

Predicting the scope of practice of family physicians

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ABSTRACT

OBJECTIVE To identify factors that are associated with the scope of practice of FPs and GPs who have office-based practices.

DESIGN Secondary univariable and multivariable analyses of cross-sectional data from the 2001 National Family Physician Workforce Survey conducted by the College of Family Physicians of Canada.

SETTING Canada.

PARTICIPANTS General community of FPs and GPs who spent most of their clinical time in office settings.

MAIN OUTCOME MEASURES Demographic characteristics and scope of practice score (SPS), which was the number of 12 selected medical services provided by office-based FPs and GPs.

RESULTS The multivariable model explained 35.1% of the variation in the SPS among participants. Geographic factors of provincial division and whether or not the population served was rural explained 30.5% of the variation in the SPS. Male physician sex, younger physician age, being in group practice, greater access to hospital beds, less access to specialists, main practice setting of an academic teaching unit, mixed method physician payment, additional structured postresidency training, and greater number of different types of allied health professionals in the main practice setting were also associated with higher SPSs.

CONCLUSION Geographic factors were the strongest determinants of scope of practice; physician-related factors, availability of health care resources to the main practice setting, and practice organization factors were weaker determinants. It is important to understand how and why geographic factors influence scope of practice, and whether a broad scope of practice independent of population needs benefits the population. This study supports primary care renewal efforts that use mixed payment systems, incorporate allied health care professionals into family and general practices, and foster group practices.

EDITOR'S KEY POINTS

- The scope of practice of Canadian FPs and GPs has narrowed. To meet the health care needs of communities, governments must understand the factors that affect the scope of practice of FPs and GPs.
- Province of practice and whether the practice was rural explained almost all of the variation in the scope of practice score in this study. Because health care delivery is a provincial responsibility, provincial health care policies can affect scope of practice. Provincial policies that affect the ratio of family physicians to specialists might be particularly important: post-hoc analyses showed that provincial scope of practice scores positively correlated with provincial family physician to specialist ratios (Spearman's ρ 0.715, $P=.013$) but not with other measures of provincial physician resources, gross domestic product, or health care expenditures.

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Les facteurs qui déterminent le champ de pratique des médecins de famille

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RÉSUMÉ

OBJECTIF Identifier les facteurs qui déterminent le champ de pratique des médecins de famille (MF) et des omnipraticiens (OP) qui exercent en bureau médical.

TYPE D'ÉTUDE Analyse secondaire univariable et multivariable des données transversales du Sondage national auprès des médecins de famille effectué en 2001 par le Collège des médecins de famille du Canada.

CONTEXTE Le Canada.

PARTICIPANTS MF et OP de milieux communautaires pratiquant principalement dans des bureaux médicaux.

PRINCIPAUX PARAMÈTRES À L'ÉTUDE Caractéristiques démographiques et score pour l'étendue du champ de pratique (SECP), mesuré selon le nombre de services fournis par ces MF et OP parmi une sélection de 12 services médicaux.

RÉSULTATS Le modèle multivariable expliquait 35,1 % de la variation du SECP entre les participants. La localisation géographique dans la province et le fait que la population desservie était ou non rurale en expliquait 30,5%. Des scores plus élevés étaient aussi observés chez les médecins mâles ou jeunes, en pratique de groupe, ayant plus d'accès à des lits d'hôpitaux ou moins d'accès à des spécialistes, pratiquant principalement dans une unité d'enseignement universitaire, ayant un mode de rémunération mixte, ayant eu une formation structurée additionnelle après la résidence et ayant un plus grand nombre de professionnels de la santé de divers types dans leur principal milieu de pratique.

CONCLUSION Les facteurs géographiques étaient les plus forts déterminants du champ de pratique; les facteurs liés au médecin, la disponibilité de ressources dans le principal milieu de pratique et les facteurs liés à l'organisation de la pratique étaient des déterminants plus faibles. Il est important de comprendre comment et pourquoi les facteurs géographiques influencent le champ de pratique, et de déterminer si un large champ de pratique sans rapport avec les besoins de la clientèle est avantageux pour la population. Cette étude appuie les efforts de réforme des soins primaires qui préconisent des modes de rémunération mixtes, et l'incorporation d'autres professionnels de la santé dans les bureaux de médecine familiale et générale, et encouragent la pratique de groupe.

