

Getting it all done. Organizational factors linked with comprehensive primary care

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Background. Comprehensiveness, a defining feature of primary care (PC) is associated with patient satisfaction and improved health status. This paper evaluates comprehensive services in fee-for-service (FFS), Health Service Organizations (HSOs), Family Health Networks (FHNs) and Community Health Centres (CHCs) payment models in Ontario.

Objectives. To assess how organizational models of PC differ in the delivery of comprehensive services and which organizational factors predict comprehensive PC delivery.

Methods. Cross-sectional mixed-method study with nested qualitative case studies. *Setting.* PC practices in Ontario. *Participants.* One hundred and thirty-seven PC practices (35 FFS, 32 HSO, 35 FHN and 35 CHC) and 358 providers. *Instruments.* Surveys based on the Primary Care Assessment Tool and qualitative interviews. *Outcome measures.* Comprehensiveness scores were calculated from practice report of clinical services offered in women's health, psychosocial counselling, procedural and diagnostic services. Confounding variables were calculated from provider and patient surveys. Performance at a model level was compared using analysis of variance. Multiple regressions then established factors independently associated with comprehensiveness.

Results. CHCs offered significantly more comprehensive services (74%) than other models (61%–63%; $P < 0.005$). Thirty-five per cent of the variance in comprehensiveness was explained by a regression model that included the number of family physicians working at the practice, presence of other allied health providers, rurality and length of practice operation.

Conclusions. Practice size and diversity of providers seemed to partially explain the better performance of CHCs. Practice setting and, probably, practice maturity are significant drivers in the provision of comprehensive PC services. These factors warrant further examination in other PC environments.

Keywords. Comprehensiveness, performance measurement, primary care, primary health care, quality of health care.

Introduction

Comprehensiveness is widely acknowledged as a defining characteristic of primary care (PC).^{1–3} Valued by patients⁴ and advocated by professional organizations,^{5,6} comprehensive PC service delivery is associated with adherence to physician's advice⁷ and improved health status.⁸ It forms a key plank in the moves to incorporate chronic disease management within PC.⁹

Although definitions vary, comprehensiveness essentially reflects the breadth of PC service delivery—the

type and range of services that 'practices' have the capacity to offer to patients.¹⁰ In recent years, evidence has emerged of the declining comprehensiveness of PC. Providers have been observed to be providing care in less varied locations and both practices and providers are offering a narrower range of procedures.¹¹ Patients, particularly those from minority groups,¹² are receiving less whole person and holistic care.¹³

We wished to assess the comprehensiveness of a large sample of Ontario PC practices. Our study was part of a mixed-methods cross-sectional study, the

'Comparison of Models of Primary Health Care in Ontario' (COMP-PC). The study was designed to describe and compare the structure and process of care within four primary health care delivery models in Ontario, Canada. The models chosen [fee-for-service (FFS—including the newly formed Family Health Groups (FHG)], Family Health Networks (FHNs), Health Service Organizations (HSOs) and Community Health Centres (CHCs) were, at the time of the study (2005–2006), responsible for delivering PC to the majority of the Ontario population. Figure 1 describes the models and their essential characteristics.

This paper addresses two questions: (i) Does the extent of comprehensive PC services differ between the four models? and (ii) What practice-level organizational factors are associated with the provision of comprehensive PC?

Methods

Design

Cross-sectional mixed-methods study in Ontario, Canada, between October 2005 and June 2006. Our methods have been described in full elsewhere¹⁴ and are summarized below. Data were gathered from PC practices, patients receiving care at and providers (family physicians and nurse practitioners) working within these practices. The study was approved by the Ottawa Hospital Research Ethics Board.

Sample and recruitment

Our sampling frame included all known and eligible FHNs (94), CHCs (51) and HSOs (65) in Ontario. The FFS/FHG sampling frame of 155 represented a random sample extracted from a list of 1884 practices. The

sampling frame for FFS/FHG practices was selected from a list of 3276 FFS/FHG physicians. From this list, we randomly identified 200 practices using a random number generator. Three were excluded because they could not be identified.

The remaining 197 FFS–FHG practices were invited to participate. Forty-two of these FFS–FHG practices were found to be ineligible (for reasons such as wrong model, specialized practice and walk-in clinics), leaving 155 eligible FFS/FHG practices.

