

# Declining Comprehensiveness of Services Delivered by Canadian Family Physicians Is Not Driven by Early-Career Physicians

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## ABSTRACT

We describe changes in the comprehensiveness of services delivered by family physicians in 4 Canadian provinces (British Columbia, Manitoba, Ontario, Nova Scotia) during the periods 1999-2000 and 2017-2018 and explore if changes differ by years in practice. We measured comprehensiveness using province-wide billing data across 7 settings (home, long-term care, emergency department, hospital, obstetrics, surgical assistance, anesthesiology) and 7 service areas (pre/postnatal care, Papanicolaou [Pap] testing, mental health, substance use, cancer care, minor surgery, palliative home visits). Comprehensiveness declined in all provinces, with greater changes in number of service settings than service areas. Decreases were no greater among new-to-practice physicians.

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## INTRODUCTION

Declining comprehensiveness of family physician practice has been documented across multiple jurisdictions,<sup>1-8</sup> with accompanying speculation that this is driven by lack of interest or inadequate training among more recent cohorts of family physicians.<sup>1,9-17</sup> Supporting this speculation are data showing that physicians who have recently entered practice participate in a narrower range of services and/or practice settings than those in established practice.<sup>2,8,14,18</sup>

An accurate understanding of changes in comprehensiveness is needed to inform policy responses. If more recent cohorts are delivering less comprehensive care than more experienced physicians, targeted interventions during formative stages of training and in the early career process might be needed. We used population-based linked administrative data from 4 Canadian provinces to test the hypothesis that any decline in comprehensiveness over time is greater among physicians within their first 10 years of practice than among physicians in practice for >10 years.

