Can J Diabetes 45 (2021) 5–14

Contents lists available at ScienceDirect

Canadian Journal of Diabetes

journal homepage: www.canadianjournalofdiabetes.com

Original Research

Improving Diabetes Care in the British Columbia Southern Interior: Developing Community–University Initiatives to Address Service Gaps

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Key Messages

- Diabetes resources in the British Columbia southern interior are lacking and an evaluation would illuminate service strengths and gaps.
- A community-engaged approach was helpful for conducting an environmental scan to identify local diabetes services.
- A community–university stakeholder meeting generated plans for collaborative research projects.

ARTICLE INFO

Article history:
Received 4 December 2019
Received in revised form
23 April 2020
Accepted 27 April 2020

Keywords:
community engagement
diabetes
environmental scan
service delivery

ABSTRACT

Objectives: Diabetes rates in the British Columbia (BC) interior are rising more rapidly compared with the rest of Canada, whereas diabetes service provision is limited within this region. The purposes of this article were: 1) to identify characteristics of diabetes service delivery; and 2) to co-develop community–university diabetes research projects to address service barriers and gaps in the BC southern interior across urban, rural and Indigenous populations.
Methods: A 3-step approach was used. In step 1, a web search was conducted to identify diabetes-related services. In step 2, 10 community members working or volunteering in diabetes organizations participated in semistructured telephone interviews pertaining to diabetes service access, priorities, barriers, benefits and gaps. In step 3, a meeting of researchers and community members (n=25) was held to foster collaboration and co-develop research projects.
Results: Seventy-eight urban, rural and Indigenous diabetes-related services were identified in the BC southern interior. Provision of care to those with new type 1 diabetes and gestational diabetes diagnoses was identified in the interviews as a key priority; the needs of these groups contribute to a deficiency of resources to deliver prediabetes programs. The meeting produced plans for 2 collaborative projects: (1) the development of a diabetes patient journey map, and (2) development of a diabetes service hub with navigators for patients.
Conclusions: Together, community members and researchers have identified service gaps and formulated research projects to improve diabetes management for urban, rural and Indigenous peoples living in the BC southern interior.

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https://doi.org/10.1016/j.jcjd.2020.04.003

Mots clés:
engagement communautaire
diabète
analyse de l'environnement
service de livraison

R É S U M É

Objectifs : Les taux de diabète dans l'intérieur de la Colombie-Britannique (ICB) augmentent plus rapidement qu'ailleurs au Canada, et les services en diabète y sont limités. Les objectifs étaient de caractériser les services en diabète et de codévelopper un programme de recherche communauté-université dans le sud de l'ICB pour les populations urbaines, rurales et autochtones.
Méthodes : Une approche à trois étapes a été employée: recherche en ligne pour identifier les services pertinents; entrevues téléphoniques semistructurées avec 10 intervenants sur l'accès aux services en diabète et les priorités, obstacles, bienfaits et lacunes connexes; et rencontre entre chercheurs et intervenants (n=25) pour élaborer un programme de recherche.
Résultats : Quatre-vingt-cinq services en diabète pour les populations urbaines, rurales et autochtones ont été identifiés. Une priorité rapportée par les intervenants était que la prestation de soins aux personnes récemment diagnostiquées (diabète de type 1 ou gestationnel) contribuait à un manque de ressources en prédiabète. La rencontre des intervenants a généré un programme de recherche local et l'identification de deux projets collaboratifs: (1) élaboration d'un diagramme du parcours du patient (en cours), et (2) élaboration d'un pôle de services en diabète avec des intervenants-pivots pour les patients.
Conclusions : Le processus a contribué à développer un programme de recherche communauté-université ciblant des actions potentielles pour améliorer la gestion du diabète pour les populations urbaines, rurales et autochtones.

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Introduction

In Canada, the prevalence of diabetes is projected to reach 5 million by 2025, with an associated cost of $16 billion to the health-care system (1). Approximately 60% of Canadians are overweight or obese, putting them at increased risk for developing diabetes (2). Diabetes rates from 2001 to 2016 have risen at a faster rate for Indigenous peoples in the British Columbia (BC) interior (from 4.7% to 9.0%) compared with the rest of Canada (from 4.2% to 7.0%) (3). More alarming is the 3-fold greater prevalence of diabetes for First Nations peoples living on-reserve (17.2%) and off-reserve (10.3%) (2).

Despite the rise in diabetes, services related to diabetes in the BC southern interior are lacking. For instance, a recent study showed no freely accessible diabetes prevention services in Kelowna, the largest city in the BC interior (4). Given the health disparities outside of urban centres, service gaps are likely even greater in rural towns and for Indigenous peoples (5).

The current project focuses on diabetes service delivery in the BC southern interior; specifically, services or programs that community-dwelling individuals can access to help prevent or manage diabetes. A focus on prevention and management aligns with Diabetes Canada's clinical care practice mandate to enhance prevention and reduce the burden of diabetes complications (1). Because diabetes and obesity are often comorbid conditions (e.g. up to 85% of the risk of developing type 2 diabetes is attributable to obesity) (6) that are managed or treated together, obesity management services and programs were included within the project's scope. Acute care services (e.g. amputation surgery) were considered beyond the scope of this project.

The BC southern interior

The geographical and demographic characteristics of the region, including urban, rural and Indigenous peoples, must be considered when delivering health services in the BC southern interior. The health service regions in the BC southern interior are divided into 2 geographic areas: the Central Okanagan and the South Okanagan and Similkameen. The Central Okanagan region is largely urban and has a population of 194,000, spread across 2,904.86 km^2. In comparison, the South Okanagan and Similkameen region has a population of 197,000, but covers a combined area of 28,000 km^2 (7). These regions are comprised primarily of nonurban, primarily rural, small- (1,000 and 29,999 people) and medium-sized (30,000 and 99,999) population centres (i.e. population living outside the main commuting zone of larger urban centres) (7,8). The urban–rural distinction between these 2 regions may create unique challenges in accessing diabetes-related resources (e.g. rural communities may lack infrastructure, continuum of care and transportation to resources in urban centres).

