3.73:1000 (Vancouver region). Family physician:population ratios were calculated for 69 rural communities. Family physician:population ratios vary from 3.27:1000 (Alert Bay) to 0.36:1000

(Salmo). There were 2 communities (Madeira Park and Valemount) listed as having no physician. Sixty-five percent of these rural communities have family physician:population ratios that are less than the British Columbian average, and 42% have family physician:population ratios of 0.80 or less.

Conclusions: The physician:population ratios in all northern health regions and in many rural communities throughout British Columbia, are below the provincial average. This may contribute to the issue of "burnout" commonly cited among physicians working in rural areas.

[Contents]

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Résumé

Objectif : Déterminer le ratio médecin:habitants dans les régions sanitaires de la Colombie-Britannique et dans des communautés rurales isolées de la province.

Conception : Analyse de données provenant du régime de services médicaux et de données tirées du recensement de 1996 de la Colombie-Britannique.

Résultats : Le ratio moyen médecin de famille:habitants en Colombie-Britannique est de 1,06:1000. Ce ratio varie de 0,76:1000 (région de Peace Liard) à 1,65:1000 (région de Vancouver). Le ratio total moyen médecin (médecins de famille et spécialistes):habitants en Colombie-Britannique est de 1,86:1000. Ce ratio varie de 0,91:1000 (région de Peace Liard) à 3,73:1000 (région de Vancouver). On a calculé les ratios médecin de famille:habitants pour 69 communautés rurales. Ils s'échelonnent de 3,27:1000 (AlertBay) à 0,36:1000 (Salmo). Deux localités (Madeira Park et Valemount) n'avaient pas de médecin. Dans 65 % de ces localités rurales, le ratio médecin de famille:habitants est inférieur à la moyenne de la Colombie-Britannique et 42 % ont des ratios médecin de famille:habitants de 0,80 ou moins.

Conclusions : Les ratios médecin:habitants sont inférieurs à la moyenne provinciale dans toutes les régions de santé du Nord et dans beaucoup de localités rurales de la Colombie-Britannique, ce qui peut contribuer aux problèmes «d'épuisement» constaté chez les médecins des régions rurales.

[Contents]

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On Jan. 31, 1998, 22 doctors in 5 rural communities in northern British Columbia (Burns Lake, Fraser Lake, Vanderhoof, Fort St. James and Mackenzie) resigned their hospital privileges to protest exhausting on-call schedules. Physicians in Houston, Chetwynd and other isolated rural

communities throughout British Columbia soon followed suit with similar job action. At the peak of the dispute as many as 62 doctors from 21 communities withdrew at least partial services.1 The doctors in these rural communities argued that clinic work plus on-call requirements had become so onerous that they were becoming exhausted and were facing "burn out." One measure of work load is the physician:population ratio, which is an index commonly used to compare the number of doctors to the local population. Traditionally it has been used as an important factor in health resource planning.2,3

This study looks at the physician:population ratio in British Columbia and how it varies across the province. We were particularly interested in determining the ratios in northern and isolated rural communities. If these ratios are less than those seen in urban communities or less than the provincial average it could be argued that one contributing factor to rural physician "burn out" is an undersupply of physicians in rural areas.

[Contents]

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## Methods

Physician:population ratios for the 20 health regions in British Columbia were determined using data obtained from the British Columbia Medical Services Plan.4 The data include June 1997 population estimates, physician count (specialists and family physicians) and calculated full-time equivalent physician counts, for each of the 20 health regions and are summarized in Table 1.

Full-time equivalent (FTE) counts were calculated according to the Health Canada FTE definition, rounded to the second decimal.4 It is defined by (a) grouping the physicians into categories by similar styles of practice; (b) totalling the fee-for-service payments received by each physician; (c) determining the 40th and 60th percentiles of practitioner payment totals within each style of practice category; (d) associating FTE = 1 with every practitioner whose total payments fall between the 40th and 60th percentiles; (e) calculating FTE < 1 for all practitioners with total payments below the 40th percentile as follows: FTE = (practitioner payment total)/(40th percentile practitioner payment total); (f) calculating FTE > 1 for all practitioners with total payments above the 60th percentile, as follows: let A = (practitioner payment total)/(60th percentile practitioner payment total), then FTE = 1 + ln(A), where ln is the natural logarithm; (g) specialists practising in radiology, pathology, medical microbiology and nuclear medicine are assigned FTE = 1.

The formula assumes that 1 FTE = $129 841.01 of earnings during the 1997 calendar year. Family physicians earning in excess of $129 841.01 are counted as 1 FTE. The incomes of physicians earning less than $129 841.01 who practise in the same community are combined to determine the number of FTEs. For example, in a community where there are 3 physicians — earning $260 000, $50 000 and $80 000 respectively — there would be 3 physicians counted but

they would represent only 2 FTEs.

