Grassroots Development of Patient's Medical Home Practices in Canada

A College of Family Physicians of Canada Commissioned Report

Prepared for:
Health Policy and Government Relations Unit, College of Family Physicians of Canada

Date: July 2024

McMaster University Department of Family Medicine
David Braley Health Sciences Centre
100 Main Street West, 6th floor
Hamilton, ON L8P 1H6
fammedmcmaster.ca

Authors

Lawrence Grierson, Aimun Q. Shah, Asiana Elma

Contributions

Michelle Howard, David Price, Jose Francois, Alan Katz, Hila Shnitzer, Laurie Yang, Augustine Okoh, Jenny Zhao, Joshua Choi

Acknowledgements

Rei Tanaka, Anastasia Gayowsky, Refik Saskin, Richard Perez, Lesley Plumtree, Carole Taylor, Kevin John Friesen, Charles Burchill, and CFPC's Patient's Medical Home Steering Committee.

Disclaimers

Stage two of this study was supported by ICES which is funded by an annual grant from the Ontario Ministry of Health (MOH) and the Ministry of Long-Term Care (MLTC). Parts of this material are based on data and information compiled and provided by CIHI, the MOH and MLTC. The analyses, conclusions, opinions, and statements expressed herein are solely those of the authors and do not reflect those of the funding or data sources. No endorsement by ICES, the MOH or the MLTC is intended or should be inferred. Parts of this material are based on data and information provided by Ontario Health (OH). The opinions, results, view, and conclusions reported in this paper are those of the authors and do not necessarily reflect those of OH. No endorsement by OH is intended or should be inferred. Note that the study also used data adapted from the Statistics Canada Postal CodeOM Conversion File, which is based on data licensed from Canada Post Corporation, and/or data adapted from the Ontario Ministry of Health Postal Code Conversion File, which contains data copied under license from ©Canada Post Corporation and Statistics Canada.

Funding

This project was supported by the College of Family Physicians of Canada and the Research, Analysis and Evaluation Branch of the Ontario Ministry of Health and Long-Term Care via their Applied Health Research Question program.

Corresponding Author

Lawrence Grierson, PhD
Department of Family Medicine, McMaster University
David Braley Health Sciences Centre
100 Main St. W., Hamilton, Ontario L8P 1H6
griersle@mcmaster.ca
(905)-525-9140 x x22738

Citation

Grierson, L., Shah, A.Q., Elma, A. (2024). Grassroots development of Patient's Medical Home practices in Canada: A College of Family Physicians of Canada Commissioned Report. Available from: [insert URL].

Acronyms

ACR	Urine Albumin to Creatinine Ratio
ANOVA	Analysis of Variance
CFPC	College of Family Physicians of Canada
CHC	Community Health Center
CHF	Chronic Heart Failure
CIHI	Canadian Institute for Health Information
COPD	Chronic Obstructive Pulmonary Disease
CPDB	Corporate Provider Database
CR	Colonoscopy
CTAS	Canadian Triage and Acuity Scale
DM	Diabetes Mellitus
EMR	Electronic Medical Record
ER	Emergency Room
FFS	Fee-for-Service
FHG	Family Health Group
FHO	Family Health Organization
FHT	Family Health Team
FIT	Fecal Immunochemical Test
FOBT	Fecal Occult Blood Test
FPMH	Formal Patient's Medical Home
FTE	Full Time Equivalent
HbA1C	Glycated Haemoglobin
GP	General Practitioner
HSD	Honestly Significant Difference
ICES	Institute for Clinical Evaluative Sciences
LPN	Licensed Practical Nurse
MAM	Mammogram
MCHP	Manitoba Centre for Health Policy
MOHLTC	Ontario Ministry of Health and Long-Term Care
NP	Nurse Practitioner
PA	Physician Assistant
PAP	Papanicolaou (Pap) Test
PCCF	Postal Code Conversion File
PCPOP	Primary Care Population
PHRPC	Provincial Health Research Privacy Committee
PHU	Public Health Unit
PMH	Patient's Medical Home
ODD	Ontario Diabetes Dataset

OHIP	Ontario Health Insurance Plan Claims
OT	Occupational Therapist
PT	Physiotherapist
QI	Quality Improvement
RHA	Regional Health Authority
RN	Registered Nurse
RPN	Registered Practical Nurse
SD	Standard Deviation
SITB	Self-Initiated Team Based
UTI	Urinary Tract Infection
VCM	Virtually-Constructed Matched

Table of Contents

Executive Summary

Objectives: The increasing complexity of primary care in Canada is driving family medicine practices towards interprofessional team-based models of care as avowed in the Patient's Medical Home vision. This report describes a two-stage study that aims to develop a nuanced understanding of the processes, mechanisms, and structures that support practices in developing of family physician-led interdisciplinary primary care healthcare teams, and to measure the impact of these developments on access and delivery of comprehensive family medicine.

Methods: This is a two-stage study. Stage 1 is a qualitative research strand, which employed a multiple descriptive case study methodology involving 17 unique team-based practices across Canada. Each of these practices self-initiated a successful transition to team-based care. Relevant data were collected via interviews with medical and clinical practice leaders in each case. Analysis followed an established approach of qualitative description. Stage 2 is a quantitative research strand, which involved a retrospective matched-cohort design that evaluated the impact of self-initiated team-based practice developments on access and delivery of primary care services. Health administrative data pertaining to 6 practices in Ontario and 8 practices in Manitoba were accessed via the ICES and the Manitoba Centre for Health Policy (MCHP), respectively, and used to assess the impact of this arrangement relative to formal PMH practices and comprehensive family medicine care not situated in interprofessional healthcare teams. Relevant analyses considered the number of rostered patients, continuity of care metrics, access to preventative care services, and the number of physician visits across the practice and within subgroups of elderly patients and those with chronic conditions.

Results: The mix of healthcare professionals that constitute the resulting interprofessional teams reflect the health needs of the relevant community of patients. All cases studied needed to secure funding, physical space, electronic medical record technology, a champion for change, and stakeholder support to realize their vision. Each transformation required the case to come to a deep understanding of local needs, to foster stakeholder engagement, and to engage in continuous quality improvement. The team-based model was perceived to increase access to care and utilisation of services, better care coordination, and improved patient and provider satisfaction. In Stage 2, the practices that were situated in team-based models scored more favourably on our metrics of interest pertaining to access and comprehensiveness of primary care, compared to physicians that did not operate in interprofessional teams. Of interest, for several variables, the practices that had self-initiated interprofessional team development scored higher than formal PMH models.

Recommendations: The report concludes with recommendations for governments, health authorities, family practices, and medical educators. Governments are encouraged to create opportunities for practices to seek funding and resources that meet community needs and simplify the administrative processes for practice leaders to seek support. Family practices are encouraged to contemplate their unique vision for interprofessional care and to identify local champions who can promote effective change. Medical educators are encouraged to centre interprofessional practice and health system leadership as core features of family medicine curricula at the undergraduate and postgraduate levels.

Introduction

Background and Context

Primary care is essential for a high functioning healthcare system (Starfield et al., 2005). However, many in Canada experience challenges accessing comprehensive continuous primary care (CIHI, 2019), with millions of residents reporting they either do not have a family physician (Ontario College of Family Physicians, 2022; BC College of Family Physicians, 2022) or cannot access one on a timely manner (Hendry, 2022; CBC News, 2022).

This crisis of access to family medicine is expected to grow. Citing the difficulties of building and managing a profitable practice (CFPC 2022a), and the financial and administrative burden of completing medical forms (O'Toole et al., 2022), coordinating care across multiple health sectors and providers, updating medical records, or managing increasingly complex care plans and patients, many family physicians are reporting intolerable rates of burnout and exhaustion (CFPC, 2022a; CFPC, 2022b; Payne, 2022). Accordingly, a growing number of family physicians are closing their practices (CMA, 2022) and entering retirement (CFPC, 2022a), an exodus that is exacerbated as the discipline becomes more and more unattractive to medical students and resident learners. Indeed, a significant portion of family medicine training positions are being left vacant (McKeen, 2022; Frketich, 2022) and more graduates are choosing not to join comprehensive family medicine practices (CMA, 2022). In response, numerous stakeholders, system leaders, and scholars have called for federal and provincial leadership and policy that re-imagines and improves family medicine practice in Canada.

Amongst these calls is loud advocacy for greater investments in interdisciplinary, team-based practice. This approach to practice is central to the CFPC's Patient's Medical Home (PMH) vision (CFPC, 2019a), which encompasses a set of policy recommendations spanning the implementation of remuneration structures that better incentivize continuity-based and community-adaptive family medicine (Mitra et al., 2021; Bazemore et al., 2018; Canadian Health Services Research Foundation, 2010; CFPC 2020) and increased development of interdisciplinary healthcare teams that support family physicians in caring for more patients across a fuller practice scope (Manns et al., 2012; Khan et al., 2008; Khan et al., 2021; Kiran et al., 2022; McKay et al., 2022; Strumpf et al., 2017). To date, the PMH recommendations have, to a degree, been actualized across the country, with several provinces enacting unique healthcare policies that contemplate support for PMH practice models. However, despite the government investment in PMH initiatives, the widespread adoption and uptake of the PMH model has been elusive and remains incomplete in Canada (CFPC, 2019b; Wong et al., 2021; Katz et al., 2017).

Notably, the international health systems research literature highlights PMH developments in the United States, Australia, and United Kingdom that were initiated and realized with minimal external involvement or government support (Metusela et al., 2023; Nutting et al., 2010; Pourat et

al., 2023). Through recent research concerned with the congruence between clinical training sites and family practices in Canada (Elma et al., 2023), we also identified a small proportion of family medicine teaching practices across the country that had - in a seemingly self-initiated manner - developed a family physician-led interdisciplinary team-based approach to primary care service delivery (Elma et al., 2023). Collectively, this evidence is encouraging as it suggests that practices can independently achieve team-based care functionality.

A better understanding of how such practices identified the need for change and navigated change management, as well as the impacts that these changes had on service delivery, will be beneficial in inspiring and supporting practices that wish to pursue similar development efforts. Accordingly, this research aimed to better understand the conditions and contexts that afford the self-initiated development of family medicine practices that embody key PMH principles in Canada, and the outcomes of those efforts. While the PMH vision describes a broad set of practice characteristics, in this work, we are particularly interested in the development of continuity-based, family physician-led practices that have transitioned to provide interdisciplinary team-based care to patients. It is our hope that our findings will contribute to collective pursuit of a relevant, accessible, cost effective, and high-quality healthcare system across Canada.

Objectives

This is a two-stage study that aims to understand the processes, mechanisms, structures, and practice features that family medicine practices in Canada have leveraged to achieve development or transformation towards an interdisciplinary team.

The objectives of this study are:

1. To develop a nuanced understanding of the processes, mechanisms, structures, and practice features that support the self-initiated development of family physician-led interdisciplinary primary care healthcare teams (Stage 1).

2. To measure the impact of these development or transformation of PMH-practice on access and delivery of comprehensive family medicine (Stage 2).

Methods

Stages of Research

This is a two-stage study.

Stage 1 is a qualitative research strand. This stage employed a multiple descriptive case study methodology, which included interviews with relevant medical and clinical practice leaders across Canada to understand the mechanisms and processes that enable practice-initiated development or transformation towards an interprofessional, team-based practice.

Stage 2 is a quantitative research strand. This stage involved a retrospective matched-cohort design to evaluate the impact of the practice-initiated development towards team-based care on metrics associated with access and delivery of primary care services. Specifically, health administrative data were used to assess the impact of this self-initiated transformation on the number of rostered patients per physician, the number of annual family physician visits across the practice and within subgroups of elderly patients and those with chronic conditions, continuity of care, and the proportion of patients with access to preventative care services. The quantitative strand made use of health administrative data obtained from ICES (formerly known as the Institute for Clinical Evaluative Sciences) in Ontario and the Manitoba Centre for Health Policy (MCHP) in Manitoba. Outcomes associated with clinics of interest in each respective province were analyzed and compared to formal PMH and non-interprofessional team-based models. Note that while we sought to achieve similar analyses across both provinces, there were limitations in the data and codes available at each data centre. This resulted in some meaningful differences in cohort generation and analysis.

Ethics

The study received ethics approval for Stages 1 and 2 from the Hamilton Integration Research Ethics Board (Project 15892 and Project 16635). To access data at MCHP in stage 2, we received additional approvals from the ethics committee at the University of Manitoba (Project HS26153) and the Manitoba Provincial Health Research Privacy Committee (PHRPC) (Project P2023-96). Stage 2 analyses conducted at the ICES Central site were also subject to internal privacy assessment and a data sharing agreement was established to import location information of included study sites. The full protocol underwent a full review and received feasibility approval at ICES and MCHP.

Stage 1

Theoretical Foundations

This investigation was guided by the Theory of Social Innovation, which offers a conceptual framework for considering how social phenomena give way to new processes that re-define the routines, authority, and flow of resources within a social system (McGowan & Westley 2015; Westley, McGowan, & Tjörnbo, 2013; Westley, Zimmerman, & Patton, 2006). In this work, the mounting constraints on access and delivery of comprehensive family medicine in Canada is understood as the social phenomenon. The theory describes that innovation occurs because the phenomenon provides a view of the adjacent possibilities that exist one degree removed from the current reality (Kaufmann, 2000) and is successful because it leads to a shift that has sustainable and transformative impacts (Westley et al., 2011). This theory draws our attention to the scale and durability of the practice developments occurring in response to the social phenomenon. Furthermore, it also forefronts considerations for the way development is driven by the overlapping and complimentary efforts of actors at both the niche and landscape levels, As such, our approach to data collection focused influences emanating from both local and national sources.

Study Design

Through a pragmatic constructivist approach, we employed an instrumental, multiple case study methodology to investigate the processes family medicine practices engage when developing or transitioning towards an interdisciplinary team-based practice. The instrumental case study methodology allows researchers to gain insight into a particular situation or phenomenon within its real-life or contemporary setting (Yin, 2014). This methodology also affords understanding of the specific contextual factors and processes within the system that explain the "how" and the "why" of actions or events occur. In this regard, considering the complexity of practice organization and transformation that involves various interrelated factors such as team dynamics, leadership, and communication (Janamian et al., 2014), this methodology helps us understand these complexities holistically as well as the influence they may have on the mechanisms and processes. Multiple cases afford comparison that fosters greater understanding of the differences and similarities within and across the practices (Guftasfsson, 2017; Yin, 2014).

Case Definition and Boundaries

A case was defined and bounded as a continuity-based family practice that developed or transformed so as to deliver family physician-led primary healthcare services to a defined group of patients via an interdisciplinary team-based approach. Cases could include practices that developed an in-house interdisciplinary healthcare team or that reflected loosely organized groups of family physicians who created an interdisciplinary team-based approach via coordinated relationships with allied health support situated outside of the practice. In the latter cases, the group of physicians and external support were bounded as a single case. This approach acknowledged the various pathways in which interdisciplinary team-based support can be realized within a practice. Practices were eligible for inclusion if they self-initiated the transition process. Notably,

all cases studied realized some government or health authority involvement throughout the transition or development process.

Case Selection

The research team engaged with the literature and key contacts from the CFPC's *Patient's Medical Home Steering Committee* (which is presently defunct) to identify the features, processes, and mechanisms that were most relevant to the development or transformation process. These features and mechanisms included size of practice, number of providers, staffing arrangements, financial underpinnings and funding corridors, the distributed nature of sites, relationships with academic centres, the potential use of an external facilitation service, and whether the development was framework driven and/or informed by other practice developments. Once these features were identified, we relied on our professional networks and the CFPC to identify family practices across Canada that were appropriate for this inquiry. On occasion, we also spoke to regional or provincial representatives, who were identified through health authority or ministry websites. These individuals provided insight into the regional and provincial context of developing interdisciplinary team-based family medicine practices and were also able to identify potentially relevant family practices *vis-à-vis* our research objectives.

