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Assessing the Effectiveness of Policies to Reduce Diabetes Hospitalizations Before and After the Reforms of Physician Payment and Primary Care Organization in British Columbia and Alberta

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ABSTRACT

Objective: Diabetes is one of the most common chronic conditions in Canada. Appropriate care management, particularly in primary care settings, has been demonstrated to improve the outcomes of people with this condition. Policies have been implemented to support primary care providers in providing appropriate diabetes management. This study aimed to evaluate whether policy changes related to improving care have impacted diabetes hospitalizations in British Columbia and Alberta, Canada.

Methods: This study used a before-and-after evaluation design based on longitudinal administrative data including physicians' claims and hospitalizations from 1998–1999 to 2009–2010. We performed ordinary least squares regressions to assess the variations in diabetes hospitalization rates following the implementation of policies in primary care settings in each province.

Results: Diabetes-related hospitalization rates have been decreasing since 1998 and continued to decrease after the reforms in both provinces. In 1998, the adjusted hospitalization rate for diabetes was 2.9% in Alberta and 1.7% in British Columbia compared to, respectively, 1.1% and 0.8% in 2009. Regression results suggest that the changes in policy in 2003 have had limited impact on outcomes for those with diabetes.

Conclusions: The hospitalization rates were already declining in both provinces over time, before and after the reform, so it is challenging to disentangle the decrease that could be attributable to policy changes. More research is needed to better understand the impact of changes in primary care on outcomes such as hospitalizations for diabetes.

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R É S U M É

Objectif : Le diabète est l'une des maladies chroniques les plus fréquentes au Canada. Il a été démontré que la prise en charge appropriée des soins, particulièrement dans les milieux de soins primaires, améliore les résultats cliniques des personnes souffrant de cette maladie. Des politiques ont été mises en œuvre afin de soutenir les prestataires de soins primaires dans l'offre d'une prise en charge appropriée du diabète. La présente étude avait pour but d'évaluer si les changements de politiques en matière d'amélioration des soins ont eu une incidence sur les hospitalisations liées au diabète en Colombie-Britannique et en Alberta, au Canada.

Méthodes : Cette étude utilisait un plan d'évaluation de type « avant-après » fondé sur des données administratives longitudinales comprenant les réclamations des médecins et les hospitalisations de 1998–1999 à 2009–2010. Nous avons réalisé des régressions selon la méthode des moindres carrés ordinaires pour évaluer les variations des taux d'hospitalisation liée au diabète après la mise en œuvre des politiques dans des milieux de soins primaires de chaque province.

Résultats : Les taux d'hospitalisation liée au diabète ont diminué depuis 1998 et ont continué de diminuer après les réformes dans les deux provinces. En 1998, le taux ajusté d'hospitalisation liée au diabète était de 2,9 % en Alberta et de 1,7 % en Colombie-Britannique comparativement à 1,1 % et à 0,8 % en 2009. Les résultats de régression suggèrent que les changements de politiques en 2003 ont eu une incidence limitée sur les résultats cliniques des personnes souffrant du diabète.

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Conclusions : Les taux d'hospitalisation déclinaient déjà dans les deux provinces au fil du temps, avant et après la réforme, il est donc difficile d'isoler la diminution qui pourrait être attribuable aux changements de politiques. Davantage de recherches sont nécessaires pour mieux comprendre l'incidence des changements en soins primaires sur les résultats cliniques, tels que les hospitalisations liées au diabète.

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Introduction

Diabetes is one of the most common chronic conditions, and it affects more than 2 million Canadians (1). The prevalence and costs of diabetes are estimated to grow, respectively, from 8.3% and CAN\$1.5 billion in 2013 to 10.3% and CAN\$1.9 billion by 2020 in British Columbia and from 5.8% and CAN\$1.1 billion to 8.6% and CAN\$1.6 billion in Alberta (2,3). The leading source of the direct costs of diabetes is hospitalizations (4,5). Yet diabetes is a chronic condition that can be managed in a primary care setting and is considered to be an ambulatory care-sensitive condition (6). Thus, hospitalizations for such conditions could potentially be prevented through better access to effective primary care (7,8). The rationale is that when individuals have access to primary care physicians who provide effective care by ordering the necessary tests, following up on the results and supporting patients in controlling and managing a chronic condition like diabetes, it decreases the chances of acute complications that could lead to hospitalizations. Hospitalization rates are then used as a measure of the quality of primary care because there is evidence that better diabetes care is associated with fewer complications and admissions for diabetes (9,10). A European study found that stronger primary care systems were associated with lower hospitalization rates for asthma, chronic obstructive pulmonary disease and diabetes (11).

