

Use of chronic disease management programs for diabetes

In Alberta's primary care networks

David J.T. Campbell MD MSc Peter Sargious MD MPH FRCPC Richard Lewanczuk MD PhD FRCPC Kerry McBrien MD MPH CCFP
Marcello Tonelli MD SM FRCPC Brenda Hemmelgarn MD PhD FRCPC Braden Manns MD MSc FRCPC

Abstract

Objective To determine the types of chronic disease management (CDM) programs offered for patients with diabetes in Alberta's primary care networks (PCNs).

Design A survey was administered to PCNs to determine the types of CDM programs offered for patients with diabetes; CDM programs were organized into categories by their resource intensity and effectiveness. Results of the survey were reported using frequencies and percentages.

Setting Alberta has recently created PCNs—groups of family physicians who receive additional funds to enable them to support activities that fall outside the typical physician-based fee-for-service model, but which address specified objectives including CDM. It is currently unknown what additional programs are being provided through the PCN supplemental funding.

Participants A survey was administered to the individual responsible for CDM in each PCN. This included executive directors, chronic disease managers, and CDM nurses.

Main outcome measures We determined the CDM strategies used in each PCN to care for patients with diabetes, whether they were available to all patients, and whether the services were provided exclusively by the PCN or in conjunction with other agencies.

Results There was considerable variation across PCNs with respect to the CDM programs offered for people with diabetes. Nearly all PCNs used multidisciplinary teams (which could include nurses, dietitians, and pharmacists) and patient education. Fewer than half of the PCNs permitted personnel other than the primary physician to write or alter prescriptions for medications.

Conclusion Alberta's PCNs have successfully established many different types of CDM programs. Multidisciplinary care teams, which are among the most effective CDM strategies, are currently being used by most of Alberta's PCNs.

EDITOR'S KEY POINTS

- In Alberta, primary care reform has taken the form of primary care networks (PCNs), which aim to improve access to and coordination of care for patients. A PCN consists of primary care physicians working with other health care providers, including nurses, dietitians, and pharmacists, to provide care to patients in a specific catchment area.
- Given differences in local priorities, personnel available, and historical patterns of care, it has been anecdotally noted that PCNs have established different types of chronic disease management (CDM) programs. This research sought to determine which types of CDM programs have been adopted to manage diabetes by Alberta's PCNs and whether these choices were consistent with current evidence.
- The results show that most of Alberta's PCNs have identified CDM for diabetes as a priority and offer at least some form of a CDM program for diabetes.

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Programmes de traitement des maladies chroniques appliqués aux diabétiques

Dans des réseaux de soins primaires de l'Alberta

David J.T. Campbell MD MSc Peter Sargious MD MPH FRCPC Richard Lewanczuk MD PhD FRCPC Kerry McBrien MD MPH CCFP
Marcello Tonelli MD SM FRCPC Brenda Hemmelgarn MD PhD FRCPC Braden Manns MD MSc FRCPC

Résumé

Objectif Déterminer les types de programmes pour le traitement des maladies chroniques (TMC) qui sont offerts aux diabétiques fréquentant les réseaux de soins primaires (RSP) de l'Alberta.

Type d'étude On a demandé aux RSP de répondre à une enquête afin de déterminer les types de programmes de TMC qu'ils offrent aux diabétiques; ces programmes ont été répartis en catégories en fonction de l'intensité et de l'efficacité de leur personnel. Les résultats de l'enquête ont été rapportés sous forme de fréquences et de pourcentages.

Contexte L'Alberta a récemment créé des RSP—des groupes de médecins de famille qui reçoivent des sommes additionnelles pour certaines activités qui n'entrent pas dans le cadre habituel de la rémunération à l'acte, mais qui visent plutôt des objectifs déterminés, comme les TCM. On ignore pour l'instant quels autres programmes sont offerts grâce aux nouvelles subventions que reçoivent les RSP.

Participants Ce sont les responsables du TMC dans chaque RSP qui ont répondu à l'enquête: directeurs exécutifs, responsables des maladies chroniques ou infirmiers fournissant ce genre de traitement.

Principaux paramètres à l'étude Identification des stratégies de TMC appliquées aux diabétiques dans chaque RSP, qu'elles soient disponibles à tous les patients et que ces services soient dispensés uniquement par le RSP ou conjointement avec d'autres agences.