POINTS DE REPÈRE DU RÉDACTEUR

- Le champ de pratique des (MF) et des (OP) s'est rétréci au Canada. Pour répondre aux soins de santé requis par les communautés, le gouvernement doit comprendre les facteurs qui influencent le champ de pratique des MF et des OP.
- Dans cette étude, presque toutes les différences dans les scores pour l'étendue du champ de pratique s'expliquent par la province de pratique et par le fait de pratiquer en région rurale. Comme la dispensation des soins de santé relève des provinces, les politiques provinciales en santé peuvent influencer le champ de pratique. Les politiques provinciales qui touchent le rapport entre MF et spécialistes pourraient avoir une importance particulière: une analyse a posteriori a indiqué que les scores provinciaux pour le champ de pratique étaient positivement corrélés aux rapports provinciaux entre MF et spécialistes (ρ de Spearman 0.715, $P = ,013$) mais non aux ressources en médecins des provinces, à leur produit intérieur brut ou à leurs dépenses en santé.

Cet article a fait l'objet d'une révision par des pairs.
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Scope of practice (SP) of Canadian FPs and GPs is crucial to Canada's health care system because FPs and GPs provide most primary care. Its reported decline¹⁻⁴ is concerning because a narrower SP might translate into less patient access to different services and higher health care costs from higher referral rates. Understanding factors that affect SP can allow policy makers to develop strategies that support a broad SP. A greater SP has been associated with provider factors, including male sex,^{2,5-11} more time since graduation,² younger age,^{2,6,12,13} and Certification in family medicine^{2,14}; practice factors, including group practice,⁶ nonspecialized practice,¹⁵ practices located outside of cities with medical schools^{2,11} and in rural settings,^{2,6,7,13,15,16} and practices in different regions of the country⁶; fee-for-service physician remuneration compared with capitation^{17,18}; and more access to hospital beds and less access to specialists.^{19,20}

Several limitations in these studies affect the validity of the measurement of SP and its predictors. First, because only 4 studies^{4,6,15,16} of the 14 Canadian studies^{1-6,10-12,14-16,19,20} had national data about scope, conclusions about regional SP and its predictors cannot be generalized. Second, none of the Canadian studies excluded FPs and GPs with specialized practices, which could have affected the accuracy of SP measured. Third, SP was inadequately measured either by using referral rates^{11,19,20} or by only considering out-of-office services,^{1,2,8,15} different skills in a specific area (eg, procedures),^{6,7,16} or a limited number of services.^{3,4,10,14}

This study aimed to more accurately understand SP and its predictors by using a national sample of FPs and GPs who had office practices and by including a representative number of services that could be expected to be provided by FPs and GPs with broad SP.

METHODS

This study analyzed cross-sectional data collected from the 2001 National Family Physician Workforce Survey (NFPWS), a census survey conducted by the College of Family Physicians of Canada of all Canadian FPs and GPs. Details of the survey methodology are available elsewhere.²¹ Because this was an anonymous secondary data analysis, requirement for ethics approval was exempted by the Health Sciences Research Ethics Board at the University of Western Ontario in London.

The 2001 NFPWS had an overall response rate of 51.3%, with 13088 respondents.²¹ Because male physicians and physicians from specific health regions were underrepresented, and both sex and region have previously been shown to affect practice patterns, the data were weighted by sex and health region to correct for this nonresponse bias.²¹ Analytical weighting was used in this study.

This study focused on respondents who were office-based FPs and GPs—FPs and GPs whose main practice settings were private offices and clinics (excluding walk-in clinics); community clinics, community health centres, and centre local de services communautaires; or academic family medicine teaching units. This reduced the analyzable sample size to 10588. Conducting all statistical analyses using complete-case analysis further reduced the analyzable sample size to 6789. Because analytical weighting was used and the final sample was a subset of the total sample, the individual analytical weights for each observation were recalculated accordingly.

