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CUP study: protocol for a comparative analysis of centralised waitlist effectiveness, policies and innovations for connecting unattached patients to primary care providers

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ABSTRACT

Introduction Access to a primary care provider is a key component of high-functioning healthcare systems. In Canada, 15% of patients do not have a regular primary care provider and are classified as 'unattached'. In an effort to link unattached patients with a provider, seven Canadian provinces implemented centralised waitlists (CWLs). The effectiveness of CWLs in attaching patients to regular primary care providers is unknown. Factors influencing CWLs effectiveness, particularly across jurisdictional contexts, have yet to be confirmed.

Methods and analysis A mixed methods case study will be conducted across three Canadian provinces: Ontario, Québec and Nova Scotia. Quantitatively, CWL data will be linked to administrative and provider billing data to assess the rates of patient attachment over time and delay of attachment, stratified by demographics and compared with select indicators of health service utilisation. Qualitative interviews will be conducted with policymakers, patients, and primary care providers to elicit narratives regarding the administration, use, and access of CWLs. An analysis of policy documents will be used to identify contextual factors affecting CWL effectiveness. Stakeholder dialogues will be facilitated to uncover causal pathways and identify strategies for improving patient attachment to primary care.

Ethics and dissemination Approval to conduct this study has been granted in Ontario (Queens University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board, file number 6028052; Western University Health Sciences Research Ethics Board, project 116591; University of Toronto Health Sciences Research Ethics Board, protocol number 40335), Québec (Centre intégré universitaire de santé et de services sociaux de l'Estrie, project number 2020–3446) and Nova Scotia (Nova Scotia Health Research Ethics Board, file number 1024979).

Strengths and limitations of this study

- This is the first study in Canada to evaluate the effectiveness of centralised waitlists in primary care in terms of attachment of unattached patients on the centralised waitlist with a primary care provider.
- This study was developed in collaboration with partners across sectors and disciplines, including patients, in response to policymaker identified priorities and knowledge gaps.
- Limitations in comparable measures across jurisdictional boundaries are known and will be mitigated with cross-provincial analysis by experienced team members and the use of mixed methods data triangulation to generate comprehensive, context-sensitive findings.
- A robust integrated knowledge translation and dissemination plan has been developed to ensure rapid uptake of findings and resulting implications to improve patient attachment to primary care.

INTRODUCTION

Compared with other Organisation for Economic Co-operation and Development countries, Canada ranks low in patient access to primary care providers (ie, family physicians or nurse practitioners),[1] which is a fundamental component for a strong healthcare system.[2 3] Despite several Canadian and provincial commissions on healthcare, recommendations to reinforce primary care to guarantee access,[4–9] as of 2017, 4.7 million Canadians, approximately 15.3% of Canada's population, were without a regular primary care provider.[10 11] These patients are classified as 'unattached'.[10 12]

Finding a primary care provider for unattached patients is an important problem in Canada,[13] where primary care providers are typically the first point of contact with the healthcare system, providing continuity in care and referrals to specialised care as indicated. Vulnerable patients and those with complex needs, such as youth, recent immigrants, or those with a low-income level, and/or low social support remain less likely to be attached to a primary healthcare (PHC) provider,[14 15] even though they would benefit more than less vulnerable individuals from access to comprehensive and continuous PHC.[16 17] Unattached patients are less likely to seek care, and use walk-in clinics more frequently than those who are attached.[15] Chronically ill unattached patients have greater disease burden,[18] and considerable concern about meeting their medical needs.[16 17] Unattached patients with serious mental health and substance use disorders have greater burden of suffering[18] and feel stigmatised by their lack of success in attaching to a PHC provider.[16] To address the critical need for linking unattached patients to a primary care provider, 7/10 Canadian provinces have implemented centralised waitlists (CWLs).[19] A CWL is a single point of entry, which may or may not include patient prioritisation, that assigns patients to services from a pool of participating providers.[10 20 21] CWLs aim to improve access by managing the asymmetry between supply and demand for services, that is, greater patient demand than available primary care provider supply.[22] These CWLs generally serve to centralise unattached patients' requests for a primary care provider in a given jurisdiction and match them with primary care providers, with variation in the specific waitlist processes across provinces.[23 24] CWLs are a new phenomenon in primary care and remain underevaluated.[24 25] It is unknown how effectively CWLs attach patients to primary care providers, and moreover, which waitlist attributes and processes best facilitate attachment of patients with a primary care provider.

