



Centre for  
HEALTH SERVICES AND POLICY RESEARCH

# Single and Group Practices Among Primary Health Care Physicians in British Columbia

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## About CHSPR

The Centre for Health Services and Policy Research (CHSPR) is an independent research centre based at the University of British Columbia. CHSPR's mission is to stimulate scientific enquiry into issues of health in population groups, and ways in which health services can best be organized, funded and delivered. Our researchers carry out a diverse program of applied health services and population health research under this agenda.

CHSPR aims to contribute to the improvement of population health by ensuring our research is relevant to contemporary health policy concerns and by working closely with decision makers to actively translate research findings into policy options. Our researchers are active participants in many policy-making forums and provide advice and assistance to both government and non-government organizations in British Columbia (BC), Canada and abroad.

CHSPR receives core funding from the BC Ministry of Health Services to support research with a direct role in informing policy decision-making and evaluating health care reform, and to enable the ongoing development of the BC Linked Health Database. Our researchers are also funded by competitive external grants from provincial, national and international funding agencies.

Much of CHSPR's research is made possible through the BC Linked Health Database, a valuable resource of data relating to the encounters of BC residents with various health care and other systems in the province. These data are used in an anonymized form for applied health services and population health research deemed to be in the public interest.

CHSPR has developed strict policies and procedures to protect the confidentiality and security of these data holdings and fully complies with all legislative acts governing the protection and use of sensitive information. CHSPR has over 30 years of experience in handling data from the BC Ministry of Health and other professional bodies, and acts as the access point for researchers wishing to use these data for research in the public interest.

For more information about CHSPR, please visit [www.chspr.ubc.ca](http://www.chspr.ubc.ca).



## Acknowledgements

The creation of group practice identifiers for more than 4,000 physicians in each of two fiscal periods is no easy feat; it requires a great deal of work at the conceptual and technical levels, and hours of attention to detail and nuance. This project represents the second time this type of work has been undertaken at CHSPR, and this report documents methodological advances and the result of validation work.

This project benefited greatly from conceptual advancements in defining group practices using the BC Linked Health Database, and from methodological lessons from previous work conducted by Robert Reid and Rachael McKendry. The conceptual and methodological advancements used to create this report were guided by contributions from Diane Watson, Robert Reid, Rachael McKendry and David Goertzen. Nino Pagliccia, Bogdan Bogdanovic and Sandra Peterson completed the programming required to establish the research data file; Charlyn Black developed the method used to refine practice groupings with telephone numbers; Jennifer Bow helped create a standardized physician practice file; David Goertzen conducted all the analysis required to group and describe practice settings, and Dawn Mooney validated postal codes and created the maps and figures. Rachael McKendry and Diane Watson co-wrote the manuscript, and all authors contributed to and approved its content. External academic reviewers and colleagues who provided feedback on draft copies of this report are also gratefully acknowledged. Special thanks to Chris Balma for his editorial contributions.

The BC Ministry of Health provided funding, under the Primary Health Care Transition Fund, to support this project. The results and conclusions are those of the authors and no official endorsement by the Ministry is intended or should be inferred. This project is part of a larger program of research conducted at the request of the Ministry.

The Behavioural Research Ethics Board of the University of British Columbia approved this initiative, and the College of Physicians and Surgeons of British Columbia approved the use of their data to ensure the accuracy of our counts and determinations regarding geographic location of physicians.

This report relies primarily on information derived from other organizations. All analysis and interpretation, and any errors, are the sole responsibility of the authors.

## Executive Summary

This report offers an important glimpse into the organization of single-physician and group practices that deliver primary health care (PHC) in British Columbia. It identifies actively practicing PHC physicians and pinpoints their work locations in order to classify single- and multiple-physician practices, and assesses temporal shifts in the organization of these practices. Perhaps even more significantly, the methods outlined in this report will enable policy-relevant research designed to enhance our understanding of the organization and delivery of PHC across the province.

This is a descriptive study using administrative data (physician billing, registration and service data from the BC Ministry of Health, and licensure information from the College of Physicians and Surgeons of British Columbia) from fiscal years 1996/97 and 2000/01.

Physician data from these sources were linked using common identifiers and physicians providing PHC services were identified by analysis of their billing practices. Practice location information was identified using workplace postal code and manually compared; PHC physicians with identical addresses were classified as community-based group practices, and those with unique addresses were classified as community-based single-physician practices. Physicians with work addresses in hospitals or large organizations were also identified and categorized as group or single-physician practitioners. We also identify PHC physicians with only a home address.

While the number of active physicians providing PHC in the province remained relatively stable over the study period (4,152 in 1996/97 and 4,183 in 2000/01) this report does note shifts in practice sizes and environment.

The number of PHC physicians working in community-based group practices in British Columbia increased by three per cent over the fiscal years studied. In 1996/97, 2,294 (55%) physicians were located in 700 group practices. By 2000/01, that number had increased modestly to 2,422 (58%). This result varied across health authorities, with some experiencing a net decrease in the number of community-based group practices.

The number and proportion of PHC physicians working out of large organizations and hospitals also increased over the study period. There were 57 physicians located in large organizations in 1996/97, and 71 in 2000/01. The number of hospital-based PHC physicians almost doubled over the period, from 278 to 529, representing an increase of seven to 13 per cent of the total PHC physician workforce. The number of PHC physicians in single-physician practices decreased from 1,523 to 987. However, due to limitations of the 2000/01 data, 174 physicians in that year could be assigned only to a home address, and the drop recorded in single-physician practices may be exaggerated.

These results are very similar to those found in national physician surveys. However, these survey results only reveal the proportion of physicians in groups by practice type, not the number of groups, their sizes or characteristics.



## Introduction

Canadians strongly support the idea of team-based health care<sup>1</sup> and the majority of citizens would prefer that their family doctor work as part of a group.<sup>2</sup> The team approach to primary health care (PHC), led by doctors, is perceived as the new “centrepiece of the health care system” because it is meant to “be responsive to individual needs, structured to emphasize wellness and prevention, and offer integrated and co-ordinated care by various professionals.”<sup>3</sup> Canadians expect professionals to collaborate, to share, critique and use data and information collectively, and thereby attain efficiency gains in the health system.<sup>4</sup> The majority of Canadians believe that collaborative and integrated PHC teams would improve quality of patient care (73%) and expedite access to care (69%).<sup>5</sup>

Canadians identify interdisciplinary teams as a solution to the current challenge of finding a family doctor and “some hoped that a supportive and collegial team would reduce the burden on doctors, prevent burnout, and encourage health professionals to locate and stay in rural and remote areas.”<sup>6</sup> In 1996, 64 per cent of Canadians gave strong approval to group practice arrangements, even if it meant not seeing their regular physician.<sup>7</sup> In 2004, fully 86 per cent of Canadians supported requiring health professionals to work in teams that include physicians and other types of health care providers.<sup>8</sup> Accordingly, family physicians across the country report they are increasingly practicing in groups,<sup>9</sup> though few share office space with non-physician professionals.<sup>10</sup>

Activities intended to restructure the delivery of PHC services in Canada have been underway for some time. When public investments declined in the mid-1990s and then rebounded, governments sought guidance from a variety of health care committees and commissions to assist them in the process of restructuring and reinvestment. In terms of guiding reinvestments in PHC, the most noteworthy undertaking of the time was the National Forum on Health, whose deliberations led to the establishment of the Health Transition Fund. In 1997, the National Forum recommended moving toward more integrated health care delivery with PHC as a foundation. Key elements included: tying funding

mechanisms to the health status of patients (such as capitation) rather than to volumes of services provided by physicians (fee-for-service); using pay to promote a continuum of care from prevention to treatment; and encouraging the use of interdisciplinary teams.<sup>11</sup>

Between 1997 and 2001, the Health Transition Fund financed pilot or evaluation projects across Canada; 65 of these projects focused on PHC. Four provinces (British Columbia, Ontario, Nova Scotia and Newfoundland) required physicians to work in groups and to move toward interdisciplinary teams as a precondition for funding.<sup>12</sup> Toward the end of the Health Transition Fund era, it was evident that a national policy framework and additional investments were needed to kindle and sustain widespread momentum toward PHC renewal, including a transition to more group- and interdisciplinary-based practice. In September 2000, Canada’s First Ministers agreed upon an Action Plan for Health System Renewal that included additional investments to catalyze PHC. The Government of Canada announced the Primary Health Care Transition Fund (PHCTF) in 2001, which established a policy framework to guide the investment of \$800 million to “support the transitional costs of implementing sustainable, large-scale, primary health care renewal initiatives.”<sup>13</sup>

Objectives of the PHCTF included the establishment of “interdisciplinary primary health care teams of providers, so that the most appropriate care is provided by the most appropriate provider” and collaborations among these teams to “facilitate co-ordination and integration with other health services, i.e., in institutions and in communities.” Subsequently, interdisciplinary collaboration in PHC was explicitly mentioned in the First Ministers’ Accord<sup>14</sup> and 10-Year Plan for Health Care in Canada (2004). All provincial governments now include this as one element of their goals and objectives statements for PHC renewal.<sup>15</sup>

There is much to be learned about the impact of shifts in the organization of PHC on access to services, continuity of care, patient outcomes, costs and other dimensions of quality. This initiative develops a population-based data infrastructure to identify group practices where physicians are likely to practice in teams, thereby building capacity to evaluate the impact of temporal shifts toward team-based PHC in British Columbia. We focus on constructing these measures for the two fiscal periods that predate the Health Transition Fund and PHCTF—1996/97 and 2000/01—in order to describe the nature of PHC physician group practice settings in these baseline periods. Our intent is to create group practice variables that will be useful to future research regarding the effect of practice arrangements on the delivery and use of PHC and the impact of any temporal shifts on these patterns of delivery. The practice settings described in this report focus on physicians who work in single or group practice settings. This report is a prelude to examining interdisciplinary teams of health professionals.

