The Comparison of Models of Primary Care in Ontario study (COMP-PC): Methodology of a multifaceted cross-sectional practice-based study

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Abstract

Background: In Ontario, primary care practices are organized by models of care. From the traditional fee-for-service (FFS), more recent models were introduced in attempts to address deficiencies in the system. We undertook to compare the performance of the models across a broad array of dimensions and to understand the underlying practice factors associated with superior performance. We report on the methodology grounding this work.

Methods: We conducted a cross sectional mixed method study of primary care practices in Ontario between 2004 and 2006 to describe and compare FFS, Family Health Networks (FHN), Community Health Centres (CHC) and Health Service Organizations (HSO). The study was guided by a conceptual framework of primary health care. Practice (137), provider (363) and patient (5,361) (pre & post visit) surveys were conducted, and 4,108 chart audits were performed in participating sites. Performance across a large number of primary care attributes was evaluated. Details of the eligibility, sampling and recruitment approaches are discussed. Nested case studies generated qualitative provider and patient data from 2 sites per model along with insights from key informants and policy makers familiar with all models.

Conclusions: This is the first comprehensive evaluation of primary care models in Ontario.

Key words: health policy; models of care; primary health care; organizational structure; family practice; fee-for-service plans; community health centers; health services;

Introduction

As growing evidence reveals the importance of quality primary care to the health of populations, there is increasing international interest in the efficient, effective and equitable delivery of primary care services. In response, many industrialized nations have initiated reforms in the delivery of primary care designed to optimize comprehensiveness, integration and accessibility. Over the past two decades, the province of Ontario, Canada has developed an array of diverse models of primary care delivery with little information on their comparative performance to guide further reform initiatives.

In 2002, the Government of Canada established the Primary Health Care Transition Fund, an $800 million commitment to help provinces and territories develop sustainable new approaches to primary health care delivery. In this paper we report on the methodology of a mixed-methods practice-based study sponsored from this fund; the Comparison of Models of Primary Care in Ontario (COMP-PC). The study compared four models of primary care delivery in Ontario, traditional fee-for service (FFS), a capitation-based system called a Health Service Organisation (HSO), a multidisciplinary Community Health Centre (CHC) model employing salaried physicians with a focus on community needs, and a relatively new model of physician run group practices--the Family Health Networks (FHN)--which incorporated extended hour coverage, financial support for information technology and a blended remuneration formula of capitation, performance bonuses and FFS. This large study used a complex methodology which could not be sufficiently described in associated articles. This paper, therefore, serves as an elaboration of the methods that will be reported in a succinct form elsewhere.

Methods

Objectives

The objectives of COMP-PC were to describe four organizational models; FFS, HSO, CHC and FHN, to measure and compare the quality of primary care delivered, and to better understand aspects of practice organization that influence the health care experience of patients and the quality of care they receive. The

process and outcome evaluation were guided by a conceptual framework (Figure 1).[1]

Design

The (COMP-PC) project was a cross-sectional mixed-methods study of primary care practices involving quantitative data collection, and a nested qualitative case study from a subset of two sites per model. The Ottawa Hospital Research Ethics Board approved the study.

Study population

The study involved primary care practices, their providers and patients. We also interviewed key informants and policy makers who had in-depth knowledge of each model.

Sample size

The study measured the performance of PC practices across numerous outcomes. Because we expected the measure of disease prevention performance to require the greatest number of measurements, it was used to estimate sample size.

Sample size was calculated using a minimum clinically important difference of 0.5 standard deviations, with an alpha value of 0.05 and a beta value of 0.20, and was chosen to control for the family-wise error rate and variance of the cluster (cluster correlation coefficient of 0.2).[2] The basic unit of random selection was the practice. The sample size recommendation was to include 40 practices per model and data from at least 30 patients per practice. Due to budgetary and time limitations, the number of practices was later reduced to 35. To compensate for the potential that surveys would not be completed, the number of surveys collected at each practice was allowed to exceed 30 (the target was 50).

