

Editor's key points

► This study aimed to describe changes in the comprehensiveness of services delivered by family physicians across service settings and areas, and to examine how the magnitude of any changes differs by physician characteristics.

► An accurate picture of changes in comprehensiveness, including changes in both service settings and service areas, and which physician characteristics are associated with greater changes, is needed to inform primary care education and policy responses.

► Changes in comprehensiveness were observed across all family physician characteristics, suggesting that declining comprehensiveness is not explained by generational changes in family medicine, a growing proportion of female doctors, or changes in training. Instead, findings point to the need to consider how changes experienced by all physicians, including changing patient needs and system contexts, shape comprehensiveness of practice.

Changes in comprehensiveness of services delivered by Canadian family physicians

Analysis of population-based linked data in 4 provinces

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Abstract

Objective To describe changes in the comprehensiveness of services delivered by family physicians across service settings and service areas in 4 Canadian provinces, to identify which settings and areas have changed the most, and to compare the magnitude of changes by physician characteristics.

Design Descriptive analysis of province-wide, population-based billing data linked to population and physician registries.

Setting British Columbia, Manitoba, Ontario, and Nova Scotia.

Participants Family physicians registered to practise in the 1999-2000 and 2017-2018 fiscal years.

Main outcome measures Comprehensiveness was measured across 7 service settings (home care, long-term care, emergency departments, hospitals, obstetric care, surgical assistance, anesthesiology) and in 7 service areas consistent with office-based practice (prenatal and postnatal care, Papanicolaou testing, mental health, substance use, cancer care, minor surgery, palliative home visits). The proportion of physicians with activity in each setting and area are reported and the average number of service settings and areas by physician characteristics is described (years in practice, sex, urban or rural practice setting, and location of medical degree training).

Results Declines in comprehensiveness were observed across all provinces studied. Declines were greater for comprehensiveness of settings than for areas consistent with office-based practice. Changes were observed across all physician characteristics. On average across provinces, declines in the number of service settings and service areas were highest among physicians in practice 20 years or longer, male physicians, and physicians practising in urban areas.

Conclusion Declining comprehensiveness was observed across all physician characteristics, pointing to changes in the practice and policy contexts in which all family physicians work.

Changements dans la globalité des services prodigués par les médecins de famille canadiens

Analyse de données populationnelles reliées entre elles dans 4 provinces

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Résumé

Objectif Décrire les changements dans la globalité des services prodigués par les médecins de famille dans les divers milieux et domaines de services dans 4 provinces canadiennes, cerner les environnements et les régions qui ont le plus changé, et comparer l'ampleur des changements selon les caractéristiques des médecins.

Type d'étude Une analyse descriptive des données de facturation basées sur la population à l'échelle de la province, reliées aux données des registres sur la population et les médecins.

Contexte La Colombie-Britannique, le Manitoba, l'Ontario et la Nouvelle-Écosse.

Participants Les médecins de famille détenteurs d'un permis d'exercice durant les exercices financiers 1999-2000 et 2017-2018.

Principaux paramètres à l'étude La globalité était mesurée dans 7 milieux de services (soins à domicile, soins de longue durée, départements d'urgence, hôpitaux, soins obstétricaux, assistance chirurgicale, anesthésiologie) et dans 7 domaines de services conformes à l'exercice en clinique (soins prénataux et postnataux, test de Papanicolaou, santé mentale, toxicomanie, soins pour le cancer, chirurgie mineure, visites à domicile en soins palliatifs). La proportion de médecins actifs dans chaque environnement et domaine est rapportée, et le nombre moyen de milieux et de domaines de services selon les caractéristiques des médecins est mentionné (années de pratique, sexe, milieu de pratique rural ou urbain et lieu de la formation en médecine).

Résultats Des déclinés dans la globalité ont été observés dans toutes les provinces à l'étude. Les plus grands changements étaient les déclinés dans la globalité des milieux, et de plus petits changements étaient dans des domaines conformes à l'exercice en clinique. Des changements ont été observés, quelles que soient les caractéristiques des médecins. En moyenne, dans ces provinces, les diminutions dans le nombre de milieux de services et de domaines de services étaient les plus élevées chez les médecins exerçant depuis 20 ans ou plus, de sexe masculin et en milieu urbain.

Conclusion Un déclin dans la globalité a été observé chez les médecins, quelles que soient leurs caractéristiques, ce qui pointe vers des changements dans les contextes de la pratique et des politiques dans lesquels tous les médecins de famille travaillent.

