Canadian Agency for Drugs and Technologies in Health

Agence canadienne des médicaments et des technologies de la santé

OPTIMAL THERAPY REPORT

COMPUS

December 2009

# SUMMARY REPORT: Optimal Prescribing and Use of Blood Glucose Test Strips for Self-Monitoring of Blood Glucose

*Supporting Informed Decisions*

*À l'appui des décisions éclairées*

This summary is based on comprehensive Optimal Therapy Reports on the topic prepared by the Canadian Optimal Medication Prescribing and Utilization Service (COMPUS), a service of the Canadian Agency for Drugs and Technologies in Health (CADTH). The conclusions were provided by experts. The authors have also considered input from other stakeholders.

The information in this report is intended to help health care decision-makers, patients, health care professionals, health systems leaders, and policy-makers make well-informed decisions and thereby improve the quality of health care services. The information in this report should not be used as a substitute for the application of clinical judgment in respect of the care of a particular patient or other professional judgment in any decision-making process nor is it intended to replace professional medical advice. While CADTH has taken care in the preparation of the report to ensure that its contents are accurate, complete, and up-to-date, CADTH does not make any guarantee to that effect. CADTH is not responsible for any errors or omissions or injury, loss, or damage arising from or as a result of the use (or misuse) of any information contained in or implied by the information in this report.

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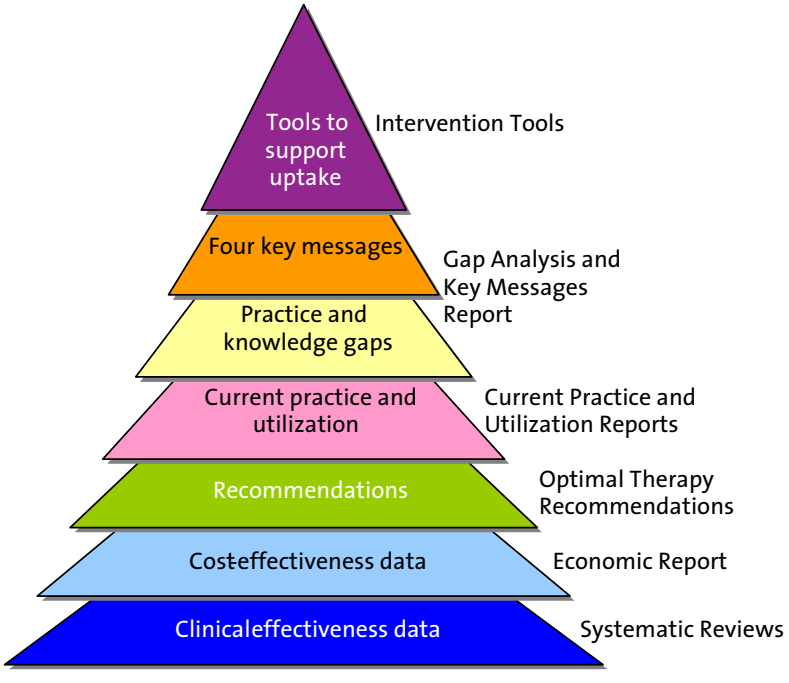
# SUMMARY REPORT:

## Optimal Prescribing and Use of Blood Glucose Test Strips for Self-Monitoring of Blood Glucose

The Canadian Agency for Drugs and Technologies in Health (CADTH) — through its Canadian Optimal Medication Prescribing and Utilization Service (COMPUS) — has released a series of Optimal Therapy Reports on the self-monitoring of blood glucose (SMBG), together with recommendations and intervention tools to support the uptake of this information. These reports and tools are part of the diabetes mellitus topic, a priority area identified by the COMPUS Advisory Committee (CAC).

CADTH's work focuses on the use of test strips that are used to measure blood glucose for people with diabetes. The analysis assessed available evidence to find out if people with type 1, type 2, and gestational diabetes should be testing their blood glucose, and if they should, how often they should test. The findings indicate that, generally, most people with type 2 diabetes do not have to test as often as they do now. This is important information when considering the best way to support good health for people living with diabetes while also recognizing finite health care resources. If CADTH recommendations are put into practice, resources will be freed up to be invested elsewhere.