Résultats Il y avait d'importantes variations entre les RSP pour ce qui est des programmes de TMC offerts aux diabétiques. Presque tous les réseaux utilisaient des équipes multidisciplinaires (pouvant inclure infirmiers, diététistes et pharmaciens) et faisaient de l'éducation des patients. Moins de la moitié des RSP permettaient à des membres du personnel autres que des médecins de famille de faire ou de modifier des prescriptions médicamenteuses.

Conclusion Les RSP de l'Alberta ont réussi à instaurer plusieurs types de programmes de TDM. À l'heure actuelle, la plupart de des RSP utilisent des équipes de soins multidisciplinaires, une stratégie qui compte parmi les plus efficaces.

POINTS DE REPÈRE DU RÉDACTEUR

- En Alberta, la réforme des soins primaires a pris la forme de réseaux de soins primaires (RSP), lesquels cherchent à améliorer l'accès et la coordination des soins aux patients. Un RSP est formé d'un médecin de soins primaires qui collabore avec d'autres membres du personnel soignant, incluant des infirmiers, des diététistes et des pharmaciens, dans le but de fournir aux patients des soins dans un domaine médical spécifique.
- En raison de différences dans les priorités locales, et selon le personnel disponible et le modèle traditionnel des soins, il a été occasionnellement noté que les RSP ont instauré différents types de programmes pour le traitement des maladies chroniques (TMC). Cette étude voulait déterminer quels types de programmes de TMC ont été adoptés pour les diabétiques dans les RSP albertains et vérifier si ces choix étaient conformes aux données probantes disponibles.
- Les résultats montrent que la plupart des RSP albertains ont déclaré que le TMC du diabète était une priorité et ont offert au moins une forme de programme de TMC pour les diabétiques.

Cet article a fait l'objet d'une révision par des pairs.
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Diabetes affects 2.25 million Canadians, and managing diabetes and its complications costs more than \$9 billion annually.¹ Safe, effective, and cost-effective interventions for diabetes are available, including antihypertensive medications, cholesterol-lowering treatment, and glycemic control.²⁻⁹ To optimize the care of patients with diabetes, comprehensive care, including behaviour modification and pharmacologic therapy, has been shown to be highly effective.¹⁰ However, such care is difficult to deliver and usually requires the use of multidisciplinary chronic disease management (CDM) programs.^{11,12}

Chronic disease management programs vary in design and effectiveness. In 2006, a systematic review of randomized trials evaluated the effectiveness of CDM care for diabetes, categorizing programs into 11 distinct strategies.¹³ The authors noted that most CDM programs improved glycosylated hemoglobin A_{1c} (HbA_{1c}) levels for participants, although to varying degrees.¹³ These different programs also vary in resource intensity, with some requiring the modification of electronic medical records (EMRs), and others necessitating the hiring of specific staff.

Implementing CDM programs is challenging, as additional resources and changes to practice style are often required to ensure that all patients have adequate access. Primary care reform (a potential means of improving access) has become topical across Canada, although it is being proposed and accomplished in varying ways.¹⁴ In most provinces, primary care reform is aimed at increasing interdisciplinary care, providing extended hours for care delivery, and placing increased emphasis on prevention and patient education.¹⁵

In Alberta, primary care reform has taken the form of primary care networks (PCNs), which aim to improve access to and coordination of care for patients.¹⁶ A PCN consists of primary care physicians working with other health care providers, including nurses, dietitians, and pharmacists, to provide care to patients in a specific catchment area. While each network provides care to patients with and without chronic diseases (and has the flexibility to focus on any aspect of care that will benefit patients according to local need), CDM for patients with diabetes has been identified as a priority by most PCNs.¹⁶ Additional funding (\$50 per enrolled patient per year) is provided to the PCNs to support activities that are not funded by the typical physician-based fee-for-service model but that address specified objectives such as CDM.¹⁷ These funds may be used to hire nurses, to enable allied health care professionals to work to their full scope of practice, or for supporting other initiatives, including CDM programs.

Given differences in local priorities, personnel available, and historical patterns of care, it has been anecdotally noted that PCNs have established different types

of CDM programs. Given the differences in effectiveness and costs between the various CDM programs, we sought to determine which types of CDM programs have been adopted to manage diabetes by Alberta's PCNs and whether these choices are consistent with current evidence.

METHODS

In August 2010, we conducted a telephone survey of all Alberta PCNs to determine details of the CDM strategies for diabetes used in each PCN. The study was approved by the University of Calgary's Conjoint Health Research Ethics Board.