Points de repère du rédacteur

► Cette étude visait à décrire les changements dans la globalité des services fournis par les médecins de famille dans tous les environnements et domaines de services et à examiner si l'ampleur des changements, le cas échéant, différait selon les caractéristiques des médecins.

► Il est nécessaire, pour éclairer l'éducation et les réponses politiques en soins primaires, d'avoir un portrait exact des changements dans la globalité, y compris des changements à la fois dans les milieux et dans les domaines de services.

► Des changements dans la globalité ont été observés, quelles que soient les caractéristiques des médecins de famille, ce qui porte à croire que le déclin dans la globalité ne s'explique pas par des changements générationnels en médecine familiale, par une proportion grandissante de femmes médecins ou par des changements dans la formation. Les constatations pointent plutôt vers la nécessité de tenir compte de la façon dont les changements vécus par tous les médecins, comme les changements dans les besoins des patients et dans les contextes du système, influent sur la globalité de la pratique.

Comprehensiveness is 1 of 4 key attributes of primary care.¹ Comprehensiveness of primary care services has been associated with system efficiency and patient-reported high quality of care.²⁻⁷ That comprehensiveness is declining is a perennial concern,⁸⁻¹⁵ with accompanying speculation about the factors driving declines. At the same time, the role of family physicians within health systems continues to evolve^{16,17} in ways that may shape comprehensiveness. Family physicians are working as hospitalists, in emergency departments (EDs), and in long-term care (LTC) facilities, but at the same time it may be becoming less common for physicians to follow their own patients in these settings.^{15,18} Family physicians are also delivering focused care in response to community needs, such as addiction medicine and palliative care.^{19,20} Last, changing scopes of practice of other health professionals may also influence family physicians' roles (eg, more widespread involvement of midwifery in obstetrics).¹⁹

These system-wide changes suggest the need for careful attention to how comprehensiveness is considered. We may expect to see greater changes in *service settings*, and services such as obstetric deliveries and anesthesia administration that imply out-of-office practice, than in *service areas* consistent with providing office-based care in the community to a broad patient panel (eg, sexual and reproductive health care, mental health services, palliative care). Previous research examining changes in comprehensiveness has varied in the degree of its focus on service settings^{8,12,15} and other areas of general service provision,²¹ but no research has distinguished between them directly.

In considering factors driving declining comprehensiveness, some also point to lack of interest or inadequate training of recent graduates,^{8,22-30} observing that physicians who have recently entered practice appear to participate in a narrower range of services and practice settings than those in established practice.^{9,15,21,27} If declining comprehensiveness is concentrated among physicians newly entering practice, that might point to the need for interventions in training and support of early career physicians. If changes in comprehensiveness are observed across all family physicians, that points to the need for broader consideration of the roles family physicians play and how these align with health system needs.

An accurate picture of changes in comprehensiveness, including changes in both service settings and other service areas, and which physician characteristics are associated with greater changes, is needed to inform primary care education and policy responses. We use linked health system data in 4 Canadian provinces (British Columbia [BC], Manitoba [MB], Ontario [ON], and Nova Scotia [NS]) to describe changes in the comprehensiveness of services delivered by family physicians across service settings and areas, and to examine how the magnitude of changes differs by physician characteristics.

— Methods —

Setting

Payment models for family physicians vary across provinces. Most family physicians are private providers paid under a fee-for-service remuneration model for people covered under provincial health insurance.³¹ The chosen study provinces (BC, MB, ON, NS) vary with respect to primary care practice and payment models but have comparable administrative data that could be accessed over the study period. Shadow billing is required for physicians compensated under capitated or salaried models. Shadow billings occur when physicians bill fee codes for tracking purposes, but do not receive full fee-for-service payment. All provinces have required 2-year family medicine residencies since the early 1990s. We use *family physicians* to include both physicians who completed a family medicine residency and general practitioners who trained prior to 2-year residency requirements.