The primary outcome was the scope of practice score (SPS)—the number of medical services provided out of a total of 12 office-based and non-office-based medical services. The SPS (**Box 1**) had content validity, as the 12 services were chosen from those that have historically been provided by FPs and GPs and from lists of services considered essential to comprehensive primary care by key stakeholders: the Ministry of Health and Long-term Care of Ontario,²² the “basket of services” of primary care described in the report of the Provincial Coordinating Committee on Community and Academic Health Science Centre Relations in 1996 for Ontario,²³ and the Future of Family Medicine project, a collaborative project among important organizations of family medicine and primary care in the United States to redefine and renew the model of practice in family medicine.²⁴

Box 1. The 12 medical services included in the scope of practice score

- Anesthesia
- Chronic disease management
- Emergency medicine
- Home for the aged and nursing home visits
- Housecalls
- Inpatient hospital care
- Palliative care
- Preventive medicine
- Coordination of patients' use of other health care services
- Mental health care
 - psychotherapy and counseling
 - other mental health care
- Surgical services
 - major surgery
 - surgical assisting
 - minor surgical procedures (dilatation and curettage aspiration, lumbar puncture, musculoskeletal injection or aspiration, casting and splinting, needle aspiration, skin biopsy, other biopsy, suturing, and other minor surgery)
- Maternity care
 - antenatal care
 - intrapartum care
 - postpartum care

There were 12 independent variables. Physician sex,^{2,5-10} physician age,^{2,6,12,13} and rural practice^{2,6,7,13,15,16} have previously been associated with the SP of FPs and GPs and needed to be controlled for in multivariable analyses. The potential associations with SP needed to be verified for the following: longer time since graduation,² group practice,⁶ region of practice,⁶ type of physician payment,^{17,18} more access to hospital beds, and less access to specialists.^{19,20} Additional structured training after family medicine residency, main practice setting, and the number of different types of allied health professionals in the main practice setting were determined a priori to have potential influence on the SP of FPs and GPs. Certification in family medicine and practice location outside of cities with medical schools were not included because relevant data were not available in the 2001 NFPWS.

All statistical analyses were conducted with the Statistical Package for the Social Sciences, version 13.0. Univariable and multivariable analyses were conducted via complete-case analysis. Because only 6789 of 10588 respondents (64.1%) had complete responses to variables required for multivariable analyses, a sensitivity analysis was conducted by repeating the univariable and multivariable analyses with the same data set after imputation of missing values for continuous variables using maximum likelihood estimation (whereby a missing value of a variable is estimated based on how the particular variable interacts with other variables in the data set, and a final value is produced after considering all possible values and giving weight to those that are more plausible) and comparing these results with those of the analyses conducted via complete-case analysis.

RESULTS

Table 1 describes the characteristics of the sample of FPs and GPs in this study after analytical weighting. **Table 2** contains the results of univariable and multivariable analyses. In the multivariable model, factors that were positively associated with the SPS included younger physician age, male physician sex, additional structured training after family medicine residency, physician payment other than fee-for-service, less access to specialists and hospital beds, and having a greater variety of allied health professionals in the practice. Compared with private offices and clinics, a main practice setting of an academic family medicine teaching unit was positively associated, while community clinics were negatively associated, with the SPS. Compared with being in solo practice, being in group practice was positively

Table 1. Characteristics of sample of FPs and GPs: Analytic weighting was used; N = 6789.

