RESEARCH

Inter-provincial Variation and Determinants of Access to Team-Based Primary Care in Canada

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Abstract

Background: Team-based care involves family physicians working with other health professionals to provide primary care to patients. It has been implemented across Canada; however, its adoption varies, as health care delivery is the responsibility of provincial governments and not the federal government.

Objective: To examine variations in the composition of team-based primary care amongst Canadian provinces in 2008 and identify patient characteristics that may have predicted access.

Methods: Data are from the 2008 Canadian Survey of Experiences with Primary Health Care, a national survey of patients' experiences with primary care in Canada. The sample size available for analysis was 11,521 and the response rate was 70.8%. Team-based care was defined as a family physician working with either a nurse or another type of health provider. Logistic regression was used to examine determinants of access to team-based care, adjusting for demographic, health status, and socioeconomic variables.

Results: In 2008, 37.1% of Canadians reported having access to team-based care. The composition of team-based care varied amongst provinces and the most common model in all provinces were family physician plus nurse-only teams except in Quebec and Manitoba. Statistically significant predictors of access to team-based care were province of residence and total number of chronic conditions.

Conclusion: With continuity of primary care reform in Canada, a new national survey is needed. Future assessments should aim to increase accuracy in the definition of team-based care through improvements in survey question design and patient education.

Primary care involves first-contact, non-referral services to address patient's health care need and problems.[1] Traditionally, in Canada primary care has been non-team-based, that is, delivered by family physicians (FPs) working independently in an individual or group practice.[1] Even if part of a group practice, FPs tended to work independently of each other coming together only to share major overhead expenses such as building rent and administrative staff.[2] Over the past several decades, and particularly since the early 2000s, primary care delivery in Canada has been changing to encompass other health providers in newer team-based care models. This is due to political and public concern around a perceived decline in primary care access in response to health care funding cutbacks in the 1990s and a decrease in medical school graduates choosing primary care.[3,4] In addition, various reports increased pressure on federal, provincial, and territorial governments to deliver structural changes to primary care delivery and provide the financing required to increase effectiveness and efficiency.[5-7] To support the provinces in reforming primary care, the federal government launched the Primary Health Care Transition Fund in 2000.[8]

The Primary Health Care Transition Fund accelerated primary care reform efforts through structural changes to health care delivery.[9] In order to receive this funding, each province had to ensure that their reform efforts increased access to primary care, one way of which was to establish team-based care models. Team-based care involves FPs working collaboratively with other health providers to deliver care to patients.[10,11] This type of care involves patient appointments with each team member who offers their own perspective, individual skills, and experience.[12,13] The team then meets regularly to discuss ongoing and future care directions for the patient.[10] Team-based care is expected to strengthen the primary care system by providing more comprehensive and coordinated care to patients than non-team-based care.[14]

As health care delivery is not the responsibility of the federal government, wide variations in the composition and adoption of team-based care has occurred amongst provinces. At its most basic level, team-based care involves a FP and some form of a registered nurse, such as a family practice nurse, advanced practice nurse, or nurse practitioner, recognizing that the scope of practice amongst types of nurses varies.[15] This model is most evident in Quebec where Family Medicine Groups are often comprised only of a FP and nurse.[16] In some provinces, team-based care may include a variety of other health providers required to meet the need of patients, such as dieticians, social workers, and pharmacists, among others.[15,17] Even within provinces, the composition of team-based care is highly variable. For example, numerous types of team-based care models exist in Ontario and they vary in the kind of health providers involved (e.g., community health centres and family health teams).[16]

To date, research on team-based care in Canada has been promising. Compared to non-team-based care, team-based care is associated with improved processes and outcomes of care such as health promotion and disease prevention, access to after-hours care, and quality of care.[12,13] Furthermore, the benefit of team-based care appears to be greater in those with greater need for health care such as those with poorer health status and those with multiple chronic conditions.[12] Despite these benefits, little is known nationally on the composition of team-based care amongst provinces and what predicts patients' access. Therefore, this study investigates inter-provincial variation in team-based care composition as reported in 2008 with an emphasis on describing determinants of access.