In addition, Indigenous peoples within the BC interior may face their own unique challenges in accessing and utilizing diabetes-related services. The Syilx Okanagan people reside in the BC southern interior and encompass 7 bands (3). According to Interior Health Authority statistics, there are 17,510 people with an Indigenous identity living throughout the BC southern interior (3). Across the BC interior, over 65% of the Indigenous people living in BC live off-reserve and cannot access services on-reserve (9). However, off-reserve resources may not be culturally sensitive. Any research efforts to improve diabetes care in the BC southern interior must consider the unique needs of urban, rural and Indigenous communities.

Using a community-engaged approach to address service gaps

Improvements to health policy, the delivery of care and patient outcomes require that researchers work collaboratively with community stakeholders, from priority setting to knowledge dissemination (10,11). These efforts should be underpinned by evidence-based assessments and priority-setting activities (12,13). To begin addressing potential gaps or barriers, collaborative efforts must be undertaken to set a research agenda to improve diabetes-related service delivery in the BC southern interior. When stakeholders collaborate with researchers to co-develop health research priorities and agendas, the impact of subsequent efforts is greater than what can be achieved by researchers working alone (14,15). Engaging community stakeholders helps to ensure that meaningful research is generated and that end-users see value in adopting the research outcomes (e.g. new interventions or approaches).

Regarding diabetes programs and services for Indigenous peoples, Canada's Truth and Reconciliation Commission has called for respect for the distinct health needs of Indigenous Canadians, including traditional approaches to healing, which require expertise beyond the standard model of care (16). A review of diabetes

and obesity programs in Indigenous communities identified participatory research projects as a best practice, in part because participatory research better respects local knowledge and protects against colonial biases (17). Participatory research also helps ensure community perspectives and priorities are reflected in researchers' activities as per principles of community-engaged research (18).

The present project

The objectives of this project were to: 1) identify characteristics of diabetes-related service delivery, and 2) foster greater community–university collaboration by co-developing community–university research projects to address gaps in diabetes care within the BC southern interior. The project brought together community health and diabetes/obesity university researchers with varied expertise (e.g. rural, clinical, behavioural, Indigenous health) and community members from various organizations (e.g. diabetes educators, health authority staff, clinicians).

An environmental scan and community–university meeting were used to identify and begin to address resource gaps, barriers and priorities in the areas of diabetes and obesity care in the BC southern interior. Environmental scans are efficient tools for collecting health-care data, with methods that can be uniquely tailored to the needs of a specific community (19). In step 1 of our project, a web search provided a picture of diabetes service availability in the BC southern interior and was used to identify prospective interviewees to be involved in subsequent steps. In step 2, community members with knowledge of diabetes services were interviewed to develop a comprehensive picture of the services provided. Together, the results from the environmental scan (steps 1 and 2) provided a platform for discussion and priority setting. In step 3, university and community members met to build community–university collaborations and discuss collaborative efforts that could be undertaken to address the identified priorities, gaps and opportunities in diabetes care. The methods and results for each step are presented in what follows.

Step 1: Web Search for Diabetes Services

As a component of the environmental scan, the primary objective of the web search was to identify the scope of diabetes- and obesity-related services in the BC southern interior.

Method

Using the Google search engine, a Boolean search was conducted between June 1, 2018 and August 31, 2018, to identify relevant community-based resources. See Supplementary Table 1 for the search terms. To accurately represent common Internet searching patterns, the first 10 pages of search results were reviewed for relevant resources (20). "In-private" browsing, which does not use cache data or cookies for Internet browsing, was used to not bias the search results based on the computer being used. To be included as a valid resource, websites had to explicitly mention that the service provider offered diabetes care or clinical obesity services. Participants in steps 2 and 3 provided up-to-date program information, added services missed by our search and identified general healthy lifestyle programs that people with diabetes could be referred to support their diabetes self-management.

Results

The Central Okanagan: A total of 48 services were identified: 33 specific to diabetes and 15 to obesity (Table 1). Most diabetes services were free of charge and delivered through the health authority. Free services were available for individuals of any age, with any type (i.e. type 1, type 2, gestational, prediabetes) or stage of diabetes disease progression (e.g. from new diagnoses to uncontrolled diabetes with complications). Most obesity services were provided for a fee and delivered through private practices (e.g. nutritionist, fitness coach). Other diabetes-related services available for a fee included foot care clinics, pharmacies and optometry offices.

The South Okanagan and Similkameen: A total of 25 services were identified: 12 diabetes services, 4 obesity services, and 9 more general health and weight-loss programs (Table 1). Similar to the Central Okanagan, most diabetes services were free of charge and delivered through the health authority. There were free services for individuals of any age, all types of diabetes and all stages of diabetes disease progression. There were few obesity-specific resources. Participants in steps 2 and 3 identified additional generalized healthy-lifestyle programs in smaller towns that provided services to individuals with diabetes or obesity, as well as other chronic conditions. Most obesity services were provided for a fee and delivered through private practices.

Indigenous health services: There were 5 services related to clinical obesity and diabetes provided by the Interior Health Authority, First Nations Health Authority, Westbank First Nations, Penticton Indian Band and Métis Community Services Society of BC (Table 1). One of these programs was specific to diabetes, providing individuals with information about diabetes and strategies for prevention and self-management. The other 4 programs provided more generalized resources, ranging from the broad provision of knowledge about nutrition and child development, to more specific services for, and education about, specific chronic diseases (such as diabetes). All these programs were generally staffed by a registered nurse or community health nurse and located near urban centres.

Step 2: Semistructured Interviews

As the second step in the environmental scan, interviews were undertaken to provide a more comprehensive account of service delivery strengths and gaps.

Method

Participants: Recruitment occurred in 2 steps. First, the research team purposively identified potential participants to be interviewed who held administrative or service-delivery roles. This was based on the team's knowledge of individuals who would be good candidates to interview and findings from the web search. Next, using snowball sampling, the initial participants then referred others to the study. To be eligible, individuals had to: 1) have knowledge of relevant programs and services available in the Okanagan or South Okanagan/Similkameen area, and 2) work or volunteer in diabetes or obesity care. Step 2 received approval from the University of British Columbia's Behavioural Research Ethics Board.