For the nested case study, we selected eight practices from within the sites recruited for the cross-sectional study in order to allow for methodological and data triangulation. We stopped conducting interviews after reaching an acceptable level of data saturation for each model and for each category of respondent

(providers, patients and key informants).

Study participants

Practices

Eligibility

Eligible practices were required to have belonged to their respective model for at least 1 year before enrolment in the study. During the recruitment period, we observed that the majority of FFS practices had converted to FHGs. At the time of recruitment, the main difference between FHG and FFS models was that FHG practices had to register their patients and provide extended hours of service.[3] A decision was made to include FHG practices within the FFS group. For practical reasons, we excluded practices in the far north of the province.

Practices were required to provide broad based primary care, have at least one full-time-equivalent physician and obtain the consent to participate from at least half of their providers (defined as doctors and nurse practitioners). Group practices with more than one physical site (address) were each considered a discrete entity unless the sites shared at least four of the following five criteria: office space, staff, expenses, patient records and on-call duties.[4]

Sampling strategies and recruitment

For three models, we identified potential practices by updating an internal list of sites established for the purpose of another study conducted in 2004. There was no publicly available list of HSO practices. We compiled our own list of 69 HSO sites through a process of telephoning known HSO physicians and networking to identify others. For CHCs (53), FHNs (104), and HSO (69), the entire known population was sampled. For the FFS practices (1,885), we used a random-number generator to select and order a pool of 300 from which contact could be sequentially made to perform a preliminary evaluation of eligibility. Eventually, 197 practices were approached for participation.

For the nested case study, we used a typical case sampling strategy[5] to select the sites. Practice sites were invited to participate in this qualitative component if they typified the model to which they belonged in size and composition. Practices needed to be large enough to allow sufficient provider interviews to permit data saturation within that model. We recruited one urban and one rural practice from each model, with the exception of HSOs, for which two urban sites were selected, since these organizations are concentrated in urban areas.

Study invitation materials were mailed to eligible practices. Follow-up was done through a combination of mailings, telephone calls and face-to-face visits. Sites were offered $2,000 (Canadian) in recognition of the professional and administrative time required to participate in the study. An additional $500 was paid to those practices participating in the qualitative component. Recruitment lasted from June 2005 to June 2006. We recruited 137 practices, 35 FFS, FHN and CHC, and 32 HSOs from 155, 94, 51, and 65 eligible sites, respectively.

<u>Providers</u>

Eligibility

Doctors and nurse practitioners working at the practice were eligible for the study if: they had practiced at that site for at least one year (doctors) or six months (nurse practitioners); the participating practice was the principal site of their clinical practice; the majority of their services were devoted to primary care; and the majority of their patients were over the age of 17 years.

Sampling strategies and recruitment

All eligible providers were invited to participate at the time of practice recruitment; 363 providers participated. Practices electing to also participate in the qualitative component provided names of family physicians, nurse practitioners and nurses who were interested in interviews. For two sites with multiple providers, this process yielded only 2 providers. In these cases, snowball sampling was then used to recruit providers through the first contact.

<u>Patients</u>

Eligibility

Patients were eligible if they were: patients of consenting providers, 18 years of age or older, not severely ill or cognitively impaired, not known to the survey administrator (SA), and able to communicate in English or French either directly or through a translator. Patients participating in the qualitative component of the study were required to have been patients of the practice for at least one year and to have attended at least three appointments during that time.

Sampling strategies and recruitment

Following a prepared script and an invitation letter, receptionists introduced the study to all patients presenting for their appointment on the day of survey administration. Using another prepared script, the SA provided more detailed information about the study, verified the full set of eligibility criteria, and invited the patient to participate. The target number of patient participants in each practice was 50, but data collection was discontinued after one week of recruitment efforts if at least 30 surveys had been completed. A total of 5,361 patients were recruited. In practices participating in the qualitative component of the study, the SA invited patients who had completed surveys to take part in an in-depth interview at a later date, until six-to-eight agreed.

<u>Chart audit</u>

Eligibility

Chart abstraction was limited to the charts of regular patients of consenting care providers who were 17 years of age or older at the time of their last visit, and had at least two years of information, with at least one visit in the previous year. Patients were excluded if they had either died or had left the practice in the previous two years, had used the practice for specialized services only (e.g., foot care), were known to the chart abstractor (CA), or were staff members of the practice.