Recruitment

After each case was identified, we invited potential participants from each practice to participate in a semi-structured interview. Eligible participants were family physicians, practice leaders, and/or administrators who were actively involved in the development or transformation process. These individuals were ideally situated to provide detailed information regarding the nature and characteristics of the practice size, staffing, patient populations served, and scope of services delivered and were involved in the evolution and history of the practice change. The invitations were distributed through email either directly by the research team or the CFPC on behalf of the research team. Additionally, we used snowball sampling by requesting participating individuals to identify other practices that engaged in similar developments. The study advertisements instructed participants to contact the research team for eligibility screening, provide demographic details through a survey (Appendix A), and complete the consent form. This allowed the team to verify prospective participants' involvement in the practice transformation and accordingly proceed with scheduling interviews.

Data Collection

Data were collected from various sources including case-specific reports or documents, surveys, and, primarily, participant interviews. Semi-structured interviews were conducted by videoconferencing software or phone, based on participant's preference, from June 2023 to October 2023. Following the interview, one participant from each case was requested to complete a practice questionnaire (Appendix B) that collected characteristics associated with the case including geography, patients served, and team composition. Five members of the research team,

all of whom had no prior existing relationships with the participants, conducted the interviews. Following the completion of an interview, the interviewer generated a memo, highlighting key insights and ideas from the discussion. The research team used the memos in support of bi-weekly analytical conversations that advanced the results framing. This reflexive process often prompted new ideas that were explored in subsequent interviews.

Interview Guide Development

The interview guide was informed by a literature review and was iteratively developed in consultation with the research team that brought in diverse perspectives from research, family practice organization, and primary healthcare system leadership (Appendix C). The initial interview guide was piloted with a health system leader and the pilot interview was recorded. Based on responses and feedback elicited, the interview guide was revised. The guide begins with asking questions about the practice and its features or characteristics, and then elicits responses regarding the journey of developing or transforming the practice, with probes inquiring about the specific changes implemented, the actors and agents involved, processes related to funding and resource acquisition, training and onboarding, and general change management. The guide also prompts participants to explain the broader social phenomena that motivated the need for change, and how it impacted various groups within the practice (e.g., patients, staff). Finally, the interview guide closes by prompting reflections on lessons learned and recommendations for other practices embarking on similar journey.

Data Analysis

Using an unconstrained deductive approach (Elo & Kyngas, 2008) to qualitative description (Sandelowski, 2010), we began by generating comprehensive descriptions of the cases, including the geographic setting of the practice, team composition, number of rostered patients, remuneration structures, clinical scope, and the level of government involvement in the development or transformation to an inter-professional care team. Next, we described the key patterns associated with practice development or transformation. In doing so, the research team remained attuned to the principles of the Theory of Social Innovation, focusing on the phenomenon driving change, the actors and agents involved, the durability of the development, and the transformative impact. Simultaneously, we sought and described the specific steps and actions taken within a case to develop or transform the practice. Our analysis began within the individual cases and progressed to identifying cross-cutting patterns and themes across all the cases, enabling a deeper exploration and categorization of the transcendental features of relevance. Two research team members (LG, AE) led coding, independently appraising four transcripts to form an initial analytic framework. This framework was then operationalized by six members of the research team on a randomly assigned sample of interview transcripts. To ensure rigour and consistency, each transcript was double coded using the framework. The team held bi-weekly one-hour meetings to compare results, discuss themes and ideas, and address discrepancies in interpretation. The coding

framework was regularly updated and refined following these meetings. The final step involved developing a coherent narrative that effectively addressed the research question.

Stage 2

Study Design

This was a retrospective matched-cohort design using linked population-level health administrative data. This data associated with self-initiated interprofessional team-based primary care practice sites (SITB) in the provinces of Ontario and Manitoba, Canada, were compared with formal-PMH practice (FPMH) cohorts and virtually-constructed matched (VCM) cohorts in each province to assess the impact of grassroots transformation towards team-based family practice on outcomes associated with primary care access. The data were not aggregated across the two provinces due to a lack of interoperability between the foundational datasets in each province.

Cohort Description

SITB sites were family physician-led primary care practices in Ontario and Manitoba that developed or transitioned to an interdisciplinary team-based approach in a self-initiated manner. These sites were identified by the study team during Stage 1. FPMH sites were exemplified as Family Health Teams (FHT) in Ontario and MyHealth Teams (MyHT) in Manitoba. These FPMH sites operated under a development model that was heavily government-mediated, representing a different mechanism for interprofessional team development compared to the self-initiated group. In both provinces, the VCM cohort consisted of a physician sample that was not attached to a group practice, enabling evaluation of the impact of team-based versus non-team-based practices on access and health outcomes. Comparison of these three constructs within province afforded a measure of assessment of how self-initiated team-based efforts influenced patient access and health outcomes compared to government-supported models and non-team-based practices.

Data Sources

Health administrative data were provided and managed by ICES in Ontario and the MCHP in Manitoba.

In Ontario, health administrative data were extracted using the following databases and datasets: Corporate Provider Database (CPDB), GAPP Decision Support Systems (Physician Payments), Postal Code Conversion File (PCCF), Primary Care Population (PCPOP), Ontario Health Insurance Plan Claims Database (OHIP), Ontario Diabetes Dataset (ODD), Ontario Chronic Obstructive Pulmonary Disease (COPD) Dataset, and Ontario Congestive Heart Failure (CHF) Dataset.

In Manitoba, administrative and billing data were extracted using the following databases: Manitoba Public Health Information Management System, Manitoba Health Insurance Registry

Data, Medical Claims/Medical Services, Shared Health/Diagnostic Services, Provider Registry (Physician Master File), Hospital Abstracts, and Electronic User Site Location.

Descriptions and rationale for leveraging these databases are provided in Appendix D and Appendix E.

In both provinces, the data procured for analysis were extracted from a 6-year window ranging from April 2016 to April 2021, which accommodates the post-transformation period for all relevant practices. Notably, data from five years prior (2010 to 2015) were required to identify patients with the variable-relevant chronic conditions within the repositories at MCHP. These data were used simply as markers to identify included patients in the window of interest (2016-2021) and were not submitted for analyses.

Cohort Construction - Ontario

In Ontario, the Health Region Peer Group (HRPG) classification system (Statistics Canada, 2018) was used to generate cohorts for comparison with similar socio-economic profiles. HRPGs are determined using 23 variables that include basic demographics, living conditions, and working conditions, derived from 2018 health region delineations and 2016 population census data (Statistics Canada, 2018). To categorize SITB clinics of interest by a HRPG, postal code data were converted using Statistics Canada's Postal Code Conversion File Plus (PCCF+) (Statistics Canada 2019). Then, in the ICES dataset, all FHTs located within these identified HRPG categorizations were included as part of the FPMH group. The VCM cohort constituted physicians operating outside of a team-based or physician enrollment model (PEM) that were sourced from Public Health Units (PHUs) associated with the HRPGs of the clinics of interest. This approach ensured that the cohorts were composed of comparable patient socioeconomic and demographic characteristics.

Patients assigned to physicians in the SITB and FPMH cohorts comprised formally rostered and virtually rostered patients. Formally rostered patients are those who were officially registered with a physician or the practice through a formal enrollment process. Virtually rostered patients were defined as those attributed to the physician based on billing data. Specifically, a patient in the PCPOP database is considered "virtually rostered" to the physician who billed the highest dollar amount for primary care services for that patient over a two-year period. In the VCM cohort, all patients were considered as virtually-rostered since they were attached to physicians practicing outside of team-based models that formally enrolled patients.

To ensure that we captured physicians that were practicing comprehensive family medicine across all cohorts, we excluded physicians who had fewer than 500 billings associated with matched patients in the last fiscal year prior to indexing of the records. In this context, practice of comprehensive family medicine was inferred based on volume of billings, with the threshold set

to exclude physicians with minimal billing activity. This threshold was established by identifying the first percentile point in a distribution curve of the total number of billings per patient, service date, and billing code for each physician in the PCPOP database. This percentile point, calculated to be 497, was rounded up to 500 to set the threshold.

Cohort Construction – Manitoba

In Manitoba, the clinics of interest that had self-initiated a transformation towards team-based care were identified using the EUSLCD (site code) variable from the Medical Claims/Medical Services Database in the MCHP Data Repository. This code allowed for identification and grouping of physicians who worked together at these sites of interest. Patients were assigned to the clinics and included if they had at least three ambulatory visits in the time period of analysis, and the majority of their visits were at that clinic.

The FPMH cohort was created by identifying and selecting MyHealth Teams operating in the province that were matched to our SITB sites based on age, sex, and geographic location. In the VCM comparison cohort, patients that were not attached to our sites of interest or to MyHealth teams were similarly identified based on their match in age, sex, and geographic location to our SITB cohort. Physicians in both FPMH and VCM cohorts that provided care to these matched patients were included in the analysis based on the total number of providers in each site-specific clinic. Note that these cohorts were not composed of individual clinics, but rather, groups of clinics and providers.

Outcome Variables

The following practice-level variables were examined to assess the impact of the transformation to team-based care in Ontario and Manitoba:

1. **Total number of physicians**: The total number of unique family physicians who practiced at the site over the time window.
2. **Total number of attached patients**: In Ontario, we considered this as the average total number of virtually rostered and formally rostered patients per family physician over the time window. In Manitoba, this was the average total number of patients per physician that had at least three ambulatory care visits within the time period of analysis, with the majority of visits being at the sites of interest.
3. **Total number of annual patient visits**: The average total number of annual patient visits (for any primary care service) per family physician across the time window.
4. **Total number of annual patient visits by unique patient**: The average total number of annual patient visits by unique patients per family physician across the time window.

5. **Total number of annual patient visits by a sub-group of the elderly**: The average total number of annual visits by a sub-group of older adults (65 years or older) per family physician across the time window.
6. **Percentage of patients diagnosed with chronic conditions (Ontario only)**: The percentage of all patients diagnosed with a chronic condition (of DM, COPD, and CHF), calculated as follows:
    a. The average percentage of all patients diagnosed with DM, COPD, and CHF across the time window.
    b. The average percentage of patients diagnosed with one comorbidity from DM, COPD, and CHF across the time window.
    c. The average percentage of patients diagnosed with two comorbidities of DM, COPD, and CHF across the time window.
    d. The percentage of patients diagnosed with all three of DM, COPD, and CHF across the time window.
7. **Total number of annual patient visits by a sub-group of individuals with at least one chronic condition**: The average total number of annual visits by a sub-group of patients with at least one chronic condition of Diabetes Mellitus (DM), COPD, and CHF, per physician across the time window. In Ontario, this included all virtually rostered and rostered patients identified as part of the established ICES disease-cohorts. In Manitoba, patients with chronic conditions at least one year of data in the analysis window were included.
8. **Proportion of patients receiving continuity of care**: In Ontario, this was calculated as the average proportion of annual family physician visits by rostered patients (which includes virtual and formally rostered patients) with the same provider at the practice across the time period. In Manitoba, this assessment included both the average proportion of annual family physician visits by rostered patients with the same provider at the practice, and the proportion of visits with the same site, over the time period. Patients were excluded if they were not rostered or had less than three physician visits in that year, which aligns with established conceptualizations of continuity of care using MCHP data (Katz et al., 2014).
9. **Proportion of patients receiving preventative care services**: The average annual percentage of patients receiving preventative care services across the time period. This was calculated out of the total number of patients that were eligible for a particular service (e.g., proportion of patients that were eligible to receive a mammogram in the province that received one). In Ontario, the following preventive care services were included: any colonoscopy screening (10 years), colonoscopy (10 years), fecal occult blood test (FOBT) and fecal immunochemical test (FIT) (2 years), eye exam for DM (2 years), 2 or more glycated haemoglobin (HbA1C) tests for DM (1 year), 1 or more lipid tests for DM (1year), mammogram (2 years), and Papanicolaou (Pap) test (2 years). In Manitoba, the following preventative care services were considered: flu vaccination for older adults (≥65 years) (1 year), urine albumin to creatinine ratio (ACR) test for DM (1 year), and eye exam for DM (1 year). For the two diabetes-specific

preventions, patients with less than three years of health data were excluded. This in line with the MCHP definition of diabetes which uses a data window of up to three years.

Data Analysis

Health administrative data across all primary care settings were linked using unique encoded identifers and analyzed securely at ICES and MCHP. We generated descriptive and inferential statistics to describe the characteristics of the cohorts, compare health outcomes and evaluate the impact of these models on care access. In both Ontario and Manitoba, site level data were aggregated by group (SITB, FPMH, VCM) and averaged across the time window for comparison, such that no practice-specific data were reported.

Cohort analyses involved generating descriptive statistics for all outcome variables for all three practice groups. These data are presented for each cohort as means and standard deviations.

Additionally, in each province, the outcome variables reflecting metrics spanning the analysis time was subjected to a one-way ANOVA with aggregated practice group as the only factor. Alpha was set at $p < .05$ for all analyses.

Appendix F provides an overview of the analytic plan for each outcome variable. Appendix G presents a raw data table layout for ICES and MCHP research data management.

Results

Stage 1: Qualitative Arm

Case Characteristics

We studied 17 cases situated across eight provinces and one territory. Three cases were community-based practices, twelve were teaching sites, and we did not receive sufficient information to classify the remaining two sites. With respect to remuneration, five were salary-based, one was capitation-based, two involved service contracts, four used blended structures, and three were fee-for-service, with information for two practices not available. Note that although the study considered fee-for-service practices, this is not a presumed remuneration method under the PMH model. Six cases were in a rural area; 11 were in an urban area (Table 1). Case descriptions are available in Appendix H.

Table 1. Aggregated Locations, Operations, and Clinical Attributes of Cases

Case Characteristics	Number of Cases (%)
Province	
Alberta	2 (11.8%)
British Columbia	2 (11.8%)
Manitoba	4 (23.5%)
New Brunswick	1 (5.9%)
Newfoundland & Labrador	0 (0%)
Nova Scotia	1 (5.9%)
Northwest Territories	1 (5.9%)

Nunavut	0 (0%)
Ontario	4 (23.5%)
Prince Edward Island	0 (0%)
Quebec	0 (0%)
Saskatchewan	2 (11.8%)
Yukon	0 (0%)
Type of Site	
Teaching	11 (64.8%)
Community	4 (23.5%)
Unknown	2 (11.7%)
Distance to Nearest Hospital	
In the same building	2 (11.7%)
< 5 km	8 (47.2%)
5 to 10 km	3 (17.6%)
> 20 km	2 (11.7%)
Unknown	2 (11.7%)
Geographic Disposition	
Rural	6 (35.2%)
Urban	11(64.8%)
Patient Rostering	
Yes	12 (80.0%)
Average Number of Patients	
< 500	1
500-1000	5
1000-1500	5
> 1500	1
No	2 (11.7%)
Unknown	3 (17.6%)
Remuneration	
Fee for Service	3 (17.6%)
Salary	5 (29.4%)
Capitation	1 (6.9%)
Service Contract	2 (11.7%)
Blended	4 (23.5%)
Unknown	2 (11.7%)
After-hours Clinic	
Yes	10 (58.8%)
No	5 (29.4%)
Unknown	2 (11.8%)

Participant Characteristics

We interviewed 21 people (10 women; 11 men (self-identified)). The interviews lasted between 40 and 110 minutes. The participants held a wide range of clinical, academic, and administrative leadership roles in their practices and/or across the healthcare system. Clinical roles included medical lead, physician associate, and group member. Administrative and leadership roles included managerial positions (e.g., physician owner, clinical managers, medical or executive medical directors) and senior leadership positions (e.g., vice president or chief medical officers). Several participants performed a combination of clinical, executive, and teaching roles (e.g., preceptors) (Table 2).