Study design and data sources

We used administrative data capturing the billing and shadow billing information submitted by all practising family physicians to describe comprehensiveness of care at 2 points in time (1999-2000 and 2017-2018), the earliest and most recent years for which data comparable across provinces were available at the time of the study. Linked administrative health databases were developed and housed separately in BC (Population Data BC), ON (data sets were linked using unique encoded identifiers and analyzed at ICES), MB (Manitoba Centre for Health Policy), and NS (Health Data Nova Scotia). We accessed comparable databases, developed comparable definitions for all variables, and conducted parallel analyses for each province. Further details on these data are published elsewhere.³²⁻³⁹

Population

We included all family physicians registered with their provincial regulatory colleges or who billed the provincial health insurance system for primary care in the 1999-2000 and 2017-2018 fiscal years. We excluded physicians in either year who had fewer than 100 patient contacts (unique combinations of physician, patient, and date, regardless of the number of fee items billed) or had fewer than 50 billing days within the study year, to reduce skewing of results by including physicians with very low service volumes. We also excluded physicians if 80% or more of billing records took place in locations other than an office-based practice or within a specific service setting or area (defined below), to ensure a comparable definition of *family physicians* in both time points.

Measures

Comprehensiveness. We identified 7 service settings (home, LTC, EDs, hospital, obstetric deliveries, surgical assistance, anesthesia administration) and 7 service areas

(prenatal and postnatal care, Papanicolaou testing, mental health, substance use, cancer care, minor surgery, palliative home visits) that could be tracked over time in each of the 4 study provinces. These align with settings and domains of care in the College of Family Physicians of Canada's Family Medicine Professional Profile¹⁶ and Residency Training Profile¹⁷ and build on a previously published approach using administrative data.²¹ Measurement details are outlined in Appendix 1, available from **CFPlus**.*

Physician characteristics. We used data from provincial regulatory colleges to classify the physician population. *Years in practice* was defined as year of analysis (1999 or 2017) minus graduation year plus an additional 2 years to account for time in residency. Year of graduation was not available for all study years in Manitoba. Manitoba analysis relied on year first registered with the provincial insurer, and years in practice was truncated at 23 years, as the first year of registration that could be observed was 1973. College-recorded sex is a binary variable self-reported by physicians at the time of registration, and whether legal sex, sex assigned at birth, or gender is being reported cannot be confirmed. Urban versus rural practice location was assigned based on the Statistics Canada metropolitan influence zone of residence for the majority of patients seen by a family physician.⁴⁰ The location where a physician's medical degree (MD) was obtained (Canada, international, or unknown) was available in BC and MB, and prior to 2013 in ON.

Analysis

First, we describe the physician population in each province and study year presenting numbers and percentages. In each year, we report the percentage of physicians active in each setting or area (5 or more patient contacts), and the change in percentage over time. We created summary scores by summing the number of active settings and service areas for each physician, and report means, standard deviations, and the change in mean over time. As data reflect the complete population of physicians in each province and year, we do not present confidence intervals or tests of statistical significance.

Ethics

This project has received ethics approval from the UBC-SFU Harmonized Behavioural Research Ethics Board, the Ontario Tech University Research Ethics Board, the Nova Scotia Health Authority Research Ethics Board, and the University of Manitoba Research Ethics Board.

— Results —

Changes in the characteristics of family physicians

The characteristics of family physicians changed over the study period in ways that may be related to

comprehensiveness of services provided. Between 1999-2000 and 2017-2018 the number of family physicians and the percentage of family physicians in practice for 20 years or longer and who identified as female increased in all studied provinces (**Table 1**). The percentage of physicians in rural settings decreased in MB and NS. The percentage of internationally trained physicians increased in BC and ON. The number of patient contacts per physician per year fell similarly in all provinces (by between 20% and 25%), while the percentage of physicians excluded owing to low practice volume or focused practice settings or areas increased between the 2 years (Appendix 2, available from **CFPlus***). Among physicians excluded owing to low practice volume or focused practice, the percentage in practice for 20 years or longer increased in 2017-2018, while the percentage in practice within their first 10 years decreased. When we examined reasons for exclusion (Appendix 3 available from **CFPlus***), the increase in physicians excluded was driven by physicians with 80% or more of their activity in non-office locations, predominantly hospital and ED services.

Changes in service settings

In all provinces, the percentage of physicians with activity in homes, LTC, EDs, and hospitals fell substantially (by between 10.6 and 48.5 percentage points) (Table 2, available from **CFPlus***). The percentage of physicians with activity in obstetric deliveries, surgical assistance, and anesthesiology also fell, although patterns varied somewhat across provinces.

The mean number of settings fell in all provinces by between 0.9 and 1.7 (Table 3A, available from **CFPlus***). In 1999-2000, physicians within their first 10 years practised in fewer service settings on average than physicians in practice for 10 to 29 years. In 2017-2018, patterns changed such that physicians in their first 10 years had similar or higher mean numbers of service settings than physicians in practice for 10 years or longer. On average, male physicians practised in more settings, although the decline in number of settings was greater among male than among female physicians. Physicians in rural areas practised in more settings in all provinces and at both points in time. We observed slightly greater declines in service settings among physicians in urban areas of BC and MB than in rural areas, while changes were similar in ON and NS.