The CUP study (Comparative analysis of centralised waitlist effectiveness, policies and innovations for Connecting Unattached Patients to primary care providers) is the first in Canada to evaluate the effectiveness of CWLs. A previous study, conducted by our team, described the components of the seven CWLs in Canada and their mechanisms.[10 24] In the knowledge translation and exchange phase of this previous study, policymakers asked for an outcome evaluation of CWLs and recommendations to improve primary care capacity to meet unattached patients' needs, expand provider engagement with CWLs, and optimise patient prioritisation strategies. In response to these key stakeholder requests, the present CUP study will assess CWL effectiveness in attaching patients to a regular primary care provider.

We will employ a mixed methods approach to understand the complexity of assessing outcomes of CWLs in primary care. Using CWL data linked to administrative data in Ontario (ON), Québec (QC), and Nova Scotia (NS), which have different approaches to CWLs, we will compare CWL effectiveness in attaching unattached patients to primary care providers across three provincial primary care contexts. By incorporating qualitative methods to capture and delineate the contextual factors influencing patient attachment, we can open the 'black box' of CWL effectiveness to determine the components, processes and environmental factors that promote primary care attachment.

The CUP study purpose is to compare the effectiveness of CWLs in ON, QC, and NS in attaching unattached patients to primary care providers through the CWL. These three provinces have available data on CWL and have wide variation in provider and patient characteristics.

The CUP study objectives are to:

- Measure the effectiveness of CWLs.
  - Determine the degree to which attachment rate and time to attachment varies by patient, provider, practice, and geographical variables.
  - Compare the number of emergency department (ED) and primary care visits pre/post attachment via CWL to see if attachment reduces ED use and/or increases primary care continuity.
- Describe contextual factors including policies, innovations, and concurrent approaches to patient attachment that affect CWL effectiveness.
  - Determine contextual factors in practice, organisational, and external environments that may affect CWL effectiveness.
- Elicit patient and provider experiences of attachment (including via a CWL).
- Identify strategies to help provinces achieve their goals by identifying enablers, barriers, and modifiers of the effectiveness of CWLs.

METHODS AND ANALYSIS

Study design

We will use a multiple comparative case study design to measure, compare, and understand CWL effectiveness. Case studies generate in-depth understandings of complex phenomena in their real-life context and explain causal pathways.[26–28] By using mixed quantitative and qualitative data collection methods, which is characteristic of case study designs,[29] we will compare CWL effectiveness (ie, rate of patients attached; time to attachment) and explain *how* and *why* any variations in effectiveness exist.[26] Stakeholders, including patients, will be engaged in conducting, reporting, and disseminating the research.

We define the cases as CWLs in ON, QC, and NS, described in detail in our previous work.[25] Table 1 briefly describes some of the characteristics of the CWL within each province. Common features among the three CWLs include the goal of patient attachment to a primary care provider, province-wide implementation with regional-level management and similar patient registration processes.[24] The three cases were selected for their availability of data and ability to link them to administrative data sets, their variation in contextual environments and features including prioritisation of complex patients,

Table 1 Characteristics of CWLs within study provinces

Province	Québec	Ontario	Nova Scotia
Programme name	Guichets d'accès aux clientèles orphelines	Healthcare Connect	Need a Family Practice Registry
Implementation year	2008	2009	2016
Governance			
Province-wide implementation	Yes	Yes	Yes
CWL implemented as a permanent measure	Yes	Yes	Yes
Human resources			
CWL care connectors at regional level	Yes	Yes	Yes
Patients can be attached to nurse practitioners	Yes	No	Yes
Financial resources, guidelines and regulations			
Financial incentives to attach CWL patients	No	Yes	No
Mandatory attachment of CWL patients for certain providers	No	No	No
Prioritisation of patients for attachment			
	Prioritisation of complex/vulnerable patients	Prioritisation of complex/vulnerable patients	Simple prioritisation—certain groups of patients prioritised for attachment

Adapted from Breton *et al*[10]

CWL, centralised waitlist .

list maintenance processes and financial incentives for providers.[10] We will focus analysis over the past five fiscal years (2016–2021).

