



Defining and Measuring Full Service Family Practice in BC, 1991–2006

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Background

Ongoing primary care reform in Canada is in part a response to concerns that Canadians lack timely access to a regular source of primary care. While the supply of general practice physicians per capita has been stable, changes in practice patterns including abandonment of specific areas of practice (such as obstetrics, anesthesia, or provision of services in hospitals, homes, or long-term care facilities) and movement to walk-in style clinics may shape accessibility of primary care as perceived and experienced by patients. In British Columbia (BC), the General Practice Services Committee (GPSC) has spearheaded reform efforts. Founded in 2003, the GPSC is a joint committee composed of the BC Ministry of Health, the BC Medical Association, and the Society of General Practitioners of BC. Its mandate is to support full service family practice and benefit patients. This report seeks to operationalize the GPSC definition of full service family practice using administrative data, and to track changes in physician practice patterns consistent with that definition over time.

Methods

We classified elements of the GPSC definition of full service family practice according to four features of primary care (first-contact access for each new need, long-term person-focused care, coordinated care, comprehensiveness for most health needs). We then determined which elements could be measured using administrative data available over the period from 1991/2 to 2005/6, and report changes over that period. We also describe physician characteristics associated with a full service style of practice, and perform sensitivity analysis to confirm that any observed changes were not the result of a shift to alternate payment plans not captured in the fee-for-service data used in analysis.

Results

Marked declines were observed in first-contact, long-term person-focused, and coordinated care. Comprehensiveness was roughly constant over time. While provision of maternity care fell markedly, scores on all other elements rose to compensate. Differences in provision of full service care are apparent by physician characteristics, with higher scores among male physicians, those in middle age, University of BC graduates, those practicing in the Interior and Northern health authorities, as well as in rural and small town settings. Declining trends persisted when adjusting for the possibility that full service physicians have moved to alternate payment plans.

Conclusion

A marked decline in the provision of full service family practice was observed over the period from 1991/92 to 2005/06 in BC. This was observed across all examined physician characteristics.

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Background

A stronger primary care system contributes to better outcomes for patients and a more efficient health care system (1). Starfield has described primary care services as having four main features:

1. The first point of access to the health care system for each new need;
2. Longitudinal care focused on the person, not the disease, implying the existence and use of a regular source of care over time;
3. The part of the system that coordinates care provided elsewhere or by others, including both coordination by practitioners and through medical records. For some purposes, primary care is also described as being oriented toward family and community; and
4. Comprehensive for most health needs, in that it can arrange for all types of services with referrals to other types and locations of care as appropriate (1,2).

These four features are consistent with an earlier US Institute of Medicine definition of primary care as “the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community” (3). In Canada, family physicians play a central role in providing primary care, and have been the focus of recent efforts to reform primary care in several provinces.

Primary care reform

Reform has come in the face of concerns that increasing numbers of Canadians lack timely access to a regular source of primary care. Over the period from 2003 to 2010, the proportion of British Columbians reporting being without a regular medical doctor climbed from 10.6% to 14.3% (4). While the supply of general practice physicians per capita has been stable (5), primary care physicians report that they are providing fewer hours of direct patient care (6,7) and younger doctors are

seeking a different work-life balance (8). At the same time, there has been concern about declining comprehensiveness of family practice, as physicians move to walk-in clinics (9) or abandon specific areas of practice (such as obstetrics, anesthesia, or provision of services in hospitals, homes, or long-term care facilities) (10,11).

This combination of factors has the potential to shape accessibility of primary care as perceived and experienced by patients. However, changes over time and across multiple dimensions of care have not been described. This report seeks to address this gap. The underlying analyses represent one component of a larger project examining changes in the supply, availability, and use of physicians services, motivated by an interest in understanding the shift from a general perception in Canada of a physician surplus in the early 1990s, to a shortage a half-decade later.

Full service family practice

In British Columbia (BC), recent efforts at primary care reform have been spearheaded by the General Practice Services Committee (GPSC). Founded in 2003, the GPSC is a joint committee composed of the BC Ministry of Health, the BC Medical Association, and the Society of General Practitioners of BC. Its mandate is to “support full service family practice and benefit patients” (9). It has introduced incentive payments for patient care in areas such as chronic disease management, maternity care, mental health, care for the frail and elderly, and palliative care over the period from 2003-2008, as well as other support programs. Central to the GPSC’s approach to reform is the idea that the doctor-patient dyad is the critical component of primary care (12), and that this is best-supported by full service family practice (FSFP). The GPSC defines FSFP as a style of practice that includes most of the following (13):