Table 2. Participant Demographic Characteristics (n=21)

Participant Characteristics	**n**
Mean Age in years (SD)	48.75 (8.85)
Gender	

	Women	10
	Men	11
Role		
	Clinical Leadership[1]	7
	Practice Manager	1
	Physician Member or Associate	6
	Executive Leadership[2]	7

[1] *Included Medical Lead, Clinical Director, Chief Medical Officer, Physician Owner*

[2] *Included Senior Director, Co-Director, Vice President, Vice Chair, President*

The Need for Change

Our participants described that their impetus for transforming to team-based care stemmed from a realization that the *status quo* was no longer sustainable to serve the community. Increasing patient complexity, high morbidity, and underserved needs were important drivers across all cases. The way that they had been delivering primary care was inefficient, did not meet patient needs, and did not provide effective access. Participants described witnessing an increase in practice closures, physician retirement, and longer wait-times for patients to see a family physician within their communities. This was perceived to hinder patient access to essential primary care services. Furthermore, the current state of practice structures was perceived to be unsustainable for family practice.

> "*It was about trying to bring awareness to a problem with primary care in [City], and it was because we had four family practices, and one had just closed and there was quite an outcry about leaving so many people without a family doctor*." (Participant 3)

Our physician participants perceived team-based collaborative care to be an antidote to the current primary care crisis. Specifically, transitioning or developing interdisciplinary, collaborative models of care was described to better accommodate the diverse and complex medical needs of patients, while also ensuring provider wellness, alleviating burnout and promoting work-life balance.

Government Support

Our recruitment approach focused our inquiry on practices that self-determined the need for change. As such, in none of the cases studied, did a relevant provincial, territorial, regional and/or local healthcare authority come forth, mandate, or initiate the change on behalf of the practice. Yet, a degree of government support was realized in all instances.

Most participants described relatively low levels of government support. In these cases, the practice recognized a need for change, initiated that change without government involvement, and accessed government resources later; either via lobby or application to a subsequently-established funding support program. However, in a small number of cases, the participant described

recognizing a prominent government initiative (for e.g., a pilot program), which served as a major prompt to initiate change. Participants who leveraged these opportunities described a higher degree of government involvement in their transformation:

> "*It started as a shared care pilot. So back in [province] there were six shared pilots, and what really started to get me into a team was the fact that the government had given some funds for us to add allied health professionals to a practice of three physicians. So, we started with three physicians, and we added a nurse, and we added a social worker and we added additional administration time. So, I was able to ease into the concept of a family health team….*" (Participant 19)

The change process varied considerably across all cases, and our analysis was not able to define a specific moment when government involvement was generally sought or needed. Notably, participants described that the degree of government support could create tension with their sense of practice autonomy. For the most part, practice leader participants from the cases with greater government involvement told us that they maintained control and influence over the implementation and transformation processes; however, there were instances where they also described a need to organize around performance measures set by the government:

> "*[W]e are accountable to them because we have measures. Like for first – for primary care access and stuff. So, they will come back and say you're not meeting your targets, we need to do something about that.*" (Participant 21)

This tension was also present in participant concerns about how practice autonomy would be sustained in the future:

> "*I think there was some fear of losing autonomy, fear of, you know, is this going to be just another pilot and it's going to go away? Am I going to have to do more work than I was before? Or all of a sudden, while there's a new organization, are they going to start to tell me what to do and how to operate my practice?*" (Participant 14)

Team Composition and Organization

The team compositions across the 17 family practices were all unique, reflecting a mix of smaller physician teams with one to four family physicians, larger teams ranging from 5-10 physicians, and teams surpassing 15 family physicians that often incorporated part-time and associate physicians. Almost all care teams included nurses (NPs, RNs, RPN/LPNs, and community health nurses). Most practices also included pharmacists as part of collaborative care, and over half of the cases provided mental health support in the form of mental health counsellors, psychologists, and behavioural health consultants. Other common roles included dieticians, social workers,

physiotherapists, and physician/clinical assistants. Several cases also utilized diabetes-focused providers, including diabetic nurses, chronic disease nurses, and diabetes educator dieticians. Less common providers included: respiratory therapists, phlebotomists, holistic wellness advisors (conceptualized as responsible for the roles of both a social worker and counsellor), audiologists, kinesiologists, midwifes, lactation consultants, and patient care coordinators. Administrative support was universally essential, including but not limited to program assistants, receptionists, and medical office assistants.

Our investigation revealed two forms of team structures – *embedded* and *adjacent* - which appeared as a function of the mechanism by which the interprofessional team members are funded and the unique way practice leaders conceived team-based care. In the *embedded* structure, interprofessional team members are integrated within the team and serve to extend the family physician's scope, providing holistic and comprehensive care to the physician's patient roster. In this structure, team members are practice staff, and usually co-located in a way that allows for frequent and accessible communication, efficiency, and seamless collaboration. In the *adjacent* structure, the interprofessional team members are characterized as collaborators to the practice. In this structure, interprofessional team members are funded externally, often by the regional health authority or provincial government. These members provide their service to both the physician's patient roster, and in some instances, maintain their own patient caseload.

Essential Components

Common essential components that enabled development and transition were realized across all cases. These included adequate funding, a dedicated practice change champion, physical space, and local and system-level support from relevant stakeholders and groups.

Funding

Funding played a critical role in supporting all transitions. Practices acquired the necessary financial resources through a mixture of funding corridors. These included self-investment, government investment, community funding, and funding from academic centres. Regardless of the corridor mix, funding supported interprofessional team member and/or administrative personnel salaries, physical spaces, electronic medical record systems, and other operational requirements.

<u>Self-Investment</u>

We encountered a few participants who reported self-investing in their practice. This involved the use of practice-generated revenue, personal reserves, or bank loans to fund the team-based transition. These participants espoused an entrepreneurial stance, and expressed a sense of responsibility in investing in their practices to meet community needs:

"*GP has to go and reflect on how we do things. GP has to take chances. GP has to spend money, invest millions of dollars in a project and that's all life changing*." (Participant 1)

Community Fundraising

Community funding was realized as donations and investments from grassroots organizations, foundations, and municipalities:

"*[W]e've also fundraised through the [Healthcare Foundation]...We put a fund together to support primary care… and we've also had another big donor who stepped forward just because he believes in health care. So, it's been really great community support.*" (Participant 3)

"*So, the community came together… the community needed to raise an extra one million dollars to have the physician's office attached. That was definitely cut by the [Health Authority] government. So that's what happened is the community raised that money because they saw that that was the most practical*." (Participant 5)

Government Funding

Government investment refers to financial support provided by provincial, territorial, regional and/or local healthcare authorities. Participants in cases that took advantage of pilot initiatives and programs reported that the practice was allocated specific funding in support practice transformation. Participants in other cases described approaching the government for funding and/or related resources as they encountered specific needs in their transition process:

"*… we did approach them [Regional Health Authority] formally to ask for more space and they gave it to us, which is great.*" (Participant 4)

Others highlighted the way in which they took advantage of newly-developed government programs:

"*So, the first physician assistant was hired by me, so she worked under me. .... And then we created funding for her – we got creative with the government, because we had a special fund called Interdisciplinary Team Demonstration Initiative, ITDI. So, these funds came from [Province] Health, so we utilized those funds to create this position for PA (Physician Assistant). And we funded one of our NPs (Nurse Practitioners) through that as well …*" (Participant 21)

Participants in four cases applied for provincial and federal grants that supported the recruitment and compensation of interprofessional healthcare providers:

> "*I received a grant to build a team-based care clinic. It was a small grant [from Health Canada], and I was able to bring together physio, OT (occupational therapy), nursing, social work, midwifery, pharmacy.*" (Participant 16)

Academic Centres

A small number of participants indicated receiving financial support from academic training institutions. Cases that served as teaching sites received support from the departments of their affiliated academic institutions in strategic planning, recruitment of interprofessional members for teaching roles, and securing additional space. However, participants noted this support is insufficient for retaining interprofessional team members and covering costs related to practice equipment.

> "*So, I would say, we get about $80,000 a year for the teaching units here, and that's barely enough to cover the secretarial fee, the medical supplies and the rooms they use for two or three residents, but not for five or six.*" (Participant 1)

A Champion

Participants at all cases identified a practice leader who spearheaded the transformation process. These "*champions*" were described as influential, passionate, and committed to the success of the transformation and its prospective impact on patients and the system.

> "*Under their direction and the passion that they had, there was lots of interdisciplinary groups coming forward. … because of that leadership that they had and the passion that they had, it actually solidified into disciplinary things and great patient outcomes came from it.*" (Participant 5)

These leaders were regarded as visionaries and key decision-makers in the context of their practice and the local community. They were also universally well-connected to extensive professional networks and connections with influential figures across the relevant health system. They coordinated efforts, engaged stakeholder groups, and communicated the mission and vision of the transformation to all involved:

> "*Having someone that has a vision, and willing to put in that time, don't get me wrong, there's stressors in time you have to deal with. That's the number one thing.*" (Participant 18)

The way in which champions conceptualized team-based care bore relevance on whether the practice adopted an *embedded* or *adjacent* model. These conceptualizations were often informed by past medical training experiences:

> "*My training was in [City]. My residency was in the community health center. Then after that I had a fellowship at [Hospital], and it was quite a collaborative practice there. ... I like to call it collaborative imprinting. ... It's just like that was in my training and it is important, right? ... everybody would be there, and you'd have input from the social worker, you have input from the psychologist, it was very collaborative. So, I think it was that kind of imprinting as I call it. That's your template for anything short of that doesn't really fit, particularly if you were in a practice where it worked really well, which I think that it did*." (Participant 12)

Physical Space

Transitioning into a team-based practice universally required the acquisition of new physical space:

> "*...okay, we got to talk space. Where are people going to sit? How are we going to do this, where are the printers going to be? Where's the computer? You have to get to that kind of level ... [teams] do take more space."* (Participant 2)

Participants also regularly offered commentary that highlighted the perceived importance of team co-location:

> *"[S]ome of the inter-team communication ...we co-located the teams to sit together. There's a fair bit of on-the-fly personal communication, particularly between the docs and the nurse and between the docs because the docs and the nurses sit together and if we're dealing with a complicated patient sometimes it's through the EMR but often it's with a 'Hey [Colleague], can you call this patient and deal with it?' So, there's some direct communication let's say*." (Participant 11)

Electronic Medical Records

All cases leveraged electronic medical records (EMR) in care delivery. This technology was seen as essential in connecting interprofessional health team members and was reported as the most frequent mode of communication within the team. It was also useful in cases where providers were not necessarily co-located in the same space.

Stakeholder Involvement

Across all cases, our participants strongly emphasized the essential value of stakeholder collaboration. Participants shared how they involved and engaged community groups, practice members, and local, regional and/or provincial government throughout the transformation process.

Ultimately, the engagement of these stakeholders supported effective co-design and implementation:

> "[It] *was a huge co-design initiative made up of partners, experts, physicians, patients, to really look at how do we structure a model that is going to work in this region*." (Participant 14).

Community

Community members and organizations played a critical role in helping practices identify and understand the local healthcare needs and gaps. Emphasizing the value of collaboration, participants described inviting these individuals and organizations to join steering committees and working groups and to provide feedback as the practice transitioned:

> "*Like the decisions are - we have made some decisions where I think, … it truly is the best thing for the community. The community can now decide to address social determinants of care. … We have fundraisers on the board like [Local Foundation] and with our Healthcare Foundation, we have a patient perspective on the board. …All those that's who's on the board, they make the overarching decisions about values, vision, mission…*" (Participant 4)

Practice Members

Participants also described the importance of engaging members of the practice during the transition process. These individuals were seen as key collaborators who could share insights regarding existing challenges within the practice, promote buy-in, and participate in strategic planning. They were often invited to support the process:

> "*I think we had the focus of chronic disease, and I think it was more chatting with docs, chatting with our clinic and saying, well, who do we want? Where are we going to have game?*" (Participant 13)

Our participants also explained that it was not always easy to achieve this engagement. Members and contributors to practices were not always well-versed or prepared for team-based care. Accordingly, the pursuit of a team-based culture required the practice champions to facilitate a shift in thinking about how care is delivered before the team's engagement in the process was fully realized:

> "*There's still growing pains in the clinic. We have, every month we have a monthly operations meeting where the whole clinic gets together and talk about what can be improved and what, you know so. There's still growing pains but overall, we're making this work*." (Participant 10)

Local, Regional or Provincial Government

Beyond funding and resource acquisition, participants recognized engagement with the local (e.g., municipal), regional, or provincial government was valuable for strategic planning and navigating bureaucratic systems:

> "*So, the health authority, when we first started, I had a good relationship with our Director of primary care … she helped us a lot but then she moved on. Then I asked the Chief Operating Officer of [Regional Health Authority], who should we ask to be on our board now? I'd like someone that's at a level that can make some decisions and be strategic, but I don't wanna waste anybody's time if this isn't interesting to them. And she said, "oh I should" and so then she was on her board*." (Participant 4)

Processes and Mechanisms

The process of transformation was generally characterized by stages of gaining a deep understanding of local needs, building a business case, change management, and continuous quality improvement. At each stage, a range of challenges, facilitators, and barriers were at play, each of which impacted the trajectory of change.

Identifying Needs and Strategic Planning

Practice leaders recognized the importance of aligning their team make-up with the specific needs of the local patient populations. This process involved reviewing national population reports or engaging with local community to gain insights into patient demographics, prevalent health issues, and other determinants of health:

> "*[I]f I want to do something, I don't know, maybe I want to add a different kind of person to my team, or do something like that, the process really – you need to do your homework, you'd start with looking at national standards around whatever the issue might be, and then you start talking with managers of the clinic, other physicians, other nurses, other people in your team*." (Participant 2)

The identification of community needs was often described as "*dynamic*" given the evolving nature of the healthcare landscape. They discussed reviewing successful team-based primary care practices regionally, nationally, and even internationally (i.e., United States, United Kingdom). This involved literature searching and in-person site visits. In a small number of cases, needs assessments and strategic plans were generated by independently contracted organizations.

Business Case Development

Most of our participants indicated that they developed a business case to support the transformation process. Upon engaging with patient communities and practice members to identify the local

healthcare needs, business cases that outlined the current state of the practice, provided a description of the proposed change, and justified a request for resources were built. These focused the potential impact the development will have on the quality-of-care delivered in the community. The cases were usually developed by the practice champion in collaboration with local community or health system leaders:

> *"So we hosted this massive community engagement with hundreds of people… Now we're a non-profit society with charitable status last year and we're like, wow, we gotta fast track this. We started a process of engaging the physicians to come along and said, here's our proposal. What do you think the problems are? What do you think? And we'd already done the outreach to all the stakeholders like our municipality, provincial government, local government, health authority. Then we really started doing outreach to the providers and family practice.."* (Participant 4)

Case development and submission processes were perceived by participants to be administratively onerous, requiring multiple levels of approval from different levels of government or stakeholder groups. Some participants expressed these processes to be well-outlined and easy to follow, while others perceived them to be complicated, time consuming, and resource intensive:

> "*I'm a clinician and I'm a leader of teams, …but the advocacy and the lobbying of the government takes up an enormous amount of time that's unnecessary. I would say unnecessary. It's beyond what is needed to put a case forward or a case example forward. And that scares off a lot of physicians… It's not a streamlined process, it's not a user-friendly process.*" (Participant 19)

Managing Change

Participants at each case described that, once the vision was articulated, resources were acquired, and the plan was set, they embarked on a progressive process of managing the transformation. This involved inspiring '*buy-in*' from across the practice team. In this regard, our participants believed that the vision of team-based care should be shared by all. It was important that team members were willing to work in, believed in, and enjoyed being part of a team.