Analytical framework

We will use the Tomoaia-Cotisel[30] approach for assessing and reporting contextual factors of primary care innovations, which involves: engaging diverse perspectives, considering multiple policy and context levels, time, formal and informal systems/culture, and identifying interactions between policies and contexts. It is tailored specifically to innovations in primary care and considers moderators at multiple levels, including the practice level, organisational level, and external environment.[30] We will apply their framework to all qualitative analysis to understand the contexts influencing the effectiveness of CWLs, as determined via *Objective 1*.

We will employ a fully integrated mixed methods design.[31 32] We will investigate *Objective 1* using quantitative methods, including CWL registry data and administrative healthcare databases. We will investigate *Objective 2* via qualitative interviews with policymakers and conducting policy reviews in each province. *Objective 3* will consist of qualitative interviews with patients and primary care providers to elicit their experiences with CWLs. In *Objective 4* we will identify enablers, barriers, and modifiers of CWL effectiveness, applying the Tomoaia-Cotisel framework to integrate findings from *Objectives 1, 2*, and *3* and create meta inferences.[31 32] Our study treats qualitative and quantitative methods with equal status, operationalised through two dominant quantitative and qualitative arms. We operate from a transdisciplinary perspective through attention to collaboration within and across the study arms and being open to creating new concepts and approaches for our study.[33 34]

Objective 1: measure the effectiveness of CWLs for attaching patients to primary care provider

In this study, we define patient attachment in the context of CWLs in two ways: as the date when a patient has been assigned to a provider from the CWL; and the date a patient has a first appointment with a provider via the CWL. The principal focus of *Objective 1* is the delineation of counts, proportions and rates of patient attachment and time to attachment in ON, QC, and NS. We will analyse CWL data to assess patient attachment via CWL over time (key measures of interest summarised in table 2). Resulting measures will be stratified by demographics (eg, age, sex, rurality), pre-existing comorbidity as a measure of patient complexity, and select measures of prior health service utilisation (eg, ED visits, potentially unnecessary hospitalisations) as indicators of need. Provider-specific measures of attachment will be stratified by demographic and professional characteristics (eg, fee for service vs alternate funding plan; solo vs collaborative team). Findings will be compared within and across provinces.[35]

Linking CWL data to administrative databases allows examination of relationships between the main attachment outcomes listed above (attachment through CWL and delays) and predictors such as demographics and health complexity status. We will also analyse the

Table 2 Outcome measures and definitions to be used in the evaluation of centralised waitlist effectiveness

Name	Definition
Number registered	Number of individuals registered on waitlist in a study interval (eg, fiscal year).
Number placed	Number of individuals attached from the centralised registry, of those registered, at regular intervals (eg, monthly).
Number attached	Number of individuals attached (placed by registry and other means), of those registered, at regular intervals (eg, monthly).
Placement duration	Time to attachment with primary healthcare (PHC) provider (date of placement—date of registration), of those registered.
Attachment duration	Time to attachment with PHC provider (date of attachment—date of registration), of those registered.
Number of providers	Number of providers in waitlist database in a study interval (eg, fiscal year).
Number of attaching providers	Number of providers in waitlist database who attach ≥1 individual(s) over a study interval (eg, fiscal year).
Proportion/rate of attachment	Proportion of attached individuals, of those registered, over a regular study interval (eg, monthly).
Proportion/rate of placement	Proportion of placed individuals, of those registered, over a regular study interval (eg, monthly).
Proportion of attaching providers	Proportion of providers in centralised waitlist database who attach ≥1 individual(s) in a study interval (eg, fiscal year).

association between the waiting time and the index of deprivation area, comparing patients who were attached versus those who were unattached.[36] While there is no standard way to define complex patients across the three provinces, we will use a standard definition of complexity[37] for cross-provincial analysis (ie, 2+ chronic conditions defined by Canadian Chronic Disease Surveillance System (CCDSS)[38] and/or 4+ ED visits in the year prior to attachment). The different CCDSS conditions (congestive heart failure, chronic obstructive pulmonary disease, diabetes, and mental illness or substance use disorders) will be categorised both separately and together in different models, as cumulative effects of multiple conditions add burden and need for care. Secondary analysis will identify which conditions may be most sensitive to increased or reduced healthcare (ED, primary care) visits once attached to a provider.

We will link provincial CWL registry data to other, routinely collected administrative data, via established processes within The Institute for Clinical Evaluative Sciences in ON, Health Data Nova Scotia and Régie de l'assurance maladie du Québec, which all house multiple health and social services data sets in a secure environment.