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Random selection

In practices with paper-based charting, the total length of the shelves containing the charts was divided into 60 "similar distance" sections, and the fifth chart from the start of each section was retrieved for evaluation. In practices with electronic medical records, a random-number generator produced a list of 100 practice patients. In each case the CA reviewed eligibility sequentially until 30 eligible charts were identified for review. In total, 4,108 eligible charts were captured.

Data Collection Tools

Quantitative Component

The quantitative data collection tools comprised three surveys and a chart abstraction form. The surveys were modified from the Primary Care Assessment Tool (PCAT) Adult edition, abridged. The PCAT is an instrument developed to measure the quality of primary care services. The full version of the PCAT was validated in 2001.[6] We selected this tool because of the high degree of congruency between the dimensions it addresses and those set out in our conceptual framework, and because the instrument allows the perceptions of patients and providers to be measured. To minimize the burden on providers in group practices, the subset of questions from the provider survey addressing practice factors common to all were removed and were incorporated in a practice survey. The content of the PCAT was mapped to the dimensions of the conceptual framework, and where deficiencies were noted, the tool was supplemented with questions from National Physician Surveys and other studies[4;7-9] or with questions developed by the investigators. Some dimensions were exclusively informed from the qualitative interviews. Copies of the surveys are available from the authors upon request.

Practice survey

The practice survey was divided into three sections. The first focused on the description of the practice

environment including the setting, hours of operation, availability of medical and social services in the surrounds, use of information technology, and accessibility for disabled persons. The second section contained questions that measured comprehensiveness, community orientation and cultural competency. The third section captured various practice attributes, including governance, team structure, extent of information technology adoption, and economic information (such as sources of income, salaries and operating costs).

Provider survey

The first section of the survey contained questions measuring the provider's perception of practice performance on several dimensions of health care service delivery: first-contact accessibility, availability, accommodation, equity, cultural sensitivity, family-centred care, coordination, collaboration, services offered, population orientation and provider satisfaction. The second section captured provider demographic information, work setting and socioeconomic information.

Patient survey

The patient survey was divided into two sections. The first section was completed in the waiting room before the visit with the provider. This section captured patient socio-demographic and economic information, and elicited patient's experience on a broad range of dimensions of health care service delivery, including first-contact accessibility, accommodation, patient–provider relationship, cultural sensitivity, respectfulness, family-centred care, trust, relational continuity, coordination, comprehensiveness, and population orientation. The second section, completed after the appointment with the provider, took less than five minutes to answer and captured visit-specific information, including waiting time, visit duration and measures of activities related to health promotion.

The survey was developed in English, translated in French through an extensive iterative translation process, and validated against the English version on a sample of 120 bilingual individuals.[9] We made the tool available in two languages only (French and English) and relied on the services of translators to reach patients

who spoke neither of these languages.

Chart audit

The chart audit forms captured four thematic areas: 1) patient demographic information, 2) visit activities (including referrals, prescriptions and orders), 3) chart organization and 4) measures of performance of technical quality of care, including prevention, chronic disease management and acute disease management. We evaluated performance of technical quality of care by comparing the care provided to established guidelines for the prevention, chronic disease management and acute disease management.

Qualitative Component

We used the conceptual framework to define the topics and questions to be covered during qualitative data collection. At the case study sites at least two physicians and at least one nurse practitioner (if available) were interviewed. The interview guide for providers contained questions about the influence of organizational characteristics (e.g., remuneration scheme), processes (e.g., teamwork, inter-professional collaboration) and clinical routines on service delivery. The interview guide for patients focused on their experience with the practice around the dimensions of accessibility, continuity, coordination and comprehensiveness of care. Finally, the interviews with key informants focused on qualitative comparisons of the four models studied in relation to broad issues such as governance, accountability and performance measurement in the primary care field.