Methods
Data
Data are cross-sectional and come from the 2008 Canadian Survey of Experiences with Primary Health Care (CSE-PHC) conducted by Statistics Canada. To date, this is the only national population-based study of patients' experiences with primary health care in Canada. The survey sample was taken from respondents of the Canadian Community Health Survey Cycle 4.1 and is representative of Canadians aged 18 years and older, excluding individuals living on Reserves or Crown Lands, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions. The CSE-PHC used a complex sampling design, with stratification, multiple selection stages, and unequal selection probabilities due to over-sampling

in some provinces. Data were collected between April and June of 2008 using a computer assisted telephone interview. The response rate was 70.8% and the sample size was 11,582. This study used the Public Use Microdata File of the CSE-PHC, accessed through the Statistics Canada Data Liberation Initiative. Due to small numbers, this public file excluded respondents who lived in the three territories (n = 61) resulting in a sample size available for our analysis of 11,521.

Dependent Variable
Our dependent variable was primary care type defined as team-based care or non-team-based care. Respondents were first classified as having a regular FP (n=9,903) or no regular FP (n=1,618). Respondents with no regular FP were excluded from further analyses, as the purpose of this study was to examine patients with primary care. Based on definitions used in a previous study, we further distinguished those with a regular FP into team-based care and non-team-based care.[12] We assigned respondents as having access to team-based care (n=3,819) if, in addition to having a regular FP, they responded positively to at least one of the following CSE-PHC questions: (a) "Is there a nurse working with your primary care provider who is regularly involved in your health care?" or (b) "Other than your primary care provider, other doctors and a nurse, are there other health providers like dieticians and nutritionists working in the same office where you get your regular health care?" Respondents with a regular FP but answering no to both questions were assigned to non-team-based care (n=6,084). Team-based care was further classified into different model types, that is, having access to a FP plus: nurse-only (n=2,280); other health provider-only (n=936); or both a nurse and other health provider (n=603).

Independent Variable
Demographic, health status, and socioeconomic factors were included in the analyses. These variables were age, sex, province of residence, health status, total number of chronic conditions, income, and education. Eleven individual chronic conditions (arthritis, asthma, chronic pain, emphysema or chronic obstructive pulmonary disorder, cancer, depression, mood disorder, diabetes, heart disease, stroke, and high blood pressure or hypertension) were used to create a variable for the total number of chronic conditions per respondent. For province of residence, Ontario was chosen to be the reference against other provinces.

All variables had missing values except for age, sex, and province. A missing category, however, was only

created for income due to a high non-response rate of 15.9%. All other variables had high response rates (>98%) and no separate missing category was created, as this would have resulted in small numbers that would have been insufficient for the logistic regression analyses. Therefore, to minimize sample size reduction and reduce bias, missing values for a particular variable were imputed into the largest response category.

Analysis

First, we described unadjusted frequencies of respondent characteristics by primary care type (team-based care vs. non-team-based care). Second, we described unadjusted proportions of team-based care within provinces followed by model type (FP plus: nurse-only; other health provider-only; and both nurse and other health providers) within provinces. Third, we used multivariate logistic regression to examine determinants of access to team-based care after adjustment for respondent characteristics.

Goodness of fit was assessed for the logistic model using the F-adjusted mean residual test to account for the complex survey design.18 We used the linearization method (robust variance) to estimate variance due to the complex survey design.19-21 As this method typically gives a smaller variance than replication methods a conservative level of statistical significance of p < 0.01 was used. All analyses were completed with Stata 12 and used sample weights provided in the public file.

Results

Population Characteristics

In 2008, 37.1% of Canadians reported having access to team-based care compared to 62.9% reporting access to non-team-based care (Table 1). Having access to team-based care compared to non-team-based care statistically significantly differed only by province of residence. Respondents with team-based care did not statistically significantly differ from those with non-team-based care on the variables of age, sex, health status, total chronic conditions, education, or income.