## METHODS

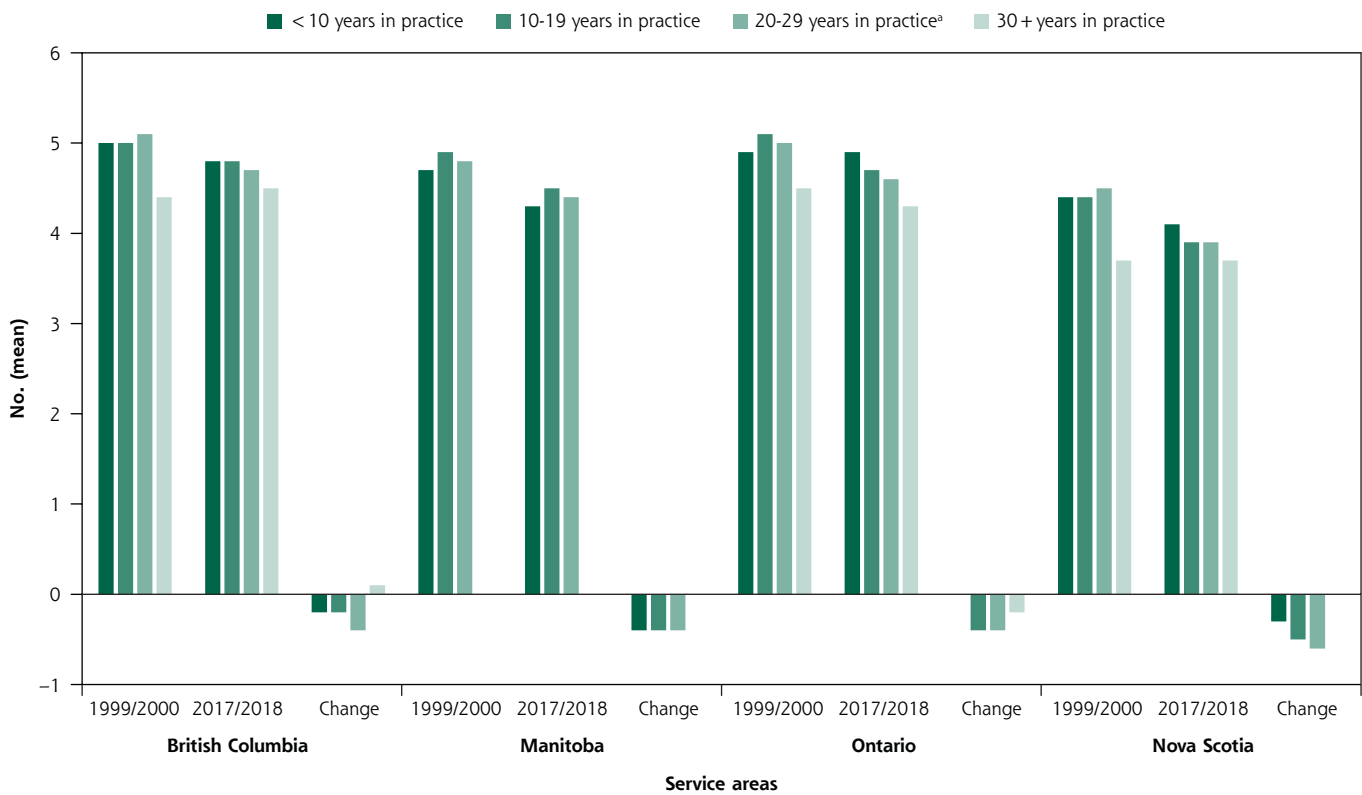
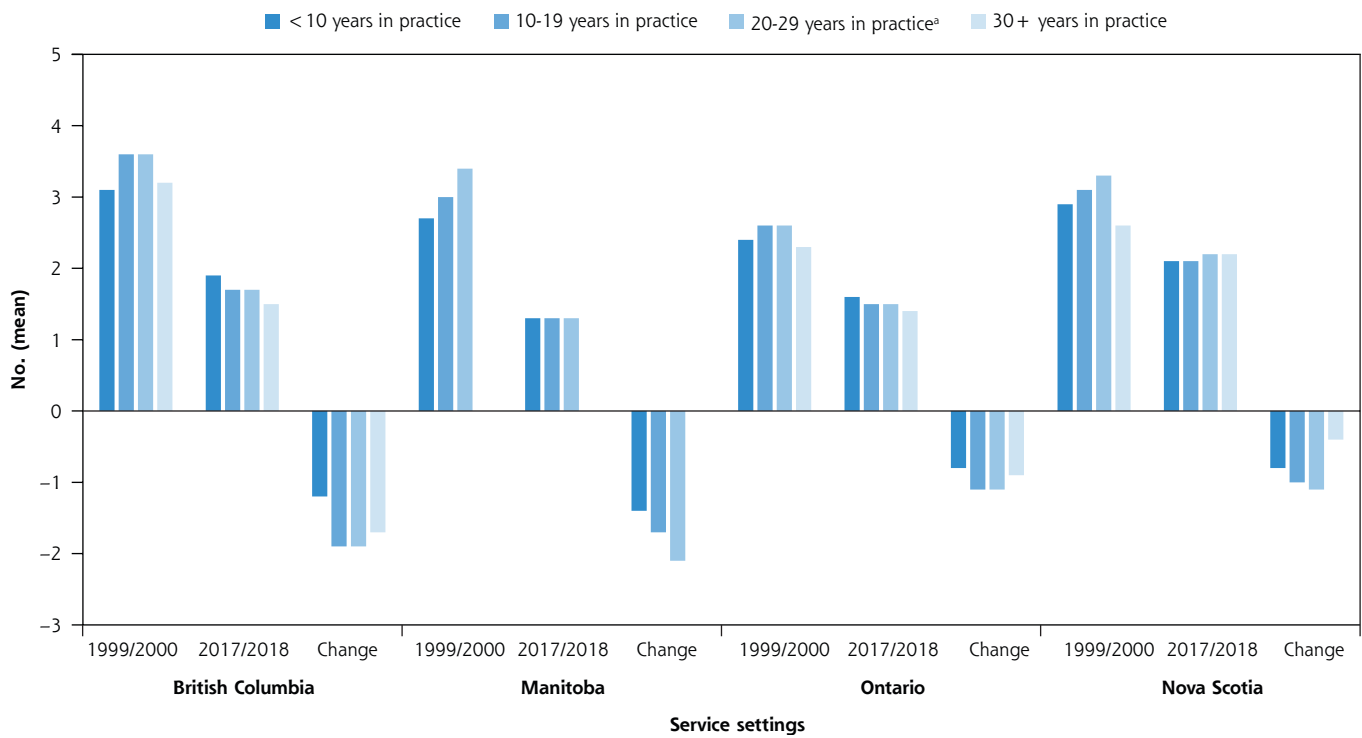
### Data and Measures