Patient health card numbers will be retrieved from each CWL and encrypted by a third party to link patient information in administrative databases. Similarly, family

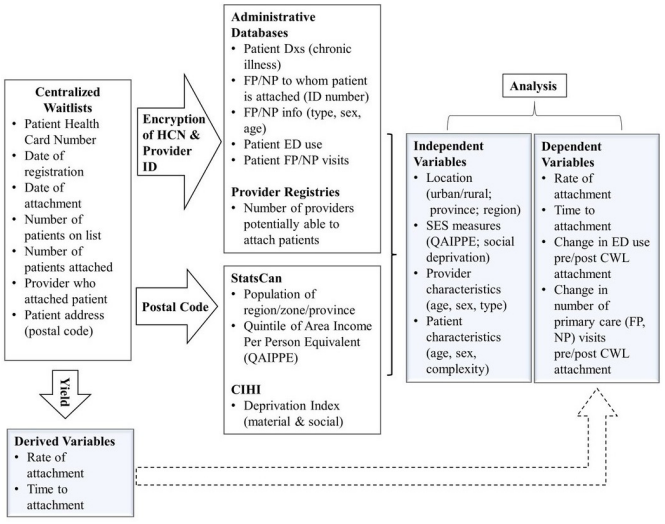

Figure 1 Planned linkage, and analyses. CIHI, Canadian Institute for Health Information; CWL, centralised waitlist; Dxs, diagnoses; ED, emergency department; FP, family physician; HCN, health card number; NP, nurse practitioner; SES, socioeconomic status.

physician provincial medical board numbers and registration numbers of nurse practitioners who accept patients from the CWL will be encrypted so provider information may be securely retrieved from the administrative databases. Data sources and their linkage are illustrated in figure 1.

We will first look to the CWLs to identify patients who have been removed from the list. We can further identify patient attachment via formal rosters, where available, or by identifying the date of a first encounter between the patient and provider. This approach may be limited in some jurisdictions where first meetings ('meet and greets') are unbilled appointments and a second appointment may not be needed within the study period.[39] In this case, we can triangulate by determining whether the patient has been returned to the list (which occurs in all study provinces if attachment fails).

Data analysis

Data addressing *Objective 1* will include several sources. Analysis will be conducted using SAS software (SAS Institute). Frequencies of relevant provider and patient characteristics will be presented for each province and regions within provinces. *Bivariate analyses* will examine simple relationships between each predictor (eg, number of providers available stratified by time in practice, baseline attachment rate, age, sex, rurality, income quintile, Canadian Institute for Health Information (CIHI) social deprivation scores, and chronic conditions)[40] and primary outcomes of interest—patient attachment rate and time to attachment. Secondary outcomes include observed changes in ED and primary care visits pre/post attachment. Depending on the number of available cases, bivariate comparisons may be done for each region within provinces, as well as provinces as a whole. Bivariate

methods used depend on the normality of the variables' distributions. Parametric tests will be used where the data are normally distributed, and non-parametric tests will be used where the data are not normally distributed.

Similar regional and provincial comparisons will be run for the subset of patients with complex needs, determined from administrative data, as defined by the CCDSS.[38] Attachment rates for these patients can be compared with rates for the general population of unattached patients using bivariate parametric or non-parametric measures as appropriate, within and between provinces.

Appropriate to the issue of time to patient attachment is *survival analysis*, which relates the time that passes before an event occurs to one or more covariates that may be associated with that quantity of time. In this study, the 'event' is attachment to a primary care provider, and the covariates are the predictors, including patient age, sex, rurality, time already spent as an unattached patient (weeks), income quintile, CIHI social deprivation score, and complexity (chronic illness; ED use). A proportional hazard model will be constructed for each fiscal year. Within each fiscal year, models can be constructed to examine relationships among the predictors and attachment within 3 months, 6 months, and attachment by the end of the fiscal year. The resulting regression equations will be used to develop predictive models with associated sensitivity and specificity measures indicating how well patient attachment can be predicted using the measures we have, and which measures are most important in the predictions.

Stratified analyses will be conducted to quantify the effect of rurality, as previous studies have suggested access to a primary care provider may have a different impact in rural versus urban areas.[41–43] Provider age and sex, and patient age, sex, and self-reported gender from CWL data will be included in the models as predictors, and we will include interaction terms, as patient age and gender affect provider preferences for providers and are often concordant with patient age and gender (eg, women more frequently request a female provider and once attached to a provider, and a provider's roster becomes full, the patient and provider age together).[44–46] The multivariate analyses will be repeated using the subset of patients with complex needs to determine if a measure of attachment equity exists between these patients and the general population of unattached patients.