INDEPENDENT VARIABLE	N (%)	MEAN SCOPE OF PRACTICE SCORE (SD)
Physician-related variables		
Physician age,* y		
• <35	745 (11.0)	8.8 (1.9)
• 35 to 44	2308 (34.0)	8.7 (2.0)
• 45 to 54	2502 (36.9)	8.7 (2.1)
• 55 to 64	965 (14.2)	8.6 (2.2)
• ≥65	269 (4.0)	7.6 (2.5)
Years in medical practice [†]		
• 0 to 10	1679 (24.7)	8.9 (1.9)
• 11 to 20	2452 (36.1)	8.7 (2.1)
• 21 to 30	1986 (29.2)	8.6 (2.2)
• 31 to 40	540 (8.0)	8.3 (2.3)
• >40	132 (1.9)	7.6 (2.4)
Physician sex		
• Male	4472 (65.9)	8.8 (2.1)
• Female	2317 (34.1)	8.3 (2.0)
Additional postgraduate training after family medicine residency		
• Yes	2391 (35.2)	8.9 (2.1)
• No	4398 (64.8)	8.5 (2.1)
Physician payment type		
• Fee-for-service only	3051 (44.9)	8.3 (2.2)
• Other	3738 (55.1)	8.9 (1.9)
Availability of health care resources to main practice setting		
Referral to specialists [‡]		
• 1 (poor)	503 (7.4)	8.7 (2.1)
• 2	2051 (30.2)	8.8 (2.0)
• 3	2607 (38.4)	8.7 (2.0)
• 4	1252 (18.4)	8.4 (2.2)
• 5 (excellent)	375 (5.5)	8.2 (2.4)
Hospital beds [§]		
• 1 (poor)	1720 (25.3)	8.7 (2.0)
• 2	2421 (35.7)	8.6 (2.1)
• 3	1738 (25.6)	8.5 (2.1)
• 4	695 (10.2)	8.9 (2.1)
• 5 (excellent)	215 (3.2)	9.3 (2.1)
Practice organization		
No. of different types of allied health professionals in main practice setting		
• 0 to 2	5936 (87.4)	8.8 (2.1)
• 3 to 5	791 (11.7)	8.0 (2.0)
• ≥6	62 (0.9)	7.4 (2.1)
Main practice setting		
• Private office or clinic	6101 (89.9)	8.7 (2.1)
• Community clinic, CHC, CLSC	468 (6.9)	7.9 (2.2)
• Academic family medicine teaching unit	220 (3.2)	8.9 (1.7)
Practice type		
• Solo practice	1619 (23.9)	8.4 (2.2)
• Family physician group practice	4512 (66.5)	8.8 (2.0)
• Family physician-specialist group practice	658 (9.7)	7.9 (2.3)
Geographic variables		
Population served [¶]		
• Urban	4291 (63.2)	8.2 (2.1)
• Semiurban	1363 (20.1)	9.2 (2.0)
• Rural	1135 (16.7)	9.7 (1.6)
Provinces ^{‡‡}		
• Newfoundland and Labrador	114 (1.7)	9.0 (1.8)
• Prince Edward Island	68 (1.0)	9.4 (1.6)
• New Brunswick	135 (2.0)	9.7 (1.5)
• Nova Scotia	248 (3.6)	9.4 (1.6)
• Quebec	1450 (21.4)	7.2 (2.0)
• Ontario	2550 (37.6)	8.6 (2.0)
• Manitoba	209 (3.1)	8.8 (2.0)
• Saskatchewan	209 (3.1)	10.1 (1.3)
• Alberta	628 (9.3)	9.3 (1.9)
• British Columbia	1178 (17.4)	9.7 (1.5)

CHC—community health centre, CLSC—centre local de services communautaires.

*Mean (SD) physician age was 46.2 (9.5) years.

†Mean (SD) number of years in practice was 18.0 (9.6) years.

‡Availability of specialists for referral was scored on a 5-point Likert scale (with 1 being poor and 5 being excellent). Mean (SD) Likert score for availability of specialists was 2.9 (1.0).

§Access to hospital beds was scored on a 5-point Likert scale (with 1 being poor and 5 being excellent). Mean (SD) Likert score for access to hospital beds was 2.3 (1.1).

||The mean (SD) number of allied health professionals in the main practice settings was 1.1 (1.3).

¶This referred to the population primarily served by the respondent's practice, as selected by the respondent. The original categories of inner city and urban-suburban were collapsed into urban; small town was collapsed into semiurban; and rural, geographically isolated, and remote were collapsed into rural.

‡‡Complete-case analysis excluded all respondents from the territories.

Table 2. Results of univariable and multivariable analyses with complete case analysis: *N* = 6789.