Semistructured interview protocol: Semistructured interviews were used to elicit participants' knowledge about the state of diabetes service delivery in the Okanagan. Participants provided written informed consent. Telephone interviews were conducted by one interviewer (S.L.) and lasted approximately 30 minutes. Interviews were audio recorded and supplemented with the interviewer's handwritten notes. The interview began by asking about the interviewee's occupation, role within their respective organization, the services delivered by their organization and the population of interest that they serve. To provide a comprehensive picture of service delivery, they were then asked 5 questions about

Table 1
Diabetes and obesity services in the British Columbia southern interior

Program and type	n	Description	Types of services
Central Okanagan Diabetes Services			
Diabetes: Self-management, information, support programs	16	Services designed to teach individuals about diabetes and how to manage the condition	• Free services delivered through IHA for all types of diabetes* • Free services delivered through nonprofit organizations (e.g. Diabetes Canada, UBC) • For-profit pharmacologic services to help with medication management
Diabetes: Exercise and physical activity programs	3	Services focused on exercise and education about diabetes for managing the condition	• For-profit services to help individuals with diabetes exercise safely and effectively to help manage the condition • Education regarding care and management of the condition
Diabetes: Foot care services	14	Foot care clinics that offer services to diagnose and treat foot issues related to diabetes	• Diagnosis and treatment of diabetic retinopathy • Food hygiene services • Foot health information
Obesity: General treatment of obesity for children and adolescents	4	Services specifically for the treatment of obesity	• Nutrition/diet/healthy eating • Physical activity • Clinical counselling
Obesity: General treatment of obesity for adults	5	Services specifically for the treatment of obesity	• Nutrition/diet/healthy eating • Physical activity • Clinical counselling
Obesity: General treatment of obesity for adults	6	Services for general weight loss	• Exercise programs • Physical activity • Fitness coaching • Nutrition/diet/healthy eating
South Okanagan and Similkameen Diabetes Services			
Diabetes: Self-management, information, support groups	6	Services designed to teach individuals about diabetes and how to manage the condition	• Free services delivered through IHA for all types of diabetes • Free services delivered through nonprofit organizations (e.g. Diabetes Canada) • For-profit pharmacologic services to help with medication management • For-profit in-home diabetes care
Diabetes: Foot care services	6	Foot care clinics that offer services to diagnose and treat foot issues related to diabetes	• Diagnosis and treatment of diabetic retinopathy • Food hygiene services • Foot health information
Obesity: General treatment of obesity for children and adolescents	2	Services specifically for the treatment of obesity	• Nutrition/diet/healthy eating • Physical activity • Clinical counselling
Obesity: General treatment of obesity for adults	2	Services specifically for the treatment of obesity	• Nutrition/diet/healthy eating • Physical activity • Clinical counselling
Obesity: General treatment of obesity for adults	5	Services generally for weight loss	• Nutrition/diet/healthy eating • Registered dietitian services • Exercise/physical activity
South Okanagan and Similkameen community recreation centres	4	Community recreation centres offering various services in multiple domains	• Health and fitness programs • Child, youth and family services • Recreation programs
Indigenous Diabetes Services			
Indigenous Health: General Health Services	4	Collaboration between Interior Health and Aboriginal peoples to ensure Aboriginal peoples have adequate access to culturally appropriate health-care services	• Facilitates connections between Aboriginal peoples and other health-related resources • Support the health, intellectual, emotional and physical and spiritual well-being of patients
Diabetes: Self-management, information, support	1	Services designed to teach individuals about diabetes, and how to manage the condition	• Increase awareness • Diabetes education • Physical activity/healthy eating

IHA, Interior Health Authority; *UBC*, University of British Columbia.
* "All type of diabetes" includes type 1 diabetes, type 2 diabetes, gestational diabetes and prediabetes.

the diabetes services they deliver and for which they were aware. There were no specific follow-up probing questions; however, participants were asked to explain or qualify their response when necessary. Before conducting the interviews, the interview guide was tested with 2 practice participants who were exercise coaches. The participants were asked:

1. How are these services typically accessed?
2. What are the priorities for diabetes/obesity care (within the organization that you are affiliated with)?
3. What are the barriers to accessing the services that you deliver?
4. What are the benefits (to clients) or strengths of the services that you deliver?
5. Are there any gaps in the services you deliver? If so, please describe.

Analysis: The handwritten notes documented participants' responses to each interview question. These notes were checked for

accuracy against audio recordings, and participants' answers for each question were transcribed verbatim. Inductive content analysis was used to organize responses from the semistructured interviews into smaller meaningful categories that could be discussed at a subsequent community–university meeting in step 3. The purpose of content analysis is to reduce larger volumes of text to smaller content categories (21,22). Research findings can be placed on a continuum of data transformation during analysis from description to interpretation (23). Our approach to the content analysis was to employ an inductive synthesis of participant data to represent interviewees' views of the state of diabetes service delivery.

Two coders—the interviewer and a trained research assistant—read through the responses several times to familiarize themselves with the data. Next, they independently generated initial content categories from the responses to each question. The 2 coders then discussed the content categories until agreement was reached. As a result of this discussion, initial content categories were either condensed, separated or removed in arriving at a final set of content categories.

Results

Participants: In total, 25 individuals were contacted to participate and 10 interviews were ultimately conducted (8 women). Seven were purposively recruited and 3 were recruited through snowball sampling. Five individuals from Central Okanagan, 3 from the South Okanagan and Similkameen region and 2 individuals who worked with Indigenous populations, were interviewed. Three interviewees were current and/or former volunteers with national and local diabetes nonprofit organizations. Four were employed by the local health authority: 2 were diabetes educators and 2 worked in managerial positions. The other interviewee managed a municipal recreation centre that provided a variety of well-being, health and chronic disease services. For the Indigenous diabetes care interviewees, 1 was a band member and former diabetes educator, whereas the other was a band elder and a community research advisor. Three of the interviewees self-identified as having either type 1 or type 2 diabetes.