Secondary analysis will include changes in rates of ED use, number of primary care visits pre/post attachment and number of visits to same provider/clinic (continuity) at 3, 6, and 12 month intervals. A reduction in ED use and increased primary care visits with continuity would align with expected outcomes of primary care attachment.[47 48] Relationships between predictors and secondary outcomes will involve multivariate analysis for count data such as Poisson or negative binomial regressions. We will use stepwise backward elimination in which all variables are entered in the equation, then sequentially removed, deleting each variable whose loss gives the most insignificant deterioration of the model fit. This is repeated until no further variables can be deleted without statistically significant loss of fit. This results in the most parsimonious models to explain the variation in outcomes.

Objective 2: identify contextual factors affecting CWL effectiveness

Understanding policy and contextual factors that influence health system innovation implementation is critical to interpreting effectiveness findings (*Objective 1*) and making recommendations for transformation, scale, and spread.[25 49 50] Each provincial team will conduct a review to identify and examine existing policies and contexts influencing the capacity for patient attachment via the CWL.[51 52] This will include examining in each province: provider hiring and funding policies, primary care delivery models, financial incentives, programmes and innovations that help meet the needs of unattached patients and/or assist with patient attachment outside of the CWL system, and other policies that may play moderating roles in the process of attachment via CWLs.

Data collection

To collect data for document analysis, we will conduct interviews with policymakers followed by a document search. We will elicit guidance from the policymakers on what policies and key contextual documents exist, whom to consult for further policy and document identification related to primary care access and/or attachment, where to look for grey literature (ie, materials that are not formally published)[53] on provincial policies of interest and key search words to use.

We will use a convenience sample (ie, study policymakers) followed by snowball sampling, a successful method to identify key informants with a specific policy or content expertise (ie, CWLs and patient attachment).[54] We will conduct recorded qualitative interviews virtually using Zoom video conferencing (Zoom Video Communications) and recordings will be transcribed verbatim. Interviewers will take comprehensive field notes during and immediately following the interviews.[55] We aim to interview 10 stakeholders per province, or until we reach saturation.[56 57]

We will use the information gathered through policymaker interviews to conduct a grey literature search in each province to identify relevant policies and key contextual documents. We will return to the policymakers iteratively until a comprehensive set of relevant policies and context documents are identified.

Data analysis

Interview transcripts, identified policies, and contextual documents will be examined using framework analysis,[58] incorporating the Tomoaia-Cotisel framework for understanding primary care interventions' contexts through the use of spreadsheets that map findings to the framework.[58] The framework method sits within the collection

of analysis methods termed thematic analysis, which involve coding, categorising, and theme identification and refinement,[58] and is a practical and recommended analytical approach for case studies.[26] One of the defining features of the framework method is matrix output, which displays a table that organises and summarises the data according to cases (individual documents) in rows and codes (descriptive or conceptual labels applied to excerpts of raw data) in columns.[58] We will use the Tomoaia-Cotisel framework to assign the column labels. This matrix provides a structure into which researchers organise and reduce the data, and readily compare and contrast data across and within cases.[58] This analysis method aligns well with research that involves predefined issues and occurs in a limited timeframe.[59] The data will be coded and analysed within each province. Qualitative analysis will be performed with the assistance of NVivo Software (QSR International) for data management and to enable comparison and synthesis of codes. Any disagreements will be resolved through consensus-based discussion among study leads and, when needed, re-examination of transcripts and data. Findings from *Objectives 1* and *2* will inform lines of inquiry for *Objective 3* and the findings presented at the stakeholder dialogues in *Objective 4*.

Objective 3: explore patient and provider experiences of attachment via a CWL

We will interview patients who have been attached via a CWL and providers who have taken on new patients via a CWL to explore on-the-ground experiences with CWLs. Similar to *Objective 2*, we will use the Tomoaia-Cotisel framework as a theoretical orientation to further contextualise CWL effectiveness. Through these in-depth interviews, we will increase the diversity of the perspectives included and allow a deeper look at practice level factors, informal systems and the interaction between policies, processes, and contexts.[30]