Quality Control

All tools were piloted prior to study start. Data entry verification was performed for all four tools, and accuracy of the practice and provider surveys was supplemented with double data entry. Chart audit validation was performed twice during the study. At each verification, CAs were informed of their errors, and received additional focused training then and throughout the study. Data was exported into SPSS and verified for internal consistency, missing information, and outliers. Queried data was verified against the hard copy of the data collection tools. The validity of the qualitative findings were verified using naturalistic inquiries.[10] We also

engaged in member-checking procedures to establish the credibility of our findings. Finally, the use of data triangulation techniques increased the construct validity of our measures for the performance domain (for both the quantitative and qualitative components). Details of the quality control processes are available on line: .

Study processes

This study involved a wide range of personnel from various backgrounds over a 3 year period and required significant organizational preparation. Details of the study team composition and study processes are available on line: .

Stakeholder advisory committee

A stakeholder advisory committee comprised of two members from each model, Ministry of Health representatives, a community member and study team members met twice during the study. The committee's goals were to serve as conduits between their representative group and the study team, to ensure transparency of the study process, to guide the evaluation plan and interpretation of results, and to participate in outcome dissemination.

Discussion

The limitations of this mixed-method study stem largely from the inherent problems associated with cross-sectional and survey based studies. These include professional bias in the patient survey and participant selection bias. Other study specific factors are discussed below.

Sample selection

Sample selection was limited by our ability to identify practices within a model, the geographical boundaries we established for data collection, and the selection of settings in which patient recruitment was performed. There was no accessible central source of reliable practice lists within each model, except for CHCs. In addition, late in 2004, the ministry of health made a new model of care, the FHG, to which FFS practices

could transition. We initially excluded practices of that model, but FFS practices converted to this new model quickly, so that by early 2006 most FFS practices had become FHGs, and it became evident that the great majority would transition by the year end. As a result, 3 months before recruitment was terminated, a decision to include these FHGs into the FFS group was made. This potentially led to a bias for non-early adopters as a longer time was spent recruiting them.

The geographical boundaries set by the study resulted in the exclusion of the most northern territories. These areas serve a more marginalized population living under very different conditions and for whom the experience in primary care services is not reflected by the study sample. Our study's findings cannot be extrapolated to that group.

Finally, we chose to administer the patient survey to those patients visiting the practice on a given day. This face-to-face approach is expected to have enhanced our response rate (compared to what might be expected with a telephone or mailed questionnaire approach) but resulted in an over-representation of those more likely to frequent the practice. The sample, therefore, does not represent the general practice population nor did it reach the "housebound" patients. Rather it is weighted, perhaps appropriately so, by the frequency of visits.

Data

While the original PCAT tool had been validated[6], we relied on the abridged version of a validated scale which had not been validated. We made the tool available in two languages only (French and English) and used the services of translators to reach patients who spoke neither of these languages. While we felt it was essential to capture the essence of the experience of linguistic minorities, the use of an intermediary allows for biases or inconsistencies to be introduced during the translation.

Ideally, the selection of practices for the case study would have been informed by the results of the quantitative surveys concerning the quality of care indicators. This would have allowed us to select negative or

deviant cases within each model for in-depth analyses. However, because of time constraints, sites were invited to participate in both components (quantitative and qualitative) of the study at the onset.

Conclusions

This is the first pan-Ontario evaluation of models of primary care. The breadth of data collected will allow an in-depth description of the practices belonging to each model type.

An evaluation of the practice factors (organizational features and practice attributes) associated with better performing practices will help inform policy makers about optimal features in PC practices, and practice managers about how best to structure practices to serve their disadvantaged patients. This paper, will be useful to researchers interested in investigating issues related to quality of care and organizational performance in primary care.

Links

Quality Control Processes link

Surveys data entry validation

Shortly after initiating data collection, duplicate data entry for chart audits and patient surveys for eight sites (targeting all CAs and SAs) was performed by a research associate to estimate data entry error rates. Error rates were 1.3%, 1.4%, 4.4%, and 0.33% for patient, provider and practice surveys, and chart audits, respectively. A substantial proportion of the discrepancies observed in the survey data related to the assignment of "0" by the SA in numeric fields where no data had been recorded on the form. Detailed feedback and instructions were provided to all personnel involved in data entry. To ensure high quality data, at the end of the study, all provider and practice surveys were re-entered by another research associate (double data entry) and errors corrected.