Invitations were mailed to all practices in each model's sampling frame. These invitations were followed up by a combination of mailings, telephone calls and face-to-face visits. In each group, we continued recruiting until we reached our target of 35 practices or until no further practices consented. We excluded practices that did not offer general PC services for adults, had belonged to their respective model for <1 year and where fewer than 50% of the sites' providers consented to participate in the survey.

Following administration of the study materials, three of the recruited HSO practices were found not to fit our predetermined criteria and were hence excluded from the sample. Two practices per model were selected using a typical case sampling strategy for participation in the qualitative component.¹⁵

The sample size for the COMP-PC project was calculated to detect a difference of 0.5 SD in a score reflecting disease prevention, with an alpha value of 0.05, a beta value of 0.20 and an intra-cluster correlation coefficient of 0.2.

Instruments

Instruments were adapted from the adult version of the Primary Care Assessment Tool (PCAT).¹⁶ A

	Community Health Centre (CHC)	Fee for service (FFS)		Family Health Network (FHN)	Health Service Organization (HSO)
		Fee for Service	Family Health Groups (FHG) ¹		
Year introduced	1970s	-	2004	2001	1970s
Group size	Groups practice – Unspecified size	1 Physician	Minimum 3	Minimum 3	Minimum 3
Physician remuneration	Salary	FFS	FFS and incentives	Capitation ² with a 10% FFS component, and incentives	Capitation ^b and incentives
Patient enrolment	Required No roster size limit	Not required	Required No roster size limit	Required Disincentive to enrol >2,400 ³	Required Disincentive to enrol >2,400 ^d
Access	No specified requirements	No specified requirements	THAS ⁴ Extended hours ⁵	THAS Extended hours ^c Access bonus ⁶	THAS Extended hours ^e Access negation ⁷
Multi-disciplinarity⁸	Extensive	None	None	Some	Some
Assistance for Information Technology	Some	None	None	Yes	None
Objectives/Priorities	Responsiveness to population needs, multi-disciplinarity, prevention, focus on underserved, community governed ¹⁸	-	Accessibility ¹⁹	Accessibility, comprehensiveness, doctor-nurse collaboration, use of technology	Responsiveness to population needs, multi-disciplinarity, health promotion, cost effectiveness ²⁰

Adapted from <https://www.oma.org/PC/PCRComparisonJan0807.pdf> (PCRComparisonJan0807.pdf)

FIGURE 1 Ontario's main PC models in 2005/2006

provider survey, completed by participating family physicians and nurse practitioners, captured demographic information. A single practice survey (containing items describing practice environment (including the team structure, setting, hours of operation and the availability of medical and social services offered within the practice and in the local community) was completed by the practice manager or lead physician at each site.

Measures

'Comprehensiveness indicators' were adapted from those within the PCAT's provider instrument. These were transferred into our study's practice survey to minimize survey fatigue. Additional minor modifications were made to the PCAT to favour service items with strong face validity for Canadian PC. The PCAT's ordinal measurement of whether a service was available (definitely/probably/probably not/definitely not) was collapsed into a binary (yes/no) scale. The comprehensiveness scale included 15 separate clinical services. For the purpose of reporting, we collapsed these items into four groups (women's health, counselling, procedural and diagnostic services).

Data analysis

Data were analysed using SPSS-PC version 15.0. To avoid casewise deletion due to missing values in multivariate analyses, continuous data were imputed using the nearest neighbourhood technique and missing discrete variables formed a separate category.

Description of models and associations with comprehensiveness. Patient, provider and practice characteristics were compiled and compared across model using analysis of variance (ANOVA) or chi-square tests, as appropriate. Bivariate linear regressions were used to evaluate the association between each factor and the overall comprehensiveness score.

Comparison of models. Comprehensiveness scores were compared across models using ANOVA and linear regressions. Three linear regressions were calculated: the first was unadjusted, the second controlled for patient characteristics and practice context and the third also included provider characteristics. Within each regression, forward selection was performed for non-model variables, using entry and exit criteria of $P = 0.05$ and $P = 0.10$.