Data collection

We will recruit participants in each provincial case through the CWLs. For patients, each provincial CWL manager will select a group of potential adult participants from their CWL and will use name and address information from the database to send an informational letter to potential participants, inviting them to the study. Recipients will be directed to make contact if they are interested in participating. This method of recruitment has been used previously in NS to recruit unattached patients for research. Similarly, we will work with the organisations managing the CWLs in each province to invite providers who have accepted patients into practice via the CWL. We will plan to conduct interviews with 10 patients and 10 providers in each province and will continue recruiting until data saturation is reached.[56 57]

Our sampling strategy is designed to create a conceptual or theoretical understanding of participant experiences rather than to generalise to wider populations.[57 58] Therefore, we will purposefully invite patients and providers based on key tenets from the Tomoaia-Cotisel framework, such as demographics and association with different models of care (eg, provider age, gender, location, remuneration model, practice organisation; patient age, chronic conditions, health, sex, ethnicity, linguistic group, geography, income). We will iteratively revise our sampling and recruitment strategies as we collect data and learn more about patient and provider experiences with CWLs.[60 61] Semi-structured interviews will be conducted, as they allow flexibility for participants to tell their stories and for patient–interviewer dyads to explore emerging relevant threads of conversation.[62] Data will be collected as described in Objective 2, above.

Data analysis

We will use the framework method for analysis (see *Objective 2*), allowing for inductive and deductive coding approaches.[58] We will code deductively to the Tomoaia-Cotisel framework and inductively from interview transcripts, allowing new emergent themes to enhance what cannot be gleaned from the framework alone.

Analysis across Objectives 1, 2 and 3

We will develop initial meta inferences by identifying where results and inferences from quantitative and qualitative analysis complement and diverge from one another. Where possible, we will also explore linking qualitative and quantitative findings through cross-cutting themes and concepts and the use of joint displays. We will then work to combine our integrative analyses across the entire study into a larger understanding of CWL effectiveness across provinces.

Objective 4: identify enablers, barriers and modifiers for the effectiveness of CWLs

We will conduct three stakeholder dialogues (one per province) to elicit provider, policymaker, and patient perspectives on: (1) *causes for variations in effectiveness* identified in *Objectives 1–3*; and (2) recommendations for improving patient attachment through CWLs. Participants will identify issues with implementation, including internal enablers and barriers/modifiers of CWL effectiveness, (ie, within the CWL system) and external enablers and barriers/modifiers (eg, policies, context).

Approach

Stakeholder dialogues will use deliberative dialogues.[62 63] The dialogues will involve a multistage process to ensure participants receive and process relevant evidence, and then collectively discuss this evidence to inform future action. The idea is that all participants learn from the different views and experiences brought forward in the dialogue. This interaction can uncover unique insights and stimulate discussion around viable solutions and implementation considerations. The multistage process will include: preparatory discussions/consultations to help frame the issue of patient attachment in primary

care and identify dialogue invitees; distribution of pre-event evidence briefs to disseminate relevant research evidence; convening of ~20 participants (per province) to engage in a 1-day dialogue session around the issue; and distribution of a post-event dialogue summary. In addition to gaining important understanding, participants should be able to leave the event prepared and motivated to champion efforts to continue the dialogue and tackle the issue of patient attachment to primary care.

Data collection and analysis

We will recruit CWL stakeholders, such as managers, policymakers, including provincial government and health authority partners, managers, professional organisations, and primary care providers via our study stakeholders and relationships developed throughout integrated knowledge translation and exchange (iKTE) processes. We will recruit patients, family members, and citizens via multiple mechanisms, including the CIHR Strategy for Patient-Oriented Research (SPOR) SUPPORT units and networks.

During the dialogues, we will present findings of a previous study on the functioning of CWL in various jurisdictions (ie, how the CWLs operate)[19] and from this study to participants and ask for hypotheses on why these variations/trends occurred. Through triangulation of data from *Objectives 1, 2,* and *3*, the team will identify what works and what does not in terms of primary care patient attachment and share potential solutions identified by participants. Participants will be asked to consider the policies and programmes that were identified and to suggest implementation considerations (ie, barriers and facilitators to implementation).