> "*[W]e have this vision … and looked to find other providers that would make up the constitution of scope of different health professionals within that clinic. ... in the beginning, making sure that we had like-minded providers and people seem to sort of understand and really value and grasp the sort of like fundamental concepts of what collaborative care would require*." (Participant 12)

Buy-in was achieved through a combination of training, regular communications, and the nurturing of a trusting work culture. It was universally emphasized that teams needed to be trained in the conceptual underpinnings of team-based care and the new procedures and processes that supported this style of care delivery:

> "[*W]e really identified a lot of things in detail and just the culture of how we would treat each other and establish, at the end of the decision-making day and we had it again professionally facilitated through our [Consultant Group] … They gave us this leadership training and change management.*" (Participant 4)

This information was shared via comprehensive communications and full team huddles, which focused on workflow changes and shifts in team member responsibilities. These engagements, however, went beyond education. They also served as important touchpoints for elevating team morale and nurturing a positive team culture. Indeed, our participants highlight how trust was an important facilitator, and that this trust was conveyed in both formal communications and through workplace behaviours:

> *"But ultimately you know once the responsibility has been assigned out, there is a need to respect each other's abilities and competencies and to trust each other. And so, once I have my pharmacist looking after my diabetes patients, I trust the pharmacist to manage them."* (Participant 10)

Iterate, Adapt, and Repeat

Amongst the most important things in the journey towards developing team-based care, all cases employed continuous quality improvement (QI) processes. Ultimately, constant assessment, evaluation, and iterative adaptation were hallmarks of the team-based care developments. Insights were regularly harnessed from the perspectives of patients, providers, the broader community, and municipal leaders. Data were generated in a few different ways. All cases collected feedback within the practice, via patient and provider satisfaction surveys, as well as through informal conversations and experiences with patients:

> "*And we get feedback all the time constantly.*" (Participant 8)

In several cases, external organizations collected and evaluated QI data. This was largely dependent on the local context. For example, in provinces with regional primary care networks, the network would often collect and analyze outcome data. For teaching sites, the affiliated University played a role in pushing QI initiatives. In cases where there was heavy government involvement and resourcing, the government was responsible for collecting data and conducting needs assessments. Practices involved in these government relationships were also accountable to

report how they met target metrics such as maintaining patient roster size and disease preventions.

Several factors were considered in subsequent iterations of change, all grounded in meeting patient care needs and promoting efficiency. These included the type, number, and responsibilities of providers and staff. For example, roles were expanded to better meet community needs:

> "*So, we used to have an Indigenous health liaison, ...her role was a bit underutilized, because it was very boxed in for a very specific need. ... then we thought, okay, let's just make it a social worker position, get rid of the term Indigenous social worker so we're not boxing ourselves in and limiting options. And then that's kind of what happened.*" (Participant 21)

Perceived Impact and Outcomes

The transition towards an interprofessional team was described to have profound impact on multiple facets of the practice and system. Every participant described the development of an interdisciplinary healthcare team to have positive for patients, providers, and communities. Notably, practice-level outcomes associated with accessibility, scope of service, and impact on community health did not seem to differ meaningfully between those practices that received greater or lesser government support. That is, changes to team-based care were universally praised as effective on these fronts. However, we did note that there were differences with respect to some secondary provider-level outcomes – in particular, as it pertains to the provider's perception of practice autonomy.

Increased Access to Timely and Coordinated Care for Patients

The shift towards an interdisciplinary team was perceived to be beneficial for patients in terms of attachment, access to timely care, and health outcomes. Across cases, participants described an increased capacity to take on additional patients and provide them with timely access to care:

> "*So that expanded my attachment as well, so I could take on more patients than I could by myself. But not only that, I could provide timely access through the physician assistant*." (Participant 21)

> "*So, we saw double the number of patients, and we also saw, of course, more than double the number of revisits. So, we could see that through our stats that were reaching more people.*" (Participant 20)

Specifically, participants described collaborating with multiple team members, each contributing their expertise to ensure patients can access timely comprehensive care. In that regard, the development allowed the practices to better meet the needs of the community:

> "[*I]t has been highly successful in meeting the needs of many patients whose needs were not being met elsewhere and in addressing primary care among a highly complex and challenging population.*" (Participant 11)

Participants described receiving overwhelmingly positive feedback from their patients, expressing deep appreciation for having access to a family doctor:

> "[*T]hey started doing outbound calls to attach new patients and the positive feedback we got, just to say, 'Oh my god I'm so happy I've got a family doctor. I haven't had a family doctor in 10 years….' That's probably the most positive feedback we've had, is just people being able to say, 'I just didn't think I'd have a family doctor.' And so that's been great*." (Participant 3)

As a result of timely access to coordinated and comprehensive care, some participants reported seeing positive patient health outcomes:

> "*I had better results than everybody else. People were losing weight, blood pressures were down, their vitals were better. Everything was great, chronically better, it was called.*" (Participant 1)

Improved Collaboration and Job Satisfaction

For the healthcare providers, the transformation has brought changes in their roles and the ways in which they organize themselves in an interprofessional team. This change required regular adjustments, however, our participants generally reported experiencing greater efficiency and organization in their workflow. Consequently, this was perceived to enable enhanced job satisfaction and reduce burnout.

Working in a collaborative interprofessional environment also fostered important learning experiences for the family physicians. In coordinating with healthcare professionals from other disciplines, participants described having an appreciation for the depth of knowledge and training each discipline contributes to patient care:

> "*I can distinctly remember one of the residents just going, the family practice resident saying, 'How, I didn't know you knew all that," and "you're really well read.' And the midwifery looked at them and said, 'This is what I do. I trained for four years in delivering and taking care of –' And there was this ah-ha moment. It's like, oh, yeah, you have this opportunity within your family practice training for this much training in maternity care*." (Participant 16)

Improved Health Utilization Services

The transformation also contributed to improved efficiency and use of healthcare services at the systemic level, with examples including cost savings, or reduced visits to the local emergency department:

> "*I always make my calculations, how many patients a year per 1,000 patients I have go to ER. How many patients a year go to hospitalization, end up in hospitalization. Here, the clinic we run the last time I did my studies on how efficient we were, our clients were going 39% less often to the hospital for ER services than other clients in the province. That's a big chunk. 23% less a minute for all diagnostic, psychiatry, surgery, everything [inaudible]. We use 300% less imaging or lab tests and other practices*." (Participant 1)

> "*When the second to last family practice closed, our emergency department started tracking how many visits they were getting, particularly in low acuity situations like the probably they said it was very difficult to just say based on the CTAS scores whether it they'd be suited to see a family doctor or not, but it's kind of indicative I guess at least. And the numbers just started going up and up and up. They had just saw a huge increase in visits and even when the higher acuity ones were sort of staying similar. And so it was people showing up for UTIs and prescription renewals and things that like really should have been dealt with by a family doctor. And then the lead, our lead medical director, there just shared some results. She was looking at year-over-year visits now for January, February, March, as we've gone through. And I'll use round numbers, but if January this year was say, 30% higher than January last year. The increase has dropped and as of May is actually less than May last year. So it's like, oh wow, this is exactly what we're hoping for.*" (Participant 3)

Summary of Findings

The findings of this qualitative study illuminate the numerous and multifaceted processes involved in the self-initiated transformation of family practices into interdisciplinary, team-based care models. Participants revealed a variety of factors involved in the transformation, ranging from financial and resource considerations to leadership and stakeholder dynamics. Quality improvement was essential throughout the transformation process, ensuring that family practices continued to adapt and sustain effective processes to manage change. Leaders at the practice level, often portrayed as champions, played a central role in mobilizing resources and fostering collaboration to drive change in accordance with mission and vision statements. Positive impacts of team-based interdisciplinary care were realized for patient outcomes, provider satisfaction, and system efficiency. Government and health authorities should offer flexible funding and

technological infrastructure to support further adoption of team-based family medicine. Medical education leaders and regulators are urged to integrate training in leadership, system thinking, and interprofessional collaboration into curricula.

Notably, this qualitative analysis is not without its limitations. To begin, we did not sample cases from all jurisdictions in Canada. Given the relevance of provincial and territorial policy constraints, we may not capture all nuances that are relevant across the country. However, it must be mentioned that 17 cases provide considerable analytic power, such that we feel confident that the description provided will resonate across the Canadian family medicine practice landscape. Further to our limitations, all study participants were individuals who were associated with a clinic that was successful in operationalizing a team-based care transformation. Accordingly, the results may not reflect the range of experiences, challenges, or barriers one may face in transforming practices to team-based care. There may have been others who have made this effort but not achieved the same recognizable success.

Stage 2: Quantitative Arm

Case Characteristics

In Ontario, six SITB clinics were included and found to be distributed across the following HRPGs: group B (n=2), group C (n=2), group D (n=1), and group H (n=1). Fourteen total FHTs and 22 PHUs located across these four HRPGs were identified in the data. The data associated with the six SITB sites, the 14 FPMH sites, and the 22 VCM sites between April 2016 and April 2021 were aggregated within each group to generate three cohorts for comparison. After excluding physicians who had fewer than 500 billings associated with matched patients in the last fiscal year prior to index, the SITB cohort included 464,040 total individual records, the FPMH cohort included 1,207,807 individual records, and the VCM cohort included 3,040,430 individual records (Figure 1). Eight SITB clinics of interest from Manitoba were also identified and included as a parallel analysis to provide insight on the potential jurisdictional impact of the outcome measures. The data from these eight Manitoba sites, as well as seven matched FPMH sites, and eight matched VCM sites between April 2016 to April 2021 were aggregated within each group to create three comparison cohorts. The data generated at ICES in Ontario is presented first, followed by the data generated at MCHP in Manitoba.

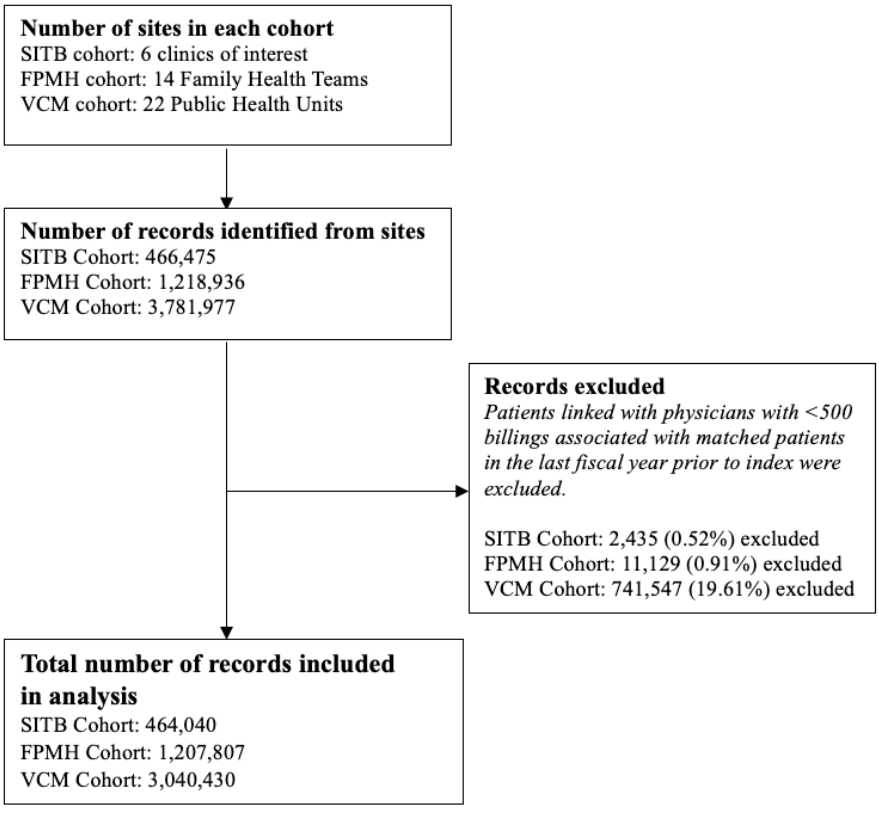

Figure 1: Flowchart of SITB, FPMH, and VCM Cohorts Creation in Ontario (Data Source: ICES AHRQ Project P0908.104.000)

Outcomes Analyses: Ontario

1. Number of Attached Patients per Physician

In Ontario, the mean (SD) number of attached patients per physician was 1,371.06 (45.64) in the SITB cohort, 1,227.64 (15.91) in the FPMH group, and 586.64 (26.00) in the VCM group (Table 3). A one-way ANOVA and post-hoc analysis revealed that the clinics of interest that had self-initiated the transformation to team-based care had significantly more attached patients than both FHTs ($p<0.0001$) and non-team-based practices ($p<0.0001$). FHTs also had significantly more attached patients than non-team-based practices ($p<0.0001$).

Table 3: The Average Number of Physicians and Attached Patients in Ontario (Data source: ICES AHRQ Project P0908.104.000)

Cohort	Mean (SD) Number of Virtually Rostered Patients Per Physician	Mean (SD) Percentage of Virtually Rostered Patients per Physician	Mean (SD) Number of Physicians Included in the Cohort	Mean (SD) Number of Rostered and Virtually Rostered Patients Per Physician
SITB	87.40 (19.45)	6.35 (1.29)	56.33 (4.08)	1,371.06 (45.64)
FPMH	74.19 (3.37)	6.05 (0.34)	164.00 (2.97)	1,227.64 (15.91)
VCM	586.64 (26.00)	100.00 (0.00)	865.00 (36.89)	586.64 (26.00)
p-value[α]	-	-	-	$p < 0.0001$

[α] Overall significance calculated from one-way ANOVA with group as the only factor

2. Annual Patient Visits

In Ontario, practices that had self-initiated interprofessional team development had an average of 2,791.94 (114.73) annual patient visits per physician, while FHTs and non-team groups had averages of 2,321.24 (160.23) and 1,378.31 (120.56) annual visits per physician, respectively (Table 4). The differences between groups were statistically significant, with the SITB group showing significantly higher patient visits per physician compared to both the FPMH cohort ($p=0.0002$) and the VCM cohorts ($p<0.0001$). The SITB clinics of interest also saw a significantly greater number of unique visiting patients per physician compared to the FPMH ($p<0.05$) and VCM cohorts ($p<0.0001$). FPMH practices saw a significantly greater number of unique visiting patients per physician than VCM practices ($p<0.0001$).

In terms of care for elderly patients ($\geq$ 65 years), the self-initiated group displayed an average of 976.25 (55.06) annual patient visits per physician for this patient group, which was significantly greater than the 867.40 (56.73) visits recorded for the FPMH group ($p=0.0071$) and the 458.29 (35.40) visits for the VCM or non-interprofessional team cohort ($p<0.0001$).

Table 4: Comparison of the Average Annual Patient Visits per Physician Across SITB, FPMH, and VCM Cohorts in Ontario, Including Sub-Groups of Older Adults (+65 years) and Individuals with at Least One Chronic Condition (of DM, COPD, and CHF). (Data source: ICES AHRQ Project P0908.104.000)

Cohort	Mean (SD) Annual Visits per Physician	Mean (SD) Annual Visits by Unique Patients per Physician	Mean (SD) Annual Visits by Older Adults per Physician	Mean (SD) Annual Visits by Individuals with Chronic Conditions
SITB	2,791.94 (114.73)	823.91 (52.79)	976.25 (55.06)	934.56 (42.59)
FPMH	2,321.24 (160.23)	737.37 (56.94)	867.40 (56.73)	725.49 (49.37)
VCM	1,378.31 (120.56)	294.55 (36.65)	458.29 (35.40)	385.36 (27.98)
p-value$^{\alpha}$	$p < 0.0001$	$p < 0.0001$	$p < 0.0001$	$p < 0.0001$

$^{\alpha}$ Overall significance calculated from one-way ANOVA with group as the only factor

Practice-initiated interprofessional team-based care also significantly impacted the care provided to a sub-group of individuals with at least one chronic condition (of DM, COPD, and CHF). The SITB group had an average of 934.56 (42.59) annual visits per physician by this sub-group, whereas the FPMH cohort 725.49 (49.37) and the VCM cohort had 385.36 (27.98) (Table 4). These differences were found to be statistically significant, with the SITB group having a higher average number of visits compared to both FHTs ($p<0.0001$) and non-group physicians ($p<0.0001$).