- Health and health risk assessments
- Co-ordination of patient care across the spectrum of primary, secondary, and tertiary care, including making referrals and acting on consultative advice

- Longitudinal care of patients across the spectrum of their medical needs
- Diagnosis and management of acute ailments
- Chronic disease management, including implementation of BC guidelines
- Primary reproductive care including the organization of appropriate screening
- The provision of or the arrangement with another provider for the provision of prenatal, obstetrical, postnatal, and newborn care
- Primary mental health care
- Primary palliative care
- Care and support of the frail elderly
- Support for hospital, home, rehabilitation and long-term care facilities
- Patient education and preventive care
- The maintenance of a longitudinal patient record
- An association with other practitioners that provides patients with a designated provider to contact for medical advice and/or care as appropriate both during and outside of office hours, an association that includes the use of call-group guidelines and protocols for patient follow-up
- The future use of information technology systems as they become available to further enhance the co-ordination and provision of patient care.

Since the GPSC reforms are predicated on a model of care in which the physician-patient dyad is central, physicians are responsible for the full range of primary care functions, providing comprehensive, continuous, and patient-centered care, and serving as the first point of contact between a patient and the health care system. This can be contrasted with team-based models in which the core functions of primary care are shared across a variety of service providers. It also stands in contrast to walk-in practices, which may provide accessible, first-contact services, without maintaining continuity over time, or fulfilling a coordinating role.

Despite a focus on supporting the FSFP style of care, the degree to which family physicians practice within this model, their characteristics, and how provision of FSFP changed over the period leading up to the GPSC

reforms is unknown. In order to examine this, it is necessary to operationalize the GPSC definition using administrative data, and then to track changes in physician practice patterns consistent with that definition over time.

Primary care physician practice patterns

Previous Canadian literature examining practice patterns with administrative data has focused on scope of practice, or the dimension of comprehensiveness of care. A 2009 paper by Glazier et al. evaluated capitation and enhanced fee-for-service models in Ontario, and measured the mean number and percent of 21 services defined using Ontario Health Insurance Plan Billing codes (14). In the 2006 Manitoba report “Profiling Primary Care”, an Atypical Diagnostic Coding Index (ADCI) was used to summarize scope of service provision, in order to determine the extent to which primary care physicians were sub-specializing, implying less availability for general practice (15). This used the Johns Hopkins Expanded Diagnosis Clusters (EDCs) grouping system which sorts ICD-9 codes for each physician visit into 27 distinct groups. The authors determined an ‘expected proportion of codings’ using the actual distribution of each of the 27 groups in the region.

Survey data has also been used to examine practice patterns. Wong and Stewart used the 2001 National Family Physician Workforce Survey to identify factors associated with the scope of practice of FPs in office-based practice, based on 12 historically provided medical services (10). Earlier, Hutten-Czapski, Pitblado and Slade described the scope of family practice in rural and urban settings, using a practice breadth score based on survey responses to the 1997 National Family Physician Survey. This survey included 16 questions on procedures and eight on on-call activities (16).

In BC, scope of practice has been examined using individual fee items grouped into categories (17), but domains other than comprehensiveness were not measured and the study did not examine changes over time.

The Primary Care Assessment Tool (PCAT) is a survey tool including items dealing with primary care quality designed to measure each of the core domains of primary care as articulated by Starfield, as well as three other related domains (family centeredness, community orientation, and cultural competence) (18). However, in order to track changes over time, we needed to use existing administrative data, so this approach was not feasible.

Objectives and research questions

Existing approaches to describing family physician practice patterns do not consider all of the elements noted in the GPSC definition. The extent to which family physicians practice within this model, their characteristics, and how provision of FSFP changed over time remain unknown.

We first seek to operationalize the GPSC’s definition of FSFP using administrative data in BC. We then set out to answer the following questions:

1. How has the provision of FSFP changed over the period from 1991 to 2006?
2. What are the characteristics of family physicians who maintain full service practices?

Approach

Dimensions of primary care

We adopt the definition of FSFP articulated as part of the GPSC primary care policies in this analysis, and classify elements according to Starfield’s four features of primary care (9). We then determine if we can measure the dimension using administrative data available in BC in all four study years (see Table 1). A detailed explana-