Primary Care Type Within Provinces

As of 2008, respondents in all provinces reported having more access to non-team-based care than team-based care except for Prince Edward Island (Table 2). Rates of team-based care were highest in Prince Edward Island (52.8%), followed by Manitoba (44.3%), and New Brunswick (42.2%). Rates of team-based care were lowest in Newfoundland (20.6%), followed by Nova Scotia (25.8%), and British Colombia (26.3%).

Amongst team-based care, FP plus nurse-only teams were the most common type within all provinces except Quebec (24.8%) and Manitoba (18.2%) where FP plus other health provider-only teams were more common. FP plus nurse-only teams were particularly dominant in Prince Edward Island, responsible for 44.0% of all primary care in the province. Manitoba had the highest proportion of FP plus nurse and other health provider teams (12.7% of all primary care) with New Brunswick (7.1%) being the second highest.

Determinants of Access to Team-Based Care

The multivariate logistic regression analysis showed that the only predictors of access to team-based care were total number of chronic conditions and province of residence (Table 3). As the total number of chronic conditions increased, having access to team-based care increased (e.g. those having 3 or more chronic conditions were 1.73 times more likely to have team-based care than those with no chronic conditions). Compared to those living in Ontario, those residing in Newfoundland (OR = 0.39, 99% CI=0.24 to 0.65), Nova Scotia (OR = 0.53, 99% CI = 0.36 to 0.77), Saskatchewan (OR = 0.70, 99% CI = 0.50 to 0.99), and British Colombia (OR = 0.55, 99% CI = 0.39 to 0.78) were statistically significantly less likely to have access to team-based care. Residents of Prince Edward Island (OR = 1.79, 99% CI = 1.15 to 2.77) were the only provinces to be statistically significantly more likely to have access to team-based care than those living in Ontario.

Discussion

Our finding that those with more chronic conditions have greater access to team-based care than non-team-based care is encouraging. It suggests that efforts to offer comprehensive and coordinated care to this population of sicker patients are working. A next step of team-based care may be to target other vulnerable populations, such as the elderly and those of lower socioeconomic status. Research has shown that these populations tend to be in poorer health status and they may benefit from increased health care direction provided by team-based care.[12,13]

In 2008, team-based care had been introduced in all provinces and territories in Canada but was particularly developed in Ontario, Quebec, and Alberta.[16] Therefore, finding that compared to those living in Ontario, neither Quebec nor Alberta residents were more or less likely to have access to team-based care was an expected result. Results for some other provinces, however, were unexpected. In British Colombia team-based care was

Table 1: Population characteristics by primary-care type (%)

	Team-based care (n=3819)	Non-team based care (n=6084)	P - value
Age			
18-24	4.6	6.6	
25-44	26.1	26.5	
45-64	49.9	50.1	0.009
65+	19.5	16.8	
Sex			
Male	46.9	47.8	
Female	53.1	52.2	0.12
Health-status			
Excellent	23.0	19.5	
Very good	36.6	39.2	
Good	26.8	28.8	0.62
Fair or poor	13.6	12.5	
Total chronic conditions			
None	47.2	54.3	
1	26.1	23.0	
2	12.9	12.6	0.03
3 or more	13.8	10.1	
Education			
< Secondary	19.4	17.8	
Secondary	38.8	37.5	0.21
≥ Secondary	41.8	44.8	
Income			
$0 to $19,999	8.1	8.3	
$20,000 to $39,999	13.4	14.0	
$40,000 to $59,999	14.6	14.6	0.48
$60,000 to $79,999	12.9	12.5	
$80,000 or more	36.2	33.6	
Missing	14.8	17.0	
Province of Residence			
Newfoundland and Labrador	0.9	2.1	
Prince Edward Island	0.6	0.3	
Nova Scotia	2.2	3.7	
New Brunswick	2.9	2.3	
Quebec	22.8	22.0	0.00*
Ontario	43.7	39.5	
Manitoba	3.9	2.9	
Saskatchewan	2.4	3.0	
Alberta	10.6	9.5	
British Columbia	10.1	16.7	

*Indicates statistically significant difference between team-based care and non-team-based a p <0.01 using the Wald X^2 statistic