To provide additional context to the above variable, we also generated the proportion of patients diagnosed with at one, two, or all three of DM, COPD, and CHF comorbidities within each cohort (Table 5). The data reveal that there are greater proportions of patients with comorbidities in the SITB and PFMH cohorts than the VCM cohorts. These data offer contextualization to understanding difference seen in number of visits by older adults with chronic conditions (Table 4).

Table 5: The Average Proportion of Patients (SD) with Chronic Conditions of DM, COPD, and CHF Between Cohort in Ontario (Data source: ICES AHRQ Project P0908.104.000)

Cohort	Percent with at Least One Comorbidity from DM, COPD & CHF	Percent with Each Condition of DM, COPD and CHF	Percent with One Comorbidity of DM, COPD, and CHF	Percent with Two Comorbidities of DM, COPD, and CHF	Percent with All Three Comorbidities of DM, COPD, and CHF
SITB	17.65 (0.66)	*DM:* 10.36 (0.48) *COPD*: 8.75 (0.27) *CHF*: 2.36 (0.17)	14.33 (0.45)	2.81 (0.20)	0.51 (0.02)
FPMH	16.35 (0.55)	*DM*: 9.74 (0.41) *COPD:* 7.57 (0.18) *CHF*: 2.45 (0.12)	13.36 (0.41)	2.57 (0.13)	0.51 (0.02)
VCM	11.05 (0.33)	*DM:* 7.19 (0.19) *COPD*: 4.57 (0.23) *CHF*: 1.33 (0.03)	9.24 (0.28)	1.57 (0.05)	0.42 (0.01)
p-value$^{\alpha}$	p <0.0001	-	p < 0.0001	p < 0.0001	p < 0.0001

$^{\alpha}$ *Overall* significance *calculated from one-way ANOVA with group as the only factor*

3. Continuity of Care

The proportion of annual patient visits that occurred with the same provider was 48% (0.01) on average for the SITB cohort, 48% (0.01) for the FPMH cohort, and 41% (0.02) for the VCM cohort. The self-initiated interprofessional practices scored higher than non-team-based practices on this measure of continuity of care (p<0.0001) and performed equivalent to formal FHTs (p=0.5349).

Table 6: The Average Percentage (SD) of Annual Primary Care Visits by Patients in Ontario With the Same Physician (Data source: ICES AHRQ Project P0908.104.000).

Cohort	Mean percent (SD) of annual patient visits by rostered + virtually rostered patients with the same family physician
SITB	48.00 (0.01)
FPMH	48.00 (0.01)
VCM	41.00 (0.02)
p-value$^{\alpha}$	p < 0.0001

$^{\alpha}$ *Overall significance calculated from one-way ANOVA with group as the only factor*

4. Preventative Care Services

As presented in Table 7, the proportion of eligible patients with access to eight different types of preventative care services between SITB, FPMH, and VCM cohorts in Ontario were evaluated. Results show that there were a significantly greater proportion of patients in the SITB group with access to preventative care services compared to patients in the VCM group for all outcomes [CR screening: p<0.0001; CR: p=0.0002; FOBT: p<0.0001; DM eye exam: p=0.0002; HbA1C: p=0.0101; MAM: p=0.0006; PAP: p=0.0021] with the exception of lipid tests, where there were no statistically significant differences between groups (p=0.1802).

However, the FPMH cohort scored significantly higher than the SITB group on outcomes of CR screening (p=0.0001), receiving a CR (p<0.0001), and DM eye exams (p=0.0251). Both the SITB and FHT groups did not differ for measures of FOBTscreenings (p=0.1076), HbA1C testing (p=0.1802), lipid testing (p=0.0965), MAMs (p=0.2222), and PAP tests (p=0.3326).

Table 7: The Average Percentage (SD) of Eligible Patients with Access to Preventative Care Services in Ontario (Data source: ICES AHRQ Project P0908.104.000)

Cohort	Type of Preventative Care Service							
	CR Scr (10Y)	**CR (10Y)**	**FOBT/FIT (2Y)**	**DM Eye (2Y)**	**≥2 HbA1C (1Y)**	**≥1 Lipid Scr (1Y)**	**MAM (2Y)**	**PAP (2Y)**
SITB	65.11 (1.96)	43.94 (2.15)	37.27 (3.28)	69.98 (1.92)	49.18 (5.00)	59.86 (4.74)	61.77 (5.21)	43.46 (4.71)
FPMH	72.38 (2.17)	53.20 (1.01)	40.71 (3.46)	72.76 (1.73)	53.78 (6.01)	64.60 (4.20)	65.91 (5.78)	46.71 (6.25)
VCM	52.22 (2.09)	38.57 (0.91)	21.82 (2.36)	63.91 (1.81)	40.92 (4.00)	63.20 (3.14)	47.81 (4.68)	33.19 (3.89)
p-value[α]	<0.0001	<0.0001	<0.0001	<0.0001	0.0018	0.1523	<0.0001	0.0009

[α] Overall significance calculated from one-way ANOVA with group as the only factor
Abbreviations: *CR: colonoscopy; DM: Diabetes Mellitus; FIT: Fecal Immunochemical Test FOBT: Fecal Occult Blood Test; HbA1C: Glycated hemoglobin; MAM: mammogram; PAP: Papanicolaou (Pap) Test; Scr: Screening; Y: year*

Outcomes Analyses: Manitoba

1. Number of Attached Patients per Physician

In Manitoba, the mean number of attached patients per physician was 204.66 (9.93) in the SITB cohort, 27.77 (1.49) in the FPMH group, and 43.63 (4.48) in the VCM group (Table 8). The practices that had self-initiated interprofessional team practice had significantly greater number of

attached patients compared to both the FPMH ($p<0.05$) and virtual group physicians ($p<0.05$). There were no significant differences between the FPMH and VCM cohort in terms of the number of attached patients.

Table 8: The Average Number of Physicians and Attached Patients in Manitoba (Data Source: MCHP Project 2024-005; PHRPC #P2023-96)

Cohort	Mean (SD) Number of Physicians Included in the Cohort	*Mean (SD) Percentage of Virtually Rostered Patients per Physician*
SITB	111.50 (21.36)	204.66 (9.93)
FPMH	241.50 (25.89)	27.77 (1.49)
VCM	278.33 (15.19)	43.63 (4.48)
p-value$^{\alpha}$	-	p <0.0001

$^{\alpha}$ *Overall significance calculated from one-way ANOVA with group as the only factor*

2. Annual Patient Visits

In Manitoba, selected practices that had self-initiated interprofessional team development had an average of 885.94 (76.89) annual patient visits per physician, while FPMH and VCM groups had averages of 2706.57 (317.63) and 3307.83 (235.02) annual visits per physician, respectively (Table 9). The VCM cohort had significantly more ($p<0.05$) annual visits per physician than both the SITB and FPMH cohorts, while the FPMH cohort had significantly more annual visits per physician than the SITB clinics of interest.

In terms of care for elderly patients (≥ 65 years), the SITB group displayed an average of 238.71 (32.51) annual patient visits per physician for this patient group, while 669.51 (64.90) visits were recorded for the FPMH group and 830.54 (73.84) visits were recorded for the VCM or non-interprofessional team cohort (Table 8). Both the FPMH and VCM cohorts were found to have significantly more visits ($p<0.05$) by this sub-group of older adults compared to the SITB clinics, and there were no significant differences between the FPMH and VCM groups with regards to visits by this group.

Table 9: Average Annual Patient Visits per Physician in the SITB Cohorts in Manitoba, Including Visits from Sub-Groups of Older Adults (+65 years) and Individuals with at Least One Chronic Condition(of DM, COPD, and CHF (Data Source: MCHP Project 2024-005; PHRPC #P2023-96).

Cohort	Mean (SD) Annual Visits per Physician	Mean (SD) Annual Visits by Unique Patients per Physician	Mean (SD) Annual Visits by Older Adults per Physician	Mean (SD) Annual Visits by Individuals with Chronic Conditions

SITB	885.94 (76.89)	274.69 (15.65)	238.71 (32.51)	246.32 (27.79)
FPMH	2706.57 (317.63)	825.85 (136.58)	669.51 (64.90)	667.50 (56.28)
VCM	3307.83 (235.02)	957.99 (119.54)	830.54 (73.84)	888.17 (66.45)
p-value$^{\alpha}$	p <0.0001	p <0.0001	p <0.0001	p <0.0001

$^{\alpha}$ *Overall significance calculated from one-way ANOVA with group as the only factor*

The SITB group also had an average of 246.32 (27.79) mean visits per physician by patients with at least one chronic condition (of DM, COPD, and CHF), compared to the FPMH and VCM cohorts which had 667.50 (56.28) and 888.17 (66.45) mean annual visits per physician. The mean visits by this subgroup were significantly greater in the VCM cohort ($p<0.05$) compared to both the FPMH and SITB clinics. The mean visits were also significantly greater in the FPMH cohort compared to the SITB cohort.

3. Continuity of Care

In Manitoba, the average proportion of annual patient visits that occurred with the same family physician was 47.99% (0.042) in the SITB cohort, 49.53% (0.07) in the FPH cohort, and 54.29% (0.05) in the VCM cohort (Table 10). The visits to the same physician in the VCM cohort was significantly greater ($p<0.05$) than the SITB cohort, but there were no significant differences between the SITB and FPMH cohort, or the FPMH and VCM cohorts.

The average proportion of annual patient visits that occurred at the same site was 82.67% (0.050) in the SITB cohort. This was significantly greater ($p<0.05$) than the 66.14% (0.06) visits to the same site in the FPMH cohort, and the 66.63% (0.07) visits to the same site in the VCM cohort (Table 10). There was no statistically significant difference found between the mean annual visits to the same site for the FPMH and VCM cohorts.

Table 10: The Average Percentage (SD) of Annual Primary Care Visits by Rostered Patients$^{\beta}$ in Manitoba at the Same Site and With the Same Physician (Data Source: MCHP Project 2024-005; PHRPC #P2023-96).

Cohort	Mean percent (SD) of annual patient visits by rostered patients with the same physician	Mean percent (SD) of annual patient visits by rostered patients at the same site
SITB	47.99 (0.042)	82.67 (0.050)
FPMH	49.53 (0.07)	66.14 (0.06)
VCM	54.29 (0.05)	66.63 (0.07)

p-value$^{\alpha}$	p < 0.0242	p < 0.0001

$^{\beta}$*Excludes patients with less than three physician visits in the last year*

$^{\alpha}$ *Overall significance calculated from one-way ANOVA with group as the only factor*

4. Preventative Care Services

As presented in Table 11, the proportion of eligible patients with access to three different types of preventative care services between SITB, FPMH, and VCM cohorts in Manitoba were evaluated. Results show that the 59.79% (0.02) annual proportion of diabetic patients that received ACR tests in the SITB cohort was significantly greater ($p<0.05$) compared to both the mean 52.40% (0.02) and 55.59% (0.02) of patients in the FPMH and VCM cohorts, respectively. The proportion receiving ACR tests in the VCM cohort was also significantly greater ($p<0.05$) than the FPMH cohort.

The annual proportion of diabetic patients that received an eye-exam was 43.70% (3.29) for the SITB cohort. This was significantly greater ($p<0.05$) compared to both the 41.98% (0.02) of patients for the FPMH cohort, and 39.94% (0.02) of patients for the VCM cohort. There were no statistically significant differences in diabetic patients receiving eye exams between the FPMH and VCM cohorts.

Of older adults greater than or equal to 65 years of age, 57.73% (3.40) received an annual flu vaccine in the SITB cohort, while 60.50% (0.03) received this in the FPMH cohort, and 57.72% (0.04) received this in the VCM cohort. None of these differences were found to be statistically significant between groups.

Table 11: The Average Percentage (SD) of Eligible Patients with Access to Preventative Care Services in Manitoba CHF (Data Source: MCHP Project 2024-005; PHRPC #P2023-96).

Cohort	**Type of Preventative Care Services**		
	ACR (1Y)	**DM Eye (1Y)**	**Flu Vaccine for Older Adults (+65 years) (1Y)**
SITB	59.79 (0.02)	43.70 (3.29)	57.73 (3.40)
FPMH	52.40 (0.02)	41.98 (0.02)	60.50 (0.03)
VCM	55.59 (0.02)	39.94 (0.02)	57.72 (0.04)
p-value$^{\alpha}$	p <0.0001	p = 0.0083	p = 0.2129

$^{\alpha}$Overall significance calculated from one-way ANOVA with group as the only factor

Abbreviations: *ACR: albumin-creatinine ratio test; DM: Diabetes Mellitus; Y: year*

Summary of Findings

In summarizing the results, it is first important to acknowledge that we are not entirely confident that the numbers reported from the MCHP are truly reflective of the intended cohort constructs. In particular, we note that the numbers of patients deemed affiliated with physicians across all three cohort types are far smaller than anticipated. There are a number of possible reasons for this; however, most saliently, this is likely attributable to the limits in the way 'rostering' or 'affiliations' were defined in Manitoba. We suspect that the requirement of at least three ambulatory visits in the time period of analysis, which constituted the majority of visits with that provider or clinic, excluded a high number of affiliated patients from the foundational counts. Moreover, it is possible that the Manitoba cohorts include numerous physicians who are not practicing full-time, deflating the number of patients per physician. Given these limitations, we have focused the summary of findings on the Ontario data and between-cohort analyses, limiting interpretation of the Manitoba findings to a cursory overview.

In Ontario, one might view the counts of attached patients or patient visits as lower than expected, especially for the VCM cohort. It is possible that physicians in any cohort could be seeing more patients than captured in the data. Given the criteria for associating non-rostered patients to physicians at ICES, a portion of patients who may be seeing another provider more often are ultimately excluded from our count. Considering that the VCM cohort is entirely constructed of physicians with virtual rosters, this limitation bears more influence on those counts. However, in reviewing other literature, we find complimentary numbers that are in line with the evidence we generated, showing that physicians not practicing in a Patient Medical Home had panel sizes of fewer than 650 patients (Kiran et al., 2016). Examining broader changes in practice patterns of family physicians across the country also supports and adds confidence to our findings. A growing number of family physicians over the last decade have been providing services outside of primary care, and in 2021, nearly 30% of Canadian family physicians were shown to be practicing predominantly outside of primary care (CIHI, 2024; Freeman et al., 2018). Further, our findings could also reflect some of the impacts of the current access to care challenge. That is, patients who aren't rostered to a team may experience greater access challenges with their physicians such that they are more prone to use walk-in services or seek out another provider elsewhere.

Accepting that we have generated robust cohorts for comparison that are aligned with previous work, and with limitations acknowledged, we are encouraged to see that, in Ontario, the grassroots SITB clinics are associated with more patients per physician, more patient visits (unique or otherwise) per physician, more patient visits by older adults per physician, and more patient visits by individuals with chronic conditions per physician than either the Family Health Team clinics or virtually-constructed matched cohort of physicians. Notably, the Family Health Teams also outperformed the VCM cohort on these same metrics, highlighting the overall benefits of team-

based care. Indeed, the Ontario SITB and FPMH clinics also yielded greater continuity of care scores than the cohort of physicians not associated with a team-based approach.

