

General practitioner-to-population ratios and long-term family physician retention in British Columbia's health regions

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**Objective:** To determine if there is a relationship between long-term retention of general practitioners (GPs) and low GP-to-population ratios, low specialist-to-GP ratios, and poor regional health indicators.

**Study population:** Rural British Columbia health regions located outside the lower mainland and outside southern Vancouver Island.

**Main outcome measures:** Health region GP-to-population ratios, health region specialist-to-GP ratios and 3 health indices were plotted against long-term GP retention rates. The long-term GP retention rate (i.e., percentage of physicians listed for 10 or more consecutive years in a health region community) was determined from physician directories published each year by the College of Physicians and Surgeons of British Columbia (1979–1980 to 1998–1999). Regional health indices used were: 1) age standardized mortality rates, 2) teen pregnancy rates, and 3) smoking rates. These indices were obtained from recent reports published by British Columbia's Provincial Health Officer.

**Results:** Health regions with the lowest long-term GP retention rates tended to be the more northerly ones. Health regions with low GP-to-population ratios and low specialist-to-GP ratios tended to have the lowest long-term GP retention rates. Health indices data reveal that health regions with high standardized mortality rates, high regional smoking rates and high teen pregnancy rates had the lowest long-term GP retention rates.

Conclusions: Provincial physician directory information can be used to investigate relationships between long-term GP retention rates and GP-to-population ratios, specialist-to-GP ratios and regional health indicators.

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Objectif : Déterminer s'il y a un lien entre le maintien à long terme des effectifs d'omnipraticiens (OP) et la faiblesse des ratios OP:habitants, le faible ratio spécialistes:OP et les indicateurs régionaux médiocres de la santé.

Population de l'étude : Les régions de santé rurales de la Colombie-Britannique situées à l'extérieur des basses-terres continentales et à l'extérieur du sud de l'île Vancouver.

Principales mesures de résultats : On a tracé la courbe des ratios OP:habitants et des ratios spécialistes:OP des régions de santé, ainsi que de trois indices de santé en fonction des taux de maintien à long terme des effectifs d'OP. On a calculé le taux de maintien à long terme des effectifs d'OP (c.-à-d. le pourcentage des médecins inscrits pendant dix années consécutives ou plus dans une communauté d'une région de santé) à partir des répertoires des médecins publiés chaque année par le Collège des médecins et chirurgiens de la Colombie-Britannique (1979–1980 à 1998–1999). Les indices régionaux utilisés ont été les suivants : 1) taux de mortalité normalisé selon l'âge, 2) taux de grossesses chez les adolescentes et 3) taux de tabagisme. On a tiré ces indices de rapports publiés récemment par le directeur médical de la Colombie-Britannique.

Résultats : Les régions de santé qui présentaient les taux les plus faibles de maintien à long terme des effectifs d'OP avaient tendance à être situées le plus au Nord. Les régions de santé où les ratios OP:habitants et spécialistes:OP étaient faibles avaient tendance à présenter les taux les plus faibles de maintien à long terme des effectifs d'OP. Les données sur les indices de santé révèlent que les régions de santé où les taux de mortalité normalisés, les taux de tabagisme et les taux de grossesses chez les adolescentes sont élevés présentaient les taux les plus faibles de maintien à long terme des effectifs d'OP.

Conclusions : On a utilisé les renseignements tirés de répertoires de médecins de la province pour étudier les liens entre les taux de maintien à long terme des effectifs OP et les ratios OP:habitants, les ratios spécialistes:OP et les indicateurs régionaux de la santé.

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## Introduction

General practitioner (GP)-to-population ratios in all northern health regions and in many other

rural communities throughout British Columbia are below the provincial average.<sup>1</sup> A low GP-to-population ratio in a rural community implies a heavy workload for physicians, with long hours in clinic, onerous "on-call" obligations, professional isolation, relatively little uninterrupted free time for self and family, and difficulty securing time for vacation and continuing medical education (CME). A recent British Columbia Medical Association (BCMA) survey confirmed that rural BC physicians are concerned about all of these issues.<sup>2</sup>

The specialist-to-GP ratio is also below the provincial average in all northern health regions and in many rural communities.<sup>1</sup> One would predict that rural family physicians (FPs) who work in such communities manage more complicated patients with fewer laboratory and diagnostic services than their urban colleagues. The BCMA survey did find that rural FPs report significantly lower satisfaction scores with respect to issues such as access to lab and diagnostic services, appropriate procedural skills training, and access to specialists than urban physicians do.<sup>2</sup>