Table 2: Primary care type within provinces (%)

	Primary Care type		Team-based Care Breakdown		
	Non-team-based care (n = 6,084)	Team-based care (n = 3,819)	Nurse & other (n = 603)	Nurse-only (n = 2,280)	Other-only (n = 936)
Newfoundland and Labrador	79.4	20.6	5.5	12.3	2.8
Prince Edward Island	47.2	52.8	6.4	44.0	2.4
Nova Scotia	74.2	25.8	3.1	15.1	7.6
New Brunswick	57.8	42.2	7.1	28.2	6.9
Quebec	59.8	40.2	6.9	8.5	24.8
Ontario	60.5	39.5	5.9	27.4	6.2
Manitoba	55.7	44.3	12.7	13.5	18.2
Saskatchewan	68.3	31.7	4.4	21.3	6.0
Alberta	60.5	39.5	4.5	28.0	7.0
British Columbia	73.4	26.3	3.6	17.2	5.5

being implemented at lower rates than Ontario, but likely not as drastic as our statistically significant results would suggest.[16] In 2008, the Maritime Provinces were thought to have lagged behind other provinces in their implementation of team-based care.[16] Our finding that residents of Prince Edward Island reported being more likely to have access to team-based care than those living in Ontario was a surprising result due to the known lack of primary care reform in that province.[16]

A potential reason for these discrepancies may be that some patients are unable to correctly identify the profession of their health providers. Although there is a lack of data in primary care settings, previous research in hospital-based settings has shown that the majority of patients are unable to correctly identify their health providers.[22,23] Our intuition is that patients in primary care settings likely have similar difficulty, and that this difficulty would increase with an increase in the number and diversity of health providers. For example, Quebec's organization of team-based care has been generally centred on a single model involving a FP plus a nurse.[24] Our results showed, however, that most respondents in that province were reporting that their team-based care involved other non-nurse health providers. In addition, it is possible that some patients may not be aware of the presence of other health providers in their FP's team-based practice unless previously exposed to them in the course of receiving primary care. A solution may be providing patients increased education on the roles of the multiple health providers involved in their primary care. This in turn would provide patients an increased ability to identify which providers are available to them in the delivery of

their health care and ultimately increase the accuracy of patient surveys.[25]

A consistent definition of team-based care continues to remain a challenge in Canada. National surveys do not explicitly ask Canadians if they have access to team-based care and instead it is a variable constructed together from several survey questions on respondent's health care experiences. For example, based on another research article, this study used several questions asking respondents about the types of health care providers involved in their primary care to create a definition of team-based care.[12] This categorization of all primary care teams under the umbrella term of "team-based care" is only useful for initial research into their effectiveness. Moving forward it will become increasingly important to understand the differences in types of health providers and practices available to patients across the country. In addition, the ability to evaluate the effectiveness of each health provider's contribution to team-based care would be beneficial. As a first step, the present study teased out different types of team-based care, that is FP and nurse-only teams, FP and other health provider-only teams, and FP plus both nurse and other health-provider teams. Future surveys should increase their sample sizes to allow researchers to continue to distinguish different types of team-based care and develop methods to consistently evaluate their effectiveness.

As the primary care landscape in Canada is rapidly changing, new surveys to assess reform efforts including team-based care are needed. Despite using the most recently available national data on patients' experiences with primary health care, the data used