Content categories: A summary of the content from each question is presented in Table 2. In general, there was considerable overlap in content categories between the Central Okanagan and the South Okanagan and Similkameen. Results specific to one region and to Indigenous diabetes care were also highlighted. Interviewees reported that one of the greatest strengths of service delivery was the capability to provide services for those with the highest risk, specifically those with type 1 diabetes, gestational diabetes and those with uncontrolled type 2 diabetes with complications. However, the largest gap in service delivery was the very limited capacity to deliver preventive services for people with prediabetes or obesity. Outside of funded research initiatives being led by researchers at University of British Columbia in the Central Okanagan, those with prediabetes or obesity needed to pay out-of-pocket for diabetes/obesity health services. Interviewees also suggested that physicians were the key gatekeepers to accessing publicly available diabetes resources. The importance of fostering patient self-management in diabetes care was a consistently discussed theme.

All South Okanagan interviewees reported that individuals living in rural communities have difficulty locating, getting to and accessing diabetes services. Although programs run by Indigenous communities were culturally appropriate, none of the interviewees were aware of culturally tailored programs outside of these communities. One general strength of service delivery was that diabetes education services provided by governing bodies, such as individual Indian bands or the health authority, were free of charge and accessible to anyone local to that area.

Step 3: Community–University Meeting

Method

The purpose of this meeting was to strengthen community–university collaborations to co-develop research projects to pursue together to address diabetes care gaps or priorities in the BC southern interior.

Meeting protocol: The University of British Columbia's Behavioural Research Ethics Board considered the meeting to be exempt from formal approval because the purpose of the meeting's activities was to co-conduct projects. In other words, meeting attendees were collaborators and co-creators of knowledge rather than "research subjects" or participants being researched. As per Article 2.1 of the Tri-Council Policy Statement 2, research ethics board approval is not required under these circumstances. One week before the meeting, attendees were provided with a summary of results from steps 1 and 2. Participants provided implied informed consent in accepting the meeting invitation and attending the meeting, where it was explained that meeting findings would be disseminated and used to create future research projects. The meeting took place at a local hotel conference centre. Food and beverages were provided to participants, but no honoraria were provided.

The meeting agenda was co-developed with a professional meeting facilitator to align with the meeting objectives (see Supplementary Figure 1). The facilitator led the 4-hour meeting using a liberating structures approach (24), which, consistent with the meeting objectives, creatively engages and inspires participants to develop innovative ideas. After introductions and an orientation to the project, the meeting took the format of 4 small breakout groups (4 to 6 people/group), followed by large-group discussions. Breakout groups were purposefully assembled to ensure diverse composition (i.e. to prevent homogeneous groups composed of attendees with similar backgrounds).

The first part of the meeting, "Blue Sky Thinking," allowed each small group to reflect on gaps and priorities in diabetes care and then discuss 1 or 2 potential project ideas that could build upon a current strength, or strengthen an area of deficit in local diabetes care. Attendees were instructed to "think big" and not to worry about the feasibility of the projects. The second part, "Open Space," allowed attendees to select the project they felt most passionate about to discuss in further detail. In this way, attendees self-selected the project they prioritized highest. Participants outlined details regarding what is known and what needs to be known to frame the project. In the third part of the meeting, "Impact and Feasibility," the whole group discussed the impact and feasibility of each proposed project. By a show of hands, attendees self-identified who was willing to move the projects forward.

Results

Participants: Fifty-nine individuals were invited to attend the meeting. Prospective invitees were identified through a web search (step 1), interviews (step 2) and through the research team and other invitees. Twenty-six individuals agreed to attend the meeting, of whom 25 attended (16 women, 9 men; 12 from the university, 13 working/volunteering in diabetes care). Four of the attendees self-identified as having either type 1 or type 2 diabetes.

Table 3 displays the results from the meeting. During the part 1 (Blue Sky Thinking) small-group discussions, participants generated 11 ideas that ranged from small research projects (e.g.

Table 2
Content categories and rationales from stakeholder interviews

Question topic	Content categories	Population (COK, SOK, Indigenous)	Interviewees' rationales
Access to services	1. Referrals within the health-care system	COK, SOK	Most patients seen by diabetes educators are referred through their primary care provider or other health-care practitioners.
	2. Self-referral	COK, SOK	Few individuals self-refer themselves to IHA resources and identify these resources through the Internet.
	3. Differential access between remote and urban Indigenous communities	Indigenous	Access to Indigenous diabetes services were markedly different between remote and urban settings. The urban services (e.g. friendship centres) are well-equipped to offer culturally tailored services to peoples with or at risk of diabetes, whereas remote communities may have a generalized nurse from outside of the community who visits biweekly.
Priorities	1. Deliver diabetes education	COK, SOK, Indigenous	Information about managing insulin, diet or exercise should be provided to individuals with new diabetes diagnoses. Priorities for Indigenous care should focus particularly on teaching children about positive health practices.
	2. Support lifestyle self-management	COK, SOK	Teaching self-management skills is necessary to help individuals with diabetes maintain healthy lifestyle behaviours.
	3. Provide services to those with the highest risk	COK, SOK	Resources were allocated to prioritize individuals newly diagnosed with type 1 diabetes or gestational diabetes, or those with uncontrolled type 2 diabetes.
	4. Obtain continued funding	COK, SOK	A priority reported by not-for-profit organizations offering free programs, as these programs are contingent on annual funding.
Barriers	1. Lack of resources	COK, SOK	Lack of time and personnel necessary to provide high-level care to all potential patients. Due to prioritization of high-risk individuals, the diabetes clinic in the COK only reported capacity for 1 prediabetes education class every 3 months, whereas no such capacity existed in the SOK.
	2. Cost	COK, SOK	Outside of the 3 UBC-run programs, individuals with prediabetes or obesity must pay for most services out of pocket.
	3. Lack of knowledge/motivation	SOK, Indigenous	Patients may be unaware of the IHA or private for-profit services available. In rural and remote reserve communities, lack of knowledge about where and how to access services was reported. For some, there may be a lack of self-motivation to seek out and access resources until conditions progressed chronically.
	4. Lack of culturally sensitive programs	SOK	No available services were culturally tailored or sensitive to individuals of South Asian descent or for Indigenous peoples, to the knowledge of all urban and rural respondents.
Benefits and strengths	1. Provide services to those at the greatest risk	COK, SOK	Services are provided for those with type 1 diabetes, gestational diabetes and uncontrolled type 2 diabetes and complications.
	2. Ease of accessibility	COK, SOK	Anyone with diabetes questions or complications within the geographic region has free, easy access to local diabetes educators.
	3. Free/low-cost of IHA-provided services	COK, SOK	Fees to local municipally run recreational facilities are subsidized/free for individuals with a low income. Free programs developed at the UBC delivered in the COK were a reported strength.
	4. Care for Indigenous individuals in the Westbank First Nations community	Indigenous	The Westbank First Nations is one of the most well-equipped communities to deliver diabetes and obesity services.
Gaps	1. Service provider's lack of awareness of offerings from other organizations	COK, SOK	Service providers were not always aware of the offerings from other organizations, especially private for-profit services. Some did not know which services were still in existence.
	2. Continued care	Indigenous	Individuals with diabetes often needed to re-tell their story because there seems to be poor communication between diabetes/obesity providers and other health-care practitioners.
	3. Lack of awareness in the community of what organizations have to offer	COK, SOK, Indigenous	Websites are commonly out of date and there is no comprehensive list of services that could be accessed by the public. Lack of knowledge about where and how to access diabetes resources for those coming from remote reserve communities was a reported gap.
	4. Service provision	COK, SOK, Indigenous	There was a lack of resources for those with prediabetes or obesity (without a comorbidity) due to prioritization of those with the highest risk. Limited health-care coverage for insulin, poor access to specialists and the high-cost of private health-care services were also gaps. Closure of the local Diabetes Canada chapter resulted in lack of local support and fewer hard-copy resources being available for distribution to individuals living on-reserve.
	5. Infrastructure	SOK	Individuals in rural towns need to commute to larger population centres for comprehensive diabetes care. Services offered in rural towns were typically offered intermittently. The low-cost shuttle offered by IHA to bring patients to urban centres does not always have the capacity to meet the need.