Absolute number of specialists for each health region can be calculated from Table 1 by subtracting the number of family physicians from the corresponding total number of physicians in that health region. Specialist:population ratios were calculated from the data by subtracting the family physician:population ratio from the total physician:population ratio for each corresponding health region. Physician numbers and FTE counts for rural communities were also obtained from the British Columbia Medical Services Plan (MSP).4 The rural communities studied were those communities that qualify for the British Columbia Northern Isolation Allowance (NIA). The MSP has developed a rurality index score, which it uses to determine whether a community is northern and/or isolated enough to qualify for the NIA (Elizabeth Gillies, Cochair, Medical Services Plan. Northern Isolation Allowance Program. Personal communication, April 1999) This scoring system is similar to that proposed by Leduc.5

Population estimates for NIA communities were obtained from the 1996 British Columbia census via the Internet, www.bcstats.gov.bc.ca/data/cen96, and corresponding census maps from Statistics Canada. We were unable to calculate population estimates for 6 of the smallest NIA communities: Bowen Island, Bridge Lake, Denman Island, Hornby Island, Quadra Island and Winlaw.

[Contents]

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## Results

The average family physician:population ratio across British Columbia is 1.06:1000 (Table 2). The ratio varies from 0.76:1000 (Peace Liard region) to 1.65:1000 (Vancouver region). The average total physician (family physicians plus specialist physicians):population ratio across British Columbia is 1.86. This ratio varies from 0.91:1000 (Peace Liard region) to 3.73:1000 (Vancouver). The average family physician:specialist ratio across British Columbia is 1.0:0.75 (Table 3).

The ratio varies from a high of 1.0:1.26 in the Vancouver health region to a low of 1.0: 0.20 in the Peace Liard health region. Expressing the family physician:population ratio and family physician:specialist ratio in terms of FTEs does not change the results significantly.

The estimated population for 69 NIA communities are summarized in Table 4. Family physician:population ratios for these NIA communities vary from 3.27:1000 (Alert Bay) to 0.36:1000 (Salmo) (Table 4). There were 2 communities (Madeira Park and Valemount) listed as having no physician. Including these 2 communities, 65% or 45 of these rural communities have family physician:population ratios that are less than the British Columbia average, and 42% or 29

of these rural communities have family physician:population ratios of 0.80 or less.

[Contents]

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## Discussion

Our study shows that in British Columbia the family physician:population ratio varies widely among health region areas, ranging from 0.76:1000 (Peace Liard region) to 1.65:1000 (Vancouver region). The communities involved in the recent job action are in health regions having family physician:population ratios ranging from 0.76:1000 to 0.99:1000, and total physician:population ratios ranging from 0.91:1000 to 1.33:1000.1 The 7 northern British Columbia rural communities where doctors resigned hospital privileges in the spring of 1998, have family physician:population ratios ranging from 0.54:1000 to 0.91:1000 (mean value 0.71:1000).

We speculate that the relatively low family physician:population ratios seen in NIA communities are contributing to the high rate of "burnout" reported by family physicians working in rural areas. The problem appears to be compounded by the fact that there is also a relative shortage of specialists working in these areas. Gruelling call schedules, absence of immediate specialist back-up, absence of modern technology and difficulty obtaining locums also contribute to rural physician burnout; however, these factors are not necessarily reflected in high physician:population ratios, which may be misleading. For example, an area with a ratio of 1.3:1000 may, on paper, be seen to be in good shape when in reality the doctors serving the area may be on-call "1-in-3."

It is important to remember that the physcian:population ratio is just one measure of population need and physician supply. Over the years the ratio has been used traditionally in health resource planning despite the fact that no one has yet defined the ideal physician:population ratio. There are problems associated with using the physicianpopulation ratio to determine how many doctors are needed. The assumption that physicians in a community are used only by the residents in that community is not always valid. People can, and do, travel to other communities to access medical care. Some physicians travel to other communities to provide medical care. Such behaviour becomes a bigger issue for smaller communities — especially if that smaller community is located relatively close to a larger community. Geographic, economic and demographic disparities dictate that an ideal ratio for one region may not meet the needs of another. In some of the larger NIA communities, physicians functioning as specialists in areas such as obstetrics, anesthesiology and urology, who are not recognized officially by the College of Physicians and Surgeons are counted as general practitioners/family physicians by the government. This gives a misleading impression of the number of general practitioners for those communities. Despite these limitations, physician:population ratios are still considered useful as "comparative norms" especially in regard to relative access to health care services.2,3 Presumably areas with a low

physician:population ratio could benefit from additional physicians.

Studies in Ontario and Quebec have also looked at physician:population ratios and have concluded that the evidence did not support the contention that patients in remote regions were seriously under-serviced compared with more urban areas.2,6 Similar conclusions could perhaps be drawn from our data. For example, family physician:population ratios (Table 2) and total physician:population ratios (Table 3) in the lower mainland health regions of Fraser Valley, South Fraser Valley and Burnaby are among the lowest in the province. However, in terms of the total number of family physicians and the total number of specialists (Table 1) these health regions rank among the highest in the province. A high density of physicians would allow for a relatively infrequent on-call schedule as compared to that in rural areas. The high profile of the on-call issue in the recent northern doctors' dispute testifies to its importance in the work-day experience of physicians. Thus, one should consider physician:population ratios in the context of the total number of physicians available to work in any given area.

Our data also suggest that wide variations in family physician:population ratios exist among rural communities. Thus, one cannot assume that family physician:population ratios are uniform in a given health region or that they are uniformly low in all rural communities. Our data do show that the majority of rural communities have ratios that are lower than the corresponding health region ratios — sometimes quite a bit lower.

In conclusion, physician:population ratios in all northern health regions and in many rural communities throughout British Columbia, are below the provincial average. This discrepancy may contribute to the issue of "burnout" commonly cited among physicians working in rural areas.1

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