This summary highlights the work done by CADTH, from the most concise information available, in user-friendly intervention tools, back through to the evidence on which recommendations and tools were built. The following diagram presents each level of information; the corresponding sections in this summary include a link to the Optimal Therapy Report or tool on the CADTH website.




More information and the full Optimal Therapy Reports and tools may be found on the CADTH website (www.cadth.ca).

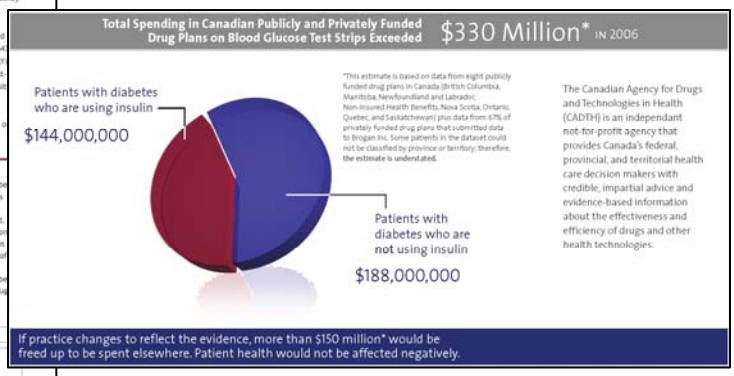
The following sections correspond to the diagram presented at the beginning of this summary. Each section represents a level of information from the most user-friendly to the most detailed.

| Tools to support uptake | Four key messages |
| --- | --- |
| *Series of tools to support uptake* | *Gap Analysis and Key Messages for the Prescribing and Use of Blood Glucose Test Strips for Self-Monitoring of Blood Glucose* |

A range of intervention tools were developed based on the key messages targeted to optimize the practice of SMBG. Input from experts and potential users aided in the selection of tools based on the best available evidence.

Examples:

- Optimal Therapy Newsletter
- Project Highlights brochure
- prescribing aid (with opportunity cost information)
- alternate prescription pad
- clinical flow sheet
- animated short
- presentation.



**Key messages:**

- **For people with type 1 or type 2 diabetes who are using basal-bolus insulin regimens, SMBG should be individualized to guide adjustments in insulin therapy to achieve optimal blood glucose control.**
- **In adults with type 2 diabetes who are using basal insulin, SMBG should be individualized, but testing of up to 14 times per week should be sufficient for most patients at most times.**
- **Most adults with type 2 diabetes managed on oral antidiabetes drugs do not require routine SMBG. Periodic testing in selected patients** (e.g., those with unstable glucose levels, acute illness, pharmacotherapy changes, risk of hypoglycemia with insulin secretagogues like glyburide) **should be linked to specific patient actions** (e.g., prevention or management of hypoglycemia, self-directed dosage adjustment)**.**
- **Most adults with type 2 diabetes controlled by diet alone should not require routine SMBG.**

CADTH works with Canadian jurisdictions, providing the information needed to make informed decisions. The reports and tools on SMBG may be used to support decisions related to the effective management of diabetes. CADTH facilitates the uptake of this information by providing materials adapted to meet user requirements.

## Practice and knowledge gaps

*Gap Analysis and Key Messages for the Prescribing and Use of Blood Glucose Test Strips for Self-Monitoring of Blood Glucose*

In comparing the Optimal Therapy Report recommendations with both the *Current Practice Analysis of Health Care Providers and Patients on Self-Monitoring of Blood Glucose* report and the *Current Utilization of Blood Glucose Test Strips in Canada* report, five major gaps emerge.

**Practice and knowledge gaps are identified through comparison of current practice and utilization information with optimal therapy recommendations.**

**Practice gaps:**

- There is routine use of blood glucose test strips among patients with type 2 diabetes who are not using insulin.
- There is limited use of SMBG results in therapeutic decisions by physicians.
- SMBG is often seen to be synonymous with self-management of diabetes by health care professionals.

### Knowledge gaps:

- There is lack of awareness among health care professionals of key evidence related to the efficacy of SMBG in patients with type 2 diabetes who are not using insulin.
- There is lack of awareness of potential opportunity costs associated with widespread use of blood glucose testing for SMBG by patients with type 2 diabetes who are not using insulin.

The identified gaps lend themselves well to the development and implementation of interventions and tools to potentially change behaviour of SMBG.