The PCNs studied

In 2003, the Alberta Primary Care Initiative was formed with the goal of creating PCNs to achieve primary care reform. The first PCNs opened in 2005. As of October 2010, there were 38 PCNs operating in Alberta, with another 2 recently approved and 3 pending approval.¹⁷ We assumed that 18 months would be required for a PCN to implement its CDM programs and we therefore limited our sample to the 30 PCNs that were established as of January 2009.

Method of survey

Our telephone survey was aimed at PCN employees who were familiar with all the CDM programs offered at the PCN. We identified these individuals through PCN websites or by calling PCN administrative staff. The position of the PCN contact person varied greatly and included executive directors, medical directors, CDM nurses, and coordinators. Responses to the survey were collected via telephone following distribution of the survey to contacts by e-mail.

Categorization of CDM programs for diabetes

Several different CDM program strategies have been shown to improve intermediate health indicators (eg, HbA_{1c} levels, use of cardioprotective medications) in patients with diabetes.^{18,19} Because CDM programs for diabetes are heterogeneous and do not conform to uniform guidelines, we classified them into categories as proposed by Shojanian et al.¹³ This scheme divides CDM strategies into 11 categories: clinician reminders; patient reminders; facilitated relay of clinical data to providers; audit and feedback; electronic patient registries; clinician education; patient education; promotion of self-management; team changes; case management; and continuous quality improvement (**Table 1**).¹³

The CDM strategies for diabetes were also grouped based on their resource intensity (**Table 2**). The strategies requiring the fewest resources are those that can

Table 1. Types of CDM strategies for diabetes

STRATEGY*	DEFINITION	EXAMPLES
Electronic medical record	Electronic system for tracking patient appointments or for tracking specific patients with diabetes	NA
Patient reminders	Telephone calls or postcards to patients to remind them of upcoming appointments or other aspects of diabetes management	Reminders of annual ophthalmology appointments
Clinician reminders	Prompts to health care providers to remind them of patient-specific diabetes management	Flag for patients who have not had recent HbA _{1c} measurements recorded
Audit and feedback	A summary of a physician's clinical performance is sent to him or her for self-evaluation	Each month the physician receives the average of the most recent HbA _{1c} values of each patient with diabetes
Facilitated relay of patient data	Clinical information from patients that is transmitted to the physician via some other route than traditional medical interactions	Patient home glucometer readings are uploaded and e-mailed to the case manager on a weekly basis
Clinician education	Increasing physicians awareness of current clinical practice guidelines and evidence-based recommendations	Conferences, workshops, educational outreach visits from PCN staff
Patient education	Increasing patient understanding of disease pathophysiology and effective methods of secondary prevention	One-on-one counseling with nursing staff, group diabetes classes
Promotion of self-management	Providing resources for patients to succeed in self-management	Glucometers, meal-tracking charts
Team changes	Addition of 1 or more members to the health care team	Adding CDM nurses, dietitians, or pharmacists to the patient care team
Case management	A team member other than the primary care physician assumes primary responsibility for coordinating care of patients with diabetes	Registered nurses track home glucose readings, send patients for bloodwork, and ensure that patients are seeing specialists appropriately

CDM—chronic disease management, HbA_{1c}—glycosylated hemoglobin A_{1c}, NA—not applicable, PCN—primary care network.
 *Strategy categories are taken from Shojania et al.¹³

be facilitated through existing EMR systems (provided the practice is already using an EMR). The next most resource-intensive strategies are those related to educational interventions, which might require part-time staff members to run educational sessions. The most resource-intensive strategies are those that require dedicated full-time staff members such as case managers or members of multidisciplinary teams (**Table 2**).

Analysis

Results of the survey were presented using frequencies, as the goal of this study was to gain an understanding of the programs offered by PCNs. Microsoft Access was used to manage the data and produce descriptive charts and tables.

RESULTS

The response rate to the survey was 97% (29 of 30), with only 1 PCN abstaining from participation. Of these 29 PCNs, 28 offered a variety of CDM programs for diabetes. In many PCNs, CDM programs were offered by some

clinics in the PCN, rather than by all clinics, or programs were geographically based and therefore not necessarily accessible to all patients in the PCN (**Figure 1**).

The 2 most commonly used strategies were team changes (28 of 29 offered programs to at least some patients in the PCN) and patient education (26 of 29 offered programs to at least some patients in the PCN). Multiple strategies were available to some patients in at least half of the PCNs surveyed. Fewer than half of the PCNs (12 of 28) had programs in which team members other than the primary physician had the authority to write or alter prescriptions for medications.