Our team includes researchers and family physicians in each of 4 Canadian provinces (British Columbia [BC], Manitoba [MB], Ontario [ON], and Nova Scotia [NS]). We used administrative data for billing and shadow-billing information submitted by all practicing family physicians to describe comprehensiveness of care at 2 points in time (1999-2000 and 2017-2018, the oldest and most recent years for which data comparable across provinces were available) in BC, MB, ON, and NS. We accessed similar databases, developed comparable definitions for all variables, and conducted parallel analyses for each province. Further details on these data are published elsewhere,<sup>19-27</sup> and complete methods are available in [Supplemental Appendix 1](#). We obtained ethics approval for each jurisdiction.

### Comprehensiveness

We identified 7 settings (home, long-term care, emergency department, hospital, obstetrics, surgical assistance, and anesthesiology) and 7 service areas of office-based practice (pre/postnatal care, Papanicolaou [Pap] testing, mental health, substance use, cancer care, minor surgery, and palliative home visits) that could be

**Figure 1. Mean number of service settings and service areas in 1999-2000 and 2017-2018 and changes over time, by years in practice.**



<sup>a</sup> In Manitoba this category includes all physicians in practice ≥20 years.

**Table 1. Rate Ratios (95% CI) for Comprehensiveness of Service Settings**

	British Columbia		Manitoba		Ontario		Nova Scotia	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
<b>Intercept</b>	NA	3.72 (3.54-3.91)	NA	3.26 (2.92-3.63)	NA	3.1 (2.9-3.21)	NA	2.26 (2.06-2.47)
<b>Years since MD (reference = 10-19 years)</b>								
<10	0.92 (0.88-0.96)	0.9 (0.86-0.94)	0.86 (0.78-0.94)	0.89 (0.81-0.97)	0.92 (0.89-0.94)	0.95 (0.92-0.99)	0.92 (0.85-0.98)	0.96 (0.88-1.04)
20-29 (MB: ≥20)	0.9 (0.86-0.93)	1.02 (0.98-1.06)	0.89 (0.79-0.99)	1.05 (0.95-1.16)	0.96 (0.93-0.98)	0.96 (0.93-1.0)	0.96 (0.89-1.03)	1.0 (0.93-1.04)
≥30	0.63 (0.6-0.67)	0.95 (0.9-1.01)	NA	NA	0.8 (0.77-0.82)	0.89 (0.85-0.93)	0.77 (0.72-0.83)	0.86 (0.77-0.95)
<b>Year</b>								
2017-2018 (vs 1999-2000)	0.49 (0.47-0.5)	0.52 (0.49-0.56)	0.45 (0.42-0.48)	0.48 (0.42-0.56)	0.6 (0.59-0.62)	0.65 (0.62-0.68)	0.69 (0.67-0.73)	0.76 (0.96-0.84)
<b>Interaction</b>								
Year, <10	NA	1.25 (1.15-1.37)	NA	1.13 (0.96-1.34)	NA	1.13 (1.06-1.2)	NA	1.07 (0.94-1.23)
Year, 20-29 (MB: ≥20)	NA	0.95 (0.86-1.03)	NA	0.92 (0.76-1.12)	NA	1.0 (0.95-1.06)	NA	0.94 (0.83-1.08)
Year, ≥30	NA	0.87 (0.78-0.96)	NA	NA	NA	0.99 (0.9-1.05)	NA	1.09 (0.94-1.26)
<b>Covariates</b>								
Male (vs female)	1.29 (1.24-1.34)	1.11 (1.07-1.16)	1.69 (1.54-1.84)	1.27 (1.17-1.37)	1.4 (1.37-1.43)	1.22 (1.19-1.25)	1.14 (1.08-1.2)	0.99 (0.95-1.06)
Urban (vs rural)	0.75 (0.72-0.77)	0.72 (0.7-0.75)	0.56 (0.52-0.6)	0.54 (0.5-0.57)	0.54 (0.53-0.56)	0.55 (0.53-0.56)	0.9 (0.85-0.96)	1.0 (0.95-1.06)
Number of contacts (per 100 contacts)	1.01 (1.0-1.01)	1.0 (1.0-1.0)	1.01 (1.0-1.01)	1.0 (1.0-1.01)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.01 (1.01-1.01)	1.01 (1.0-1.01)
International MD (vs Canadian MD)	0.86 (0.83-0.9)	0.9 (0.87-0.94)	0.91 (0.84-0.98)	0.79 (0.73-0.84)	NA	NA	NA	NA
Unknown MD (vs Canadian MD)	0.76 (0.66-0.87)	0.83 (0.73-0.95)	1.22 (0.92-1.62)	1.38 (1.26-1.52)	NA	NA	NA	NA

MB = Manitoba; MD = Doctor of Medicine; NA = not applicable.