Review of the preventative care services rendered provides a more equivocal set of findings. There were no differences between any of the three cohorts for lipid testing. The SITB cohorts delivered more colonoscopy screening, mammograms, pap smears, fecal occult blood tests/fecal immunochemical tests, HbA1C tests, and diabetes mellitus eye examinations than the VCM sites. However, the FPMH cohort provided more colonoscopy screening and diabetes mellitus eye exams than the grassroots cohorts.

In Manitoba, we were skeptical about the data quality, but noted significantly more patients per physician in the SITB cohort. Yet, the analysis highlighted that the FPMH and VCM cohorts yielded higher per-physician numbers for annual patient visits, visits by older adults, and visits by patients with chronic conditions. Continuity of care with the same family physician was relatively stable across the SITB and FPMH Manitoba cohort constructs, and the VCM cohort had significantly greater levels of continuity. When considering continuity to the same site, the SITB cohort significantly outperformed both the FPMH and VCM groups. The SITB cohort also had a significantly greater proportion of patients receiving diabetes-associated preventions of ACR tests and eye-exams compared to both the FPMH and VCM groups.

It is clear that interprofessional team-based care offers greater access and comprehensiveness of primary care to patients, at least as evident by the Ontario data. We have also noted that practices that have self-initiated a transformation to interprofessional team-based care often outperform the formal PMH models (in Ontario at least). This could be due to the ‘grassroots’ nature of the practice development being strongly aligned with local needs. This purpose-fit development likely allows physicians to provide increased services that are more tailored to the needs of the unique patient population compared to a one-size fits all approach.

Recommendations

Based on our findings, we have generated tailored recommendations for government and health authorities, family medicine practices, and medical educators. Through these recommendations, we aim to offer specific guidance to support the development of effective, sustainable team-based practices.

Government and Health Authorities

- Governments and health authorities should prioritize flexible funding opportunities that practices can seek in support of team-based transformation at *any* stage of their development

trajectory. Flexibility in the developmental timeline will allow practices to request funding in a manner that is responsive to the emergent healthcare needs of relevant communities.

- Governments and health authorities should establish clear and easily-accessible processes for the submission of practice-reform business cases, which support applications for funding and operational supports. Streamlining these procedures will reduce the administrative burden on practices, inspire more applications, and create processing efficiencies.

- Government and health authority led pilot initiatives and programs should be paired with comprehensive monitoring and evaluation systems that assess the impact of team-based transformation on practices and patient outcomes. Successful programs should be considered for scaling to benefit other regions or jurisdictions.

- Government and health authorities should empower family physicians to self-initiate the development of interprofessional family practices in a 'grassroots' fashion. They should foster opportunities and a positive environment for change.

Family Medicine Practices

- Practices aspiring to team-based transformation should determine a dedicated *practice champion*. Ideally, this individual is a physician leader with strong social capital in the practice, community, and, particularly, in the broader healthcare system. The role of the champion is to lead transformation, mobilize resources, facilitate connections, and garner support from important practice, community, and government partners.

- Practices should articulate a clear vision statement early in their development process. This statement should be crafted collaboratively, such that it outlines the shared goals and values of the interdisciplinary care team. Such a statement can guide teams through the transformation.

- Practices should engage QI specialists who can facilitate robust evaluation and identify areas for improvement in the development process. These individuals should be engaged throughout the transformation as well as post-transformation, so as to ensure that practice changes continue to address practice and patient needs.

- Practices should confer with patients and communities when designing the team-based model. The involvement of local partners will help shape the practice to meet specific needs. It will also promote local support for the transformation process.

- Practice leaders and champions should maintain transparent and continuous communication with all relevant stakeholders. This includes conveying the vision, describing the processes

that will be employed to achieve the mission, and addressing questions or concerns that arise. This will promote trust in the process.

- Practices should pursue arrangements, whether embedded or adjacent, that ensure provider co-location. Co-location enhances communication, collaboration, and service efficiency.

Medical Educators

- Medical education should train future physicians in the conceptual foundations of interprofessional practice. Medical trainees should learn about the optimal scope of practice for a wide variety of non-physician healthcare professionals and have numerous opportunities for cross disciplinary interaction. Training in interprofessional practice should promote reflexivity within learners, which helps them to assess the role of the family physician within interdisciplinary teams, to communicate within a team, and to adapt and evolve with team dynamics.

- Medical education leaders should recognize the pivotal role of the training environment in influencing attitudes, preferences, and approaches to collaborative, interdisciplinary team-based care. Schools and residency programs should ensure learners have the opportunity to work in interprofessional care teams.

- Medical schools and residency programs should integrate training on leadership, system-thinking, stakeholder engagement, and health system navigation into their curricula. Such education can equip future family physicians with the skills required to lead practice reform.

References

Bazemore, A., Phillips, R. L., Glazier, R., & Tepper, J. (2018). Advancing primary care through alternative payment models: lessons from the United States & Canada. The Journal of the American Board of Family Medicine, 31(3), 322-327.

British Columbia College of Family Physicians. (2022). Family doctors care: The role and value of family physicians in British Columbia. British Columbia College of Family Physicians. https://bccfp.bc.ca/wp-content/uploads/2022/04/BCCFP_2022_PositionPaper.pdf

Canadian Health Services Research Foundation. (2010). Myth: Most Physicians Prefer Fee-for-Service Payment. Mythbusters: Using evidence to debunk common misconceptions in Canadian healthcare

Canadian Institute for Health Information. (2024) Changes in practice patterns of family physicians in Canada. Available from:
https://www.cihi.ca/en/changes-in-practice-patterns-of-family-physicians-in-canada#ref6

Canadian Institute for Health Information. (2019). Supply, distribution and migration of physicians in Canada, 2019: Data Tables. Available from: https://secure.cihi.ca/estore/ productSeries.htm?pc=PCC34.

Canadian Medical Association. (2022). Critical family physician shortage must be addressed: CMA. Canadian Medical Association. https://www.cma.ca/news-releases-and-statements/critical-family-physician-shortage-must-be-addressed-cma#:~:text=Statistics%20Canada%20reported%20in%202019,government%20recruitment%20websites%20across%20Canada

CBC News. (2022). Half of New Brunswickers afraid they won't get healthcare when they need it, survey finds. CBC News. https://www.cbc.ca/news/canada/new-brunswick/health-care-timely-access-new-brunswick-survey-1.6604033

College of Family Physicians of Canada. (2019a). A new vision for Canada: Family Practice – The Patient's Medical Home 2019. Mississauga, ON. College of Family Physicians of Canada. https://patientsmedicalhome.ca/files/uploads/PMH_VISION2019_ENG_WEB_2.pdf

College of Family Physicians of Canada. (2019b). The Patient's Medical Home Provincial Report Card. College of Family Physicians of Canada. https://www.cfpc.ca/CFPC/media/PDF/PMH-ReportCard2018.pdf

College of Family Physicians of Canada. (2020). The need for alternative payment models in a post-COVID health system. College of Family Physicians of Canada.

https://www.cfpc.ca/en/news-and-events/newsevents/news-events/news-releases/2020/the-need-for-alternative-payment-models-in-a-post

College of Family Physicians of Canada. (2022a). Open letter from the CFPC to our Members. College of Family Physicians of Canada. https://www.cfpc.ca/en/open-letter-from-the-cfpc-to-our-members

College of Family Physicians of Canada. (2022b). Family physicians continue providing care despite burnout, COVID-19 challenges. College of Family Physicians of Canada. https://www.cfpc.ca/en/family-physicians-continue-providing-care-despite-burnout-covid-19-challenges

Elma, A., Yang, L., Chang, I., & Grierson, L. (2023). Training in Team-Based Practices: A Descriptive Analysis of Family Medicine Postgraduate Site Distribution across Canada. *Healthcare Policy*, *19*(2), 48.

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. Journal of advanced nursing, 62(1), 107-115.

Freeman TR, Boisvert L, Wong E, Wetmore S, Maddocks H. (2018). Comprehensive practice: normative definition across 3 generations of alumni from a single family practice program, 1985 to 2012. Canadian Family Physician, 64(10):750-9.

Frketich, J. (2022). McMaster University has unusually high number of family doctor training spots left empty. The Hamilton Spectator. https://www.thespec.com/news/hamilton-region/2022/05/04/mcmaster-family-health-team-doctor-training.html

Guftasfsson JT. Single case studies vs. multiple case studies: a comparative study. Sweden: Halmstad University, Halmstad, Sweden; 2017.

Hendry, L. (2022). If every Quebecer can't have a family doctor, what comes next? CBC News. https://www.cbc.ca/news/canada/montreal/quebec-family-doctors-election-1.6591444

Janamian, T., Jackson, C. L., Glasson, N., & Nicholson, C. (2014). A systematic review of the challenges to implementation of the patient-centred medical home: lessons for Australia. Medical Journal of Australia, 201, S69-S73.

Katz A, Chateau D, Bogdanovic B, Taylor C, McGowan K-L, Rajotte L, Dziadek J. *Physician Integrated Network: A Second Look*. Winnipeg, MB: Manitoba Centre for Health Policy, 2014.

Katz, A., Herpai, N., Smith, G., Aubrey-Bassler, K., Breton, M., Boivin, A. …Wong, S.T. (2017). Alignment of Canadian Primary Care With the Patient Medical Home Model: A QUALICO-PC Study. Annals of Family Medicine, 15(3), 230-236. doi: 10.1370/afm.2059.

Kauffman, S. (2000). Where good ideas come from: The natural history of innovation. New York: Penguin.

Khan, A.I., Barnsley, J., Harris, J.K., & Wodchis, W.P. (2021). Examining the extent and factors associated with interprofessional teamwork in primary care settings. Journal of Interprofessional Care, 36(1), 52-63. Doi:10.1080/13561820.2021.1874896

Khan, S., McIntosh, C., Sanmartin, C., Watson, D., & Leeb K. (2008). Primary Health Care Teams and Their Impact on Processes and Outcomes of Care. Statistics Canada. www.statcan.gc.ca/pub/82-622-x/82-622-x2008002-eng.pdf.

Kiran T, Kopp A, Glazier RH. (2016). Those left behind from voluntary medical home reforms in Ontario, Canada. The Annals of Family Medicine, 14(6):517-25.

Kiran, T., Moineddin, R., Kopp, A., & Glazier, R. H. (2022). Impact of team-based care on emergency department use. The Annals of Family Medicine, 20(1), 24-31. DOI 10.1370/afm.2728

Manns, B.J., Tonelli, M., Zhang, J., Campbell, D. J., Sargious, P., Ayyalasomayajula, B., ... & Hemmelgarn, B. R. (2012). Enrolment in primary care networks: impact on outcomes and processes of care for patients with diabetes. Canadian Medical Association Journal, 184(2), E144-E152. doi:10.1503/cmaj.110755

McGowan, K., & Westley, F. (2015). At the root of change: The history of social innovation. In New frontiers in social innovation research (pp. 52-68). Palgrave Macmillan, London.

McKay, M., Lavergne, M. R., Lea, A. P., Le, M., Grudniewicz, A., Blackie, D., ... & Rudoler, D. (2022). Government policies targeting primary care physician practice from 1998-2018 in three Canadian provinces: A jurisdictional scan. Health Policy. DOI 0.1016/j.healthpol.2022.03.006

McKeen, A. (2022). Amid shortages of family doctors across Canada, med school grads increasingly don't want the jobs. Toronto Star. https://www.thestar.com/news/canada/2022/04/27/amid-shortages-of-family-doctors-across-canada-med-school-grads-increasingly-dont-want-the-jobs.html

Metusela, C., Dijkmans-Hadley, B., Mullan, J., Gow, A., & Bonney, A. (2021). Implementation of a patient centred medical home (PCMH) initiative in general practices in New South Wales, Australia. BMC Family Practice, 22, 1-15.

Mitra, G., Grudniewicz, A., Lavergne, M. R., Fernandez, R., & Scott, I. (2021). Alternative payment models: A path forward. Canadian Family Physician, 67(11), 805.

Nutting, P. A., Crabtree, B. F., Miller, W. L., Stewart, E. E., Stange, K. C., & Jaén, C. R. (2010). Journey to the patient-centered medical home: a qualitative analysis of the experiences of practices in the National Demonstration Project. The Annals of Family Medicine, 8(Suppl 1), S45-S56.

Ontario College of Family Physicians. (2022). OCFP responds to Ontario's Plan to Stay Open. Ontario College of Family Physicians. https://www.ontariofamilyphysicians.ca/news-features/family-medicine-news/~255-OCFP-Responds-to-Ontario-s-Plan-to-Stay-Open

O'Toole, D., Sadik, M., Inglis, G., Weresch, J., & Vanstone, M. (2022). Optimising the educational value of indirect patient care. Medical Education, 56(12), 1214-1222. doi: https://doi.org/10.1111/medu.14921

Payne, E. (2022). Burned out, closing practices: Family doctors warn healthcare situation will likely get worse. Ottawa Citizen. https://ottawacitizen.com/news/local-news/burned-out-closing-practices-family-doctors-warn-health-care-situation-will-likely-get-worse

Pourat, N., Lu, C., Chen, X., Zhou, W., Hair, B., Bolton, J., ... & Sripipatana, A. (2023). Staffing transformation following Patient-Centered Medical Home recognition among Health Resources & Services Administration-funded health centers. Health Care Management Review, 48(2), 150-160.

Sandelowski, M. (2010). What's in a name? Qualitative description revisited. Research in nursing & health, 33(1), 77-84.

Starfield, B., Shi, L., & Macinko, J. (2005). Contribution of primary care to health systems and health. The milbank quarterly, 83(3), 457-502. doi: 10.1111/j.1468-0009.2005.00409

Statistics Canada. (2023). A Portrait of Seniors in Canada: Introduction. https://www150.statcan.gc.ca/n1/pub/89-519-x/89-519-x2006001-eng.htm

Statistics Canada (2018). Health Region Peer groups – Working Paper. https://www150.statcan.gc.ca/n1/pub/82-622-x/82-622-x2018001-eng.htm.

Statistics Canada (2019). Postal Code Conversion File Plus (PCCF+) Version 7 C.

Strumpf, E., Ammi, M., Diop, M., Fiset-Laniel J., & Tousignant P. (2017). The Impact of Team-Based Primary Care on Health Care Services Utilization and Costs: Quebec's Family Medicine Groups. Journal of Health Economics, 55, 76–94. doi:10.1016/j.jhealeco.2017.06.009.

Westley, F., Olsson, P., Folke, C., Homer-Dixon, T., Vredenburg, H., Loorbach, D., Thompson, J., Nilsson, M., Lambin, E., Sendzimir, J., Banerjee, B., Galaz, V. and Van der Leeuw, S. (2011) 'Tipping Toward Sustainability', AMBIO, 40: 719–38.

Westley, F., McGowan, K., & Tjörnbo, O. (2013, November). The history of social innovation. In *Keynote speech at NESTA Social Frontiers Conference, November* (Vol. 14).

Westley, F., Zimmerman, B. and Quinn Patton, M. (2006) Getting to Maybe: How the World Is Changed. Toronto: Random House.

Wong, S. T., Johnston, S., Burge, F., Ammi, M., Campbell, J. L., Katz, A., ... & Hogg, W. (2021). Comparing the Attainment of the Patient's Medical Home Model across Regions in Three Canadian Provinces: A Cross-Sectional Study. Healthcare Policy, 17(2), 19.

Yin RK. Case study research design and methods. 5th ed. Thousand Oaks: Sage; 2014. p. 282.