Organizational factors independently associated with comprehensiveness. A multivariate linear regression with forward selection (using entry and exit criteria of $P = 0.05$ and $P = 0.10$, respectively) was used to identify organizational factors independently associated with overall comprehensiveness. Additional regressions

were conducted for each dimension of clinical care and for each model type in order to verify the sensitivity of our results.

Qualitative evaluation. The interviews were recorded and then transcribed verbatim. Interview transcripts were coded and analysed using the N6 qualitative data analysis software (Non-numerical Unstructured Data Indexing Searching and Theorizing—Qualitative Data Analysis Program; QSR International Pty Ltd, Version 6, 2002). The coding scheme was developed gradually and transcript analysis involved using an open-coding strategy to develop new categories of information and refine existing ones. Ideas and categories generated after performing line-by-line analysis were tested and further explored in subsequent interviews until data saturation was reached.

Results

Data were collected from 137 practices and 363 health providers. Patient surveys were administered to 5361 patients. Patient and practice response rates across models ranged between 74%–85% and 23%–69%, respectively. Comparison to provincial health administrative databases showed that the physicians participating in the study and their patterns of practice were similar to all physicians practicing in each model.¹⁴ Interviews were conducted with 46 providers and 24 patients.

Description of models

Table 1 describes the models in terms of patient, provider and practice characteristics and indicates bivariate associations with the total comprehensiveness score.

Comparison of models

Table 2 shows that CHCs provided more comprehensive care than the other models. Table 3 contains the results of regressions of comprehensiveness against model variables and two sets of confounders. CHCs showed superior comprehensiveness even after controlling for patient and provider confounders. We found no consistent differences in comprehensiveness between the other three models.

Organizational factors associated with comprehensiveness

Table 4 shows the results of the regression establishing those factors independently associated with comprehensiveness. That model explains 35% of the variance in the comprehensiveness score. The presence of health professionals, more family physicians, higher rurality and a distance to the nearest hospital >10 km were associated with better comprehensiveness. Model

TABLE 1 Patient and practice characteristics of models and bivariate associations with comprehensiveness

	Profile of models				Association with comprehensiveness score β (95% confidence interval)
	CHC	FFS	FHN	HSO	
Patient profile	1219	1375	1494	1273	
Age (years) ^a	46	49	51	51	NS
Sex (% female) ^a	73	67	66	61	NS
Canadian born (%)	70	74	86	83	NS
Self-reported health status (% poor–fair)	24	19	17	13	–
Provider profile (n)	182	58	81	42	
Female providers (%) ^a	73	45	41	26	+
Group practices ^a	100	74	63	62	+
Family physicians (FTE) ^a	3.0	2.4	3.6	1.7	+
Nurse practitioner (FTE) ^a	2.5	0.1	0.3	0.2	+
Nurses ^b (FTE) ^a	2.7	0.6	2.0	1.1	+
Presence of allied health professionals ^a	94	17	28	26	+
Length of practice operation (years) ^a	18	16	24	26	+
Average booking interval (minutes) ^a	24	12	16	13	+
Practice context	35	35	35	32	
Hospital (>10 km) ^a	71	85	94	87	+
Rurality index ^a	14	13	16	8	+

FTE, full-time equivalent; NS represents non-significant association; β = Coefficient from bivariate linear regression of comprehensiveness, with the 95% confidence interval in parentheses; –/+ represents statistically significant ($P < 0.05$) negative/positive association with total comprehensiveness score after association bivariate linear regressions.

^aIndicates variables features that are significantly different between the models at the $P = 0.05$ level.

^bIncludes registered practice nurse, nurses and nursing assistants.

TABLE 2 Comprehensiveness scores (%) for services, service subgroups and overall (n = 137)

Dimension of PC	CHC 35	FFS 35	FHN 35	HSO 32
Womens' health				
Antenatal care	97	94	97	97
PAP smear	97	100	100	100
Delivery ^a	34	31	43	38
Family planning/birth control	100	89	86	84
Procedural				
Suturing	89	69	54	69
Allergy shots	100	97	100	100
Wart treatment	97	94	86	84
Splinting for a sprained ankle	57	40	37	53
Removal of an ingrown toenail	74	51	51	34
Counselling				
Nutrition counselling	94	11	49	44
Alcohol or drug abuse counselling	43	71	51	47
Mental health counselling	97	86	80	88
Diagnostic				
Sigmoidoscopy	6	6	11	13
Electrocardiogram	69	51	60	41
Spirometry	60	40	46	22
Comprehensiveness Score	74	62	63	61

^aDelivery = preparation for delivery and delivery of babies (possibly off-site) and Counselling = counselling for behavioural and/or mental health problems.

type was not independently associated with comprehensiveness. An analysis stratified by model indicated that the impact of these factors is largely consistent across models.