Note: There were missing data on place of graduation in Nova Scotia and incomplete data in Ontario; therefore, this variable was excluded from modeling in these provinces.

tracked consistently over time for each of the 4 study provinces [Supplemental Table 1]. These align with settings and domains of care in the College of Family Physicians of Canada's Family Medicine Profile<sup>28</sup> and Residency Training Profile<sup>29</sup> and build on an approach previously published using administrative data in Ontario.<sup>18</sup>

### Physician characteristics

We used data from provincial regulatory colleges to classify the physician population on the basis of years in practice, sex, and location of training (Canada, international, or unknown).<sup>20</sup> Urban/rural practice location was assigned on the basis of the location of residence of patients seen by the family physician.<sup>30</sup> We counted the number of patient contacts per year as a measure of practice volume. The physician populations included in the analysis are described in Supplemental Table 2.

### Analysis

We used generalized estimating equations (Poisson distribution and log link) to examine changes in count of service settings and service areas for 1999-2000 and 2017-2018. We tested the hypothesis that there was a significant interaction between year and years in practice, adjusting for physician sex, urban/rural practice location, and location of training (Canada, international, unknown) and confirmed results were consistent with and without adjustment for practice volume.

### RESULTS

The mean number of service settings in which physicians had contacts decreased in all provinces by 1.0 to 1.7 settings, and the number of service areas decreased by 0.3 to 0.5 areas. In 1999-2000, physicians in their first 10 years practiced in fewer

service settings on average than physicians in practice for 10-29 years (Figure 1). In 2017-2018, patterns changed such that physicians in their first 10 years had similar or more mean service settings than physicians in practice for  $\geq 10$  years.

The average number of service areas varied less by years in practice than did service settings. For both years, physicians in their first 10 years had similar mean service areas to those in practice longer (Figure 1).

In both unadjusted and adjusted regression analyses, physicians in practice <10 years practiced in fewer service settings (rate ratios <1) compared to those in practice 10 to 19 years, and the number of settings decreased from 1999-2000 to 2017-2018 (Table 1). The interaction effects for year and <10 years in practice showed that any decrease in service setting was less among physicians in practice <10 years (BC,

ON, NS) or not significantly different (MB) from those in practice 10 to 19 years.

There were no significant differences in the number of service areas between physicians in practice <10 years and those in practice 10 to 19 years (Table 2). The interaction between year and years in practice was not significant, or as in Ontario indicated that physicians in practice <10 years practiced in slightly more service areas than would be predicted by years in practice and year alone.

## DISCUSSION

We found declining comprehensiveness across 4 provinces, with greater changes in service settings than areas of office-based practice, but no evidence that comprehensiveness