Appendix A: Demographic and Screening Questionnaire

*** Note that participants are able to skip any question they do not want to answer. They can submit their survey as incomplete survey by clicking the "Next" button to the end of the survey and then click the "Submit" button. Participants can exit the survey by closing their browser at any point if they do not wish for their data to be recorded.

1. **How old are you?**
    a. Age: [Numerical]
    b. I prefer not to say

2. **Please select the option that best describes your gender:**
    a. Woman
    b. Man
    c. Gender fluid
    d. Non-binary
    e. Two-Spirit
    f. I prefer not to answer

3. **How many years of clinical experience do you have?**
    a. Years: [Numerical]

4. **What type of practice do you work at?**
    a. Practice: [Free Text]

5. **Where is your practice located (in terms of province) in Canada?**
    a. Province: [Free Text]

6. **What is your role at this practice?**
    a. Role: [Free Text]

7. **How long have you been working at this practice?**
    a. Years: [Numerical]

Appendix B: Practice Audit Questionnaire

*** Note that participants are able to skip any question they do not want to answer. They can submit their survey as incomplete survey by clicking the "Next" button to the end of the survey and then click the "Submit" button. Participants can exit the survey by closing their browser at any point if they do not wish for their data to be recorded.

1. **What is the practice's population size?**
   a. Answer (Numerical):

2. **On average, how many patients are attached to a single family physician at this practice?**
   a. Answer: (Numerical):

3. **What is the remuneration structure of this practice?**
   a. Fee for Service
   b. Salary
   c. Capitation
   d. Service Contract
   e. Blended, describe:
   f. Other, please specify:

4. **What is the size of the team?**
   a. Answer (Numerical):

5. **How many family physicians work in this practice?**
   a. Answer (Numerical):

6. **How many registered nurses and/or nurse practitioners work in this practice?**
   a. Answer (Numerical):

7. **How many allied healthcare professionals (e.g., physician assistant, social worker, mental health counsellor, registered dietician) work in this practice?**
   a. Answer (Numerical):

8. **How many administrative staff work in this practice?**
   a. Answer (Numerical):

9. **Does this practice have an after hours clinic?**
   a. Yes b. No

10. **Does this practice have and manage an electronic medical record?**
    a. Yes b. No

11. **If [Yes] to Q10: Which one?**
    a. Answer:

Appendix C: Interview Guide

Introduction and Purpose of Interview

Thank you for participating in this research study. As you may know, the purpose of this study is to understand the extent to which your practice has achieved some of the key principles of the *Patient's Medical Home* as outlined by the College of Family Physicians of Canada. Your practice has been recognized as one, amongst several others, that achieved having team-based, interprofessional support with family physician leadership. We think this is a great achievement and so, we're really interested in understanding some of the processes, mechanisms, structures, and practice features that supported this development or practice transformation.

To do this, I'll ask you some open-ended questions about the features of your practice, and the processes and mechanisms that the practice underwent to support its development or transformation. I also invite you to tell me anything you feel is important for us to know with respect to the research question.

I also want to remind you that you don't need to answer any questions that are uncomfortable, and we can stop the interview at any time. The interview will be recorded; however, each interview will be de-identified, meaning that anything said will not be linked back to you in order to protect your identity.

Do you have any questions before we begin?

A. **Participant Profile and Demographics:**

To begin, we are collecting some information on professional role and demographic features of our participants.

1. Can you first tell me what your role is in the practice (e.g., Lead Family Physician, Clinical Manager, Executive/Clinical Director, etc.)?
    a. Do you hold any leadership positions elsewhere in the healthcare system that intersect with your role in this practice?
    b. How long have you worked at this practice?

2. Thank you for sharing that with me. We're also interested in collecting some demographic information. Would you be able to describe any features of your social identity that you believe are important for us to know and/or feel comfortable disclosing?
    a. Gender
    b. Education level
    c. Racial background
    d. Ethnicity
    e. Marital status

B. **Practice Characteristics and Context**

We're going to switch gears a little bit and talk about your practice. To help tailor our questions and contextualize your answers, we'd like to learn more about the practice at which you work.

3. Can you first describe your practice to me? It could be anything related to the scope of services it provides, the patient populations it serves, the location, the practice model and remuneration structure.
    a. How would you describe the practice model of [insert Practice/Clinic Name]?
    b. What patient populations does your practice serve?
        i. What are the demographic characteristics (e.g., age range, cultural or ethnic backgrounds, socioeconomic status) of the patient population that you serve?
    c. Do you accept walk-in patients?
    d. Where is the practice located in terms of geographic location?
    e. What types of services does it provide?
    f. What type of healthcare professionals work at your practice (e.g., family physicians, registered nurses and/or nurse practitioners, registered dieticians, mental health counsellors, physiotherapists, etc.)?
        i. Would you describe your practice to be an interprofessional, team-based one?
    g. How are physicians remunerated?

C. Mechanisms, Processes and Structures to Practice Development and/or Transformation

Thank you for sharing some information about your practice. As part of this research, we've identified several family practices (like yours) across the country that have developed a family physician-led, team-based interprofessional approach to coordinating and delivering care to patients. We think this is amazing accomplishment and so, we are really interested in hearing more about how this practice achieved this development or transformation.

1. **Did your practice always have a team-based interprofessional structure since its formation?**

2. **When did the *first* development or transformation towards this interprofessional, team-based care happen?**
    a. What was the context for this transformation? Why was it happening?
    b. What was happening in the larger healthcare system at the time of this transformation?

3. **Can you describe the journey or process of developing or transforming your family practice?**
    a. What were the initial steps or actions taken to initiate the practice development or transformation process?
    b. Who took these actions?
    c. What were their positions or relationship to the transformation that took place?
    d. Was the change initiated at the level of the practice?
        i. Or was the practice directed by an external group to make this change?

[If the practice did not begin at inception as an interprofessional team-based model]

4. **What did your practice look like before?**
    a. What was the model of the practice?
        i. Independent?
        ii. Loosely collaborative with other practices in the region?

5. **What were the specific mechanisms or structures that were implemented to support the development or transformation efforts of this practice?**

[Changes]:

a. Did you make any specific changes to the:

i. Practice's staffing?

- How so?
- What type of healthcare workers were added to the team?
- **How did you add them to the team?**
  - How do they work within the team?
  - Do they work adjacent to the family physician?
  - Are they integrated within the team?

ii. Practice's organizational structure or governance?

- What is the governance of the practice?
- Is it owned and operated by a regional health authority? Community organization?

iii. Practice's policies?

iv. Workflow processes?

[Agents and Actors]:

b. Did you bring in any external stakeholders or human resources to support the development or transformation?

i. **If [YES]:** What type of external stakeholders did you bring in (e.g., government, local community members or organizations, etc.)?

- How did you know or decide to bring in these stakeholders?
- What were their responsibilities during the development or transformation?

[Communication]:

c. How did you coordinate and communicate with your practice associates and staff members regarding the development or transformation?

i. Did you hold any regular team meetings or huddles?

ii. Were specific roles and responsibilities assigned to various practice members?

[Training]:

d. Did you or the practice provide any training or facilitate workshops to support and guide the practice members during the practice development and transformation?

i. **If [YES]:** What type of training or workshops did you facilitate?

- How often were these training sessions or workshops held?

6. **In your experience, were there any support or resources that helped facilitate or ease the process of undergoing this transformation?**

a. Did you rely on any evidence-based research (e.g., publications)?

i. **If [YES]:** Where did you find this evidence-based research?

- Did you consult any experts?
- Who did you consult?

- Did you find the research helpful?

b. Did you review any federal or provincial or local policy documents?
   i. **If [YES]:** Where did you find these policy documents?
      - Were these policy documents helpful or useful?

c. Did you look at any examples of team-based family medicine practices in other provinces, territories or countries?
   i. **If [YES]:** What were they?
      - What models did you like? Didn't like?
      - How come you liked/didn't like them?

[Funding]:

d. Did you receive any external support such as funding, training, guidance or other resources to facilitate the development or transformation?
   i. What funding was available?
      - How much funding was available?
      - Who was providing the funding?
        - Regional Health Authority?
        - Communities?
        - Self-investment?
        - External funding opportunities?
   ii. How did you come to learn about the funding opportunity?
      - Who did you connect with to learn about the funding opportunity?
      - How did you know to connect with this person or organization?
   iii. What was the process for accessing this funding?
   iv. Was the funding raised by a group or organization? Can you tell me more about that?

[If lobbying to government or other stakeholders for funding]:

e. What features or ideas are you presenting to support your application to the government?
   i. Are you highlighting that this will help to improve access to care for the clinical populations you serve? (e.g., underserved social groups, complex patients)
   ii. Are you highlighting that this will strengthen your position teaching site, and your roles in education and training?

[Training]:

f. What training was available?
   i. Who provided the training?
   ii. What was the process for receiving training or guidance?

[Resources]:

g. What other resources were available to support this initiative?
   i. Where or how did you access this resource?
   ii. How did you come to know about accessing this resource?

iii. What was the process for accessing and using this resource?

6. In your experience, did you face any barriers in transforming your practice?

a. **If [YES]:** What constraints or obstacles did you face when transforming or developing your practice?

i. Infrastructure
ii. Workflow processes
iii. Stakeholder engagement and buy-in (e.g., practice members, patients)
iv. Inadequate resourcing (e.g., funding, human resources)
v. Timeline

b. How did these obstacles affect the transformation or development process?

c. Did you address these challenges?

i. **If [YES]:** How did you address these challenges?

- What strategies or solutions did you or the practice implement?
- Did you have to make any changes to the process or resources to adequately address these challenges?
- Did you consult or recruit external collaborators or stakeholders to guide you and the practice in overcoming these challenges?

ii. Did you learn any key lessons or have any reflections from overcoming these challenges?

D. Motivators, Catalysts, or Drivers for Practice Development and/or Transformation

1. **What was the motivation behind transforming or developing your practice to have interprofessional, team-based support?**

a. [Patient Needs]: Were there any consideration or challenges related to your patient population and their healthcare needs that influenced your motivation?

i. How did you come to understand what the patient's needs are?
ii. How did you ensure your practice development or transformation was tailored to meet the needs of your local community?
iii. Did you seek out or receive any feedback from the patients or community to inform this development or transformation?
iv. Geographic location: Are there any geographic barriers in accessing care for patients in your practice?

b. [Practice Gaps]: Were there any specific perceived gaps or limitations in your practice that influenced this change?

i. What gaps or limitations were those?
ii. How did you come to identify these gaps or limitations?
iii. What impact were these limitations having on the practice? Its patients?

iv. How did you perceive this transformation to improve or address these gaps or limitations?

c. [External Factors]: Was there any major external factors that influenced or drove this development or transformation?

i. Local / provincial / federal policy changes?
ii. Call for available funding opportunities?

2. **How were decisions made about the needs for the practice when considering practice transformation?**

E. Evaluation of Success and Impact of Practice Development and Transformation

1. In your view, do you think the practice transformation was/will be successful?
    a. Why or why not?

2. Did you conduct any assessment or implement any quality improvement initiatives in your practice to understand whether its development or transformation was successful?
    a. **If [YES]:** What assessment or quality improvement initiatives did you implement?
        i. Were there any performance indicators or metrics you considered or used for measuring the success of practice transformation?
            - If so, what were they?
            - How did you measure those metrics?
        ii. Were there any metrics that you considered but did not use to measure the success of practice transformation?
            - Why did you not use them?

    b. Did you implement or use any patient or staff satisfaction surveys to assess the outcome of the transformation or development?
        i. **If [YES]:** What questions or prompts did you ask in these surveys to assess the outcome and to understand that the transformation was successful?
            - What questions or prompts were important to ask to understand that you were meeting the needs of the community and the practice?
        ii. Did you use these surveys to drive other improvements or transformations in your practice?

3. Have you observed or noticed any improvements or changes in the practice after the transformation?
    a. **If [YES]:** What changes or improvements have you noticed?

4. From your perspective, do you think the transformation or development had any impact on the following:
    a. The clinical staff?
        i. **If [YES]:** How so?

- Addition of new interprofessional team?
- How are the interprofessional staff remunerated/funded?

b. The patients?

i. Did you observe any changes regarding:

- Number of virtually-rostered patients
- Number of visits to the family physician
- Number of specialist service visits
- Continuity in care
- Type of care received (e.g., preventative)
- Hospitalization or emergency room visits

c. How did the transformation affect the practice overall (e.g., workflow process, efficiency, care management)?

d. Physician well-being and satisfaction?

F. Evolution of Practice Development and Transformation

So, it's been some time since the practice's first transformation or initial development. We're also interested in hearing about how your practice has evolved since that initial transformation.

1. Can you tell me if the practice has evolved in any way since the initial development or transformation into an interprofessional, team-based practice that is family physician-led?
   a. **If [YES]:** How has the practice evolved?
      i. Were there any key milestones or changes that have happened since the first development?
   b. What led the practice to evolve over time?
      i. Were there any changes in patient or community healthcare needs?
         - Did you receive any patient feedback or input?
      ii. Were there any changes in the external environment that the practice felt compelled to respond to since its first transformation?
         - New funding opportunities?
         - New or change to existing local / provincial / federal policies?
         - Pandemic?

2. Did the practice encounter any major challenges or hurdles throughout its evolution?
   a. **If [YES]:** What were they?
   b. How were they addressed?

G. Lessons Learned and Future Directions or Recommendations

1. In reflecting on your experiences with transforming or developing your practice, what do you think are some of the key lessons your learned?
   a. What do you think were the key success factors that contributed to the practice transformation or development?

i. Were there any strategies that you believed were particularly critical or effective in this process? If so, what were they?
ii. Were there any strategies that you believed were not as helpful or effective in this process? If so, what were they?
iii. Were there any unexpected obstacles or barriers that you faced throughout the process? If so, what were they?

2. Looking back, is there anything you would have done differently or would give any advice to other practices that are embarking on a similar journey or process?

3. Do you have any recommendations or suggestions for other practices that are interested in or are undergoing practice development or transformation?
    a. Any reflections or recommendations regarding resources, or supports (e.g., organizational, human resource, financial support, etc.) that family practices should keep in mind for undergoing transformation or development?

4. Is there anything else you would like to share with us in regard to transforming your practice?

Thank you.

Appendix D: Databases and Datasets Accessed at ICES

Data Provider/Type	Database or Dataset Name	Data Years	Rationale
Health Services	Ontario Health Insurance Plan Claims Database (OHIP) (Data available from: Jul 1991-Jul 2023)	2015/16 to 2020/21	To observe the number of annual patient visits per family physicians in total, and for sub-groups. To observe the proportion of patients who have access to preventative care services.
ICES-derived Cohorts	Primary Care Population (PCPOP) Data available from: Apr 1995-Oct 2022	2015/16 to 2020/21	To identify the number of patients rostered or virtually rostered in the SITB and FPMH cohorts. To observe the number of preventative care services accessed, such as mammograms and pap smears.
Care Providers	Corporate Provider Database (CPDB) Data available from Apr 1965 and Jun 2023	2015/16 to 2020/21	To identify and link primary care practices to health administrative and billing data, and to create a non-team based, matched virtual cohort.
Coding & Geography	Postal Code Conversion File (PCCF)	2015/16 to 2020/21	To identify physicians not part of a team associated with PHUs of interest.
Care Providers	GAPP Decision Support Systems (Physician Payments) Data available from Apr 2005 and Mar 2020	2015/16 to 2020/21	To identify clinics of interest and family health teams,
ICES-derived Cohorts	Chronic Obstructive Pulmonary Disease Dataset (COPD) Data available from Apr 1991-Mar 2021	2015/16 to 2020/21	To observe the number of family physician visits among a sub-group with chronic conditions.
ICES-derived Cohorts	Ontario Diabetes Dataset (ODD) Data available from Apr 1991- Mar 2022	2015/16 to 2020/21	To observe the number of family physician visits among a sub-group with chronic conditions.
ICES-derived Cohorts	Congestive Heart Failure Dataset (CHF) Data available from Apr 1991-mar 2021	2015/16 to 2020/21	To observe the number of family physician visits among a sub-group with chronic conditions.