This report describes the number, type and dispersion of single-physician and group practices in 1996/97 and 2000/01 and assesses temporal shifts in the organization of practices among PHC physicians. It also documents the methods we used to develop data infrastructure to identify practices with a single physician\* and practices with multiple physicians (groups) and to accurately report on the geographic location of these practices. This project is part of a multi-stage research program designed to build capacity to conduct system-level evaluation of changes in this sector. This research program is described more fully on the Centre for Health Services and Policy Research website.

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\* We refer to *single*-physician practices rather than *solo* practices because we cannot assume that these physicians do not practice with specialist physicians or other health care providers (e.g. registered nurses, nutritionists, clinical pharmacists, nursing assistants, midwives, physical therapists, social workers, occupational therapists and others).



## Methods

In order to describe temporal and geographic patterns of single-physician and group practices, we (1) identified physicians who were actively engaged in clinical practice and had a general type of practice (TOP) (herein after called PHC physicians); (2) grouped these practitioners into single-physician or group practices; (3) validated and refined the groupings; and (4) validated information needed to accurately assign practices to geographic locations. The project relied on a research data file containing geographic information regarding the study population. This file contained a single variable that described each PHC physician's TOP, as well as data regarding address locations derived from the Medical Services Plan (MSP) Practitioner file and College of Physicians and Surgeons of British Columbia (CPSBC) Address file. The Behavioural Research Ethics Board of the University of British Columbia approved the initiative, and the CPSBC approved the use of their data to ensure the accuracy of our determinations regarding geographic location of PHC physicians.

### Identifying PHC Physicians

The study population of physicians who actively engaged in clinical practice was identified using methods described elsewhere.<sup>‡</sup> The population of PHC physicians was identified using the TOP variable available in the MSP Practitioner file.<sup>§</sup> The methods used by the British Columbia Ministry of Health to create the TOP variable require the use of billing information to categorize each practitioner according to the way they practice, rather than their declared specialty. For example, a physician could report their most recent registered specialty as a family physician, but actually have a billing pattern more closely associated with emergency medicine. He or she would be identified as an emergency medicine physician by TOP, despite his or her registered status as a family physician. In this instance, this physician would not be included in the study population since it focuses on PHC physicians. By comparison, a physician could report their most recent registered specialty as paediatrics, but have a billing pattern more closely associated with general practice. He or she would be identified as a general prac-

itioner by TOP, despite his or her registered status as a paediatrician, and would be included in the study population. British Columbia's MSP uses TOP methodology for publishing practitioner profiles.<sup>16</sup>

### Assigning Addresses to PHC Physicians

For each PHC physician in the study population, we selected all available address information from the MSP Practitioner and CPSBC Address files. Information about these data sources is provided in Appendix I. The CPSBC address (located in BC; most recent effective date; identified as a work address) was identified for each physician. If a physician did not have a work address in the CPSBC data\*\* (n=472, 11% of the total study population) we used one of three options: (1) we assigned the physician to the address of the hospital at which they had the majority of records, if they had any hospital service record(s) (n=268, 6%); (2) we assigned physicians to their MSP Practitioner file address if it was different from the CPSBC home address and they had no hospital service record(s) (n=26, 1%); or (3) we assigned the physician to the CPSBC home

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<sup>‡</sup> Practicing physicians include those who billed MSP, those who were paid through the Alternative Payments Program, and those who did not receive these forms of remuneration but who could be identified as clinically active via Hospital Discharge Abstracts Database records. These methods are described in a report by Watson et al. (forthcoming, 2006). The development and validation of an information system to identify and describe physicians in clinical practice in British Columbia. Centre for Health Services and Policy Research, University of British Columbia.

<sup>§</sup> Physicians included in the study population include those who have a TOP of general practice, GP (miscellaneous), GP alternative payments at 50 per cent, Primary Health Care Organizations physician, Salaried physician or contract. This includes the following TOP codes: 00, 55, 61, 63 and 70.

\*\*This only occurred in the 2001 CPSBC data. A work address was identified for all physicians in the cohort in the 1997 CPSBC data.

address, if they had an identical address in the MSP Practitioner address file and did not have any hospital service record(s) (n=174, 4%). We found four physicians whose work addresses were incorrectly coded as home addresses (e.g. the BC Cancer Agency was coded as a home address). We treated these as work addresses and refer to addresses identified in this manner as ‘assigned’ addresses. PHC physicians who had service records only in the Hospital Discharge Abstract Database were assigned to the address of the hospital at which they had the most service records. Physicians were excluded from the analysis if this assigned address was out of the province.\*\*

### Assigning PHC Physician Addresses to a Type of Setting

Each PHC physician was assigned to one of four mutually exclusive settings: hospital; large organization; community or home. PHC physicians were assigned to either hospitals or large organizations using detailed methods.<sup>§§</sup> PHC physicians located in community settings at the same address were identified as community-based group practices by manually matching identical city/town, as well as street name, number and suite. Physicians in community settings with a unique address were categorized as single-physician practices. To calculate the proportion of PHC physicians in community-based practice, we divided the number of physicians in this practice setting by the total number of PHC physicians.

## Refining and Validating Methods Used to Assign PHC Physicians to Groups

### Using Telephone Numbers

In accordance with the methodology used in a previous project,<sup>17</sup> telephone numbers were used to refine practice groupings. Since it is likely that PHC physicians with identical addresses may have different telephone numbers, we reviewed data from the largest group practice (20 practitioners and multiple telephone numbers). By searching the World Wide Web, we determined that this practice location had identifiable ‘cells’—smaller groups of physicians within the larger group—and that each cell had its own telephone number. Most of the PHC physicians at the address in our adjusted address file were also current members of the practice. Through this type of analysis we determined that group practices across the province seemed to fall into one of three categories: (1) one address with one telephone number; (2) multiple addresses with one telephone number; and (3) one address with multiple telephone numbers. Most groups fell into categories 1 and 3. Those that fell in to category 2 mostly consisted of practices where one or more physician had a street address, while the other physician(s) had a post office box as an address.

\*\* The large proportionate increase in hospital-based group practices may be due to our assigning hospital addresses to physicians who had only a home address in the CPSBC data but had at least one hospital record in the Hospital Discharge Abstracts Database in 2000/01.

§§ A list of hospitals obtained from the Ministry of Health was used to distinguish physicians in most hospital-based practices. Most hospitals found in the CPSBC and MSP practitioner files were included in the list of hospitals from the Ministry of Health (e.g. CFB Hospital, Esquimalt). The only Ministry-identified hospital not categorized as a hospital in our exercise was GF Strong Centre because it is a specialized, rehabilitative facility. Physicians with practices categorized as large organizations were non-hospital facilities whose main function was not primary care delivery, such as the BC Cancer Agency and the BC Centre for Disease Control. Large organizations also included WorkSafeBC (Workers’ Compensation Board). Some physicians had only a home address listed in the CPSBC file. These addresses were categorized as ‘only home address.’ These physicians were included in the total number of PHC physicians but were excluded from the counts of group and single-physician practices.