Table 1 Measurement of full service family practice using BC administrative data

Dimensions	Attribute(s) from GPSC FSFP definition	Measurable
First-contact access for each new need		
First-contact care	Health and health risk assessments	No
Access both during and outside of office hours	An association with other practitioners that provides patients with a designated provider to contact for medical advice and/or care as appropriate both during and outside of office hours	Yes
Support for alternate settings	Support for hospital, home, rehabilitation and long-term care facilities	Yes
Long-term person-focused care		
Continuity	Longitudinal care of patients across the spectrum of their medical needs	Yes
Coordinated care		
Coordination and referral	Co-ordination of patient care across the spectrum of primary, secondary, and tertiary care, including making referrals and acting upon consultative advice	Yes
Record keeping	The maintenance of a longitudinal patient record	No
Information technology	The future use of information technology to enhance the co-ordination and provision of patient care	No
Comprehensive for most health needs		
Service for both acute and chronic conditions	Diagnosis and management of acute ailments. Chronic Disease Management, including implementation of BC guidelines	Yes
Reproductive care	Primary reproductive care including the organization of appropriate screening	Yes
Maternity care	The provision of or the arrangement with another provider for the provision of prenatal, obstetrical, postnatal, and newborn care	Yes
Mental health care	Primary mental health care	Yes
Palliative care	Primary palliative care	No
Geriatric care	Care and support of the frail elderly	Yes
Disease prevention	Preventive care	Yes
Health promotion and education	Patient education	No

tion of each element and its measurement, or reasons why it could not be adequately measured using administrative data, is provided in the following section.

Watson et al. propose a logic model for primary health care that describes the inputs, activities, outputs, and expected outcomes of the primary care system in Canada, as well as the contexts that influence services (19). We focus only on outputs, described in the logic model as the volume, type (e.g. referral, prevention, curative, and palliative) and qualities of products and services. As such, our analysis informs only the clinical activities of providing primary health care in the context of the family practice. It does not describe the structure of the system in which such practices are embedded, nor does it capture outcomes (efficiency or equity).

Data sources

This report uses linked data developed by the BC Ministry of Health and provided through Population Data BC. The specific data files include BC's Medical Services Plan registration and physician payment files, and physician-level information from the College of Physicians and Surgeons of BC. Access to these data was governed by a Research Data Access Framework that met all requirements of BC's Freedom of Information and Protection of Privacy Act and other relevant legislation.

Medical Services Plan (MSP) payment file

This file includes data on all fee-for-service medical services claims paid to physicians, with anonymous identifiers for both patients and physicians. It describes services used, and includes a patient diagnosis code for each encounter. Services are classified by fee codes, five-digit codes which indicate the insured service for which the practitioner was paid. These fee codes are nested within service codes. Service codes are two-digit codes to indicate the type of service rendered by a practitioner. The Medical Services Plan (MSP) senior medical advisor is responsible for the assignment and maintenance

of the service code for each fee item. The service code can be amended to reflect the status of the fee item established between MSP and the BC Medical Association (BCMA).

College of Physicians and Surgeons of BC

This is the registering and licensing body for physicians in BC. Data available from the College provide information on physician characteristics including age, sex, year of graduation, province or country of training, practice location, and specialty, used in descriptive analyses.

Medical Services Plan (MSP) registration file

This includes a record for all BC residents who receive or are eligible to receive publicly-funded health care services, and contains individual demographic information.

All data were provided by Population Data BC with unique study identifiers that enabled us to connect records for individual patients and physicians across datasets and over time. These identifiers cannot be linked at an individual level to other data and cannot be used to identify specific individuals. We used four discrete years of data, covering a decade and a half of healthcare services use: 1991/2, 1995/6, 2001/2, and 2005/6.

In this analysis all billings are adjusted to 2005/6 fees. Contacts are defined as unique combinations of patient, physician, and calendar date, regardless of how many fee codes were billed on that day. Telephone calls, completion of documentation/forms, and other indirect patient care that would not involve an in-person meeting were not included when determining contacts.

Measuring full service family practice

First contact access for each new health need

Health and health risk assessments

This was not measured explicitly. The role of family physicians as first-contact care providers (performing health assessments, including history taking, physical exam, and diagnostic evaluation), is inherent to the structure of the Canadian health system, and so first contact being with a family physician is assumed. There will be exceptions, but these are likely to be rare. While completing health and health risk assessments are assumed to be basic elements of patient visits, these activities cannot be measured directly.

Access both during and outside of office hours

Arrangements for 24-hour, seven-day a week response could not be measured directly, as there are no provincial data on on-call groups, nor are there patient rosters corresponding to individual physicians. Physicians were classified as providing access to care both during and outside of office hours if they billed for any services designating care outside of office hours.

Billings outside of office hours included service codes 09 or 49 (excluding fee codes 04432, 07043, and 07283). These capture premiums paid for care outside of office hours. Those with no billings outside of office hours received a score of 0. All others received a score of 100.