**Table 2. Rate Ratios (95% CI) for Comprehensiveness of Service Areas**

	British Columbia		Manitoba		Ontario		Nova Scotia	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
<b>Intercept</b>	NA	4.56 (4.46-4.65)	NA	4.57 (4.36-4.78)	NA	4.99 (4.86-5.13)	NA	3.72 (3.55-3.9)
<b>Years since MD (reference = 10-19 years)</b>								
<10	0.99 (0.98-1.01)	1.02 (1.0-1.04)	0.96 (0.93-0.99)	1.01 (0.98-1.05)	1.0 (0.98-1.01)	0.99 (0.97-1.02)	1.02 (0.98-1.05)	1.03 (0.99-1.07)
20-29 (MB: $\geq 20$ )	0.98 (0.97-0.99)	0.99 (0.97-1.01)	0.94 (0.9-0.97)	1.02 (0.97-1.06)	0.97 (0.96-0.99)	0.97 (0.95-1.0)	0.98 (0.95-1.01)	0.98 (0.95-1.02)
$\geq 30$	0.89 (0.88-0.91)	0.92 (0.89-0.95)	NA	NA	0.89 (0.87-0.9)	0.9 (0.88-0.93)	0.87 (0.84-0.9)	0.87 (0.81-0.93)
<b>Year</b>								
2017-2018 (vs 1999-2000)	0.93 (0.93-0.94)	0.99 (0.97-1.01)	0.9 (0.88-0.92)	0.97 (0.93-1.02)	0.93 (0.92-0.94)	0.95 (0.93-0.98)	0.89 (0.87-0.91)	0.95 (0.9-1.0)
<b>Interaction</b>								
Year, <10	NA	1.0 (0.97-1.03)	NA	0.97 (0.92-1.02)	NA	1.06 (1.02-1.1)	NA	1.04 (0.97-1.11)
Year, 20-29 (MB: $\geq 20$ )	NA	0.98 (0.95-1.0)	NA	0.92 (0.86-0.99)	NA	1.0 (0.96-1.03)	NA	0.98 (0.92-1.05)
Year, $\geq 30$	NA	1.01 (0.97-1.05)	NA	NA	NA	1.04 (1.0-1.08)	NA	1.07 (0.98-1.16)
<b>Covariates</b>								
Male (vs female)	1.03 (1.02-1.04)	0.97 (0.96-0.98)	1.02 (0.99-1.04)	0.92 (0.9-0.95)	1.01 (1.0-1.02)	0.96 (0.95-0.98)	0.99 (0.97-1.02)	0.91 (0.89-0.94)
Urban (vs rural)	0.96 (0.94-0.97)	0.92 (0.91-0.93)	0.93 (0.9-0.95)	0.88 (0.85-0.9)	0.89 (0.88-0.91)	0.88 (0.86-0.9)	0.91 (0.89-0.94)	0.96 (0.93-0.98)
Number of contacts (per 100 contacts)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.01)
International MD (vs Canadian MD)	1.03 (1.02-1.04)	1.01 (1.00-1.02)	1.0 (0.97-1.03)	0.94 (0.92-0.96)	NA	NA	NA	NA
Unknown MD (vs Canadian MD)	0.97 (0.93-1.01)	0.95 (0.91-0.99)	1.0 (0.85-1.16)	1.01 (0.86-1.19)	NA	NA	NA	NA

MB = Manitoba; MD = Doctor of Medicine; NA = not applicable.

Note: There were missing data on place of graduation in Nova Scotia and incomplete data in Ontario; therefore, this variable was excluded from modeling in these provinces.

declined faster among physicians in their first 10 years of practice. Our measure of comprehensiveness was limited to service settings and areas that could be consistently measured with administrative data over time and across provinces. Each province has its own system of fee codes and billing requirements, yet findings were consistent across provinces. Our analysis does not speak to whether services delivered were in line with population needs. Given that some physicians focus on specific settings (ie, providing hospitalist care or working in emergency departments or in long-term care), declining physician-level comprehensiveness might not reflect declining total service volumes among all family physicians.

The present findings reinforce the concept that whereas comprehensiveness has declined over time among physicians entering practice (as has been observed elsewhere),<sup>11,15</sup> this decline occurs across all career stages for the periods assessed.<sup>1,5,18</sup> Our findings were remarkably consistent across the 4 provinces examined, given that each has their own provincially administered health insurance systems and varying models of primary care delivery and physician payment. Any efforts to enhance or maintain comprehensiveness of care delivered by family physicians should address the service delivery contexts in which all physicians are practicing rather than on interventions in training or early practice.

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**Key words:** comprehensive health care; scope of practice; primary care; family medicine; cohort effect; Canada

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 [Supplemental materials](#)

**Data support:**

**British Columbia:** Access to data provided by the Data Steward(s) is subject to approval but can be requested for research projects via the Data Steward(s) or their designated service providers. All inferences, opinions, and conclusions drawn in this publication are those of the author(s) and do not reflect the opinions or policies of the Data Steward(s).

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**Ethics:** This project received research ethics approval from the University of British Columbia-Simon Fraser University Harmonized Behavioral Research Ethics Board (H18-03291), Ontario Tech University Ethics Board (14867), Nova Scotia Health Authority Ethics Board (1023561), and the University of Manitoba Ethics Board (HS23897 [H2020:208]).

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