A trained external facilitator, as recommended in the literature,[63] from the provincial SPOR SUPPORT units in each province will facilitate the dialogue process in close collaboration with study leads. Two team members, representing policy, provider, or patient perspectives, will assist in the dialogue process. Each dialogue will be audio-recorded to ensure the data are captured and retrievable in true form, and transcribed verbatim. Note takers will be present to highlight meaningful interactions/dialogue and capture personal reflections. The provincial research associates will analyse the transcripts, notes, and post-event dialogue summary using the framework method.[58 64]

Patient involvement

Patient advocates were involved in many aspects of this protocol development, and, within this protocol, we included plans to maintain a high level of patient engagement throughout all phases of the study. This study includes four patient partners who were involved in the development of the study protocol, two of whom were patient partners on a previous qualitative study of experiences of unattachment in NS, sharing their own personal stories to ground the intentions of our team.[65] All patient partners critically reviewed the study protocol, providing feedback on several components, including data collection tools, recruitment strategies, appropriate compensation for patient participants, and knowledge translation plans. They will directly support knowledge translation activities, including press interviews and public presentations. This study has also received written support from local SPOR networks, which will help facilitate further patient engagement throughout various phases of the study. During interviews, participants will be asked if they would like to receive a report on the study findings. For those participants who are interested in receiving a report, we will collect their contact information for the purpose of disseminating our study findings. We will also offer participants the opportunity to be involved in dissemination of the results (eg, having involvement in presentations or media inquiries). Results of the study will be disseminated to study participants through social media and symposiums, as described in the ethics and dissemination section.

Challenges and mitigating strategies

Potential limitations for this study may include delays in accessing administrative data within study provinces. To mitigate these delays, proposed data requests were submitted to provincial health data custodians prior to submission for grant funding to obtain quotes for the cost of the data, to expedite the data request process and to demonstrate readiness within the grant application. This process also allowed for the identification of comparable measures across provinces. We anticipate different priorities and recommendations will emerge within each province. To facilitate cross-provincial comparisons, we have developed the clear analysis strategy elucidated in this protocol and plan to maintain regular, scheduled team communication. With any research, there can be challenges ensuring the uptake of findings by knowledge users. This challenge will be mitigated through the engagement of stakeholders by integrated knowledge users' participation throughout all stages of the study, and these challenges may be exacerbated by COVID-19 barriers to in-person meetings and busier schedules. We have identified explicit strategies for communicating findings to knowledge user team members, including regular presentations and meetings with this group of stakeholders, as well as personalised emails and social media presence. Our successful engagement will be aided by the pre-existing relationships with partners in each province. To mitigate challenges with patient engagement, the study team includes researchers with a history of successful patient engagement, and the nominated principal applicant completed training focused on patient engagement, allowing them to identify best practices for engaging patients in research. This study has included patients from the outset, including the development of materials and guidelines for patient partners. The study team includes patient advisors and received written support from local SPOR networks, which will help facilitate further patient engagement throughout various phases of the study. We continue to use the SPOR

patient engagement resources to guide our strategies,[66] which our lead principal investigator helped to develop.

Ethics and dissemination

Approval to conduct this study has been granted in Ontario (Queens University HSATHREB, file number 6028052; Western University HSREB, project 116591; University of Toronto HSREB, protocol number 40335), Québec (CIUSSS de l'Estrie - CHUS, project number 2020–3446) and Nova Scotia (Nova Scotia Health REB, file number 1024979). The study is expected to take place over 3 years.

Sharing study findings and developing recommendations are critical to transforming the knowledge generated into plans for future research and interventions to ultimately increase patient attachment to primary care in ON, QC, NS and beyond. The study components have built-in, explicit iKTE objectives. All data collection (*Objectives 1–3*) begins with the consultation of study stakeholders and the opportunity to identify other key stakeholders who should contribute. In *Objective 4*, we will bring together policymakers including provincial government and health authority partners, managers, family physicians, nurse practitioners, and patients for stakeholder dialogues (see description above).

In addition, the iKTE plan includes: peer-reviewed publications; conference presentations; local presentations to key stakeholder groups (eg, medical associations, health authorities, departments/ministries of health, primary care provincial leadership meetings); knowledge sharing on departmental websites and social media.

We will facilitate cross-jurisdictional learning via a symposium with policymakers, providers, researchers, and patients from all 10 provinces across Canada. Participants will explore possibilities for developing and improving their CWLs and other strategies to help the capacity of attaching patients in primary care. We will organise this meeting to occur concurrently with a national meeting (eg, Canadian Association of Health Services and Policy Research annual meeting) to facilitate participant attendance. The compiled case study findings of *Objectives 1–4* will provide the evidence base for this discussion. Documents will be sent to participants in advance. Evaluation will be conducted at the event and 3 months post.

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