Support for alternate settings

Contacts were classified as having occurred in the following locations outside of the office during the study year:

- Home
- Long term care (LTC) facility
- Hospital, emergency room (ER) specified
- Hospital, ER not specified

Service and fee codes for home, LTC, and ER care specify the location of services. Codes reflecting hospital care either specify hospital as the location of

Table 2 Service and fee codes specifying setting

	Service codes	Fee codes
Contacts in homes	05	00103, 00104, 00361, 96859
Contacts in long term care		00114, 00115, 13114
Contacts in hospital, ER specified	06, 26, 67	00112, 00111,* 00325, 19921, 96801, 96802, 96803, 96804, 96805, 96811, 96812, 96813, 96814, 96815, 96821, 96822, 96823, 96824, 96825, 01823
Contacts in hospital, ER not specified	27, 28, 30, 40, 41, 42, (NOT 04090, 04091, 04094, 14090, 14091, 14094), 43, 45, 46 (NOT 00361), 48, 97	00013, 00016, 00017, 00018, 00019, 00024, 00025, 00026, 00027, 00028, 00040, 00046, 00105, 00108, 00109, 00105, 00113, 00116, 00118, 00119, 00123, 00127, 00128, 03100, 00319, 00370, 00371, 00393, 00394, 00525, 00526, 00641, 00700, 00702, 00703, 00704, 00705, 00706, 00707, 00708, 00709, 00710, 00711, 00719, 00720, 00721, 00722, 00723, 00724, 00726, 00727, 00728, 00729, 00731, 00733, 00734, 00735, 00736, 00738, 00737, 00739, 00740, 00741, 00742, 00746, 00747, 00749, 00750, 00751, 00752, 00754, 00755, 00759, 00760, 00807, 00808, 00977, 01018, 01094, 01095, 02420, 02144, 02444, 04005, 04008, 04049, 04403, 07138, 07142, 07143, 07430, 07528, 07560, 07561, 07783, 70552, 08265, 08583, 08591, 08606, 08607, 08608, 08617, 08620, 08626, 08627, 08690, 08691, 08692, 08693, 08694, 08695, 10733, 11215, 11245, 11645, 11845, 12148, 13108, 13127, 13128, 13148, 13228, 13229, 12148, 19921, 96858
Contacts out of office, other		12200, 12201, 12220, 13200, 13201, 13220, 16200, 16201, 16220, 17200, 17201, 17220, 18200, 18201, 18220, 96841, 96850, 96852
Contacts in office (specified)	23	00100, 00101, 00120, 04007, 04505, 04533, 08264, 12100, 12101, 12120, 13100, 14094, 16100, 16101, 16120, 17100, 17101, 17120, 18100, 18101, 18120, 96857, 04094, 14094, 08264, 13101, 13120, 00137

*This code indicates the patient was encountered at home, and then moved to ER.

services, or correspond to services that could not be provided in an office setting. Some services had no location specified, and could not otherwise be classified (e.g. intravenous injection, skin biopsy). Fee codes within service codes 02, 08, 09, 12, 19, 22, 44, 47, 49, 60, 66, 71, 93, 94, 95, 96, and 98 not mentioned elsewhere fell into the category of “location not specified.” (See Table 2).

Physicians received a score of 100 if they provided care in all four identified non-office locations, 75 if they provided care in three of the four, 50 in two of the four, and 25 in one of the four. They received a score of zero if all services were in office, or a location that was not specified.

Long-term person-focused care

Continuity

The majority source of care (MSOC) for each patient was the physician who provided >50% of GP contacts. Patients with one contact are considered to have a MSOC. Patients who had an equal number of contacts with two or more physicians could not be assigned.

Physicians were given a score equal to the percent of the total number of patients they saw for whom they were the assigned MSOC.

Coordinated care

Coordination and referral

Disorganized care was defined as patients seeing four or more GPs in the study year. The coordination score was assigned on the basis of the proportion of a physician's patients **not** receiving disorganized care.

Record keeping

Record keeping was not measured. While all practices keep records for billing purposes, maintenance of a detailed and complete longitudinal record is likely variable.

Information technology

Use of information technology to enhance the coordination and provision of patient care could not be measured.

Comprehensiveness for most health needs

Service for both acute and chronic conditions

Diagnosis and management of acute ailments and chronic diseases was captured using Aggregated Diagnosis Groups (ADG), assigned based on ICD-9 codes. Care was classified as shown in Table 3.