Changes in service areas

Changes in service areas were smaller on average and more variable. The largest declines were for minor surgery in all provinces except MB, where it was for palliative home visits (Table 2*). Changes varied most across provinces for substance use care, but this may reflect different coding practices across jurisdictions.

The mean number of service areas fell in all provinces, although differences were smaller than for settings,

*Tables 2 and 3 and Appendices 1 to 3 are available from <https://www.cfp.ca>. Go to the full text of the article online and click on the **CFPlus** tab.

Table 1. Descriptive characteristics of family physicians in BC, MB, ON, and NS for 1999-2000 and 2017-2018 fiscal years

CHARACTERISTICS	BC		MB		ON		NS	
	1999-2000	2017-2018	1999-2000	2017-2018	1999-2000	2017-2018	1999-2000	2017-2018
All physicians	3569	4623	779	1113	8305	10,967	692	827
Years in practice, n (%)								
• <10	1001 (28.0)	1158 (25.0)	432 (55.5)	664 (59.7)	2051 (24.7)	2674 (24.4)	185 (26.7)	192 (23.2)
• 10-19	1160 (32.5)	969 (21.0)	215 (27.6)	207 (18.6)	2670 (32.1)	2128 (19.4)	243 (35.1)	154 (18.6)
• 20-29 (MB ≥20)	967 (27.1)	1244 (26.9)	132 (16.9)	242 (21.7)	2122 (25.6)	2737 (25.0)	185 (26.7)	224 (27.1)
• ≥30	441 (12.4)	1252 (27.1)	NA	NA	1462 (17.6)	3428 (31.3)	79 (11.4)	257 (31.1)
Sex, n (%)								
• Female	1083 (30.3)	2047 (44.3)	221 (28.4)	529 (47.5)	2641 (31.8)	5214 (47.5)	267 (38.6)	416 (50.3)
• Male	2486 (69.7)	2576 (55.7)	558 (71.6)	584 (52.5)	5664 (68.2)	5753 (52.5)	425 (61.4)	411 (49.7)
Location of practice, n (%)*								
• Urban	3122 (87.5)	3992 (86.4)	495 (63.5)	750 (67.4)	7391 (89.0)	9852 (89.8)	548 (79.2)	711 (86.0)
• Rural	447 (12.5)	631 (13.6)	284 (36.5)	363 (32.6)	911 (11.0)	1113 (10.2)	144 (20.8)	116 (14.0)
Mean (SD) no. of contacts	5562.8 (2870.3)	4435.6 (2802.3)	5323.7 (3236.8)	4021.1 (3338.6)	6386.9 (3683.9)	4873.9 (3898.3)	5968.9 (3152.1)	4683.1 (2778.5)
Location of MD training, n (%)*								
• Canada	2672 (74.9)	2888 (62.5)	409 (52.5)	595 (53.5)	6538 (78.7)	6825 (62.2)	NA	NA
• International	836 (23.4)	1623 (35.1)	370 (47.5)	513-517 (46.1-46.5)	1761 (21.2)	2799 (25.5)	NA	NA
• Unknown location	61 (1.7)	112 (2.4)	0 (0.0)	1-5 (0.1-0.4)	6 (0.1)	1343 (12.3)	NA	NA

BC—British Columbia, MB—Manitoba, MD—medical degree, NA—not applicable, NS—Nova Scotia, ON—Ontario.

*Location of practice is missing for 3 physicians in ON in 1999-2000 and for 2 physicians in 2017-2018. Data are missing on location of MD training in NS and are incomplete in ON.

ranging from a difference of 0.3 to 0.5 areas (Table 3B, available from **CFPlus***). The average number of service areas varied less by years in practice than did service settings. As with service settings, declines were observed for all physician characteristics, including years in practice. In both years, physicians in their first 10 years had similar mean service areas to those in practice longer. Male physicians practised in slightly more service areas on average in the earlier year, but as with settings the decline was also greater among male physicians. In the most recent year, male physicians had similar or slightly fewer service areas than female physicians did. In all provinces and at both points in time, physicians in rural areas practised in slightly more service areas. We observed similar or slightly greater decreases in service areas among physicians in rural than in urban areas.