COK, Central Okanagan; *IHA*, Interior Health Authority; *SOK*, South Okanagan and Similkameen; *UBC*, University of British Columbia.
Note: Findings are derived from the interviews of 10 stakeholders who provided care or volunteered in the area of diabetes.

Table 3
Key findings from the stakeholder meeting

Meeting part	Key findings		
"Blue Sky Thinking"	Potential projects		
	• Diabetes information hub* • A one-stop, credible, client-oriented resource online for diabetics • Patient journey map* • Diabetes specific navigator* • Grocery store overhaul to reduce and/or eliminate added sugar and refined foods in the Okanagan • Okanagan diabetes governance group* • Child and youth diabetes education • Incentives for physicians to counsel clients about preventative lifestyle choices* • Advocacy group* • A one-stop credible shop, locally directed, aligned with Diabetes 360 education, a referral program that directs clients to existing credible services • Lobby government/decision makers		
Open Space	Projects for further consideration	Idea description	What we know and key questions
	1. Patient journey map	A map and navigation tool utilizing peer mentorship to guide clients to through pathways of issues that may arise. Ultimately, clients choose their route to wellness.	What we know • Strategy has worked for other illnesses/disabilities • Engaging patients in community builds program credibility, may motivate funding What we need to know • How to connect newly diagnosed patients to the map/navigator? • How will the map route change, depending on geography and type of diabetes?
	2. Diabetes service hub with patient navigators	A go-to, brick-and-mortar hub that is the advocacy home, and provides foot care, meeting space, peer mentorship, education clinics, lifestyle programs, print and online resources and screening/ awareness events.	What we know • No such hub currently exists • Expensive to fund • Physiotherapy navigators who direct patients through the health-care system has been shown to be effective for other chronic conditions What we need to know • Who is the ideal host? Funder? • Do patients want this? • Could it work to clinically change outcomes, and how to evaluate them?
	3. Advocacy/ governance	Develop a governance or advocacy body for Diabetes in the Okanagan.	What we know • Diabetes Canada no longer has on-ground services in Kelowna • Lack of services and advocacy for obesity • No unifying body to take coordinate diabetes care What we need to know • Can we get a group of experts to create governance/consensus on diabetes? • Should obesity and diabetes be combined in advocacy group?
	4. Incentivized preventative counselling	Work with government to develop an incentivization program to allow physicians to get paid for providing diet/ exercise services.	What we know • Doctors are not paid for preventative counselling, no pay structure exists for preventative counselling • The system is not set up for preventative counselling What we need to know • How to monitor the use and measure the outcomes of an medical service plan code if implementation is justified?

Notes: The table presents findings from the first two discussion topics at the stakeholder meeting. Asterisks (*) in Big Sky Thinking section were those ideas that were selected for elaboration in the open space discussion. Two related ideas from Big Sky Thinking were combined in two of the Open Space discussions (topics 2 and 3).

mapping the patient journey), to community services (e.g. diabetes service hub), to lobbying and advocacy. The projects cut across various sectors including the private sector (e.g. grocery store overhaul), education, health care/service delivery and government/ policymaking. The facilitator asked the whole group to collectively decide on project ideas they would like to discuss further. Four were retained for part 2 (Open Space) small-group discussions on patient journey mapping, the diabetes information hub, advocacy/ governance and incentivized preventive counselling.

In part 2, participants described each idea as a solution to a problem and brainstormed ideas regarding potential benefits (i.e. "what we know") and challenges (i.e. "what we need to know") of pursuing each idea (Table 3). Similar Big Sky ideas were combined in the Open Space discussions to maximize the ideas that were discussed (e.g. diabetes service hub with patient navigators). Finally, using these details, the whole group evaluated the feasibility and impact of each idea. As shown in Figure 1, the patient journey map was perceived as the most feasible, but having modest impact. Patient journey maps are a means of following a patient through their journey (with diabetes) to understand how they interact with the health-care system. Certain projects had more variability in feasibility and impact because the potential scope of the project could vary from small to large. The navigator and diabetes hub were seen as having the greatest potential impact, while being potentially feasible. Advocacy was also perceived as having some impact and being feasible. Incentivization of preventive counselling was perceived by the group as having modest impact, but not feasible to undertake.