Based on these new insights, we refined the assigned address for each physician in the 1996/97 and 2000/01 study populations. Group practices that fell into categories 1 and 3 were grouped by location, since use of information regarding telephone numbers would not alter decisions regarding their practice setting. Physicians that fell into category 2 (multiple addresses with one telephone number) were assigned to a single address, usually the street address. Sixty-three physicians in 1996/1997 and 61 in 2000/2001 fell into category 2. Without the telephone number validation, they would have been assigned to single-physician practices, artificially inflating the proportion of single-physician practices

### Validating Geographic Location

We used a two-step process to identify and correct errors in postal codes prior to geo-coding the practice settings to local health areas, health service delivery areas and health authorities. First, data regarding the city/town name were used to validate postal codes. The city/town name was used as the standard, since recall and coding error is more likely to occur with postal codes. When errors were detected, postal code information from Canada Post was used to correct them. Then, assigned addresses were sorted by local health area to identify and correct cases in which addresses in a single city/town were assigned to more than one local health area.

### Concurrent Validity

We report that 55 per cent of PHC physicians in 1996/97 worked in community-based group practice settings in British Columbia. By comparison, results of the National Family Physician Survey conducted by the College of Family Physicians of Canada in 1997/98 indicate that 56 per cent of practitioners in British Columbia worked in group practice settings.<sup>18</sup> In that same year, 45 per cent of family physicians across the nation self-reported that they worked in group practice settings.<sup>19</sup>

We report that 58 per cent of PHC physicians in 2000/01 worked in community-based group practice settings. By comparison, results of the National Physician Survey<sup>\*\*\*</sup> conducted in 2004 indicate that 64 per cent of family physicians worked in group practice settings in British Columbia. In that same year, 61 per cent of family physicians across the nation self-reported that they worked in group practice settings.<sup>20</sup>

Our results indicate that the proportion of PHC physicians in group practice settings increased across the province between 1996/97 and 2000/01. By 2000/01, 58 per cent worked in community-based group practices and 14 per cent were based in hospitals or large organizations. An additional 24 per cent were in single-physician, community-based practice settings.<sup>†††</sup> By comparison, results of the National Family Physician Survey indicate that 31 and 26 per cent of family physicians in Canada worked in solo practices<sup>†††</sup> in 1998 and 2004.<sup>21, 22</sup>

The Physician Resource Questionnaire conducted by the Canadian Medical Association reports a slightly different picture among the family physician population. Self-report survey results from 1998, 2001 and 2003 indicate a decline in the proportion of family physicians who worked in group settings (62%, 56% and 51%, respectively). The proportion of family physicians reporting being in a solo practice was 33, 19 and 18 per cent, respectively.<sup>23, 24, 25</sup>

Although we reported a decline in the number of single community-based practice physicians (from 37% to 24% from 1996/97 to 2000/01), the drop in number is not of the same magnitude reported by the Canadian Medical Association (33% to 19% from 1998 to 2001). This could be the result of using different definitions of a group practice. The Physician Resource Survey defined groups as “shared patients and/or expenses”<sup>26</sup> unlike this project, which de-

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\*\*\* Results of the National Family Physician Workforce Survey in 2001 do not report statistics regarding practice setting in a format that are comparable to our community-based group practice variable.

††† Four per cent of physicians (n=174) could be assigned only to a home address and therefore could not be assigned to a single-physician or group practice.

††† These surveys used the term ‘solo’ practice to identify physicians practicing alone.

defines a group practice as more than one physician with an identical address. Some of the physicians we have identified as belonging to single-physician practices may actually share patients with other specialist physicians.

There are only slight differences between our results and those of national self-report surveys. These differences may relate to at least three measurement issues. First, we focus on PHC physicians, which include family physicians and those with other specialty designations who have a general TOP. Overall, 96 per cent of the PHC physicians in our study population were family physicians. We also exclude family physicians that have a TOP that is more specialized in nature. Second, we conducted a population-based analysis of the PHC physician workforce and did not rely on a survey sample. Our results are not influenced by response bias. Third, there are slight differences in time periods between our study and these national surveys. Insofar as there have been temporal increases or declines in the proportion of physicians in group practice settings, these changes influence the degree to which there will be concordance between our estimates and survey results.



## Results

In 1996/97, there were 4,152 PHC physicians actively engaged in clinical practice with an assigned address in British Columbia (see Appendix II, Table 1 for counts of PHC physicians across BC and in each health authority).<sup>§§§</sup> By 2000/01, there were 4,183 of these providers. These head counts slightly differ from those documented in forthcoming CHSPR reports, though all of these reports relied on the same conceptual approach in identifying the population of PHC physicians. By necessity, this project relied on a data extract drawn prior to the final stages of the development and refinement of an information system to identify physicians.

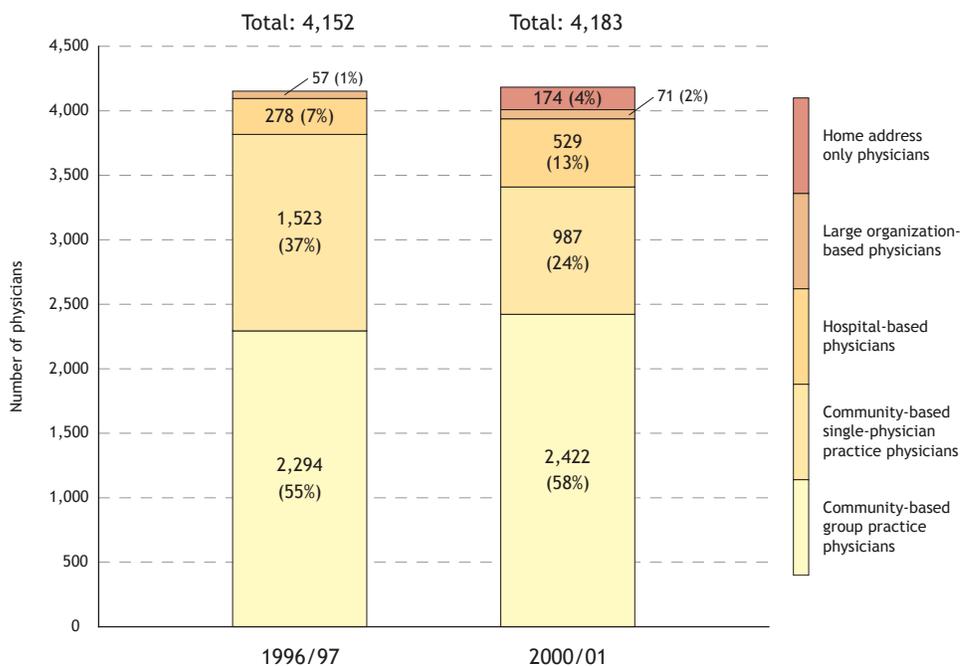
Between 1996/97 and 2000/01, the number of PHC physicians in community-based group practices in British Columbia increased from 2,294 to 2,422, representing an increase from 55 to 58 per cent of the total workforce of PHC physicians. Conversely, the proportion of PHC physicians in commu-

nity-based practice in settings with no other PHC physicians declined from 1,523 to 987, representing a decline from 37 to 24 per cent of the total PHC physician workforce. The decline in single-physician practices was accompanied by the appearance of physicians who provided only a home address (as indicated in the CPSBC Address File). There were 174 physicians who could not be assigned a work address in 2001. Appendix II includes counts of PHC physicians, by practice type and setting, at the provincial and health authority levels.

By comparison, the number of PHC physicians located in hospitals increased from 278 to 529, representing an increase from seven to 13 per cent of the total workforce.<sup>\*\*\*\*</sup> The number of PHC physicians located in large organizations increased from 57 to 71, representing an increase from one to two per cent of the total workforce (Appendix II, Table 1). **Figure 1** shows the proportion of PHC physicians by practice setting in each year.

Figure 1: PHC Physicians in British Columbia, by Practice Setting

Source: Physician counts: MSP payment information masterfile (for fee for service data), Hospital Discharge Abstracts Database (BC Linked Health Database 1996/97 and 2000/01), MSP practitioner file; primary health care organizations and alternative payments to physicians data, all BC Ministry of Health 1996/97 and 2000/01; CPSBC 1996/07 and 2000/01.