## Current practice and utilization

*Current Practice Analysis of Health Care Providers and Patients on Self-Monitoring of Blood Glucose*

*Current Utilization of Blood Glucose Test Strips in Canada*

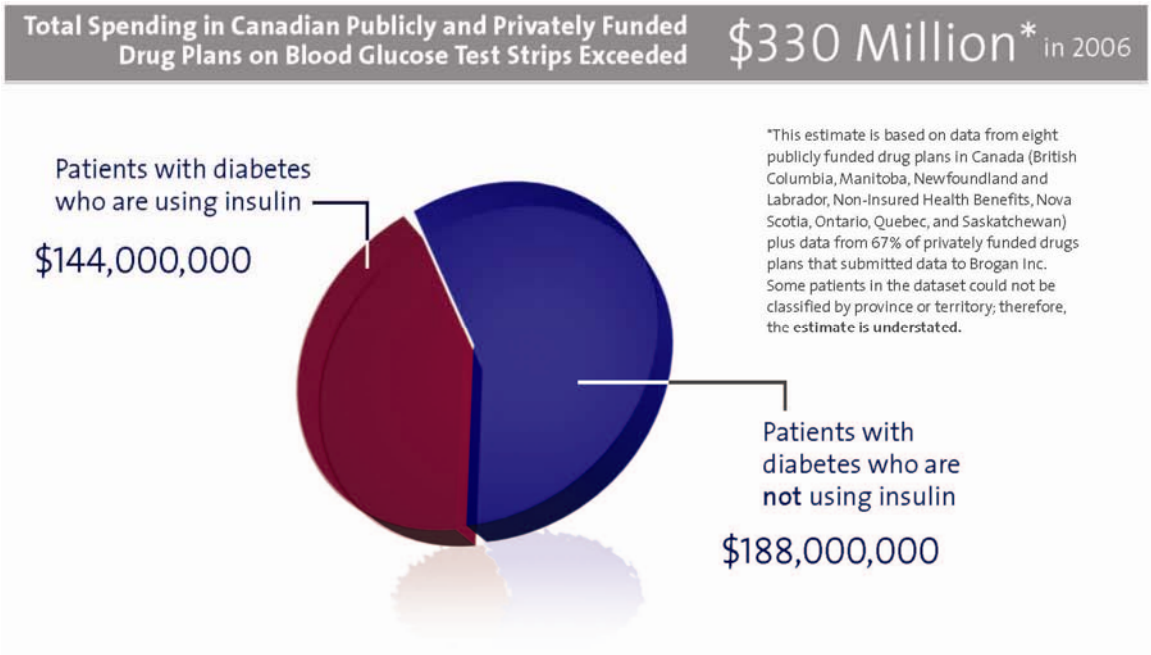
The objective of the **Current Practice Analysis Report** was to foster an understanding of the beliefs and perceptions regarding SMBG of patients, diabetes educators, physicians, and pharmacists.

To determine **current utilization** patterns of blood glucose test strips for SMBG in Canada, a retrospective analysis of administrative claims data from publicly and privately funded drug plans in Canada was performed. Frequency and cost of blood glucose test strips claimed per person, per day, were calculated, as were total utilization and expenditure on blood glucose test strips.

Both of these Optimal Therapy Reports were used, together with the COMPUS Expert Review Committee (CERC) Optimal Therapy Recommendations, in the development of key messages and intervention tools.

### A summary interpretation of the data

In privately and publicly funded drug plans in Canada, current utilization of blood glucose test strips for SMBG is considerable. In 2006, non-insulin-treated patients with type 2 diabetes covered under the Ontario Drug Benefits Program used more than one blood glucose test strip per day on average and accounted for 62% of the $109 million expended on blood glucose test strips. The increasing prevalence of type 2 diabetes may further increase the costs associated with SMBG. The Current Practice Analysis revealed that nearly all participating health care providers (physicians, diabetes educators, pharmacists) recommend SMBG to the majority of patients with diabetes. Patients, however, reported frustration that their physician did not seem interested in their SMBG results. A barrier to change is a current perception that SMBG is synonymous with the management of diabetes.




## Recommendations

*Optimal Therapy Recommendations for the Prescribing and Use of Blood Glucose Test Strips*

CERC produced seven detailed recommendations on the use of blood glucose test strips for SMBG in various populations, including:

- children and adults with type 1 diabetes
- adults with type 2 diabetes
- women with gestational diabetes.