Reducing the hospitalization rates of ambulatory care-sensitive conditions is an objective in many jurisdictions and is reported as a health system indicator in many Canadian provinces, including Alberta and British Columbia (12,13). Both provinces started reforming primary care with the introduction of operational and structural changes in 2003.

In these 2 provinces, primary care was organized primarily around solo practices in which physicians were remunerated through a fee-for-service payment scheme by their respective provincial governments in the context of a public health insurance plan. In 2003, British Columbia primary care physicians started receiving financial incentives for the care management of identified diseases, including diabetes (14). This initiative was supported by evidence that implementation of financial incentives is associated with an increase in the delivery of services for diabetes management (including the running of tests) and with outcomes in terms of levels of glycated hemoglobin (A1C), blood pressure, serum creatinine and cholesterol (15). Moreover, subsequent improvements in the care could lead to lower hospital costs despite an eventual increase in primary care costs due to additional payments (16).

However, it remains challenging to link the improvements in care and outcomes to financial incentives. Dahrouge et al (17) found that superior preventive care was not associated with a remuneration model but was, instead, related to the specific characteristics of a primary care practice, including having a female physician, the number of patients being cared for by a physician and the presence of an electronic reminder system. Such evidence supports the approach taken by the province of Alberta, where Primary Care Networks (PCNs) were created, and represents a structural change in the organization of primary care. PCNs consist of groups of family doctors and other healthcare providers (including but not limited to nurses, dietitians, social workers and pharmacists) working together—albeit not necessarily under the same roof—to meet the needs of a local patient population so as to improve access to and coordinate primary care services (18). Although physicians

continue to receive fee-for-service payments, PCNs receive additional funding (with the amount based on the number of enrolled patients) to support the hiring of the additional resources for the network (19).

British Columbia and Alberta attempted to improve care for patients with diabetes. The first implemented a strictly operational change with the introduction of a financial incentive for primary care physicians to provide care according to clinical guidelines; the latter transformed the primary care structure and provided funding for PCNs to hire their own staff and develop diabetes programs specific to their local needs. The objective of this study was to understand the relationship between the implementation of those changes in primary care and the hospitalization rates for diabetes from an ecologic perspective. Based on evidence suggesting that better primary care could lead to fewer hospitalizations for ambulatory care-sensitive conditions such as diabetes, we hypothesized that the period following the implementation of these changes would be associated with a decrease in the rates of hospitalization for diabetes in both in British Columbia and Alberta. These 2 jurisdictions offer the opportunity to look at the differences not only over time but also with 2 contextual perspectives.

Methods

Data sources and study population

The study used administrative health databases from British Columbia and Alberta: the hospital Discharge Abstract Database and the physicians' billing claims from April 1, 1996, to March 31, 2010. These databases contain the demographic and clinical information of patients, including unique identifiers, dates of birth, sex and diagnoses, using the International Classification of Diseases 9th revision (ICD-9) or 10th revision (ICD-10), depending on the year. They cover all eligible people receiving inpatient or outpatient care in each province. Eligibility was defined as being either a Canadian citizen or lawfully admitted to Canada for permanent residence, residing in the province, being physically present in the province for at least 6 months in a calendar year, and not claiming residency elsewhere.

The clinical information from physicians' billings and hospitalizations were used to identify the cohort of patients with diabetes at an index date for each year.

The study included all eligible individuals younger than 75 years of age who had diabetes at each index date over the observation period of 10 years in Alberta and British Columbia. The diagnosis of diabetes was defined using an established case definition based on a validated list of ICD codes (6), that is, those who had at least 2 physician claims or 1 hospitalization with a diagnosis of diabetes within the 2 years preceding the index date. Each year constituted the unit of analysis, and the rates were calculated at the provincial level for an ecologic analysis.

Analysis

In order to assess the impact of policies, we analyzed the differences in the rates of hospitalizations over time, before and after the implementation of the policy changes, and we considered the factors that could explain these differences. We used aggregated

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