Discussion

A community health research group was formed with the mandate of collaboratively impacting diabetes research and care in the BC southern interior. The purpose of the activities described in this article was to strengthen relationships between interdisciplinary diabetes researchers and community members. After priorities, strengths, barriers and gaps in service delivery were elucidated, a community–university group met to co-develop research projects to begin to address these issues. The navigator,

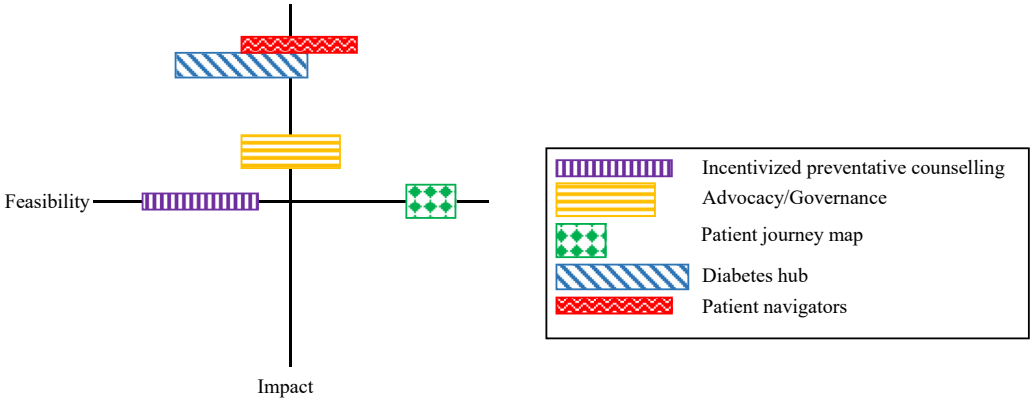


Figure 1. Visual depiction of the feasibility and impact discussion of potential collaborative projects at the stakeholder meeting. The rectangle size was determined by the group to represent the potential magnitude of variability in feasibility and impact for each of the ideas. For example, the patient journey map was horizontally the shortest because the feasibility seemed most clear.

and diabetes hub projects, were seen as having the greatest potential impact while also being feasible.

Most services uncovered in the web search were diabetes-specific and free of charge. Services provided through the health authority were widely available to individuals with all types of diabetes. However, most of the available preventive services for those with obesity or at high risk of developing diabetes were at a direct cost to individuals. Many of the services in the rural southern interior of BC (i.e. the South Okanagan and Similkameen) were clustered in larger population centres, in line with research demonstrating the limited resourcing in rural and remote health-care settings (25).

Community interviewees provided valuable insights into service delivery beyond what the web search provided. Generally, interviewees reported greater access to free services in the Central Okanagan than in the South, supporting the findings of step 1. The interviews underscored the importance of physician–patient interaction as physicians were reported as the key gatekeepers to accessing publicly available diabetes resources. Regular performance of health-enhancing behaviours is complex and requires considerable self-regulation if these behaviours are to be maintained long term (26). Interviewees' emphasis on fostering patient self-management in diabetes care was in line with current evidence regarding health behaviour change. Programs that use behaviour change techniques, the active ingredients in behavioural interventions (27), should help to foster effective diabetes self-management (28,29).

Immediate care with follow-up appointments was considered necessary for those with gestational or newly diagnosed type 1 diabetes who are at the greatest risk for diabetes-related complications. However, this need creates a gap in preventive service delivery for those with prediabetes or obesity without comorbidities, who were seen as requiring less urgent or complex care. An estimated 4.6 million Canadians meet the prediabetes diagnostic criteria, but very few are aware of this fact (30). Given 50% of individuals with prediabetes will develop type 2 diabetes within 5 years if they do not receive intervention (31), a greater allocation of resources for diabetes risk awareness, diabetes prevention and obesity management could ease the future burden of diabetes. In addition, the need to seek out fee-for-service programs for diabetes prevention creates an economic burden that may create inequities for those with a low income and may result in these individuals not using any services. Reallocating greater public resources for preventive diabetes services is a policy issue that warrants serious consideration.

Health care fails Indigenous peoples when it cannot fully appreciate the historical, social and cultural contexts that shape Indigenous health and disease (32). Culturally sensitive programs for Indigenous peoples are essential for local programming to be highly effective. The research examining Indigenous diabetes programming speaks to the necessity of community-engaged programming and the centrality of cultural foundations of diabetes interventions (such is the case with the Kahnawake Diabetes Prevention Program) (17,33). To address the lack of culturally sensitive programs, collaborative efforts in the BC southern interior should be undertaken to co-design culturally tailored programs.

The community–university meeting provided another avenue to expand service delivery providers' awareness of other organizations. Participants requested, and were provided with, a contact list of meeting attendees. Several participants also expressed interest in pursuing projects emanating from the discussions and a desire to collaborate on those projects. As a result of the meeting, collaborative projects are now underway to develop a patient journey map through the diabetes system in the BC southern interior and to continue ongoing discussion about the feasibility of a diabetes service hub with patient navigators. These projects will be co-led by a university and a community practitioner member, with ongoing engagement with community members to maximize impact and uptake (34).

Limitations and strengths

Although steps 2 and 3 provided additional information about the potential services identified in step 1, it is possible that we did not capture all services, particularly those without descriptive web pages. All of our interviewees worked for the health authority or not-for-profit organizations and the 2 Indigenous interview participants were from different bands within one of the First Nations in the BC southern interior. As such, reported perspectives on service delivery may not be generalizable to those who work in the for-profit sector or to other First Nations. In addition, although representatives of 16% of the total population of services in the BC southern interior were purposively sampled and interviewed (step 2), it is possible that this sample was too small to achieve saturation. However, step 2 was not an endpoint in itself. Rather, its purpose was to gather sufficient information to stimulate discussion in the "Blue Sky Thinking" activity of the step 3 meeting. Although we acknowledge that saturation may not have been achieved in step 2, we are confident that any lingering gaps were addressed during step 3 and that the set of proposed projects accurately reflects issues pertaining to diabetes service access and needs in the BC southern interior. A second limitation to step 2 was that the interviews focused on services provided by the interviewees rather than on all services provided in their area. A potential third limitation may be that the meeting was facilitated

using a more participatory approach rather than a consensus framework/approach (e.g. Delphi).