Chart audit validation

A total of seven CAs performed chart abstractions at 137 practices. Since this process is rather complex and prone to human error, a review process was set up to ensure the quality and consistency of data extraction. The CAs were informed that validation would take place throughout the study and were required to maintain a list of the charts reviewed at the practice for that purpose. Validation involved duplication of the entire data extraction for eight charts. We defined "levels" of error and took action according to the extent to which these errors were observed. An error that led to the failure to recognize eligibility for more than one manoeuvre (e.g. age miscalculated, chronic disease not recognized) constituted a "super" error. A "major" error was defined as a missing visit record or incorrect attribution of eligibility that led to a single manoeuvre or sub-question being missed. All other coding errors were "minor" errors. The presence of at least one super error or two major errors was considered a significant problem and led to the validation of the remaining charts at that practice. Errors encountered were corrected on the data collection form. The CAs were informed of their errors, and this opportunity was used for further training. The CAs also received ongoing training and support throughout the chart abstraction process.

The first round of validation was performed very shortly after the start of the study and involved the first two sites completed by each of the seven CAs. At that time, major errors (at least two) were identified in the charts of two CAs. The second round of validations occurred during the winter of 2006. At that time, six CAs were active; again two sites were randomly selected for each CA and the same procedure was followed. No significant problems were encountered.

Qualitative Component

We used several procedures to ensure the validity of the qualitative findings. We adopted the criteria defined by Lincoln and Guba for naturalistic inquiries.[10] First, we offered a detailed description of each site and of each PHC model. Providing a *thick* description is one of the key conditions leading to the transferability of

qualitative results to other contexts.[11] Secondly, we asked external peer reviewers to critic and challenge our research design, analytical strategy and interpretation of findings in order to increase the level of dependability of our study. We also engaged in member-checking procedures to establish the credibility of our findings by sending our case study reports to members of the eight participating sites. The key informants were also asked to review a draft copy of the final report. Also, the use of data triangulation techniques increased the construct validity of our measures for the performance domain (for both the quantitative and qualitative components).

Study processes link

Two goals directed our study process: data quality and minimal practice disruption.

<u>Data quality</u>

Tool piloting

Drafts of the surveys were reviewed and piloted internally until general consensus was reached about tool readiness. External piloting of the surveys and chart audit took place between July and October 2005 and involved six practices in the Ottawa area: two FFS, two FHGs, one FHN and one CHC. The practices were recruited sequentially, allowing for adjustments to be made in response to the results from the previous site piloted. At each site one practice survey was completed, 30 patients were surveyed and 30 charts reviewed. In total 18 consenting physicians completed the provider survey.

The piloting process identified a number of issues that allowed us to refine the chart audit, to clarify some survey questions, and to streamline the process. Smaller numbers of concerns were raised at successive iterations of the tools until no new issues were identified. Two of the pilot sites (one CHC and one FHN) were also visited by the qualitative researchers to validate the provider and patient interview guides.

Personnel training

The SAs received a half-day of training centrally and were then paired with an experienced SA for two to three days of fieldwork at one practice. The CAs received two days of training centrally and then carried out

one day of fieldwork with an experienced CA. Each group was guided by a detailed instruction manual. Data collectors were also provided with a toll free line to the project team so that they could call if they had any questions, or to report problems encountered in the field. Instruction manuals were revised to reflect new information, periodically, and were re-disseminated to the data collectors.

Data collection processes

At the first visit to the practice, the CA met with the office manager (and, when possible, the participating providers) to review the content of the practice and provider surveys and to offer assistance in interpreting the questions. If a survey was not completed during the data collection period in the practice, it was left with the respondent together with a cover letter and a self-addressed, postage-paid return envelope. Non responders at two weeks were telephoned by a research assistant, which was followed, when required, by the mailing of a second (and, if necessary, third) copy of the survey package. The site received financial compensation only when all surveys had been returned and data collection completed. To enhance patient survey completion, the SAs were available to answer patient questions and ensured that patients leaving the office completed the post-visit survey. CA were required to familiarized themselves with the charting system of each practice and inquire about all potential sources of clinical information, including registries of influenza vaccinations and medication databases.