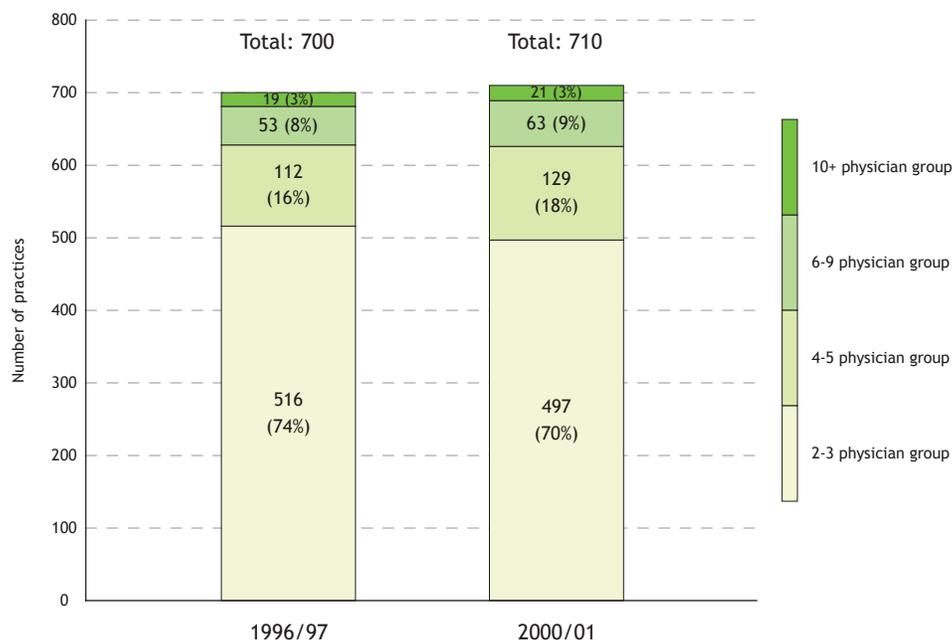


<sup>§§§</sup> Physicians who had a designated office address outside of British Columbia may have, for example, left the province toward the end of the fiscal period. In these instances, we did not include these physicians in our study population.

<sup>\*\*\*\*</sup> Of the 529 hospital-based physicians identified in 2000/01, 268 or 51 per cent had only a home address listed in the CPSBC address file. They were assigned to the hospital at which they had the most service records.

Figure 2: Community-Based  
PHC Group Practices in British  
Columbia, by Practice Size

Source: Physician counts: MSP payment information masterfile (for fee for service data), Hospital Discharge Abstracts Database (BC Linked Health Database 1996/97 and 2000/01), MSP practitioner file; primary health care organizations and alternative payments to physicians data, all BC Ministry of Health 1996/97 and 2000/01; CPSBC 1996/07 and 2000/01.



## Community-Based Group Practices

Across the province, the number of community-based group practices increased from 700 to 710 (See Figure 2). Appendix II, Table 2 describes these temporal patterns of group practices at the provincial and health authority levels.

Figure 2 illustrates the net gain (n=10) in community-based practices between 1996/97 and 2000/01. The number of group practices with two to three physicians declined by 19, the number of practices with four to five physicians increased by 17, and the number of practices with six to nine physicians increased by ten. The number of group practices with ten or more physicians increased by two over the study period.

An increase in the number of community-based group practices was not evident in all health authorities. Interior, Vancouver Coastal, and Vancouver Island health authorities saw net increases (5, 2, and 10 respectively) between 1996/97 and 2000/01. The Fraser and Northern health authorities saw net declines of six and one group practices, respectively.

The decline in small community-based group practices was reflected across most health authorities. Interior Health Authority was the exception, where the number of small practices increased from 69 to 74 over the period. Interior was also the only jurisdiction to experience a decline in the number of mid-size group practices over the study period, from 19 to 17. The largest increase in practices of this size was recorded in the Vancouver Island Health Authority, which gained nine practices, from 18 in 1996/97 to 27 in 2000/01. Practices with six to nine PHC physicians declined in the Interior Health Authority, increased in the Fraser, Vancouver Coastal and Vancouver Island health authorities, and remained stable in the Northern Health Authority. The number of very large community-based group practices (10 or more physicians) declined slightly in the Fraser and Vancouver Island health authorities, increased slightly in the Interior and Vancouver Coastal health authorities, and remained stable in the Northern Health Authority (see Appendix II, Table 2).



## PHC Physicians in Community-Based Practices

The number of PHC physicians in community-based group practice settings increased from 2,294 to 2,422 between 1996/97 and 2000/01, representing 55 and 58 per cent of the total PHC physician workforce in each period.

Figure 3 illustrates the net gain in the number of PHC physicians in community-based practices, according to the size of the group practice. These gains seem to reflect a slight reduction in the number of PHC physicians in small group practices and an increase in the number in mid-size and large group practices.

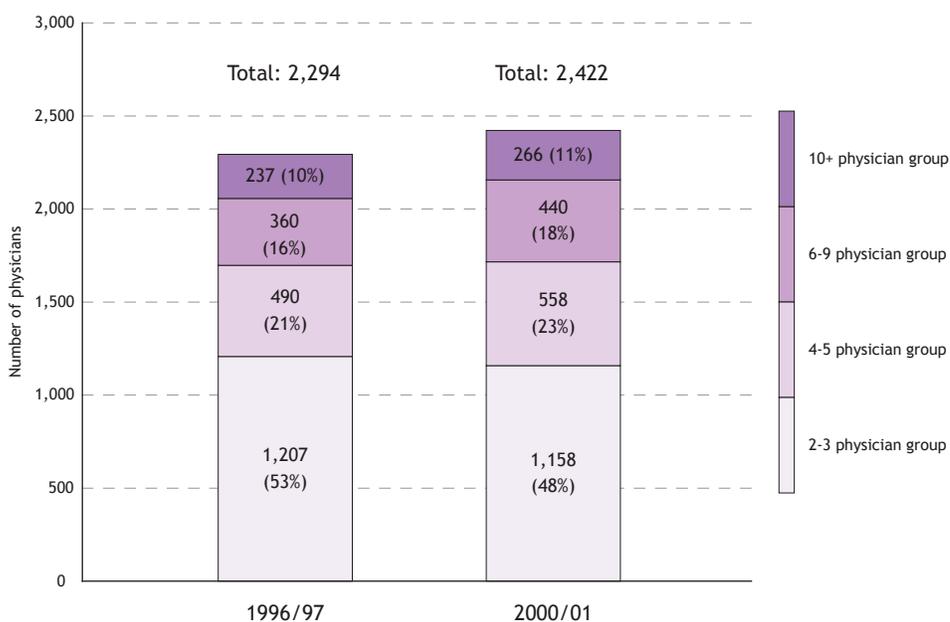
In 1996/97, the proportion of PHC physicians in community-based group practice settings varied across health authorities (See Appendix III, Table 1 and Maps<sup>††††</sup>). This variation ranged from a low of 42 per cent in Vancouver

Coastal Health Authority, to a high of 66 per cent in Interior Health Authority. The proportions in Fraser Health, Vancouver Island and Northern health authorities were 65, 59 and 53 per cent, respectively.

In 2000/01 the proportion of PHC physicians in community-based group practice settings ranged from 49 per cent in Vancouver Coastal Health Authority to 64 per cent in Fraser and Interior health authorities. The proportion in Vancouver Island Health Authority was 61 per cent. By comparison, the proportion of PHC physicians in community-based group practices in the Northern Health Authority was 52 per cent.

Figure 3: PHC Physicians in British Columbia, by Size of Community-Based Practice

Source: Physician counts: MSP payment information masterfile (for fee for service data), Hospital Discharge Abstracts Database (BC Linked Health Database 1996/97 and 2000/01), MSP practitioner file; primary health care organizations and alternative payments to physicians data, all BC Ministry of Health 1996/97 and 2000/01; CPSBC 1996/07 and 2000/01.



<sup>††††</sup> The maps in Appendix III illustrate both the proportion of PHC physicians in community-based groups by local health area (LHA) as well as the number of PHC physicians by town. The proportion of PHC physicians by practice type and setting is also illustrated for cities/towns.

## Discussion

Canada has made substantive investments in PHC renewal, funded through the Health Transition Fund (1997-2000) and the PHCTF (2001-2006). These investments and associated activities in British Columbia were designed, in part, to encourage the establishment of PHC group practices. The analyses presented here describe the degree to which PHC physicians in British Columbia practice in groups, the characteristics of those practice settings, and temporal shifts in the organization of practice.

This report provides a pioneering glimpse into the structure and distribution of single-physician and group practice settings among PHC physicians for two fiscal periods that predate the Health Transition Fund and PHCTF—1996/97 and 2000/01 respectively. Our analyses suggest that PHC physicians were far less likely to be located in single-physician, community-based practice settings, and far more likely to practice in hospitals and large organizations over this time period. At the same time, there was only modest growth in the number PHC physicians likely to be located in community-based group practice settings. Over the study period, the proportion of PHC physicians in these settings increased from 55 to 58 per cent of the workforce. Furthermore, there was only a net gain of ten community-based group practices of PHC physicians—a gain primarily among mid-size group practices (4 to 9 physicians). The proportion of PHC physicians working in group practice settings varied across health authorities.