One main strength of this project was the step-by-step approach used to form community–university partnerships and co-develop collaborative projects. Each step informed the subsequent step, while providing its own research outputs. A second strength was the diverse, interprofessional perspectives that were represented at the community–university meeting. Having representatives across our specified 3 population groups helped to ensure that each group had a voice and the opportunity to guide the development of collaborative projects.

Future directions

The collaborative projects should be implemented and evaluated using appropriate and locally infused methodologies, to determine whether the step-by-step process described in this study results in meaningful outputs. Patient journey mapping will be used to help the Interior Health Authority evaluate the continuance of diabetes care. Meeting participants interested in the diabetes hub will meet to discuss the working meeting's findings and how to proceed. Future research should seek to interview and convene a meeting with patients with diabetes to provide a more comprehensive picture of health service delivery from the users' perspective, which would enhance the potential for impact and uptake of the research outputs (10).

Conclusions

Community health research that partners with community audiences from the beginning of the research process has great potential to produce meaningful outputs that are adopted into practice. The 3-step process described in this study proved useful for forming community–university partnerships that begin to address practical, real-world problems regarding diabetes care in the BC southern interior. We believe this process can be adapted to other regions, populations and chronic conditions to develop meaningful community–researcher partnerships.

Supplementary Material

To access the supplementary material accompanying this article, visit the online version of the *Canadian Journal of Diabetes* at www.canadianjournalofdiabetes.com.

Acknowledgments

This research was supported through the Eminence funding program through the Office of the Vice-Principal, Research and Innovation, University of British Columbia, Okanagan Campus. KMG holds the Reichwald Family UBC Southern Medical Program Chair in Chronic Disease Prevention. We would like to thank all meeting attendees in step 3 who contributed to the co-creation of knowledge. We would also like to thank Susan Holtzman, Charlotte Jones, Donna Kurtz, Jonathan Little, and Lesley Lutes, who in addition to the authorship team, were members of the Community Health Eminence Cluster.

Author Disclosures

Conflicts of interest: None.

Author Contributions

SL, BTH, NO, KR, SB, MJ, and KMG contributed to the conceptualization and design of this project. SL was responsible for data acquisition for all 3 steps. GD was involved in data acquisition for step 1. KMG, MJ, and SL were responsible for analysis and interpretation of the results for all 3 steps. All authors contributed to the writing and revision of the manuscript.

References

1. Diabetes Canada Clinical Practice Guidelines Expert Committee. Diabetes Canada 2018 clinical practice guidelines for the prevention and management of diabetes in Canada. Can J Diabetes 2017;42(Suppl):S1–325.
2. Public Health Agency of Canada. Diabetes in Canada: Facts and figures from a public health perspective. 2011. https://www.canada.ca/content/dam/phac-aspc/migration/phac-aspc/cd-mc/publications/diabetes-diabete/facts-figures-faits-chiffres-2011/pdf/facts-figures-faits-chiffres-eng.pdf. Accessed June 3, 2019.
3. Interior Health. Aboriginal health: improving the health of Aboriginal people. 2019. https://www.interiorhealth.ca/YourHealth/AboriginalHealth/Pages/Nations-and-Communities.aspx. Accessed June 3, 2019.
4. Strachan SM, Bean C, Jung ME. 'I'm on the train and I can't stop it': Western Canadians' reactions to prediabetes and the role of self-compassion. Health Soc Care Commun 2018;26:979–87.
5. Pong RW, DesMeules M, Lagacé C. Rural–urban disparities in health: How does Canada fare and how does Canada compare with Australia? Aust J Rural Health 2019;17:58–64.
6. Diabetes UK. Diabetes and obesity. 2019. https://www.diabetes.co.uk/diabetes-and-obesity.html. Accessed June 3, 2019.
7. Statistics Canada. Kelowna Population Centre, British Columbia and Alberta province. 2017. www.12.statcan.gc.ca. Accessed June 3, 2019.
8. Du Plessis V, Beshiri R, Bollman RD, Clemenson H. Rural definition. Rural Small Town Canada Analysis Bull 2001;3:1–17.
9. Government of British Columbia. Supporting communities: Urban off-reserve Aboriginal people. 2019. https://www2.gov.bc.ca/gov/content/governments/indigenous-people/supporting-communities/urban-off-reserve-aboriginal-people. Accessed June 3, 2019.
10. Woolf SH, Zimmerman E, Haley A, Kirst AH. Authentic engagement of patients and communities can transform research, practice, and policy. Health Aff 2016;35:590–4.
11. Wallerstein N, Duran B. Community-based participatory research contributions to intervention research: The intersection of science and practice to improve health equity. Am J Public Health 2010;100:40–6.
12. Vollman AR, Anderson ET, McFarlane JM. Canadian Community as Partner: Theory & Multidisciplinary Practice. Philadelphia: Wolters Kluwer, 2017.
13. Rosenbaum S. Principles to Consider for the Implementation of a Community Health Needs Assessment Process. Washington: George Washington University, 2013.
14. Brett J, Staniszewska S, Mockford C, et al. Mapping the impact of patient and public involvement on health and social care research: A systematic review. Health Expect 2012;17:637–50.
15. Cyril S, Smith BJ, Possamai-Inesedy A, Renzaho AM. Exploring the role of community engagement in improving the health of disadvantaged populations: A systematic review. Glob Health Action 2015;8:1–12.
16. The Truth and Reconciliation Commission of Canada. Honouring the truth, reconciling for the future: Summary of the final report of the Truth and Reconciliation Commission of Canada. 2015. http://www.trc.ca/about-us/trc-findings.html. Accessed May 25, 2019.
17. Rice K, Te Hiwi B, Zwarenstein M, Lavallee B, Barre DE, Harris SB. Best practices for the prevention and management of diabetes and obesity-related chronic disease among indigenous peoples in Canada: A review. Can J Diabetes 2016;40:216–25.
18. Greenhalgh T, Jackson C, Shaw S, Janamian T. Achieving research impact through co-creation in community-based health services: Literature review and case study. Milbank Q 2016;94:392–429.
19. Rowel R, Dewberry Moore N, Nowrojee S, Memiah P, Bronner Y. The utility of the environmental scan for public health practice: Lessons from an urban program to increase cancer screening. J Natl Med Assoc 2005;97:527–34.
20. Jansen BJ, Spink A. How are we searching the World Wide Web? A comparison of nine search engine transaction logs. Inf Process Manag 2006;42:248–63.
21. Burnard P. Teaching the analysis of textual data: An experiential approach. Nurse Educ Today 1996;16:278–81.
22. Krippendorff K. Content Analysis: An Introduction to Its Methodology. 2nd edn. Thousand Oaks: Sage, 2004.
23. Sandelowski M, Barroso J. Classifying the findings in qualitative studies. Qual Health Res 2003;13:905–23.
24. Lipmanowicz H, McCandless K. The Surprising Power of Liberating Structures: Simple Rules to Unleash a Culture of Innovation. Seattle: Liberating Structures Press, 2013.
25. Pampalon R, Hamel D, Gamache P. Health inequalities in urban and rural Canada: Comparing inequalities in survival according to an individual and area-based deprivation index. Health Place 2010;16:416–20.
26. Carver CS, Scheier MF. Self-regulation of action and affect. In: Vohs KD, Baumeister RF, eds. Handbook of Self-regulation: Research, Theory, and Applications. New York: Guildford Press, 2011.
27. Michie S, Richardson M, Johnston M, et al. The behaviour change technique taxonomy (v1) of 93 hierarchically clustered techniques: Building an