The score was calculated as the ratio of acute and chronic contacts, multiplied by 100 (the denominator was whichever number was largest). As such, a score of 100 corresponds to equal distribution of services for acute and chronic conditions, 50 reflects twice as many in one category than the other, 25 reflects four times as

Table 3 Classification of acute and chronic conditions

	ADGs included
Acute	ADG1 Time Limited: Minor ADG2 Time Limited: Minor-Primary Infections ADG3 Time Limited: Major ADG4 Time Limited: Major-Primary Infections ADG23 Psychosocial: Time Limited, Minor ADG21 Injuries/Adverse Effects: Minor ADG22 Injuries/Adverse Effects: Major ADG7 Likely to Recur: Discrete ADG8 Likely to Recur: Discrete-Infection
Chronic	ADG5 Allergies ADG6 Asthma ADG9 Likely to Recur: Progressive ADG10 Chronic Medical: Stable ADG11 Chronic Medical: Unstable ADG12 Chronic Specialty: Stable-Orthopedic ADG13 Chronic Specialty: Stable-Ear, Nose, Throat ADG14 Chronic Specialty: Stable-Eye ADG16 Chronic Specialty: Unstable-Orthopedic ADG17 Chronic Specialty: Unstable-Ear, Nose, Throat ADG18 Chronic Specialty: Unstable-Eye ADG24 Psychosocial: Recurrent or Persistent, Stable ADG25 Psychosocial: Recurrent or Persistent, Unstable ADG32 Malignancy
Signs/ symptoms	0ADG26 Signs/Symptoms: Minor ADG27 Signs/Symptoms: Uncertain ADG28 Signs/Symptoms: Major
Not classified	ADG15 No longer in use ADG19 No longer in use ADG20 Dermatologic ADG29 Discretionary ADG31 Prevention/Administrative ADG33 Pregnancy ADG34 Dental ADG30 See and Reassure

many in one category than the other, and 0 reflects no contacts for either acute or chronic conditions.

Reproductive care

Primary reproductive care was measured as the percent of all women ages 18-74 seen by a physician in the study year, to which the physician administered a pelvic examination with pap smear. Since exams are not recommended annually, this value was multiplied by 3 and truncated at 100%. Note that the denominator is all women ages 18-74 seen by the physician. Many

will have seen multiple physicians over the course of the year, and would therefore be included in multiple denominators, leading to the low overall percentage.

Maternity care

Fee codes

Routine pelvic exam, women 18-74	04560, 14560
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The provision of pre/post-natal and obstetrical care was captured using the following fee codes:

Fee codes

Contacts (#) maternity, not delivery	04090, 04091, 04094, 14090, 14091, 14094
Contacts (#) maternity, delivery and post-natal care	00118, 00119, 04000, 04014, 04017, 04018, 04022, 04023, 04024, 04025, 04026, 04050, 04052, 04092, 04093, 14104, 04107, 14108, 14109, 04118, 04119, 14199, 04038, 04021, 04104, 04105, 04108, 04109

Physicians were assigned a value of 100 if they both performed deliveries and provided pre/post-natal care, 50 if they did one or the other (the vast majority did pre/post-natal care but not deliveries), and 0 if they did neither. We could not directly measure arrangements with another provider for the provision of some segment of maternity care.

Mental health care

Contacts for which physicians recorded ICD-9 codes 290-319 were classified as mental health care. Physicians were assigned a score of 0 if they had no contacts for mental health conditions. All other physicians received a score of 100.

Palliative care

Palliative care could not be measured. Only a small subset of decedents received specialized care that corresponds to unique fee codes, and these have changed over the study period. Moreover, any given physician may experience only a handful of deaths from within his/her patients over the course of a year, which would be insufficient to capture provision of palliative services.

Geriatric care

Though the FSFP description specifies care and support of the frail elderly, we could not assess frailty from the available administrative databases. Physicians received a score of 100 if they were the usual provider of care to at least one patient age 75 and older who had three or more contacts.

Disease prevention

Preventive care was assessed on the basis of lipid and glucose screening (men and women age 45+).

Fee codes

Glucose, patients 45+	15100, 91707, 09230, 09219
Lipids, patients 45+	91375, 92350, 91780, 09240, 09158, 09467

Since these screening measures are not indicated on an annual basis, the percent of patients receiving each test in a given year was multiplied by 3, truncated at 100, and then averaged across the two indicators.

Patient education

Patient education could not be measured. No fee codes correspond consistently and directly to education activities.