INDEPENDENT VARIABLES (REFERENCE CATEGORY)	UNADJUSTED β (UNSTANDARDIZED REGRESSION COEFFICIENT)	STANDARD ERROR OF UNADJUSTED β	UNADJUSTED R^2	ADJUSTED β (UNSTANDARDIZED REGRESSION COEFFICIENT)	STANDARD ERROR OF ADJUSTED β	ADJUSTED R^2 (% OF TOTAL R^2 EXPLAINED)
Physician-related variables						
Physician age	-0.24*	0.04	0.005*	-0.16*	0.04	0.002 (0.6)*
Years in medical practice [†]	-0.25*	0.04	0.006*			
Male physician sex	8.55*	0.82	0.016*	6.20*	0.72	0.006 (1.7)*
Additional postgraduate training after family medicine residency	6.97*	0.82	0.011*	3.22*	0.68	0.002 (0.6)*
Payment via fee-for-service only	-10.12*	0.78	0.024*	-7.88*	0.68	0.016 (4.6)*
Availability of health care resources to main practice setting						
Specialists	-2.08*	0.40	0.004*	-1.13*	0.35	0.001 (0.3) [†]
Hospital beds	1.09*	0.37	0.001 [†]	0.97 [†]	0.36	0.001 (0.3) [†]
Practice organization						
No. of different types of allied health professionals in main practice setting	-2.84*	0.30	0.013*	1.33*	0.31	0.002 (0.6)*
Main practice setting (private office)			0.010*			0.009 (2.6)*
• Community clinic, CHC, CLSC	-12.32*	1.55		-11.87*	1.50	
• Academic family medicine teaching unit	2.24 [§]	2.22		8.97*	1.90	
Practice type (solo practice)			0.019*			0.007 (2.0)*
• Family physician group practice	6.58*	0.93		5.35*	0.81	
• Family physician-specialist group practice	-7.30*	1.49		1.95 [§]	1.32	
Geographic variables			0.095*			0.110 (31.3)*
Population served (urban)						
• Semiurban	16.43*	0.96		17.20*	0.86	
• Rural	24.57*	1.03		23.96*	0.97	
Provinces (Quebec)			0.195*			0.195 (55.6)*
• Newfoundland and Labrador	28.75*	2.83		26.89*	2.59	
• Prince Edward Island	35.07*	3.62		29.91*	3.28	
• New Brunswick	39.73*	2.63		37.65*	2.40	
• Nova Scotia	34.64*	2.00		34.54*	1.85	
• Ontario	21.87*	0.96		27.31*	0.94	
• Manitoba	26.33*	2.16		26.07*	1.97	
• Saskatchewan	47.54*	2.16		48.29*	1.99	
• Alberta	33.54*	1.39		35.52*	1.31	
• British Columbia	40.00*	1.14		43.68*	1.14	

CHC—community health centre, CLSC—centre local de services communautaires.

**P* < .001.

[†]Excluded or not significant in multivariable model.

[†]*P* < .01.

[§]*P* > .05 (not significant).

associated with the SPS; being in a group practice that included specialists was negatively associated with the SPS. Providing care to semiurban and rural populations had stronger positive associations with the SPS than providing care to urban populations did. When compared

with physicians in Quebec (reference category for provinces), practising in any other province was positively associated with a broader SP. British Columbia, Alberta, and Saskatchewan had the strongest positive associations with the SPS.

The multivariable model explained 35.1% of the variation in the SPS. Geographic factors explained the greatest amount of the variation (30.5%). Physician-related factors were second, explaining a total of 2.6% of the variation, while practice organization explained 1.8%, and availability of health care resources to the main practice setting explained only 0.2% of the variation. The 3 factors that together explained 91.5% (32.1% of 35.1%) of the variation explained by the multivariable model were provincial division, whether the practice was rural, and physician payment type.

Results of univariable analyses and multivariable analysis after imputation were almost identical to those conducted without imputation. Differences occurred only with the relative contribution of independent variables that explained less than 1% of the variation in the SPS. In the imputed multivariable model, as compared with the model without imputation, practice type explained more variation than practice setting, physician age more than additional postgraduate training, and access to hospital beds more than access to specialists.