international consensus for the reporting of behaviour change interventions. Ann Behav Med 2013;46:81–95.
28. Cradock KA, ÓLaighin G, Finucane FM, Gainforth HL, Quinlan LR, Ginis KAM. Behaviour change techniques targeting both diet and physical activity in type 2 diabetes: A systematic review and meta-analysis. Int J Behav Nutr Phys 2017;14:18.
29. Cradock KA, ÓLaighin G, Finucane FM, et al. Diet behavior change techniques in type 2 diabetes: A systematic review and meta-analysis. Diabetes Care 2017; 40:1800–10.
30. Rosella LC, Lebenbaum M, Fitzpatrick T, Zuk A, Booth GL. Prevalence of prediabetes and undiagnosed diabetes in Canada (2007–2011) according to fasting plasma glucose and HbA1c screening criteria. Diabetes Care 2015;38:1299–305.
31. Knowler WC, Fowler SE, Hamman RF, et al. 10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study. Lancet 2009;374:1677–86.
32. Crowshoe L, Dannenbaum D, Green M, Henderson R, Hayward MN, Toth E. Type 2 diabetes and Indigenous peoples. Can J Diabetes 2018;42(Suppl.):S296–306.
33. Murdoch-Flowers J, Tremblay MC, Hovey R, et al. Understanding how Indigenous culturally-based interventions can improve participants' health in Canada. Health Promot Int 2017;34:154–65.
34. Martin Ginis KA. Takin'it to the streets: A community-university partnership approach to physical activity research and knowledge translation. Kinesiol Rev 2012;1:190–6.

Date:
Time: Lunch: 12:00-1:00
Meeting: 1:00-5:00
Reception: 5:00-6:00
Location:

Participants:
Research and community stakeholders engaged in prevention and care of obesity and diabetes in the South and Central Okanagan.

Purpose:
The purpose of this meeting is to introduce the project to community stakeholders and explore opportunities to strengthen collaborations between researchers and community partners.

This meeting will be successful if we are able to:

- Strengthen relationships between interdisciplinary researchers and community partners.
- Identify research/practice priorities related to preventing/managing obesity and diabetes in the Central and South Okanagan, including the application of Indigenous health and rural health lenses.
- Select a few potential partnership projects to move forward with.

AGENDA

Time	Agenda Item
12:00	Lunch
1:00	Welcome and Introductions • What are you most looking forward to from today? • What questions (or concerns) did you bring with you today?
1:30	Orientation to the Project • Team Workplan and Guidelines • Summary of “Obesity and Diabetes” program and service scan/interviews
2:00	Blue Sky Thinking • Discuss the finding of the scan (e.g., gaps, priorities); how do these relate to your priorities? • Discuss gaps and priorities; brainstorm ideas to build on/address • Summarize your favourite ideas as potential “projects”
3:00	Coffee Break and Snack
3:15	Open Space / Project Tables • Move to the table with a project you would like to explore in more detail • Generate a list of what we already know about the topic/issue, and what we need to know more about (questions to explore) • Present your table discussion and list of questions to the large group
4:00	Impact and Feasibility Quadrants • Review the projects and describe them according to their potential impact and feasibility within the 2-year time frame • What should we consider implementing as a collaborative project/projects? • Prioritize: Who is willing to conduct these projects
4:45	Wrap up • Commitment to next steps • Roundtable reflections
5:00	Reception

Supplementary Figure 1. University of British Colombia, Okanagan Campus Community Health Research Project Development: Obesity and Diabetes Stakeholder Meeting Agenda.

Supplementary Table 1
Search terms used in the web search

Root term	
Diabetes	Diabetes, prediabetes, type 2 diabetes, diabetes mellitus
Obesity	Obesity, weight*, overweight
Service	Service*, program, intervention, community programming, individual intervention, group intervention, resource
Program type	Preven* OR manag*
Location	Central Okanagan, South Okanagan, Similkameen, Kelowna, Keremeos, Oliver, Osoyoos, Penticton, Princeton
Indigenous	Aboriginal, First Nation, Indian, Indigenous, Métis, West Bank

Note. Boolean search used with the search terms indicated.
* represents a truncated search term, whereby the root of the word is entered with an "*" to instruct the database to search for all forms of a word.