Exclusion criteria

Physicians were excluded if they:

- Did not have at least one billing record in all four quarters. These physicians may be entering or leaving practice.
- Claimed more than 15,000 unique patient contacts (unique physician/patient/date combinations). This corresponds to more than 250 unique patient contacts per week. The National Physician Survey shows that only 5% of family physicians see more than 200 patients per week. These are therefore likely to be primary care clinics with shared billings across multiple physicians.
- Had more than 50% of contacts (with known location) in hospital. These physicians were assumed to be playing the role of “hospitalist” and were consid-

ered unlikely to be maintaining a practice in the community. There is a clear bimodal distribution in the proportion of contacts in hospital. On average, 90% of physicians had fewer than 35% of contacts in hospital, and a small cluster of 5% of physicians had more than 95% of contacts in hospital.

- Used shadow-billing codes associated with alternate payment plans (APPs).
- Billed less than \$50,000 in the year. These may be part-time physicians (approximately 0.3 FTE, based on a benchmark value of \$170,000 over the study period), or physicians receiving a large proportion of their income from alternate payment plans.

Table 4 Number of GP/FP physicians by exclusion category and year

	1991/2	1995/6	2001/2	2005/6
Total physicians in data	3,726	4,176	4,446	4,759
Exclusion criteria				
No record in all quarters	593	554	639	631
>10,000 unique patient contacts	39	19	34	39
>50% of contacts in hospital	168	186	293	429
APP billings	0	0	0	62
<\$50,000 in billings	194	228	270	347
Total number excluded (APP payment plan/low billing)	194	228	291	459
Total number excluded (all reasons)	994	986	1,257	1,558
Number of physicians included in analysis	2,732	3,190	3,189	3,201

Sensitivity analyses performed to ensure that changes from fee-for-service to APPs did not affect conclusions over time are described below.

Producing a summary score

All physicians were assigned a score between 0 and 100 for each dimension. To produce a composite score, dimensions corresponding to first-contact, long-term person-focused, coordinated, and comprehensive were averaged and each dimension assigned a weight of 0.25. This weighting corresponds to Starfield’s definition of

primary care (with comprehensiveness measured as one of four dimensions). Sensitivity analysis confirmed that while the scores differ with other approaches to weighting, conclusions about overall changes are robust to the weighting scheme used.

Results

Physician characteristics over time

The total number of FP/GP physicians increased over the course of the study, as did fee-adjusted billings, total contacts per physician, and the number of patients per physician. The proportion of female physicians increased, as did the number of physicians falling into age categories 50 and above. Place of graduation was roughly constant over time, though a slight increase in international graduates is observed in 2005/6. Slight fluctuation in geographic location is observed, with a decrease in metro areas, and an increase in small urban areas. See Table 5.

Change in dimensions over time

Marked declines were observed on all elements reflecting the dimensions of first-contact, long-term person-focused, and coordinated care. Notably, the percentage of physicians providing services outside office hours fell from 95.8% to 68.8% over the study period, while the percent providing care in all four alternate (non-office) settings fell from 64.6% to 34.7%. See Table 6.

The summary score for comprehensiveness was roughly constant over time. While provision of maternity care fell markedly, scores on all other elements rose to compensate.

Table 5 Physician characteristics over time

	19 91/2	1996/7	2001/2	2005/6
# physicians included	2,732	3,190	3,189	3,201
Physician practice characteristics (mean, SD)				
Total billings (\$)	209,946 (82,717)	202,950 (79,733)	204,503 (85,117)	209,292 (90,927)
Total # of contacts	1,831	5,786 (2,471)	5,925 (2,627)	6,035 (2,832)
# unique patients	(867)	2,017 (1,112)	2,086 (1,184)	2,175 (1,305)
# UPC patients*	467 (467)	427 (427)	428 (428)	417 (417)
# MSOC patients**	754 (754)	718 (718)	716 (716)	698 (698)
Physician demographics (n, %)				
Female	629 (23.0)	897 (28.1)	956 (29.8)	1018 (31.3)
Age group				
<40	1081 (39.6)	1110 (34.8)	815 (25.4)	570 (17.5)
40-44	546 (20.0)	591 (18.5)	583 (18.2)	556 (17.1)
45-49	444 (16.3)	570 (17.9)	563 (17.5)	583 (17.9)
50-54	218 (8.0)	437 (13.7)	529 (16.5)	537 (16.5)
55-59	201 (7.4)	197 (6.2)	392 (12.2)	494 (15.2)
60-64	143 (5.2)	161 (5.1)	162 (5.1)	307 (9.4)
65+	99 (3.6)	123 (3.9)	166 (5.2)	203 (6.2)
Years in practice				
<5	404 (14.8)	307 (9.6)	159 (5.0)	95 (3.0)
6-10	437 (16.0)	613 (19.2)	422 (13.1)	292 (9.1)
11-20	1000 (36.6)	1047 (32.8)	1120 (34.9)	1073 (33.5)
21-30	540 (19.8)	842 (26.4)	975 (30.4)	970 (30.2)
31+	350 (12.8)	379 (11.9)	534 (16.6)	777 (24.2)
Place of graduation				
University of BC	936 (34.3)	1092 (34.2)	1097 (34.2)	1035 (32.3)
Other Canadian medical school	1109 (40.6)	1326 (41.6)	1308 (40.8)	1273 (39.7)
International medical school	687 (25.2)	771 (24.2)	805 (25.1)	900 (28.1)
Health Authority				
Vancouver Coastal	462 (17.0)	549 (17.3)	562 (17.6)	613 (18.9)
Fraser Health	698 (25.7)	853 (26.9)	864 (27.1)	882 (27.2)
Vancouver Island	823 (30.3)	934 (29.5)	914 (28.7)	889 (27.5)
Interior	552 (20.3)	637 (20.1)	657 (20.6)	649 (20.0)
Northern	181 (6.7)	198 (6.2)	189 (5.9)	205 (6.3)