— Discussion —

These findings align with existing research evidence documenting declining comprehensiveness,⁸⁻¹⁴ and add

that these declines are largely related to a decrease in the number of service settings in which family physicians are working, rather than physicians restricting service areas in office-based care. This observation of reduced comprehensiveness is remarkably consistent across the 4 provinces examined even though they have taken varied approaches to primary care reform and physician payment.⁴¹ Although the characteristics of the physician population have changed with respect to years in practice, sex, urban versus rural practice, and location of MD training, declines in comprehensiveness are observed across all physician characteristics. This suggests that declining comprehensiveness is not explained by generational changes in family medicine, a growing proportion of female doctors, or changes in training. Instead, the findings point to the need to consider how changes experienced by all physicians, including changing patient needs and system contexts, shape comprehensiveness of practice.

Our analysis does not take into account other co-occurring changes in service delivery that may compensate

for changes in comprehensiveness among individual physicians, nor does it assess whether services delivered align with changing population needs. While we observe that fewer physicians are working in nonoffice settings, there are also more physicians in each province who work 80% or more in nonoffice locations (Appendix 3*). This means that declining comprehensiveness among individual physicians does not imply declining family physician activity in nonoffice settings overall. Changing roles for other health professionals may also influence family physicians' practice. For example, declines in family physician participation in obstetric deliveries coincide with more widespread availability of midwifery services.¹⁹ As the population ages and complexity of care changes, the relative time and effort needed for community-based care and coordination may be growing. Taken together, more information about changing system contexts and population needs is required to evaluate whether changing comprehensiveness is contributing to unmet needs.


Our findings are important to consider, as Canada has reviewed the family medicine residency training length and content and is moving to 3-year residency,⁴² based in part on the assertion that the scope of practice of early career family physicians is narrowing.²⁸ Our findings highlight that, while comprehensiveness has declined over time among physicians entering practice, as has been observed elsewhere,^{24,28} the declines are greater among established physicians (≥ 20 years in practice) than among early career physicians. While we did observe a narrowing of comprehensiveness, this is more likely related to the practice context overall and not training experiences, given that changes were observed across all categories of years in practice. As residency training is to be lengthened, we would suggest that the rationale for this should not be based on the objective of promoting comprehensiveness, as it appears the reduction in comprehensiveness is likely related to the practice context and not training experiences.⁴³

Limitations

This analysis has notable limitations. Shadow billings submitted by physicians on alternate payment plans are less complete than fee-for-service data. The proportion of shadow billing has increased over time, and alternate payment plans are more common among physicians entering practice more recently,³¹ potentially leading us to underestimate comprehensiveness among physicians within their first 10 years of practice. Although comprehensiveness and the related concepts of generalism and scope of practice are central to primary care,¹ no commonly accepted methods for defining comprehensiveness exist,⁴⁴ and data sources that permit comparison over time and across jurisdictions are limited.^{14,29,45} Roles of leadership, advocacy, and scholarship outlined in the 2018 College of Family Physicians of Canada's Family Medicine Professional Profile are not measured in our data.¹⁶

Our measure of comprehensiveness reflects service settings and areas that could be consistently measured with administrative data over the study period and across the 4 study provinces. Fee codes and information collected about service location vary markedly, and coding practices for the International Classification of Diseases, 9th Revision,⁴⁶ may also vary substantially, as is suggested by different patterns across jurisdictions for substance use service delivery. The approaches used herein are challenging to scale nationally, as each additional province has different billing data and associated limitations. The measure proposed by Schultz and Glazier²¹ is similarly limited in that it uses Ontario Health Insurance Plan codes that are specific to primary care in Ontario. Methods must be continually updated as data sources change for any approach using administrative data over time. In addition, changes to alternate payment plans may mean data are increasingly less complete over time. While we were able to address research objectives, our experience points to the need for alternate sources of data that capture physician practice characteristics to inform ongoing workforce planning. While it was not feasible to complete this analysis nationally, that findings are consistent across study provinces with varied primary care practice and payment models supports transferability of findings.

Conclusion

We observed declining comprehensiveness across all physician characteristics and in all 4 study provinces, with greater changes in service settings (home, LTC, hospital, ED) than in service areas. Any efforts to enhance or maintain comprehensiveness of care delivered by family physicians should consider changing the health system and service delivery contexts in which all physicians are practising. 

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Contributors

All authors contributed to conceptualizing and designing the study; to collecting, analyzing, and interpreting the data; and to preparing the manuscript for submission.

Competing interests

None declared

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