Table 3: Adjusted odds ratios for determinants of access to team-based care

	Odds ratio	99% Confidence Interval	P - value
Age			
18-24	1.0	-	-
25-44	1.40	(0.88, 2.24)	0.070
45-64	1.32	(0.84, 2.08)	0.110
65+	1.50	(0.93, 2.42)	0.030
Sex			
Male	1.0	-	-
Female	1.07	(0.84, 1.36)	0.470
Health-status			
Excellent	1.41	(0.88, 2.27)	0.060
Very good	1.07	(0.70, 1.62)	0.700
Good	0.99	(0.66, 1.48)	0.950
Fair or poor	1.0	-	-
Total chronic conditions			
None	1.0	-	-
1	1.37*	(1.01, 1.86)	0.000
2	1.29	(0.86, 1.91)	0.100
3 or more	1.73*	(1.14, 2.61)	0.000
Education			
‹ Secondary	1.0	-	-
Secondary	0.94	(0.67, 1.31)	0.640
≥ Secondary	0.80	(0.56, 1.76)	0.910
Income			
$0 to $19,999	1.0	-	-
$20,000 to $39,999	1.10	(0.66, 1.85)	0.620
$40,000 to $59,999	1.24	(0.72, 2.13)	0.310
$60,000 to $79,999	1.31	(0.74, 2.33)	0.220
$80,000 or more	1.41	(0.82, 2.45)	0.990
Missing	1.02	(0.59, 1.76)	0.910
Province of Residence			
Newfoundland and Labrador	0.39	(0.24, 0.65)	0.000
Prince Edward Island	1.79	(1.15, 2.77)	0.000
Nova Scotia	0.53	(0.36, 0.77)	0.000
New Brunswick	1.13	(0.78, 1.63)	0.390
Quebec	1.04	(0.74, 1.45)	0.780
Ontario	1.0	-	-
Manitoba	1.23	(0.83, 1.80)	0.172
Saskatchewan	0.70	(0.50, 0.99)	0.000
Alberta	0.98	(0.70, 1.37)	0.871
British Columbia	0.55	(0.39, 0.78)	0.000

*Indicates statistically significant difference between the variable category and the reference category at p ‹ 0.01.

in this survey are from 2008. Future assessments may consider surveying providers (e.g. National Physician Survey) on the composition of their team-based care, as they are likely more capable of identifying the professional background of their team members as opposed to patients. In addition, institutions such as the Canadian Institute for Health Information (CIHI) and the Canadian Primary Health Care Research & Innovation Network (CPHCRIN) are working on developing methods to measure organizational attributes, e.g., scoping reports on measurement in primary health care from the health provider experience.[26] These institutions are better equipped at providing more accurate information on primary care (e.g., composition of team-based care), and therefore would be instrumental in considering future survey development.

This study had several limitations to be noted. As with all surveys of cross-sectional design, causation cannot be assessed and there is a risk of recall bias. We focused strictly on health provider composition of team-based care, but recognize that a myriad of other characteristics are needed for defining team-based care, including payment schemes, governance, and rostering of patients.[24] Finally, due to insufficient power, deeper analyses into specific provincial attributes and types of team-based care were not possible.

Conclusion

This study used the 2008 Canadian Survey of Experiences with Primary Health Care to examine inter-provincial variation in the composition of team-based care and determinants of access. Our study found that 37.1% of Canadians reported having access to team-based care in 2008 with the most common model in all provinces being family physician plus nurse-only teams except Quebec and Manitoba (where family physician plus other non-nurse health provider teams were more common). The only statistically significant predictors of access to team-based care were a patient's province of residence and their total number of chronic conditions. Future surveys should increase study sample size so that we can better understand unique differences in composition and access to team-based care.

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References

1. Muldoon LK, Hogg WE, Levitt M. Primary care (PC) and Primary health care (PHC). What is the difference? Canadian Journal of Public Health 2006;97(5):409-411.

2. Morra DJ, Regehr G, Ginsburg, S. Medical students, money, and career selection: Students' perception of financial factors and remuneration in family medicine. Family Medicine 2009;41(2):105-110.

3. Mendelsohn M. Canadian's thoughts on their health care system: Preserving the Canadian model through innovation. 2002. Kingston: Queen's University.

4. Avinashi V, Shouldice E. Increasing interest in family medicine. Canadian Medical Association Journal 2006;174(6):761-762.

5. .Health Canada. "Commission on the future of health care in Canada: The Romanow commission." 2002. Ottawa: Health Canada. Available at: http://publications.gc.ca/collections/Collection/CP32-85-2002E.pdf.

6. Parliament of Canada. "The Health of Canadians – The Federal Role: The Kirby Report". 2001. Available at: http://www.parl.gc.ca/Content/SEN/Committee/372/soci/rep/repoct02vol6-e.pdf.