TABLE 3 Multivariate regression results for model comparison (n = 137)

Variables	β (models only)	β (patient and context variables) ^a	β (patient, context and provider variables) ^b
CHC (reference)	—	—	—
FFS	–12.2	–11.9	–11.0
FHN	–10.9	–11.3	–14.1
HSO	–13.5	–12.3	–16.1

All coefficients are statistically significantly at the $P = 0.05$ level. No other inter-model comparisons are statistically significant.

^aIndependent variables include age, sex, Canadian born, self-reported health status, self-reported employment status, income, presence of at-risk groups, education, ethnicity, rurality and distance to various health services. Of these, only rurality of the practice site was significant and included in the model.

^bIndependent variables include all patient and context variables, as well as provider age, sex, foreign education, years since graduation from medical school, length of operation of the practice and length of operation within its current model. Of these, only rurality and length of practice operation were significant and included in the model.

Qualitative evaluation

The qualitative data were consistent with and illuminated our quantitative findings. Providers from all models highlighted the importance of allied health professionals in expanding comprehensiveness of care. A CHC physician spoke of the advantages of working with providers of other disciplines:

I have so much support here that I don't have to deal with [all of a patient's issues]. I can identify,

TABLE 4 Multiple regression for organizational factors associated with comprehensiveness ($n = 137$)

Variables	β (95% confidence interval) ^a
Number of full-time equivalent (FTE) physicians	2.8 (1.7–3.9)
Presence of allied health professionals	9.9 (5.3–14.5)
Rurality index	0.14 (0.00–0.28)
Distance to nearest hospital >10 km	8.8 (2.3–15.3)

^aIndependent variables include all patient, context and provider variables as well as the number of FTE physicians, number of FTE nurse practitioners (NP), number of FTE non-NP nurses, number and presence of allied health professionals, model type and access to medical equipment such as electronic medical records. Only the four variables listed above were significantly independently associated with the comprehensiveness score.

but then I can quickly move them on to someone who is significantly more trained for (managing) that stuff.

Physicians at non-CHC practices were also acutely aware of the influence of financial incentives on the provision of comprehensive care. Many expressed the belief that ‘fee codes supportive of’ a given behaviour would encourage specific activities and services. The converse also held true: if the reward for performing a service was seen as smaller than the difficulties incurred, respondents indicated that the service would likely be discontinued and patients referred to another health care provider. A number of providers in the non-CHC practices highlighted their reluctance to assume responsibilities, which cannot be shared or terminated easily. Physicians indicated that they would be more likely to offer a service if the burden could be shared with colleagues, which prevents a doctor from being overwhelmed by referrals for a service only he or she offers.

Finally, it was clear there was an at times significant gap between services available and services provided. One patient commented ‘If I ask for it, [my FP] will arrange it ... but he would not encourage me ... I have always asked for pretty well everything.’ In the case of less resourceful patients, the comprehensiveness of services offered and the comprehensiveness of services provided can be expected to diverge significantly.

Discussion

There has been little examination of the comprehensiveness of services offered by PC physicians. Several findings should be highlighted. First, it was clear that compared to the other models, and at the level of the practice, CHCs offered the most comprehensive range of services. Despite differing payment systems and variations in support services, we found the level of comprehensiveness in the other models to be

relatively similar. Comprehensive practices tended to have more family physicians, non-nursing allied health providers, located in rural areas and located >10 km from the nearest hospital. Model performance did not significantly differ when these four factors were taken into account.

Higher comprehensiveness in CHCs

The CHCs outperformed the other models in two broad areas. The first related to the provision of birth control advice and nutritional and mental health counselling. The second were those that required office arrangements for surgical (suturing and removal of an ingrown toenail) or diagnostic activities (electrocardiogram and spirometry).