Our ability to assign PHC physicians to practice settings is limited by the completeness and accuracy of address information. The CPSBC Address file contains up to six possible addresses, each accompanied by an effective date. In cases where physicians had multiple work addresses, the address with the most recent effective date was selected. However, the address with the most recent date may not be the only address at which a PHC physician practices. In other words, we may have undercounted the number of PHC physicians in a group practice. Nor can we assume that physicians who had a hospital-based practice location are actually hospitalists. Analyses of services files would enable this determination.

We are also limited in our ability to identify PHC physicians in active practice due to the incompleteness of physician service and billing data. Specifically, physicians who receive payment only through Alternative Payments Program (APP) Service Agreements cannot be identified. APP Service Agreements are contracts between the Ministry of Health and an organization, rather than an individual physician. We can only identify the organizations that receive funding through APP Service Agreements, not the individual physicians who may supply services on behalf of that organization.

We are unable to explain why a significant number of physicians ( $n=472$ ) in 2001 provided only a home address to the College of Physicians and Surgeons (a potential cause of the large drop in single-physician practices). Our decision to assign some of these physicians to an alternate address (either the MSP Practitioner file or to a hospital) may have artificially inflated our count of PHC physicians practicing in a hospital. These physicians may be locum physicians, may practice part time, or may work in an academic setting and provide services on rare occasions. Only further investigation will shed light on this issue.

We also assume that PHC physicians must collocate to be considered a group practice. While shared practice settings may support more effective communications or delivery of services, these benefits may also accrue when PHC physicians practice as part of a virtual team or network.

Though PHC policy makers and administrators expect to attain health and health system benefits from interdisciplinary collaboration among PHC teams, physicians have their own personal, professional and economic reasons for collocating or networking with other providers. The purpose of this initiative was to develop population-based data infrastructure to identify group practices where physicians are likely to practice in teams and to build the capacity to evaluate the impact of temporal shifts toward team-based PHC in British Columbia. This work forms the building block for identifying interdisciplinary teams of health care professionals in PHC.



## Conclusion

PHC renewal in Canada has an array of goals: increasing the number of people with a regular source of care, improving access to care, and enhancing the degree to which care is coordinated and integrated across the health system. Interdisciplinary teams have been identified by the policy community as one method through which these goals may be achieved, and the collocation of PHC physicians is the first step in the development of team-based care.

However, providing continuity of care takes more than sharing an office location. The results of a study designed to understand the degree of continuity of care in family practice settings in British Columbia in 1996/97<sup>27</sup> indicate about 25 per cent of family physicians practiced in large community-based groups (4 or more physicians) and that these practice arrangements were predominant in rural and suburban areas of the province. For the most part, family physicians in these practices did not share patients.

So more investigation is required, and could involve: (1) measuring the extent to which these collocated physicians work collaboratively; (2) identifying other health professionals located at these sites; and (3) assessing the extent to which these interdisciplinary teams collaborate.

Group practices of collocated PHC physicians can potentially offer improved continuity of, and access to, care, but other ingredients may be necessary. For example, information systems might better enable providers (collocated or not) to share information about a patient. Relationship, management and information continuity are important to patients—patients are willing to see another physician at the same or a different practice setting if they can get quicker access.<sup>28</sup> Continuity might be better achieved through increases in the proportion of community-based physicians that collocate. And while no single-physician practitioner can provide PHC services 24/7, group practices could allow physicians to pool resources and provide out-of-office-hours care.<sup>29</sup>

Perhaps the most important contribution of this project are the legacy information systems now available to identify and locate PHC group practice settings in British Columbia at two points of time of high relevance to policy-makers, planners and evaluators. By the end of 2006, we hope to have completed work to replicate this methodology using data from a more recent period. New research that relies on this legacy information system will help answer vital questions:

1. What types of patients visit different practice settings?
2. Do group or single-physician practice settings provide better continuity of care?
3. Does practice setting influence the use of pharmaceuticals, specialists or hospitals?
4. Who delivers services within different types of practice settings?
5. What is the nature of patient sharing within different group practice settings?

There is still much to learn about team-based PHC, and much work to be done to improve the administrative data infrastructure in British Columbia (particularly in relation to alternative funding) in order to fully support PHC planning and evaluation. Researchers at the Centre for Health Services and Policy Research are committed to this agenda and look forward to developing a comprehensive picture of the attributes and qualities of physician group practice in British Columbia as we progress through our PHC research program.

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## Appendix I: Data Sources for Physician Locations

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### Medical Services Plan (MSP) Practitioner

The MSP practitioner file is a Ministry of Health registration data file that includes one mailing address per practitioner. Practitioners supply the Ministry with this billing address. Addresses contain a name, one address (clinic name if supplied, street or post office box number, town or city, postal code, and if applicable, suite number) and a unique identifier. This single address, however, may be a home, office or possibly an accountant's office. In previous work, we relied solely on physicians' billing addresses (from the MSP Payee file) to identify group practices. The result was estimates that were lower than expected, most likely because in many cases the billing address was not the practice location (e.g. when a third party billing address is used).

### College of Physicians and Surgeons of British Columbia (CPSBC) Files

CPSBC collects information from all physicians as they register to work in the province. An annual survey is conducted to update personal information. Completion of the survey is mandatory, and response rates are approximately 90 per cent. Physicians can also update their address by mailing or faxing a signed letter to the College. The CPSBC Address file contains up to six addresses for each physician, and each address is accompanied by an 'effective date' and a variable indicating whether the address is a work or home address. There can be several addresses for each physician, each with the same or different effective dates. Physicians can also designate a future 'effective date', though they are encouraged not to assign one too far into the future.<sup>\*\*\*\*</sup>

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## Appendix II: PHC Physicians by Practice Size and Setting

Table 1: PHC Physicians by Practice Setting and Type in British Columbia

		British Columbia				Interior Health	
		1996/1997	2000/2001			1996/1997	2000/2001
Practice Setting		Physicians		Practice Setting		Physicians	
Community-Based		3,817	3,409	Community-Based		620	599
In Group Practice		2,294	2,422	In Group Practice		423	451
In Single Practice		1,523	987	In Single Practice		197	148
Hospital		278	529	Hospital		21	83
Large Organization		57	71	Large Organization		3	7
Home Address		0	174	Home Address		0	16
<b>Total</b>		<b>4,152</b>	<b>4,183</b>	<b>Total</b>		<b>644</b>	<b>705</b>

		Fraser Health				Vancouver Coastal Health	
		1996/1997	2000/2001			1996/1997	2000/2001
Practice Setting		Physicians		Practice Setting		Physicians	
Community-Based		978	880	Community-Based		1,241	1,023
In Group Practice		654	648	In Group Practice		606	662
In Single Practice		324	232	In Single Practice		635	361
Hospital		13	68	Hospital		158	205
Large Organization		17	25	Large Organization		34	34
Home Address		0	41	Home Address		0	77
<b>Total</b>		<b>1,008</b>	<b>1,014</b>	<b>Total</b>		<b>1,433</b>	<b>1,339</b>

		Vancouver Island Health				Northern Health	
		1996/1997	2000/2001			1996/1997	2000/2001
Practice Setting		Physicians		Practice Setting		Physicians	
Community-Based		736	684	Community-Based		242	223
In Group Practice		454	502	In Group Practice		157	159
In Single Practice		282	182	In Single Practice		85	64
Hospital		36	93	Hospital		50	80
Large Organization		1	3	Large Organization		2	2
Home Address		0	39	Home Address		0	1
<b>Total</b>		<b>773</b>	<b>819</b>	<b>Total</b>		<b>294</b>	<b>306</b>

Totals exclude the number of physicians in group and single-physician practices. These numbers are a subset of the number of physicians in community-based practices.

Source: Physician counts: MSP payment information masterfile (for fee for service data), Hospital Discharge Abstracts Database (BC Linked Health Database 1996/97 and 2000/01), MSP practitioner file; primary health care organizations and alternative payments to physicians data, all BC Ministry of Health 1996/97 and 2000/01; CPSBC 1996/07 and 2000/01.