The PCNs were as likely to offer CDM programs that required high resource intensity as those that required low resource intensity (**Figure 1**). For instance, team changes are among the most resource-intensive strategies but are also among the most widely used. Alternatively, the strategies that can be facilitated by an effective electronic patient registry (eg, audit and feedback) might be among the less resource-intensive strategies (for clinics with a functioning electronic patient registry), but these were among the least widely used strategies in Alberta's PCNs.

Table 2. Resource intensities of various CDM strategies

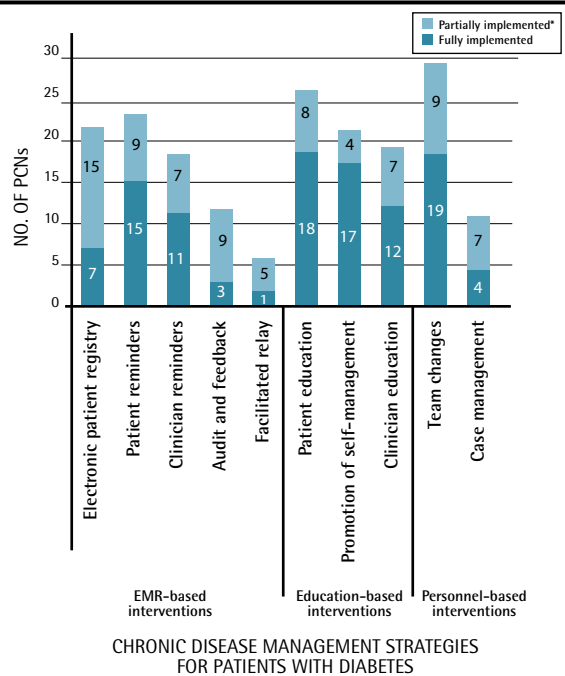
Resource intensity ↓ =====→	EMR-RELATED INTERVENTIONS	EDUCATION-RELATED INTERVENTIONS	PERSONNEL-BASED INTERVENTIONS
	EMR	Clinician education	Team changes
	Patient reminders	Patient education	Case management
	Clinician reminders	Promotion of self-management	
	Audit and feedback		
	Facilitated relay of patient data		
	Resource intensity	=====→	
	CDM—chronic disease management, EMR—electronic medical record.		

DISCUSSION

Given that most PCNs care for more than 60 000 patients, they receive a substantial budget to provide enhanced services. The PCNs face difficult decisions regarding how to best use these additional resources. Despite the many competing priorities in primary care, we found that most of Alberta's PCNs have identified CDM for diabetes as a priority and offer at least some form of CDM program for diabetes. Many PCNs employ several CDM strategies concurrently in the management of patients with diabetes. This makes sense given that some strategies, such as patient education, might be more useful for newly diagnosed patients, while others might have a larger role for patients with severe disease and diabetic complications (eg, case management).

Not all CDM strategies are equally effective for improving care. Two recent systematic reviews have compared the effectiveness of the various CDM strategies,^{13,20} highlighting that team changes are among the most effective strategies. An additional review by Shojania et al¹³ included 66 studies (50 of which were randomized trials), and concluded that the 2 interventions associated with the largest changes in HbA_{1c} levels were team changes and case management. They also noted 4 other strategies that resulted in statistically significant differences in HbA_{1c} levels: patient education, patient reminders, electronic patient registries, and clinician education. A separate systematic review that focused on the efficacy of case management in diabetes concluded that there was strong evidence supporting the use of this strategy to reduce HbA_{1c} levels and decrease complications of diabetes.²¹ Finally, a systematic review

Figure 1. Chronic disease management strategies used in Alberta's PCNs



EMR—electronic medical record, PCN—primary care network.
*Partially implemented indicates strategies that were not available to all patients with diabetes within a PCN.

done by Zwar et al compared CDM strategies based on the classification of strategies defined by the chronic care model.²⁰ Similar to Shojania et al, this study found that changes in delivery system design had the largest effect on HbA_{1c} levels. This category includes team changes, case management, electronic patient registries, and patient reminders.

The results of our study demonstrate that Alberta PCNs are employing several of the strategies that have been proven to be most effective. Nearly all PCNs use team changes (including adding nurses, dietitians, or pharmacists) to supplement standard physician care. Furthermore, the strategies shown to be most effective by Zwar et al²⁰ were the most commonly used strategies in the PCNs surveyed in our study.