7. Health Canada. "First Ministers' Accord on Health Care Renewal. 2006". Available at: http://www.hc-sc.gc.ca/hcs-sss/delivery-prestation/fptcollab/2003accord/index-eng.php.

8. Health Canada. "Primary Health Care Transition Fund, 2000-2006." 2007. Available at: http://www.hc-sc.gc.ca/hcs-sss/prim/phctf-fassp/index-eng.php.

9. Allin S. Does equity in healthcare use vary across Canadian provinces? Healthcare Policy 2008;3(4):83-99.

10. Jessup RL. Interdisciplinary versus multidisciplinary care teams: Do we understand the difference? Australian Health Review: A Publication of the Australian Hospital Association 2007; 31(3):330-331.

11. Glazier RH. Balancing equity issues in health systems: Perspectives of primary healthcare. Healthcare papers 2007; (8):35-45.

12. Khan S, McIntosh C, Sanmartin C, Watson D, Leeb K. Primary health care teams and their impact on processes and outcomes of care. Ottawa, ON: Health Information and Research Division, Statistics Canada 2008;(2):82-622

13. Jesmin S, Thind A, Sarma S. Does team-based primary health care improve patients' perception of outcomes? Evidence from the 2007-08 Canadian survey of experiences with primary health. Health Policy 2012;105(1):71-83.

14. Kates N, Hutchison B, O'Brien P, Fraser B, Wheeler S, Chapman C. Framework for advancing improvement in primary care. Healthcare papers 2012;12(2):8-21.

15. Pringle D, Levitt C, Horsburgh ME, Wilson R, Whittaker MK. Interdisciplinary collaboration and primary health care reform. Canadian Journal of Public Health 2000; 91(2):85-8, 97.

16. Hutchison B, Levesque JF, Strumpf E, Coyle N. Primary health care in Canada: Systems in motion. The Milbank Quarterly 2011; 89(2):256-288.

17. Russell GM, Hogg W, Lemelin J. Integrated primary care organizations: The next step for primary care reform. Canadian Family Physician 2010; 56(3):216-8.

18. Archer K, Lemeshow S. Goodness-of-fit test for a logistic regression model fitted using survey sample data. The Stata Journal 2006;6(1):95-105.

19. Rao RS, Sigurdson AJ, Doody MM, Graubard BI. An application of a weighting method to adjust for nonresponse in standardized incidence ratio analysis of cohort studies. Annals of Epidemiology 2005;15(2):129-136.

20. Kovar JG, Rao JNK, Wu CFJ. Bootstrap and other methods to measure errors in survey estimates. Canadian Journal of Statistics 1988;16(S1):25-45.

21. Lohr S. 1999: Sampling: Design and analysis, Second edition. Boston: Brooks/Cole Cengage Learning Inc.

22. FMakaryus AN, Friedman EA. Does your patient know your name? An approach to enhancing patients' awareness of their caretaker's name. Journal for Healthcare Quality 2005;27(4):53-56.

23. Arora V, Gangireddy S, Mehrotra A, Ginde R, Tormey M, Meltzer D. Ability of hospitalized patients to identify their in-hospital physicians. Archives of Internal Medicine 2009169(2):199-201.

24. Strumpf E, Levesque JF, Coyle N, Hutchison B, Barnes M, Wedel RJ. Innovative and diverse strategies toward primary health care reform: Lessons learned from the Canadian experience. Journal of the American Board of Family Medicine 2012;25: S27-33.

25. Azoulay-Zyss J, Roze E, Welter M-L, Navarro S, Yelnik J, Clot F, et aHealth Council of Canada. "Teams in action: Primary health care teams for Canadians". 2009. Available at http://www.healthcouncilcanada.ca/tree/2.42-teamsinaction_1.pdf

26. Canadian Primary Health Care Research & Innovation Network. "Measuring provider experiences in primary health care: Report on the development of a PHC provider survey for the Canadian institute for health information." 2013. Available at http://www.cphcrin-rcrissp.ca/images/stories/CIHI_Provider_Survey_Report_Final_Online.pdf.