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Original Research

Self-Monitoring of Blood Glucose: Impact of Quantity Limits in Public Drug Formularies on Provincial Costs Across Canada

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ABSTRACT

Objectives: For most patients with diabetes, routine use of blood glucose test strips (BGTS) has not been shown to be beneficial, yet the economic implications of broad publicly funded reimbursement for BGTS are substantial. We assessed the potential impact of BGTS quantity limits on utilization and costs for 6 publicly funded drug plans across Canada.
Methods: A cross-sectional analysis was conducted in 6 provinces (Alberta, Saskatchewan, Manitoba, Nova Scotia, Newfoundland and Labrador and Prince Edward Island) for patients who received at least 1 prescription for BGTS in 2014 through the public drug program. We determined the number of BGTS that would have exceeded the quantity limits and the associated costs to the provincial drug program.
Results: A total of $38,051,026 was spent on BGTS reimbursed through public drug programs among the 6 provinces. In provinces where BGTS use is largely restricted to patients using insulin, the potential annual savings were minimal, ranging from 0.4% to 2.3%, whereas in provinces with more liberal listings, potential savings ranged from 12.4% to 19.8%. Combining these results with data from a previous analysis in Ontario and British Columbia, the cost savings associated with BGTS quantity limits for 8 provinces across Canada (capturing approximately three-quarters of the Canadian population) is estimated to be $30.3 million annually.
Conclusions: The national implementation of a quantity limit policy for BGTS that aligns with evidence of efficacy, optimal prescribing and patient safety can lead to considerable savings for most public drug plans across Canada.

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RÉSUMÉ

Objectifs : Pour la plupart des patients diabétiques, l'utilisation systématique des bandelettes réactives pour la glycémie (BRG) ne s'est pas révélée bénéfique, mais les conséquences économiques des remboursements largement financés par les fonds publics des BRG sont substantielles. Nous avons évalué les conséquences potentielles des limitations du nombre de BRG sur l'utilisation et les coûts des 6 régimes publics d'assurance-médicaments du Canada.
Méthodes : Une analyse transversale a été menée dans 6 provinces (Alberta, Saskatchewan, Manitoba, Nouvelle-Écosse, Terre-Neuve-et-Labrador et île-du-Prince-Édouard) auprès de patients qui avaient reçu au moins 1 ordonnance de BRG en 2014 dans le cadre d'un régime public d'assurance-médicaments. Nous avons déterminé le nombre de BRG qui auraient excédé les limitations de quantité et les coûts associés aux régimes publics d'assurance-médicaments provinciaux.

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Résultats : Un total de 38 051 026 $ a été dépensé pour le remboursement des BRG par les régimes publics d'assurance-médicaments des 6 provinces. Dans les provinces où l'utilisation des BRG se limitait généralement aux patients prenant de l'insuline, les économies annuelles potentielles étaient minimes, allant de 0,4 % à 2,3 %, alors que dans les provinces ayant des listes plus ouvertes, les économies potentielles allaient de 12,4 % à 19,8 %. En combinant ces résultats aux données d'une analyse précédente de l'Ontario et de la Colombie-Britannique, les économies d'échelle associées aux limitations du nombre de BRG de 8 provinces du Canada (qui s'emparent approximativement les trois-quarts de la population canadienne) sont estimées à 30 300 000 $ annuellement.
Conclusions : La mise en œuvre nationale de politiques en matière de limitations du nombre de BRG qui s'harmonisent aux données probantes sur l'efficacité, de prescription optimale et de sécurité du patient peut entraîner des économies considérables pour la plupart des régimes publics d'assurance-médicaments du Canada.

Introduction

Self-monitoring of blood glucose (SMBG) for patients with diabetes on insulin therapy is considered an essential part of management because it allows for adjustment of insulin doses, with the goal of optimizing glycated hemoglobin (A1C) levels and preventing complications, including hypoglycemia (1,2). However, for patients with type 2 diabetes not using insulin, frequent monitoring by means of blood glucose test strips (BGTS) is controversial (3,4). Although some studies have shown small positive effects on glycemic control in this population, the effect is temporary and not considered clinically meaningful (5). As well, there is no evidence to suggest that general health-related quality of life, well-being or patient satisfaction is improved by the routine use of SMBG among noninsulin-treated patients. In fact, some studies have reported a possible increase in anxiety and depression scores in noninsulin-treated patients with diabetes who routinely use SMBG (6,7).