Although team changes had been widely used across Alberta PCNs, fewer than half (12 of 28) had adopted one of the potentially most important components of the multidisciplinary team—namely, allowing team members other than the primary physician to alter medications autonomously. This strategy was shown to be the most effective in case management programs,¹³ yielding an absolute reduction in HbA_{1c} levels of 0.96%, compared with 0.41% for case management programs without this feature. It is possible that the resources required to hire allied health professionals with prescribing authority are prohibitive for some PCNs. In Alberta, only certain

pharmacists have the authority to initiate and modify prescriptions.²² Nurse practitioners and advance practice nurses have similar prescribing authority, but standard registered nurses currently do not have this capability.^{23,24} It is also possible that the reluctance relates to physician views on allied health prescribing. According to a Canadian Medical Association survey reported in 2007, physicians recognize the value of collaborative care, with 93% of respondents supporting collaborative models throughout the system.²⁵ However, they also identified a number of barriers to the successful implementation of collaborative care:

Where non-physicians have been provided with an opportunity to undertake activities related to patient care typically unique to the practice of medicine (e.g. ordering tests), they must not do so independently but undertake these activities within the context of the team and in a manner acceptable to the clinical leader.²⁵

To enhance the uptake of proven CDM methods in Alberta primary care networks, further study of existing barriers is warranted. Research should help to inform the ongoing discussion on extending the effectiveness of care teams in a context acceptable to participating physicians. It will also be important to track the effects of PCNs on intermediate markers of high-quality diabetes care, including HbA_{1c} levels and the use of medications associated with high-quality care.

Limitations

As in all studies that depend on the classification of quality improvement strategies, not all CDM strategies fit exactly within a prespecified category. We used the definitions provided by Shojania et al,¹³ and categorized CDM activities into existing categories as well as possible. Furthermore, PCNs are organized differently across Alberta—some use a centralized model in which all patient services are provided in a central location, whereas others prefer to sponsor allied health care professionals to work in various clinics throughout their jurisdiction. For centralized PCNs, data collection was straightforward; however, for PCNs where each clinic was more autonomous, the collection of data on a PCN-wide scale was difficult. In these situations, we noted that CDM services were often only available for a portion of PCN members.

Conclusion

We found that PCNs in Alberta varied in the types of CDM programs that they offered for patients with diabetes. While team changes have been shown to be effective, and the most commonly used strategy in Alberta, the effectiveness of such changes might be increased by

having someone other than the primary care physician able to prescribe and alter medications. Given limited resources within PCNs, future expansion of CDM programs in existing and new PCNs should consider differential effectiveness and resource intensity, in addition to ease of implementation.

Dr Campbell is Alberta Innovates–Health Solutions Clinician Fellow and a graduate student in the Department of Community Health Sciences at the University of Calgary in Alberta. **Dr Sargious** is Associate Professor in the Department of Medicine of the University of Calgary and Medical Director of Chronic Disease Management with Alberta Health Services. **Dr Lewanczuk** is Professor in the Department of Medicine at the University of Alberta and Senior Medical Director of Primary Care, Chronic Disease Management and Community and Rural Health with Alberta Health Services. **Dr McBrien** is Assistant Professor in the Department of Family Medicine at the University of Calgary. **Dr Tonelli** is a nephrologist and Professor at the University of Alberta. He is Chair of the Canadian Task Force on Preventive Health Care. **Dr Hemmelgarn** is a nephrologist and health services researcher and is Associate Professor at the University of Calgary. **Dr Manns** is a nephrologist and Associate Professor at the University of Calgary.

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Contributors

Drs Campbell and **Manns** made substantial contributions to study conception and design, and to drafting the article and critical revision. **Dr Campbell** administered the surveys and collected the data. **Drs Campbell, Manns,** and **Hemmelgarn** were involved in study design, data analysis, and interpretation of data. **Drs Hemmelgarn, Tonelli, McBrien, Sargious,** and **Lewanczuk** had input into study design and provided critical revisions to the manuscript. **Dr Manns** accepts full responsibility for the work and the conduct of the study. He had access to the data and controlled the decision to publish.

Competing interests

None declared

Correspondence

Dr David Campbell, University of Calgary, Faculty of Medicine, 3330 Hospital Dr NW, Calgary, AB T2N 1N4; e-mail dcampbel@ucalgary.ca

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