There is limited information on comprehensiveness of different PC organizational models. Most such studies were done in PC in the USA. In that setting, CHCs have been found to offer more comprehensive care than Health Maintenance Organizations,¹⁷ FFS and/or Independent Practice Associations.¹⁸ Others have found comprehensiveness to be greater in capitated (as opposed to FFS) models of care.¹⁹ A single Ontario study comparing health service delivery in different PC settings (walk-in clinics, after-hours clinics and group family practices) found that walk-in clinics were less likely to provide preventive services and psychological counselling than were group family practices and mixed practices.²⁰

Ontario’s CHCs were established in the early 1970s. They are non-profit community-governed organizations that provide a broad range of primary health care services under a mandate emphasizing prevention, accessibility and linkages with other community services.²¹ Members of their interdisciplinary group practices (family physicians, nurse practitioners, dietitians and others) are paid by salary.

The practice organizational factors independently associated with comprehensiveness reveals potential reasons behind our findings of greater comprehensiveness of care being offered by CHCs.

Organizational factors associated with comprehensiveness

Factors associated with comprehensiveness fell into two groups: those related to practice setting (rurality and the distance from a hospital) and those internal to the practice (the number of full-time family physicians and the presence of an allied health professional).

Our finding that rural practices and those located >10 km from a hospital offered a wider range of services suggest a degree of responsiveness of PC practices to need. Other Ontario-based investigations of comprehensiveness have, similarly, found that residents in rural and small communities ‘receive’ a wider range of PC services than their urban counterparts¹¹ and that rural

doctors 'provide' a broader range of procedural and advanced care services than urban doctors.^{6,22,23}

It was clear that, within the practice, comprehensiveness was associated with the number of full-time equivalent family physicians. This has three possible explanations. First, given the likelihood that PC physicians vary in their skill mix, it would be expected that this would mean that larger practices could draw upon a more diverse pool of physician abilities. Second, larger practices would benefit from the economies of scale provided by their size, and hence more able to invest in medical equipment (such as sterilizers), which would be underused—and therefore unprofitable—for solo practitioners.

Finally, we documented, as had others, that multi-disciplinary teams have the potential of adding to the comprehensiveness of PC.²⁴

CHCs in Ontario have a number of these features. Although they are more likely than the other models to be within 10 km of a hospital, all CHCs are group practices. They have more family physicians than both the HSOs and the FFS practices and are between three and five times more likely to include allied health professionals.

Limitations

This cross-sectional study has a number of limitations. Our practice sample excluded practices in the far north of the province and was limited by the difficulties in identifying all practices within a model. In particular, we only recruited 23% of all FFS practices approached. However, a comparison of our sample with Ontario FFS provider profiles found minimal differences between our FFS sample and the FFS practices within Ontario.²⁵

The study's reliance on practices descriptions of services available did not allow us to assess the quality of the services nor could we capture the extent to which available services were relevant to or used by their patients. Practices were left to interpret the items themselves, a fact possibly explaining the patterns of results shown in the counselling domain (Table 2) where unexpectedly high provision of alcohol or drug abuse counselling was reported in the FFS practices.

The index used to generate comprehensiveness scores weighted all services equally. Thus, the provision of PAP smears contributed as much to the score as the provision of treatment for ingrown toenails. If the range of 'common health care needs' satisfied by these two services differs, then our index will fail to present a true picture of comprehensive care.

Finally, while our assessment of practice factors potentially influencing quality of care was large, it was not exhaustive. We did not collect data on the clinician's experience and characteristics of relationships within the team or patients and providers.

Conclusions

This paper has evaluated the provision of comprehensive PC services in four PC delivery models in Ontario, Canada. We found that CHCs provided more diverse care than the other major delivery models and that this superiority was likely to be due to overlapping skills of larger numbers of family physicians, the presence of non-nursing allied health professionals with complementary skills. Similarly, rural practices and those ≥ 10 km from the nearest hospital offered more comprehensive care. The results suggest that comprehensiveness may be promoted by policies increasing practice size and show a degree of practice responsiveness to the availability of services in the surrounding area.