Table 2: Community-Based Group Practices by Practice Size in British Columbia

Practice Size	British Columbia			
	1996/1997		2000/2001	
	Physicians	Groups	Physicians	Groups
2-3 Physicians	1,207	516	1,158	497
4-5 Physicians	490	112	558	129
6-9 Physicians	360	53	440	63
10+ Physicians	237	19	266	21
<b>Total</b>	<b>2,294</b>	<b>700</b>	<b>2,422</b>	<b>710</b>

Practice Size	Interior Health			
	1996/1997		2000/2001	
	Physicians	Groups	Physicians	Groups
2-3 Physicians	165	69	176	74
4-5 Physicians	84	19	73	17
6-9 Physicians	111	16	108	15
10+ Physicians	63	5	94	8
<b>Total</b>	<b>423</b>	<b>109</b>	<b>451</b>	<b>114</b>

Practice Size	Fraser Health			
	1996/1997		2000/2001	
	Physicians	Groups	Physicians	Groups
2-3 Physicians	362	156	339	144
4-5 Physicians	169	39	190	45
6-9 Physicians	90	13	97	14
10+ Physicians	33	3	22	2
<b>Total</b>	<b>654</b>	<b>211</b>	<b>648</b>	<b>205</b>

Practice Size	Vancouver Coastal Health			
	1996/1997		2000/2001	
	Physicians	Groups	Physicians	Groups
2-3 Physicians	392	170	373	162
4-5 Physicians	131	30	139	32
6-9 Physicians	40	6	83	12
10+ Physicians	43	3	67	5
<b>Total</b>	<b>606</b>	<b>209</b>	<b>662</b>	<b>211</b>

Practice Size	Vancouver Island Health			
	1996/1997		2000/2001	
	Physicians	Groups	Physicians	Groups
2-3 Physicians	212	88	203	87
4-5 Physicians	78	18	122	27
6-9 Physicians	86	13	118	17
10+ Physicians	78	6	59	4
<b>Total</b>	<b>454</b>	<b>125</b>	<b>502</b>	<b>135</b>

Practice Size	Northern Health			
	1996/1997		2000/2001	
	Physicians	Groups	Physicians	Groups
2-3 Physicians	76	33	67	30
4-5 Physicians	28	6	34	8
6-9 Physicians	33	5	34	5
10+ Physicians	20	2	24	2
<b>Total</b>	<b>157</b>	<b>46</b>	<b>159</b>	<b>45</b>

Source: Physician counts: MSP payment information masterfile (for fee for service data), Hospital Discharge Abstracts Database (BC Linked Health Database 1996/97 and 2000/01), MSP practitioner file; primary health care organizations and alternative payments to physicians data, all BC Ministry of Health 1996/97 and 2000/01; CPSBC 1996/07 and 2000/01.

## Appendix III: Proportion of PHC Physicians in Community-Based Group Practices

Table 1: Proportion of PHC Physicians in Community-Based Group Practices in British Columbia

	British Columbia			Interior Health	
	1996/1997	2000/2001		1996/1997	2000/2001
PHC Physicians in Community-Based Group Practices	2,294	2,422	PHC Physicians in Community-Based Group Practices	423	451
Total PHC Physicians	4,152	4,183	Total PHC Physicians	644	705
<b>Proportion in Groups</b>	<b>55%</b>	<b>58%</b>	<b>Proportion in Groups</b>	<b>66%</b>	<b>64%</b>

	Fraser Health			Vancouver Coastal Health	
	1996/1997	2000/2001		1996/1997	2000/2001
PHC Physicians in Community-Based Group Practices	654	648	PHC Physicians in Community-Based Group Practices	606	662
Total PHC Physicians	1,008	1,014	Total PHC Physicians	1,433	1,339
<b>Proportion in Groups</b>	<b>65%</b>	<b>64%</b>	<b>Proportion in Groups</b>	<b>42%</b>	<b>49%</b>

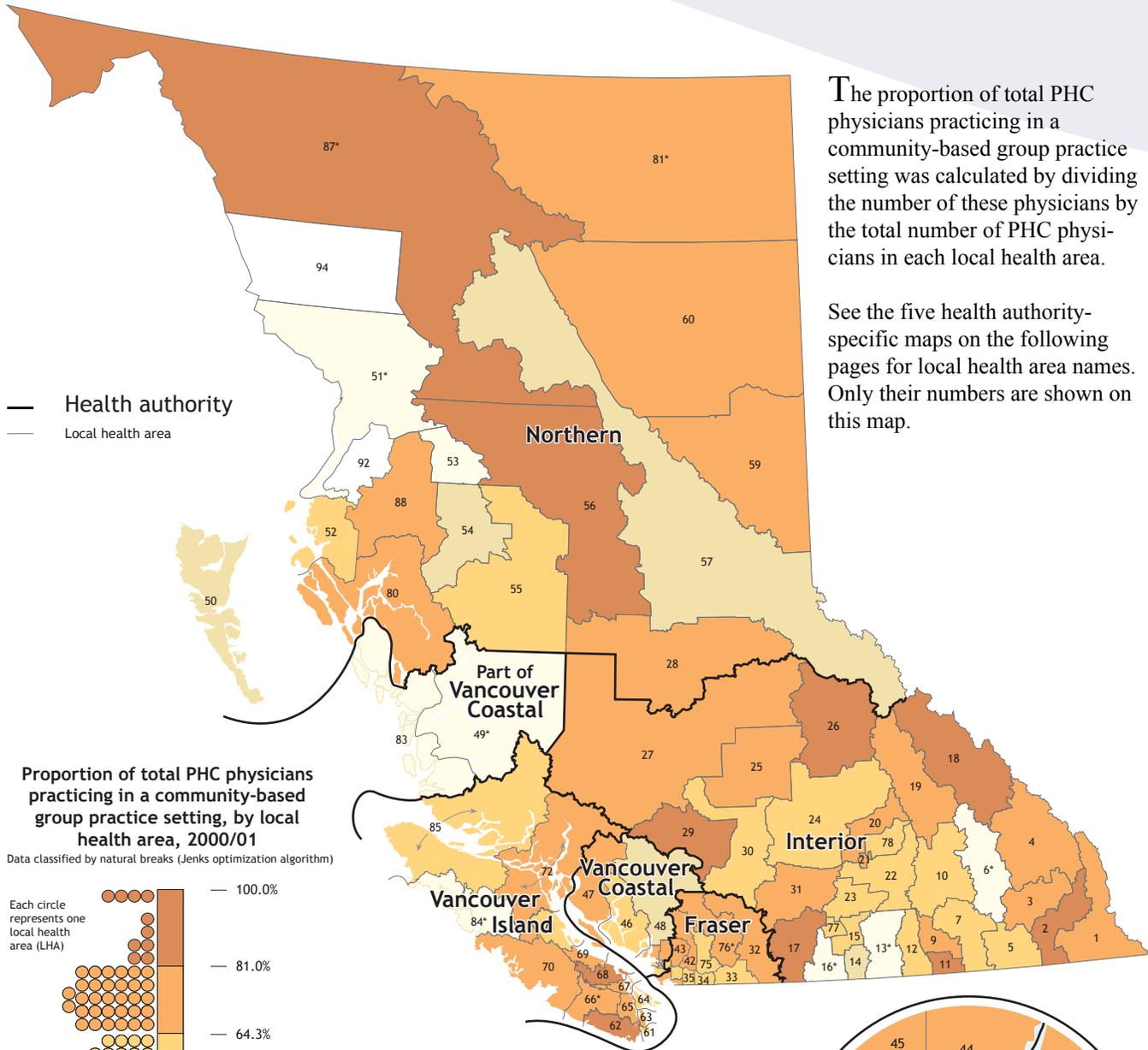
  

	Vancouver Island Health			Northern Health	
	1996/1997	2000/2001		1996/1997	2000/2001
PHC Physicians in Community-Based Group Practices	454	502	PHC Physicians in Community-Based Group Practices	157	159
Total PHC Physicians	773	819	Total PHC Physicians	294	306
<b>Proportion in Groups</b>	<b>59%</b>	<b>61%</b>	<b>Proportion in Groups</b>	<b>53%</b>	<b>52%</b>

Source: Physician counts: MSP payment information masterfile (for fee for service data), Hospital Discharge Abstracts Database (BC Linked Health Database 1996/97 and 2000/01), MSP practitioner file; primary health care organizations and alternative payments to physicians data, all BC Ministry of Health 1996/97 and 2000/01; CPSBC 1996/07 and 2000/01.



# Map 1: British Columbia—Proportion of PHC Physicians in Community-Based Group Practices (2000/2001)

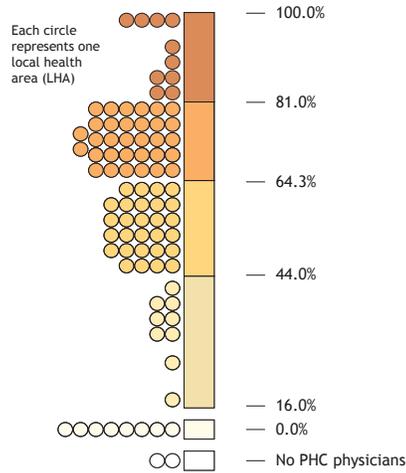


The proportion of total PHC physicians practicing in a community-based group practice setting was calculated by dividing the number of these physicians by the total number of PHC physicians in each local health area.