**Summary of CERC recommendations:**

- For adults and children with type 1 diabetes, CERC **recommends** that the optimal daily frequency of SMBG be **individualized**.
- For adults with type 2 diabetes using insulin with or without oral antidiabetes drugs, CERC **recommends** that the optimal daily frequency of SMBG be **individualized**. CERC **suggests** that the maximum average weekly frequency of SMBG is **14 tests per week** for most of these patients.
- For most adults with type 2 diabetes using oral antidiabetes drugs (without insulin) or no antidiabetes drugs, the routine use of blood glucose test strips for SMBG is **not recommended** by CERC.
- For women with gestational diabetes not using antidiabetes drugs, CERC **recommends** that the optimal daily frequency of SMBG be **individualized**.

CADTH applied the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach to summarize the available evidence and facilitate the generation of optimal therapy recommendations by CERC.

An important part of CADTH's work is the identification of areas where further research on the value of SMBG is required.

**Further research on the value of SMBG is required in:**

- gestational diabetes
- type 1 or type 2 diabetes during pregnancy
- Canada's First Nations population
- children with type 2 diabetes
- workers where hypoglycemia may pose an occupational risk
- patients with a history of hypoglycemia, newly initiated on insulin, experiencing acute illness, undergoing changes in insulin dose and/or regimen or significant changes in routine, or with poorly controlled or unstable blood glucose levels.

Researchers evaluating the effectiveness of SMBG are encouraged to design studies that can show its effect on clinically important outcomes including macrovascular and microvascular complications, patient self-management, and death, not just glucose control as measured by glycosylated hemoglobin (A1C). Results from this research will lead to improved clinical practice and better outcomes for patients with diabetes.

## Cost-effectiveness data

*Cost-Effectiveness of Blood Glucose Test Strips in the Management of Adult Patients with Diabetes Mellitus*

Cost-effectiveness data for the use of blood glucose test strips for SMBG were derived from pharmacoeconomic analyses conducted by CADTH using the United Kingdom Prospective Diabetes Study Outcomes Model.

### A summary interpretation of the data

Use of blood glucose test strips for frequent SMBG in all patients with type 2 diabetes not using insulin is unlikely to represent efficient use of finite health care resources, although periodic testing (e.g. one to two tests per week) may be cost-effective. Reduced test strip price could also significantly improve cost-effectiveness. In patients with type 2 diabetes using insulin, use of more than 21 test strips per week is unlikely to be cost-effective.

## Clinical effectiveness data

*Systematic Review of Use of Blood Glucose Test Strips for the Management of Diabetes Mellitus*

CADTH conducted a systematic review and meta-analysis to determine the:

- effect of SMBG versus no self-monitoring in patients with type 2 diabetes
- optimal frequency of SMBG in patients with type 1 and type 2 diabetes and gestational diabetes.

Electronic databases, conference proceedings, and grey literature sources were searched up to March 2009 to identify randomized controlled trials and observational studies investigating the use of SMBG in patients with type 1, type 2, and gestational diabetes.

### A summary interpretation of the data

A meta-analysis of randomized controlled trials, some of good quality, indicated that SMBG was associated with modest improvements in glycemic control among patients with non-insulin-treated type 2 diabetes. The provision of education to help patients translate results from self-monitoring into appropriate responses appeared to result in no greater benefit than self-monitoring without education, although studies may have been limited in their ability to adequately assess the effects of education. There was little evidence to suggest that SMBG confers benefits in terms of health-related quality of life, patient satisfaction, long-term complications, or mortality. Additional high-quality studies are required to determine whether self-monitoring reduces the burden of diabetes complications and to identify patient subgroups most likely to benefit.

Use of blood glucose test strips for SMBG in patients with insulin-treated type 2 diabetes resulted in improved glycemic control, although the evidence was limited and of low quality. There was insufficient evidence regarding the effect of SMBG in women with gestational diabetes. There was also insufficient evidence to determine the optimal frequency of SMBG in any of the patient populations studied.

Stakeholder feedback is sought at key points in the CADTH process. This ensures that the end products, the intervention tools, are useful to those seeking to optimize the prescribing and use of drugs.

For further information, please visit the CADTH website: www.cadth.ca.