DISCUSSION

Two geographic factors (province of practice and whether the practice was rural) explained almost all of the variation in the SPS. Geographic factors have previously been found to explain most of the variation in the SP of FPs and GPs.⁶ Because health care delivery is a provincial responsibility, provincial health care policies can affect SP. Provincial policies that affect the ratio of family physicians to specialists might be particularly important. Post-hoc analyses showed that provincial SPS positively correlated with provincial family physician-to-specialist ratio in 2001 (Spearman's ρ correlation coefficient 0.715, $P = .013$) but not with other measures of provincial physician resources (total number of physicians, total number of specialists, total number of family physicians, number of family physicians per 100 000 population), gross domestic product, or health care expenditures (total expenditure as a percentage of gross domestic product, total expenditure in current dollars, and total expenditure per capita in current dollars).

Previous studies^{2,6,7,13,15,16} have found positive associations between rural practice and SP. Whether a practice was rural independently explained a large amount of the variation in the SPS. One reason for the direct relationship between SP and whether a practice is rural is that rural FPs and GPs require a broader set of clinical skills than their urban counterparts, as specialists are less accessible. Our study supports this explanation, as greater access to specialists was negatively associated with the SPS. However, rural practice was independently associated with the SPS after controlling for access to specialists and explained a much larger amount of

the variation in the SPS than access to specialists did. A likely explanation is that there are other important factors within the definition of *rural* in this study that influenced the SPS.²⁵

This study identifies associations that support primary care renewal efforts. It affirms that group practice is a positive predictor of SP. Additionally, the negative association between sole fee-for-service payment and the SPS supports the use of other physician remuneration strategies. Third, the positive association between the number of different types of allied health professionals in the main practice setting and the SPS supports the integration of allied health professionals into family physicians' offices.

Other new findings provide support for postgraduate training in family medicine. When compared with private offices as a main practice setting, academic family medicine teaching units were positively associated with the SPS. This showed that teaching units were staffed with teachers who exemplified comprehensiveness. Second, additional structured training after family medicine residency among office-based FPs and GPs was positively associated with the SPS. For FPs and GPs who chose to spend most of their time in office-based settings, additional training did not appear to lead to narrower SP.

This study affirmed previous findings that male physician sex⁵⁻¹⁰ and younger physician age^{2,6,12,13} are associated with increased SP. Discussions about these relationships are beyond the scope of this study.

Limitations

One limitation of this study is that the data used were collected in 2001, and practice patterns might have changed since that time. Another is that the analyses conducted used only 64.1% of the 10 588 respondents. However, the sensitivity analysis conducted with an imputed data set consisting of 91.1% of the total number of respondents yielded almost identical results.

One of the weaknesses of previous Canadian studies of SP was that they did not exclude FPs and GPs with specialized practices. We were also unable to exclude these physicians, as there were no available data from the 2001 NFPWS that could have made this possible. However, physicians with SPSs below 5 (suggesting more focused practice) made up only 5.5% of the overall analyzable sample.

This study also did not take into account the population need for the services listed in the SPS. Thus, FPs and GPs from a particular province might have had narrower SP because there was less need for their participation in some services. Finally, the results of this study might not be generalizable to other countries.

Conclusion

This study confirmed that geographic factors were the greatest predictors of SP. It is important to understand

how and why geographic factors can influence SP so that SP can be enhanced where needed. A better understanding of the individual components of rural practice that affect SP is needed.

It is important to determine whether simply having a broad SP— independent of population needs— benefits the population. Important questions in this area include whether SP influences access to care and health outcomes.

This study supports primary care renewal efforts that use a mixed payment system, incorporate different allied health care professionals into the main practice settings of FPs and GPs, and foster group practices. ❁

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Contributors

Dr Wong contributed to the concept of the project; literature review; data request, analysis, and interpretation; and manuscript development. **Dr Stewart** contributed to the concept of the project, data interpretation, and manuscript revision.

Competing interests

None declared

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