See the five health authority-specific maps on the following pages for local health area names. Only their numbers are shown on this map.

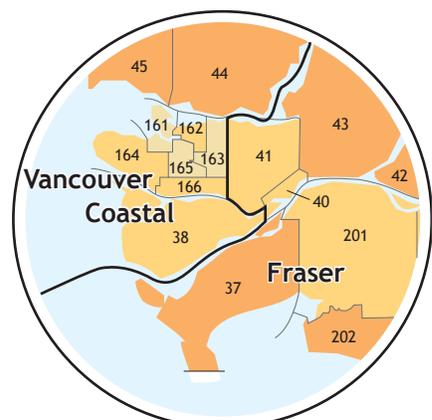
Proportion of total PHC physicians practicing in a community-based group practice setting, by local health area, 2000/01

Data classified by natural breaks (Jenks optimization algorithm)



Physician counts: MSP practitioner information file, MSP payment information masterfile (for fee for service data), Hospital Discharge Abstracts Database (all BC Linked Health Database 1996/97 and 2000/2001); primary health care organizations and alternative payments to physicians data, all BC Ministry of Health 1996/97 and 2000/01 data; CPSBC 1996/07 and 2000/01. Population counts: PEOPLE 28 (2001), BC Stats.

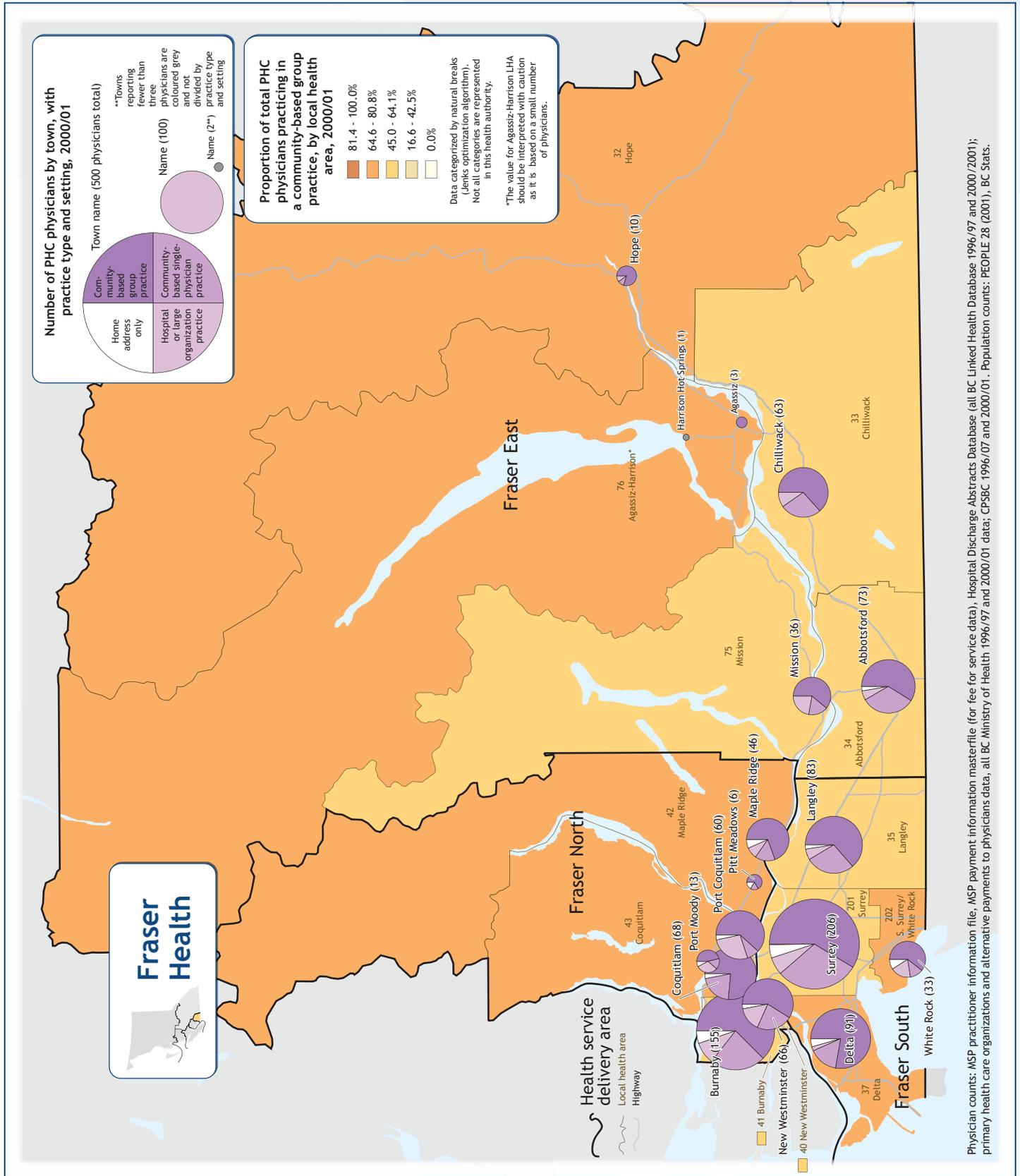
\* The values for LHAs 6, 13, 16, 49, 51, 66, 76, 81, 84 and 87 should be interpreted with caution as they are based on a small number of physicians.



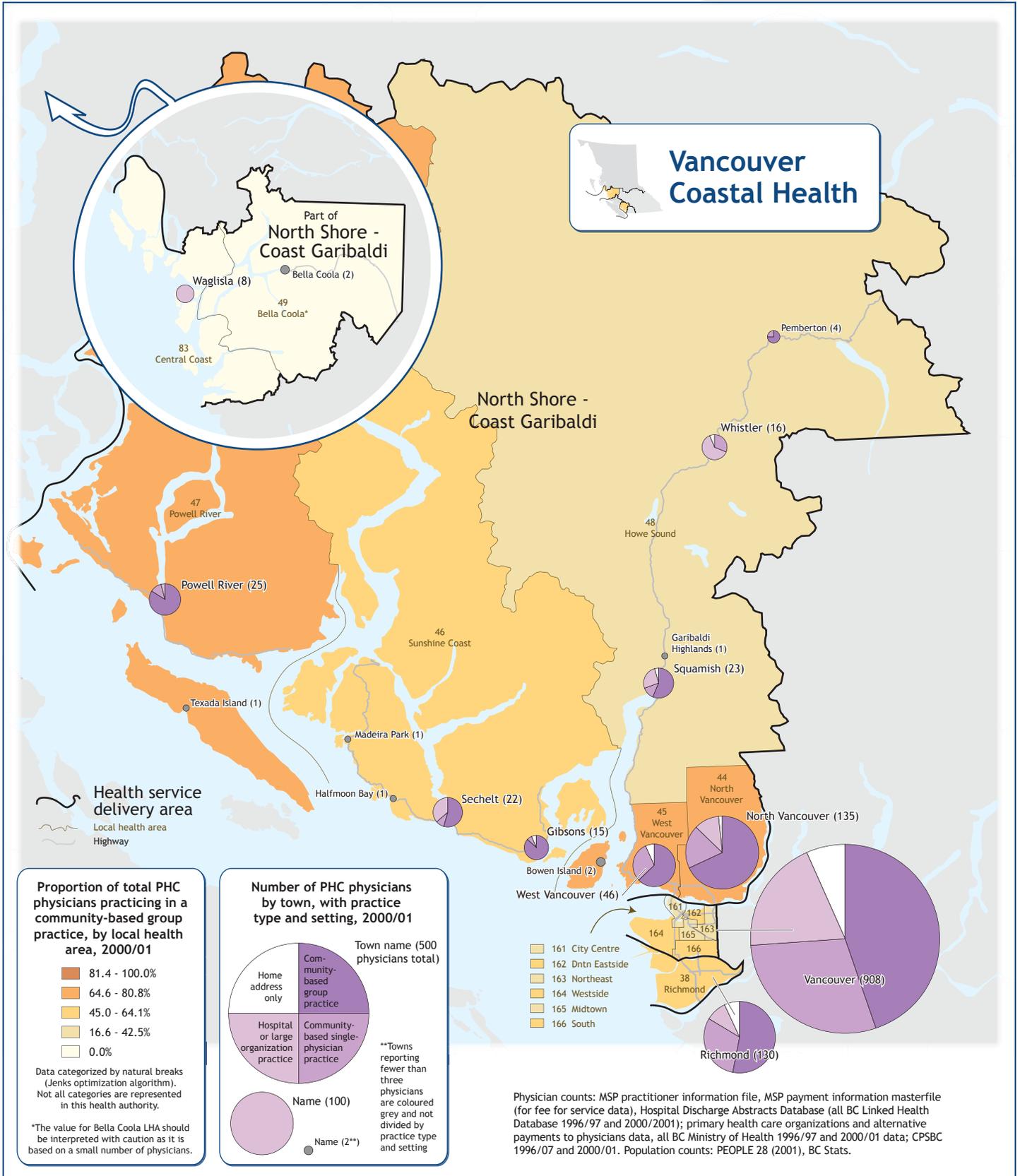




Map 3: Fraser Health—Proportion of PHC Physicians in Community-Based Group Practices (2000/2001)