All patients and providers, participating in semi-structured interviews, had completed the survey first. Our early access to quantitative data allowed us to "customize" to some extent the interview guide for each respondent. The providers' interviews focused on interrelationships between the organizational structures and processes, the practice context and the various dimensions of quality of care. The interviews with patients explored their experience receiving health care, while those with key informants emphasized macro level issues such as governance and accountability. The average interview duration was 90 minutes.

Data Entry

We used a web-based clinical data management tool (TrialStat Corporation, Ottawa, Ontario, Canada) to store all quantitative data. The customized electronic data capture forms contained data entry validation rules (ranges, missing information, and internal consistency) so as to minimize data entry errors. The SAs and CAs entered the results of the surveys and chart audits, respectively, into the system from remote locations. Data validation (targeting all CAs and SAs was performed by a research associate. Variable fields, labels and data were then exported directly into SPSS (SPSS Inc., Chicago) for analysis. All qualitative interviews were transcribed verbatim using Microsoft Word data processing software and were then validated and imported into N6 (QSR International, Doncaster, Victoria, Australia) for analysis.

Minimum disruption to the practice

To minimize disruption to the practice and to ensure a seamless effort, the data collectors received relevant information for each site, including the type of facility, contact information, participating providers, and the best day and time to call. The CA and SA coordinated the logistics of their data collection efforts with each other before contacting the site. One team member was assigned as the point of contact with the practice and both members maintained contact throughout the data collection period. Survey administration and chart abstraction required an average of 31 and 20 hours per practice, respectively.

CAs were responsible for distributing the provider and practice surveys and performing the chart audit. SAs administered the patient surveys and, in certain sites, recruited patients for the qualitative component.

Figure 1 - Conceptual Framework for Primary Care Organizations

STRUCTURAL DOMAIN

1. Health Care System

2. Practice Context

3. Organization of the Practice

1.1 Governance & Accountability
  1.1.1 Quality Improvement Process
  1.1.2 Client/Community Participation
1.2 Resources & Technical Provisions
  1.2.1 Provider Remuneration
  1.2.2 Funding
  1.2.3 Information Systems
  1.2.4 Health Human Resources
2.1 Surrounding Medical & Social Services
2.2 Population & Community Characteristics

3.1 Health Human Resources
  3.1.1 Group Composition
  3.1.2 Training
3.2 Office Infrastructure
  3.2.1 Information Technology
  3.2.2 Medical Technology
  3.2.3 Office Space Design
3.3 Organizational Structure & Dynamics
  3.3.1 Job Descriptions & Team Functioning
  3.3.2 Management & Practice Governance
  3.3.3 Clinical Information Management
  3.3.4 Organizational Adaptiveness
  3.3.5 Organizational Culture
3.4 Practice Integration

PERFORMANCE DOMAIN

Health Care Service Delivery

1.1 Access
  1.1.1 First-Contact Accessibility
  1.1.2 Availability
  1.1.3 Accommodation
1.2 Patient-Provider Relationship
  1.2.1 Interpersonal Communication
  1.2.2 Respectfulness
  1.2.3 Trust
  1.2.4 Whole-Person Care
  1.2.5 Cultural Sensitivity
  1.2.6 Family-Centered Care
  1.2.7 Advocacy
1.3 Continuity
  1.3.1 Continuity - Relational
  1.3.2 Continuity - Information
1. Service Integration
  1.4.1 Coordination
  1.4.2 Collaboration
1.5 Comprehensiveness
  1.5.1 Services Offered
  1.5.2 Services Provided
  1.5.3 Population Orientation
1.6 Provider Satisfaction

Clinical Care

2.1 Care of Acute Illness
2.2 Care of Chronic Illness
2.3 Primary Prevention
2.4 Secondary Prevention