*Usual Provider of Care. Physician provided two-thirds or more of GP contacts. Patients must have a minimum of three contacts in the year.

**Majority Source of Care. Physician provided 50% or more of GP contacts to the patient in question. Patients with an equal number of contacts from two or more physicians cannot be assigned.

Note: Data were missing for some physician characteristics. Age: 1 missing in 2005/6. Years in practice: 1 missing in 1991/2 and 2001/2, 44 in 2005/6. Place of graduation: 43 missing in 2005/6. Health Authority: 16 missing in 1991/2, 18 in 1996/7, 24 in 2001/2, and 13 in 2005/6.

Table 6 Change in the dimensions over time

	19 91/2	1996/7	2001/2	2005/6
First-contact care				
Access both during and outside of office hours				
% billing at least one service provided outside office hours	95.8	90.9	79.4	68.8
Services provided in alternate settings				
% in homes	92.3	87.9	76.2	67.5
% in nursing homes	74.7	71.5	69.8	64.9
% in hospital (ER)	85.4	79.2	64.7	52.3
% in hospital (non-ER)	99.3	98.4	91.7	86.5
% office only	0.5	0.9	4.9	8.0
% in all four settings	64.6	58.7	45.8	34.7
Mean score	87.9	84.2	75.6	67.8
Long-term person-focused care				
Continuity				
% MSOC patients (continuity)	45.8	41.2	40.2	38.1
Coordinated care				
Organized care				
% patients seeing <4 GPs	67.6	63.0	61.2	58.0
Comprehensive for most health needs				
Service for both acute and chronic conditions				
Mean % chronic contacts	23.7	24.5	27.2	29.0
Mean % acute contacts	36.5	34.7	31.1	30.7
Mean score (ratio low/high)	58.2	61.0	64.8	65.4
Maternity care				
% no obstetrical/maternity	13.3	16.7	26.0	33.5
% pre/post-natal & delivery	66.8	52.2	31.4	23.8
Mean score	76.7	67.8	52.7	45.2
Mental health care				
% with mental health contacts	98.0	97.8	98.1	98.3
Geriatric care				
% with "usual patients" aged 75+ years	94.4	94.7	93.0	92.2
Reproductive care				
% of female patients ages 18-74 receiving pelvic exams	23.5	23.4	25.0	26.1
Disease prevention				
% adults patients age 18-74 years receiving glucose and lipids tests	39.4	42.5	56.7	60.6

Change in the summary score over time

The mean FSFP score fell from 67.6 to 57.2.

Table 7 Mean summary scores over time

	1991/2	1995/6	2001/2	2005/6
Number of physicians included in analysis	2,732	3,190	3,189	3,201
Average summary score	67.6	64.1	61.0	57.2

Physician characteristics associated with full service family practice

Differences in mean scores are apparent by physician characteristics. In general, male physicians, and those in middle age had higher scores. University of BC graduates had higher scores than those graduating elsewhere. Higher scores were also observed in the Interior and Northern health authorities, as well as in small urban, rural, and small town settings. See Table 8.

Importantly, changes in physician characteristics did not explain falling scores over time, as scores fell within all categories of all variables.

Sensitivity analysis

Sensitivity analysis explored the question of whether the observed decline can be explained by the fact that physicians with full service practices have tended to move to APPS, and hence were more likely to have been excluded from our data in later years.

To explore the impact of a shift toward APPs, we assumed that all physicians excluded with APP billings or total billings less than \$50,000 would have received a score of 100. We then assumed, even more conservatively, that all physicians excluded for any reason would have received a score of 100. While mean scores are slightly attenuated, a clear declining trend persists. See Table 9.