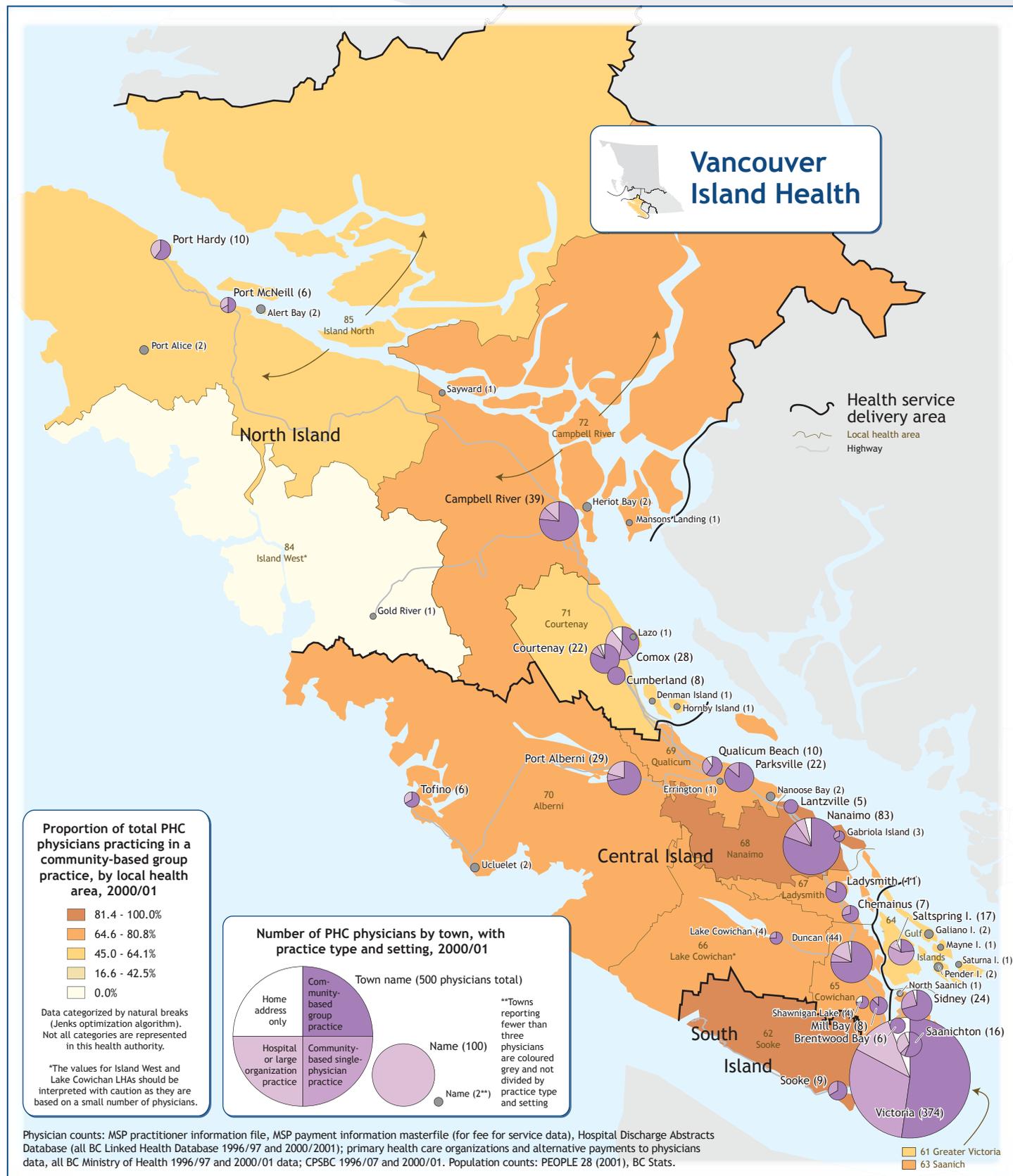


Map 4: Vancouver Coastal Health—Proportion of PHC Physicians in Community-Based Group Practices (2000/2001)

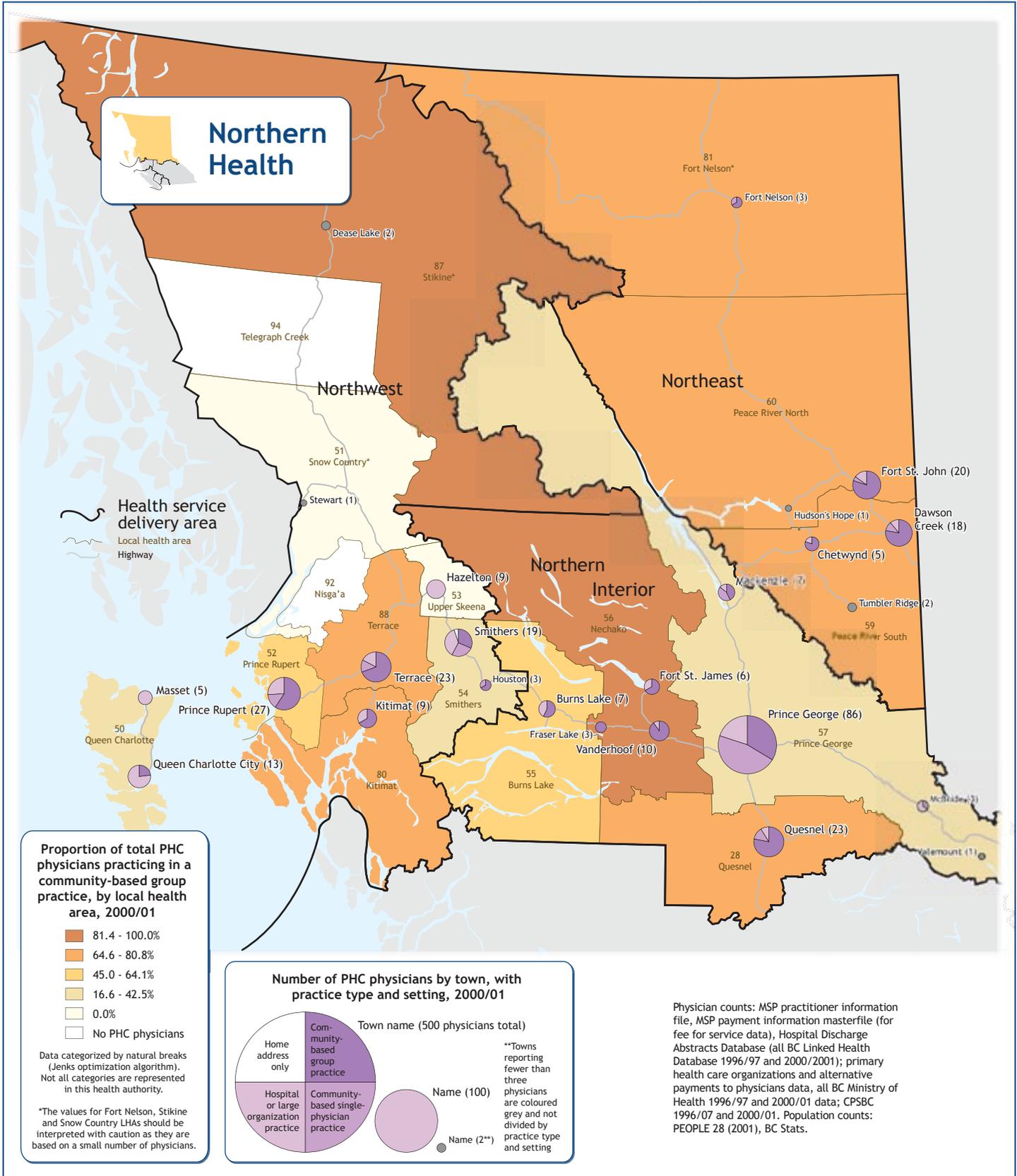




Map 5: Vancouver Island Health—Proportion of PHC Physicians in Community-Based Group Practices (2000/2001)



Map 6: Northern Health—Proportion of PHC Physicians in Community-Based Group Practices (2000/2001)



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