As a result, several guidelines and therapeutic reviews pertaining to the management of patients with diabetes have addressed the issue of frequency of use of BGTS (8–10). Most of these reviews do not specifically outline optimal testing frequencies in noninsulin-treated patients with diabetes, but a review by the Canadian Agency for Drugs and Technologies in Health (CADTH) in 2009 recommended a maximum of 14 tests per week for patients with type 2 diabetes using insulin in conjunction with other antidiabetic drugs and no routine SMBG by other patients with diabetes (9,11). In contrast, a guidance document published by the Canadian Diabetes Association (CDA) suggested that the number of SMBG tests be individualized for patients with type 2 diabetes using insulin; 15 test strips per month should be available for patients taking antidiabetes drugs, who have lower risks for hypoglycemia, and 30 test strips per month should be available for for patients taking antidiabetes drugs, who have higher risks for hypoglycemia (i.e. sulfonylureas, meglitinides) (12).

In Canada, a total of $247 million was spent on BGTS in 8 publically funded programs in 2006, with over half of the total expenditures attributable to patients not using insulin (13). In order to encourage appropriate use of these products and to decrease expenditures, policies of quantity limits for BGTS have been suggested and have been implemented in some jurisdictions across Canada. For example, in 2013, the Ontario Ministry of Health and Long-Term Care's public drug program implemented test strip quantity limits aligned with the CDA's guidance (12,14). A similar policy was subsequently adopted by the British Columbia and Saskatchewan public drug plans in 2015.

Quantity-limit policies are designed to encourage more appropriate use of BGTS, but they have also been shown to have considerable potential for cost savings in public drug programs. Indeed, it is estimated that Ontario and British Columbia will save approximately $100 million and $23 million, respectively, over the 5-year period following the introduction of the new policies (15). Despite this, the potential impact of introducing a policy of quantity limits in other jurisdictions across Canada is not known because provinces have differing levels of reimbursement through their provincial drug programs (Supplementary Appendix) (16,17). Therefore, we designed a study to estimate the potential impact of BGTS quantity limits that are similar to those already implemented in Ontario and British Columbia, on BGTS utilization and expenditures in 6 additional provincial drug plans across Canada.

Methods

We conducted a cross-sectional study among patients residing in 6 provinces across Canada (Alberta, Saskatchewan, Manitoba, Nova Scotia, Newfoundland and Labrador, and Prince Edward Island) who were dispensed at least 1 prescription for BGTS between January 1 and December 31, 2014, through a provincial public drug program. We leveraged the Canadian Institute for Health Information's National Prescription Drug Utilization Information System (NPDUIS) database to identify all prescriptions for BGTS and other diabetes therapies dispensed to each patient over the study period. We did not analyze data for Quebec, New Brunswick or the Territories because BGTS data for these jurisdictions is not captured in the NPDUIS database. This protocol was approved by the Research Ethics Board of St. Michael's Hospital, Toronto.

Each patient was assigned to 1 of 4 mutually exclusive diabetes therapy groups based on the type of diabetes therapies that they received during the study period, as follows: 1) patients dispensed at least 1 prescription for insulin; 2) patients dispensed at least 1 prescription for an oral glucose-lowering medication that may induce hypoglycemia (i.e. sulfonylureas or repaglinide) but not insulin; 3) patients dispensed at least 1 prescription for an oral glucose-lowering medication that does not induce hypoglycemia, but not insulin or hypoglycemia-inducing oral medications and 4) patients dispensed no insulin or oral glucose-lowering therapy.

Statistical analysis

We determined the total number of patients receiving BGTS, the number of strips dispensed and the associated costs for each provincial drug program, stratified by diabetes therapy group for 2014. We then modeled the potential 1-year impact of introducing quantity limits in each province that align with those implemented in Ontario, British Columbia and Saskatchewan. Specifically, these thresholds are a maximum of 3000 strips annually for insulin users, 400 strips annually for those using oral glucose-lowering medications that may induce hypoglycemia, and 200 strips annually for all others with diabetes. For each patient, we determined the number of test strips that would have exceeded these thresholds in 2014 and the associated costs to the provincial drug program. Patient-level reductions in utilization and costs were aggregated at the level of diabetes therapy group and province.