Appendix E: Databases Accessed at MCHP

Database	Data Years	Approver	Rationale
Shared Health Diagnostic Services	2015/16-2022/23	Shared Health Diagnostic Services (SHDS)	To observe the proportion of preventative care services accessed, such as cholesterol screening for cardiovascular disease, blood sugar screening for diabetes, and more.
Hospital Abstracts	2010/11-2022/23	Manitoba Health (MH)	To identify individuals with chronic conditions.
Manitoba Public Health Information Management System	2015/16-2022/23	Manitoba Health (MH)	To observe the proportion of preventative care services accessed, such as cholesterol screening for cardiovascular disease, influenza immunizations, and more.
Medical Claims/ Medical Services	2010/11-2022/23	Manitoba Health (MH)	To identify individuals with chronic conditions. To observe the proportion of preventative care services accessed, such as cholesterol screening for cardiovascular disease, influenza immunizations, and more.
Manitoba Health Insurance Registry	2010/11-2022/23	Manitoba Health (MH)	To link de-identified individuals across databases
Provider Registry (Physician Master File)	2015/16-2022/23	Manitoba Health (MH)	To link de-identified individuals across databases. To observe the number of visits paid to family physicians by the rostered patient within a year
Electronic User Site Location	2015/16-2022/23	Manitoba Health (MH)	To link patients to a practice site

Appendix F: Outcomes and Analysis of Variables(ICES/MCHP)

VARIABLE	DEFINITION	ANALYSIS	RATIONALE AND OUTCOME
NUMBER OF PHYSICIANS	The average number of physicians practicing at a particular site over time.	Mean number over the 8-year period will be calculated for each practice and aggregated across all sites within a particular cohort.	These average physician counts will be used to standardize the variables, allowing for comparisons across practices of different sizes.
NUMBER OF ROSTERED PATIENTS	The average number of virtually and formally rostered patients in the time window relative to the number of unattached patients.	Standardize per average physician. One-way ANOVA to compare between cohorts (SITB versus FPMH and SITB vs VCM).	To evaluate the impact that self-initiated team-based care has on patient attachment, and whether there are significant differences compared to FPMH and VCM cohorts.
TOTAL FAMILY PHYSICIAN VISITS	The average number of patient visits per year over the 7-year analysis window will be determined for each cohort. Patient visits for any reason will be included.	Standardize per average physician. One-way ANOVA to compare between cohorts (SITB versus FPMH and SITB vs VCM).	To determine the impact on the frequency of patient visits following the development of team-based care, and whether there are significant differences to FPMH and VCM cohorts.
FAMILY PHYSICIAN VISITS PER UNIQUE PATIENT	The average number of annual visits per unique patient over the 6-year time frame will be calculated.	Standardize per average physician. One-way ANOVA to compare between cohorts (SITB versus FPMH and SITB vs VCM).	To determine if there are any significant changes in the frequency of visits by unique patients to family physicians following the development or transformation, in comparison to FPMH and VCM cohorts.
FAMILY PHYSICIAN VISITS WITHIN SUBGROUPS OF ELDERLY.	Elderly patients are defined as individuals 65 years or older (Statistics Canada, 2023). The average number of annual visits by a sub-group of older adults across the analysis window will be calculated.	Standardize per average physician. One-way ANOVA to compare between cohorts (SITB versus FPMH and SITB vs VCM).	To gain an understanding of the impact of team-based care in terms of primary care visits for a sub-group of older adults, and whether there are differences to FPMH and VCM cohorts.
FAMILY PHYSICIAN VISITS BY PATIENTS WITH CHRONIC CONDITIONS	The average number of annual visits by a sub-group of patients with at least one chronic condition across the analysis window will be calculated. These will include conditions of diabetes, COPD, and cardiovascular disease.	Standardize per average physician. One-way ANOVA to compare between cohorts (SITB versus FPMH and SITB vs VCM).	To gain an understanding of the impact of team-based care in terms of primary care visits for a sub-group with chronic conditions, and whether there are differences to FPMH and VCM cohorts.
CONTINUITY OF CARE	The average proportion of family physician visits by rostered patient with the same provider at the practice across the 8-year time period.	One-way ANOVA to compare between cohorts (SITB versus FPMH and SITB vs VCM).	To determine whether the development to team-based care will impact patient continuity of care, and whether there are significant differences in care continuity between cohorts of FPMH and VCM.
ACCESS TO PREVENTIVE CARE SERVICES	The average proportion of preventative care services accessed over 6 years will include common screenings for diabetes (e.g., hemoglobin A1C, eye and foot exams), respiratory conditions such as COPD, cardiovascular conditions (e.g., cholesterol screening), and immunizations or vaccinations.	One-way ANOVA to compare aggregated data from the SITB cohort with the FPMH and VCM cohorts.	This variable will help assess the impact of the transformation to team-based care for preventions, in comparison to a non-PMH site, and a formal PMH site.

Appendix G: Sample Aggregated Data Table (ICES/MCHP)

Characteristic		GROUP 1 Self-Initiated Team-Based (SITB) N sites							GROUP 2 Formal Patient Medical Home (FPMH) N sites							GROUP 3 Virtually-Constructed Matched (VCM) N sites						
		2016	2017	2018	2019	2020	2021	2022	2016	2017	2018	2019	2020	2021	2022	2016	2017	2018	2019	2020	2021	2022
n of physicians in group	n								n							n						
n of patients rostered to physicians in group	n								n							n						
n of virtually rostered patients in group	n																					
n of unattached (no physician) in group	n																					
Proportion of patients with at least one visit in year	n (%)																					
n of physician visits	n																					
	mean (SD)																					
	median (IQR)																					
n of physician visits by those 65+	n																					
	mean (SD)																					
	median (IQR)																					
n of physician visits by those with 1+ chronic condition	n																					
	mean (SD)																					
	median (IQR)																					
n of eligbile patient receiving cancer screenings (subset of population - eligibility based on age and sex)	n																					
	mean (SD)																					
	median (IQR)																					

Appendix H: Case Descriptions for Stage 1

Case 1 is situated in a large city in New Brunswick and is supported by five family physicians, five registered nurses (RNs), one nurse practitioner (NP), one licensed practical nurse (LPN), a diabetic nurse, phlebotomists, and occasionally a dietician. The practice also receives administrative support from 15 administrative staff members. The site has 12,000 patients and serves as a training ground for 10-to-15 family medicine residents per year from various medical schools in the country. The family physicians are remunerated through a fee-for-service payment structure. The LPNs are funded by self-investment while the NP is funded through the regional health authority (RHA) and maintains an independent roster of patients. The NP's practice works adjacent to the case to serve community needs.

Case 2 is a rural, team-based family medicine practice, serving approximately 30,000 patients per year in the Northwest Territories. The practice is comprised of ten family physicians, who are remunerated via a salary model. The practice received interdisciplinary support from five LPNs, two NPs, two community health nurses, and a holistic wellness advisor. Administrative support is provided by eight program assistants. The advisor is conceptualized as someone who does the work of a social worker and a counsellor. The practice was described to serve both Indigenous, complex and high-need patients, and subpopulations of immigrants. It also serves a teaching practice and trains 12 to 16 residents and undergraduate medical students.

Case 3 is located in a small town in British Columbia, and is organized with support from eight family physicians, and two NPs. Administrative support is provided by eight members. The family physicians are remunerated through an FFS structure. This case is also a teaching site, with more than five medical trainees that rotate through this practice. The practice is community-operated and governed by a non-profit organization.

Case 4 is an integrated health center, situated within a small community in Saskatchewan. Two family physicians work in the physician clinic and are remunerated via a salary model. The health center also has four emergency rooms, labs, x-rays, care beds, and long-term care beds all housed within one building. The building is tied to a nearby healthcare association and is connected by the regional health authority (RHA).

Case 5 is a teaching site in a large city in Manitoba and trains approximately 50 learners per year. It is supported by nine family physicians, five RNs, two physiotherapists (PTs), one NP, a psychologist, a dietician, and a pharmacist. The allied healthcare professionals work one or two days per week. Administrative support is provided by nine staff members. The physicians are remunerated through various structures including independent contracts, salary, and FFS.

Case 6 is an interdisciplinary, resident-led group practice in British Columbia that provides comprehensive, longitudinal care to approximately 3,600 patients. It is a community-based teaching practice that takes on approximately 16 to 20 medical learners per year. The group is supported by ten part-time family physicians and two co-located pharmacists that were recruited through a partnership with the pharmacy faculty at the university. The physicians are financially compensated via a blended model consisting of salary and FFS structure. The practice also receives administrative support from four staff members.

Case 7 is situated in an urban area of Ontario, and transformed from an independent, FFS practice to a Family Health Organization (FHO) model that is operated by a team of four family physician partners. The practice has an after-hours component and receives support from a physician assistant (PA), and a mental health counsellor. This is also a teaching practice and recruits four medical learners per year. The team includes a chronic disease and prevention staff member that operate similar to PAs and have dietician knowledge (although they are not a dietician). Administrative support is provided by five staff members. The clinic serves a diverse, complex patient population. This includes approximately 6,000 patients, with 1,500 attached or rostered to a family physician. The physicians are remunerated via a capitation model.

Case 8, located in an urban area of Alberta, is organized around 15 family physicians, seven of which are physician owners and eight are associated. They are supported by 10 RNs, an NP, a behavioural health consultant, a pharmacist and 20 administrative staff. The practice also serves as a training ground for 12 medical learners per year. The physicians serve approximately 25,000 patients, with 1,500 rostered to each physician. They are financially compensated through a blended model that is over 95% capitation and less than 5% FFS. The practice's patients can also access an after-hours clinic. The practice is reportedly contracted by the provincial health agency.

Case 9 operates in a large city in Saskatchewan, and employs a group of 15 family physicians, most of which work on a part-time basis. Physicians are supported by an interdisciplinary team made up of an RN, NP and one part-time pharmacist. Together, the practice cares for a broad range of patient populations and delivers the full scope of primary care services. The clinic also as an after-hours component. The physicians see over 5,000 patients, with 500 rostered to each physician. Furthermore, the case is also a teaching practice and takes on more than 50 medical learners and residents per year. The team is also supported by administrative staff including but not limited to front desk reception, and medical office assistants. The practice underwent transformation with respect to remuneration structure, and this was negotiated with the provincial health authority and the medical association.

Case 10 is defined around a regional government-funded, non-profit healthcare centre that facilitates access to an interprofessional care team comprised of primary care physicians and allied healthcare providers for family medicine practices in urban Ontario. In essence, the centre

functions as a “hub”. The centre operates every day of the week, with some coverage during weekends. This case is one of the family practices that is affiliated with the centre and accordingly, accesses the interprofessional support offered. Healthcare professionals offered by the centre include pharmacists, NPs, social workers, registered dieticians, chiropodists, psychologists, RNs, health educators, RPNs, physiotherapists, therapists, and assessment clinicians. The affiliated practice is a FHO and Family Health Group (FHG) practice that financially compensates the family physicians through a blended model comprised of capitation and FFS structures. The practice provides comprehensive, continuous primary care services to patients of all ages, from newborns to the elderly with support from part-time nursing staff and a PA, and the centre.

Case 11 is a primary care practice located in a large city in Nova Scotia. The practice takes on two to three medical learners each year. The practice found fee-for-service billing to be a barrier to maintaining team-based care, and recently shifted to a blended remuneration structure with rostering, partial billing, and hourly wage. The team is organized around 1 family physician, with 1 nurse, 2 mental health counsellors, 1 registered dietician, 1 physiotherapist, and 2 administrative staff. These providers are co-located and share the cost of overhead, but operate independent practices with shared patients.

Case 12 is a teaching site situated within a community health center in an urban Manitoba setting. The practice takes on about three medical learners per year and cares for approximately 5,500 patients. The practice is organized as a “micro-team model” where there are three micro-teams made up of family physicians, one nurse practitioner, one primary care nurse on one team. There is also a shared team of members that include a social worker, an occupational therapist, a physiotherapist, a psychologist, a part-time pharmacist, a part-time registered dietitian, and a mental health counselor. In addition, the practice has a walk-in clinic component that takes in Canadian Triage and Acuity Scale and emergency room patients. This walk-in clinic is managed by an NP and the general practice receives administrative support from 15 staff members.

Case 13 is a primary care center situated in a large city in Manitoba. The practice houses 20 family physicians, four general surgeons, one wound nurse specialist, two mental health counsellors, two registered dieticians, a clinical pharmacist, and three chronic disease nurses who predominantly support patients with diabetes management. Some of the allied healthcare professionals work under the same ‘roof’ as the primary care center, which also includes laboratory services and a primary care pharmacy. Other professionals may practice out of different spaces (i.e., dietician), but are connected to the clinic via access to the same electronic medical record (EMR). The centre also receives administrative support from four administrative staff members, five medical office assistants, and eight receptionists. Together, the centre cares for approximately 24,000 patients, with 1,500 rostered per physician. The physicians are financially compensated through an FFS model. This clinic is also a teaching facility and takes on 20 medical learners and five residents per year.

Case 14 is a family medicine clinic that is situated within in a small town in Alberta and is supported by two family physicians. The clinic has an interprofessional team composed of four part-time pharmacists, four patient coordinators, two RNs, a mental health counsellor, and an audiologist. Patient care coordinators manage patient administrative responsibilities (e.g., care coordination, referrals) and are the first point of contact for patients. The clinic also occasionally receives support from a psychiatrist once every few months. It is affiliated with the university to train medical learners and residents, and reportedly has the largest patient roster of any practice located within 150 km, serving 5,000 patients. The practice also offers an after-hours and walk-in clinic where non-rostered patients can attend and access care.

Case 15 is defined as a practice that initially started as part of a Shared Care pilot initiative supported by a group of three family physicians, a RN, a social worker, and had administrative support. The practice later expanded in response to government request and became a FHO situated within a Family Health Team (FHT). The FHT now has 18 family physicians, allied health professionals (a variety of interdisciplinary services including social workers, nurses, nurse, practitioners, dietitians, pharmacist, respiratory therapist, and psychologists), and an executive director.

Case 16 is a primary care teaching clinic in rural, northern Manitoba. The practice embodies a micro-team model and takes on between 10 to 15 medical learners per year and serves 200 patients per day. Patients are rostered based on health conditions and are supported by an interprofessional team comprised of 17 family physicians, five RNs, two NPs, seven physician/clinical assistants, a social worker, and a dietician. The clinical assistants provide coverage outside of primary care including travelling to outlying communities, hospital work, nursery, and surgical assistance. The family physicians also work variable hours as they have responsibilities beyond the clinic operations including working in addictions, hospitalist medicine, neonatal care, emergency and caring for outlying communities. Other patient populations served by this clinic include Indigenous peoples, and immigrants. The physicians are financially compensated through a salary model. Additional care access is provided through an after-hours clinic.

Case 17 is a community health center (CHC) located in urban Ontario. The centre serves between 10,000 to 15,000 patients per year, with about 400 patients attached to a family physician. Patients are rostered based on geography and health conditions and are supported by an interprofessional team. Specifically, the centre has six family physicians, nine NPs, three RNs, three RPNs, two clinical dieticians, three diabetes educator dieticians, two PTs, two kinesiologists, a pharmacist, a midwife, and one lactation consultant. In addition to rostering patients, the CHC serves as a "hub" for independent family physicians working in the region. Through an affiliation, independent physicians are able to facilitate access to interprofessional support for their patients by sending a referral to the CHC via the EMR.