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References

- 1 Stange KC. The paradox of the parts and the whole in understanding and improving general practice. *Int J Qual Health Care* 2002; **14**: 267–8.
- 2 Starfield B. *Primary Care: Balancing Health Needs, Services and Technology*. New York: Oxford University Press, 1998.
- 3 Scheffler RM, Weisfeld N, Ruby G, Estes EH. A manpower policy for primary health care. *N Engl J Med* 1978; **298**: 1058–62.
- 4 O'Malley AS, Forrest CB, O'Malley PG. Low-income women's priorities for primary care: a qualitative study. *J Fam Pract* 2000; **49**: 141–6.
- 5 Lakhani M. The white paper: what the college wants. *Br J Gen Pract* 2005; **55**: 907–8.
- 6 College of Family Physicians (CFPC). *Family Practice Concepts and Values: Benchmarks for Health Care Reform*. Mississauga, Canada, 2009.
- 7 Safran DG, Montgomery JE, Chang H, Murphy J, Rogers WH. Switching doctors: predictors of voluntary disenrollment from a primary physician's practice. *J Fam Pract* 2001; **50**: 130–6.
- 8 Hecht FM, Wilson IB, Wu AW, Cook RL, Turner BJ. Optimizing care for persons with HIV infection. Society of General Internal Medicine AIDS Task Force. *Ann Intern Med* 1999; **131**: 136–43.
- 9 Rothman AA, Wagner EH. Chronic illness management: what is the role of primary care? *Ann Intern Med* 2003; **138**: 256–61.
- 10 Hogg W, Rowan M, Russell G, Geneau R, Muldoon L. Framework for primary care organizations: the importance of a structural domain. *Int J Qual Health Care* 2008; **20**: 308–13.

- ¹¹ Chan BT. The declining comprehensiveness of primary care. *CMAJ* 2002; **166**: 429–34.
- ¹² Stevens GD, Shi L, Cooper LA. Patient-provider racial and ethnic concordance and parent reports of the primary care experiences of children. *Ann Fam Med* 2003; **1**: 105–12.
- ¹³ Safran DG. Defining the future of primary care: what can we learn from patients? *Ann Intern Med* 2003; **138**: 248–55.
- ¹⁴ Dahrouge S, Hogg W, Russell G *et al*. The Comparison of Models of Primary Care in Ontario study (COMP-PC): methodology of a multifaceted cross-sectional practice-based study. *Open Med* 2009; **3**: 149–64.
- ¹⁵ Patton MQ. *Qualitative Research and Evaluation Methods*, 3rd edn. Thousand Oaks, CA: Sage Publications, Inc., 2002.
- ¹⁶ Shi L, Starfield B, Xu J. Validating the adult primary care assessment tool. *J Fam Pract* 2001; **50**: 50–161.
- ¹⁷ Shi L, Starfield B, Xu J, Politzer R, Regan J. Primary care quality: community health center and health maintenance organization. *South Med J* 2003; **96**: 787–95.
- ¹⁸ Safran DG, Tarlov AR, Rogers WH. Primary care performance in fee-for-service and prepaid health care systems. Results from the Medical Outcomes Study. *JAMA* 1994; **271**: 1579–86.
- ¹⁹ Starfield B, Cassady C, Nanda J, Forrest CB, Berk R. Consumer experiences and provider perceptions of the quality of primary care: implications for managed care. *J Fam Pract* 1998; **46**: 216–26.
- ²⁰ Barnsley J, Williams AP, Kaczorowski J *et al*. Who provides walk-in services? Survey of primary care practice in Ontario. *Can Fam Physician* 2002; **48**: 519–26.
- ²¹ Association of Ontario Health Centers. Our History. <http://www.aohc.org/aohc/index.aspx?CategoryID=9&lang=en-CA>. (last accessed 31 August 2009).
- ²² Humphreys JS, Jones JA, Jones MP *et al*. The influence of geographical location on the complexity of rural general practice activities. *Med J Aust* 2003; **179**: 416–20.
- ²³ Wise AL, Hays RB, Adkins PB *et al*. Training for rural general practice. *Med J Aust* 1994; **161**: 314–8.
- ²⁴ Gabbay RA, Lendel I, Saleem TM *et al*. Nurse case management improves blood pressure, emotional distress and diabetes complication screening. *Diabetes Res Clin Pract* 2006; **71**: 28–35.
- ²⁵ Hogg W, Dahrouge S, Russell G *et al*. Health promotion activity in primary care: performance of models and associated factors. *Open Med* 2009; **3**: 165–73.