Other studies have also identified relatively long work hours, lack of time for self, family and CME, availability of procedural skills training, professional isolation, and income as important issues for North American rural physicians.<sup>3–10</sup> Low job satisfaction has, in turn, been associated with depression, burnout and the intention to move.<sup>6,11–17</sup>

BC's Health Officer recently released 2 reports summarizing regional health indicators (e.g., age-standardized mortality rates, teen pregnancy rates and smoking rates) for all health regions in BC.<sup>18,19</sup> One would predict that fewer FPs stay in health regions where the health status of residents is rated as poor because the work is harder in these regions.

We could find no published data that quantified a relationship between a suspected retention inhibitor and actual FP retention in a community or regional health area. Almost all of the information on physician retention comes from cross-sectional surveys on what physicians think and what they plan to do. The objective of this study was to determine if long-term retention of GPs, as measured by physician directory listings, can be used to demonstrate a relationship between GP retention and low regional GP-to-population ratio, low regional specialist-to-GP ratio, and poor regional health indicators.

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## Methods

The study population comprised the following 12 BC health regions located outside the densely populated lower mainland and southern Vancouver Island: East Kootenay (EK), West Kootenay–

Boundary (WK), North Okanagan (NO), South Okanagan/Similkameen (SO), Thompson (TH), Coast Garibaldi (CG), Central Vancouver Island (CVI), Upper Island/Central Coast (UI), Cariboo (CA), Northwest (NW), Peace Liard (PL) and Northern Interior (NI) (see [Fig. 1](#)).

Population estimates for communities were obtained from [1996 BC census data](#).

GP-to-population ratios and specialist-to-GP ratios for health regions in BC were calculated from BC Medical Services Plan regional health data.<sup>1,20,21</sup> Because some FPs work part-time, full-time equivalent data were used in this calculation, rather than the number of FPs working in a health region.<sup>1</sup>

Health status indicator data for age-standardized mortality rate,<sup>18</sup> teen pregnancy rate (15–17 years of age),<sup>18</sup> and smoking rate (over 12 years of age)<sup>19</sup> for each of the BC regions were obtained from the 1997 and 1998 Provincial Health Officer's annual reports.

Long-term GP retention rates for each health region were obtained from BC medical directories (1979–1980 to 1998–1999). All physicians listed in each directory for each community were tabulated on a spreadsheet. Only GPs/FPs were included in the study; specialists were excluded. Communities were organized into health regions, and the total number of FPs who stayed in each health region for more than 9 years was calculated.

The relationships between GP-to-population ratios and long-term GP retention rates; specialist-to-GP ratios and long-term GP retention rates; and long-term GP retention and the 3 regional health indicators were plotted, and trend lines were generated using a statistical program embedded in Microsoft Excel.

We attempted to validate medical directory information 3 ways.

- We asked the BC Medical Services Plan (MSP) office in Victoria for any physician count numbers. They had the 1997–1998 data for 57 Northern and Isolated Allowance (NIA) communities, data that were based on physician billings per community.
- We phoned clinics in each of these 57 NIA communities and asked the person who answered the phone (usually the receptionist, office manager or physician) how many physicians were living in that community and working full- or part-time.
- We conducted a randomized survey of rural physicians living and working in the NIA communities,<sup>11</sup> and used the results as a validation tool.

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## Results

Long-term GP retention for each of the health regions, calculated as the percentage of FPs listed in medical directories in each community for more than 9 years, is shown in [Fig. 2](#). Health regions with the lowest long-term GP retention rates tended to be the more northerly ones; those with the highest long-term GP retention rates tended to be the more southerly ones (see Fig. 1).

GP-to-population ratios versus long-term GP retention rates for each health region are shown in [Fig. 3](#). Health regions with the lowest GP-to-population ratios (expressed as FP full-time equivalents per 1000 population) tended to have the lowest long-term GP retention rates.

Specialist-to-GP ratios versus long-term GP retention rates for each health region are shown in [Fig. 4](#). Health regions with the lowest specialist-to-GP ratios tended to have the lowest long-term GP retention rates.

The relationships between long-term GP retention and the 3 regional health indicators are shown in [Figs. 5, 6 and 7](#). Health regions with the lowest age-standardized mortality rates (rate per 10 000 pop.) (Fig. 5), smoking rates (Fig. 6) and teen pregnancy rates (Fig. 7) tended to have the highest long-term GP retention rates.