Table 8 Mean FSFP score by physician characteristics

	1991/2	1995/6	2001/2	2005/6
Gender				
Female	65.4	62.8	59.2	55.3
Male	68.2	64.6	61.7	58.1
Age group				
39 and under	63.9	60.0	56.5	52.4
40-44	69.3	65.5	61.3	57.6
45-49	69.5	67.1	63.0	58.2
50-54	70.8	66.9	64.4	59.9
55-59	71.4	66.9	63.9	59.7
60-64	71.6	67.6	61.4	58.4
65+	68.3	61.1	57.1	52.3
Years in practice				
<5	59.2	55.7	50.7	49.2
6-10	66.1	61.0	56.8	53.3
11-20	69.1	65.4	61.4	56.9
21-30	70.0	66.9	63.6	59.6
31+	70.9	65.9	61.8	57.7
Place of graduation				
University of BC	68.4	65.3	62.7	59.4
Other Canadian school	66.4	62.9	59.6	55.5
International	68.2	64.5	60.9	57.6
Health Authority				
Vancouver Coastal	68.3	64.3	60.6	57.1
Fraser Valley	67.8	62.7	59.2	55.1
Vancouver Island	67.5	65.2	62.0	57.6
Interior	66.9	64.6	62.3	58.8
Northern	66.1	64.0	63.7	61.7

Note: Data were missing for some physician characteristics. Age: 1 missing in 2005/6. Years in practice: 1 missing in 1991/2 and 2001/2, 44 in 2005/6. Place of graduation: 43 missing in 2005/6. Health Authority: 16 missing in 1991/2, 18 in 1996/7, 24 in 2001/2, and 13 in 2005/6.

Table 9 Mean FSFP score sensitivity analysis

	1991/2	1995/6	2001/2	2005/6
As calculated	67.6	64.1	61.0	57.2
Sensitivity 1 – assuming APP / low billing excluded had scores = 100	69.7	66.5	64.0	62.0
Sensitivity 2 – assuming all excluded had scores = 100	76.2	72.6	71.8	70.8

Discussion

A marked decline in the provision of FSFP was observed over the period from 1991/92 to 2005/06 in BC. This was observed across all physician characteristics, and even when adjusting for the possibility that full service physicians have moved to alternate payment plans. This change was driven by declines in the dimensions reflecting first-contact, long-term, person-focused, and coordinated care, as well as provision of maternity care over time.

The extent to which this change in practice affects patient outcomes remains unknown. In addition, policy reforms designed to emphasize FSFP in BC were rolled out over the period between 2003 and 2008. At the final time point in this analysis (2005/6) they had not yet come into full effect. Certainly we see no evidence in these data and analyses of a policy effect over the period 2001/02-2005/06. However, it may be unrealistic to expect an effect given the short time span and the incomplete roll-out by the end of our period of analysis. Future work will examine FSFP using more recent data, in order to observe if there has been any attenuation or reversal of the observed declines as a result of policies targeted at dimensions of FSFP.

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06. Emergency Visits
07. Institutional Visits
08. Miscellaneous and Other Visits (GP)
09. Visit Premiums
11. Prolonged or extended visit
12. Incentive payments/premiums
13. Midwifery
19. No Charge Referral
22. Consultation (full minor repeat, specialist)
23. Subsequent Visits (specialist)
24. Counseling Psychotherapy (specialist)
25. Home Visits (specialist)
26. Emergency Visits (specialist)
27. Institutional Visits (specialist)
28. Miscellaneous and Other Visits (specialist)
29. Visit Premiums
30. Critical Care Services (specialist)
40. Anesthesia
41. Cardiovascular Listing
42. Obstetrics
43. Surgery (non-minor, excisional)
44. Minor Surgery, Minor Therapeutic Procedures
45. Unlisted Miscellaneous Surgery
46. Dialysis/Transfusions
47. General Services (non-invasive tests, procedures)
48. Therapeutic Radiation
49. Procedural Premiums
60. Form Fees
71. Tray Service Items
89. Diagnostic Ophthalmology
90. Diagnostic Radiology
91. Diagnostic Ultrasound
92. Nuclear Medicine
93. Pathology (category 1)
94. Pathology (beyond category 1)
95. Pulmonary Function
96. Electrodiagnosis
97. Procedural Cardiology
98. Other (needle biopsies, Ox99, etc.)
99. Diagnostic Premiums

Appendix: List of MSP Service Codes

01. Regional Examinations
02. Consultation
03. Complete Examinations
04. Counseling
05. Home Visits