The outcome of our attempts to validate medical directory information was encouraging. According to the BC Medical Services Plan billing data, there were 333 physicians working in the 57 NIA communities in 1997–1998. According to the 1997–1998 Physician Directory, the estimated total number of physicians in these 57 communities was 348 — a difference of only 15.

It was clear from our telephone interviews that people were less sure of the number of family physicians in the larger communities (especially those over 20 000). Responses to our phone survey indicated there were 302 physicians living and working in these communities — about 87% of the 348 estimate using the directories, and a number consistent with previously calculated year-to-year physician recruitment rates in rural BC.<sup>22</sup>

In a recent study of NIA communities, 198 surveys were mailed; 131 (66%) of them were returned.<sup>11</sup> A follow-up telephone survey of nonresponders revealed that 1 nonresponder was an unlisted foreign-trained specialist, 7 were on leave-of-absence, 8 had retired or were semi-retired, 2 were duplicate mailings (i.e., a physician working and listed at 2 different community sites), and 12 had moved. These physicians make up 15% of the survey population, which, again, is consistent with previously calculated year-to-year physician recruitment rates.<sup>22,23</sup>

## Discussion

This study suggests that low long-term GP retention is related to variables that are associated with increased workload: namely, low GP-to-population ratios, low specialist-to-GP ratios and poor community health status. The findings also support cross-sectional survey data that indicate low physician-to-population ratios are associated with relatively heavy workloads, low job satisfaction, physician burnout and the decision to relocate away from rural communities.<sup>3–17</sup>

We argue that the association between poor community health status (i.e., high mortality rates, teen pregnancy rates and smoking rates) and low long-term GP retention rates reflects the heavier workload associated with poor community health. We could also argue that poor community health is negatively affected by physicians who do not stay in a community long enough to establish good working relationships with their communities. Unfortunately, cause-and-effect relationships cannot be established with this data.

Future research to investigate these relationships might include studying health indices in communities that are comparable in all respects, except that one has low GP turnover and the other has high turnover. Alternatively, one could monitor, prospectively, any changes in health indices when several "long-term" physicians leave a community at once.

Some of the limitations to our study include the observation that physician retention is a complicated issue involving more than just physician:population ratios, associated workload and on-call load. Turnover rates for physicians in a particular health region can reflect differences in the level of use of temporary physicians from overseas and from metropolitan areas — these physicians stay their mandatory time and then leave. Physician retention is also related to personal demographics (e.g., rural background or not), family status (e.g., raising a family or not), medical school training (e.g., exposure to rural medicine during training or not), professional concerns (e.g., medical confidence), practice characteristics (e.g., solo v. group), satisfaction with compensation (e.g., financial, professional, personal) and lifestyle preferences. Individual community characteristics, such as the size of the community, cultural opportunities available, percent of the population aged 0–5 years and over 65, and the presence or absence of a hospital, also affect physician location.<sup>24–28</sup>

Another limitation is that not all health regions in our study fit the expected pattern. For example, Coast Garibaldi health region stands out in Fig. 4 for having a high long-term GP retention ratio but a relatively low specialist-to-GP ratio. In fact, Coast Garibaldi health region is unique among the provincial health regions in that it is located relatively close to the North Shore and Vancouver health regions — regions with the greatest number of specialists in the province. In reality, the Coast Garibaldi health region has very good specialist coverage compared with other more northern or isolated health regions because specialists from the lower mainland areas make

frequent visits to Coast Garibaldi community clinics. The same may be true of other health regions, although not to the same extent. The fact that physicians and patients travel to other locations to deliver or receive medical care means one cannot always equate regional physician counts and regional population with service availability.

The final limitation of this study concerns the use of directory information.

- Not all FPs listed actually provide patient care; a few may have been semi-retired or retired physicians.
- A small number of physicians functioning as specialists in areas such as obstetrics, general surgery and urology, but not recognized officially by the College of Physicians and Surgeons of Canada, may have been counted as GPs/FPs.
- Directories do not list all FPs who work in a community; physicians functioning as temporary locums would not, as a rule, be listed.

In conclusion, provincial physician directory information can be used to generate qualitative relationships between physician retention and variables believed to affect retention — at least at the health region level. In future studies, we plan to examine the relationships between physician retention rates and factors that we suspect may affect physician retention at the community level. It will be interesting to see if relationships observed in this study are still apparent at the community level.

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