### Table 1: Recommendations for Self-Monitoring Blood Glucose in People with Type 2 Diabetes

<table>
<thead>
<tr>
<th>Type 2 Diabetes</th>
<th>Evidence Summary for SMBG</th>
<th>Bottom Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet alone or prediabetes</td>
<td>SMBG vs no SMBG: Improvements in glycemic control were less pronounced (ΔA1C=0.05%) and not statistically significant.</td>
<td>Routine SMBG is not required. May be considered for feedback to new patients on the effects of lifestyle interventions.</td>
</tr>
<tr>
<td>Not using insulin</td>
<td>&gt; Self-testing (&gt;7 times per week) is associated with a stat significant, but not clinically relevant, improvement (ΔA1C = 0.25%). &gt; Benefits are small up to 6 mos (ΔA1C = 0.3%) &amp; subside by 12 mos. &gt; No studies have determined whether SMBG shows benefit for hard diabetes endpoints such as reduction in blindness, kidney damage, MI or mortality. &gt; An association with depression and lower quality of life has also been noted.</td>
<td>Routine SMBG is not required. &gt; The small reduction in A1C does not translate to better glycemic control or quality of life.</td>
</tr>
<tr>
<td>Using insulin</td>
<td>Low quality evidence suggests the use of SMBG appears to be associated with improvements in glycemic control. &gt; There is insufficient clinical evidence to determine the optimal frequency of testing but should be individualized.</td>
<td>Basal insulin: ≤2 times per day: Individualize frequency, usually not more than 14 times per day. Basal-bolus insulin: Individualize frequency to guide adjustments in insulin therapy. (see Table 2).</td>
</tr>
</tbody>
</table>

### Table 2: If self-monitoring blood glucose, when? DIabetes Canada SMBG Recommendation Tool (DCCT: SMBG Tool.pdf). SMBG Interactive Tool

#### Situation

<table>
<thead>
<tr>
<th>SMBG Frequency Recommendation</th>
<th>Test Strip &amp; Lancet Coverage</th>
<th>Table 3: Consider More Frequent SMBG</th>
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<tr>
<td><strong>Basal</strong> (typically given hs)</td>
<td>SKH = 3,650 per year (10 per day)</td>
<td>（夜间的 unawareness）hypoglycemia due to decreased counter regulatory hormones.</td>
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<td>At least as often as insulin is being given. T2DM: daily at variable times, DCCT/Consort.</td>
<td>NIH: &gt; 100 per 5 days (8 per day)</td>
<td>nocturnal hypoglycemia (night sweats, nightmares): intensive insulin regimens; monitor overnight BG levels at peak action time of overnight insulin</td>
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<td>Premixed (typically ac; breakfast &amp; supper)</td>
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<td>more for info on assessment and management of hypoglycemia, see page 28</td>
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<td>QID; pre meals and at bedtime, to assess previous dose and to adjust the next dose (post-prandial or paired meal checking can also be helpful, see page 27)</td>
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<td>medication changes, major changes in diet/activity (e.g., &gt; 5 SMBG for 1-2 weeks)</td>
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<td>Intensive regimens: may require 6-10 tests/day (ac. pc. hs. night)</td>
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### To ensure accuracy of meters: Results should be compared with lab measurements of simultaneous venous fasting plasma glucose (8-hour fast) at least annually and when A1C does not match glucose meter readings. 

### Cost of meter: FREE with purchase of test strips (test strips and lancets covered by SKH provincial drug plan, NIH drug plan and many 3rd party plans), CGM devices not covered by SKH & NIH; Annual cost of test strips: $200-365 (1 test/day) to $1,300-2,500 (7 tests/day); Choice: consider patient factors and preferences (e.g. vision impairment, dexterity, alternate site testing if finger poke pain, smartphone compatibility, need for continuous glucose monitoring)
ONLINE EXTRAS: SELF-MONITORING OF BLOOD GLUCOSE IN TYPE 2 DIABETES

Background considerations:

- Weighing the benefits & risks of intensive therapy: [See also Diabetes - Landmark Outcome Trials Chart]
  - The results of clinical trials evaluating outcomes of intensive glycemic control have been somewhat disappointing. Achieving an A1C of less than 6.5% may reduce microvascular endpoints, but over 100,000 patient years of RCT data have failed to show a benefit on CV endpoints.\(^{11}\) (The 10 year observational follow-up to the UKPDS suggests CV benefit of intensive glycemic control (FBG <6; mean baseline A1C 7% vs 8.5%) especially with metformin.\(^{13}\))
  - Individualization of antihyperglycemic therapy has become a common theme; as some evidence & experience suggests that some patients may do worse with more intensive regimens (e.g. \(^{11}\) in Type 2 patients randomized to achieve an intensive A1C of 6% vs 7-8%; actual A1C achieved was 6.4% vs 7.5%).\(^{10}\)
  - Although an A1C of <7% is suggested for most, individual patient & treatment regimen factors may result in acceptance of less aggressive targets. For example the American Geriatric Society\(^{10}\) noted that an A1C of 8% may be more suitable in frail elderly & those with a life expectancy <5yrs.
  - A recent observational cohort trial found a "U" shaped curve for mortality related to A1C. An A1C of 7.5% was associated with the lowest mortality, with higher mortality seen at higher and lower A1C values.\(^{11}\)

If practice changes to reflect the evidence, $450 million to $1.2 billion* could be freed up between 2012 and 2015 for spending on antidiabetes interventions that are proven effective.

*No Drugs - may include claims from beneficiaries that received non-benefit insulin or oral hypoglycemic agents.

Patient health would not be affected negatively.

[These results were prepared using data from Bregman Inc., a unit of IMS, Phamarat8, Public and Private Drug Plans Databases, 2008-2010]

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### Acknowledgements:

Contributors & Reviewers: Ann Colbourne, MD, FRCP, FACP (Department of Medicine, U of A, Edmonton), Tessa Laubscher (CCFP, College of Medicine, U of S, Saskatoon), M Jn Laubscher (Hamilton), Henry Halatyi (PharmD, CDE, SMB, Toronto), Artene Kuntz (Pharmacist, DES, CDA, Regina); Derek Jorgenson (PharmD), College of Medicine, U of S, Saskatoon, Karen McDemarr (Pharmacist, CDE, RCHQ, SK), Kristen Chelak (Pharmacist), MSc, RPh (COMPUS, Ottawa) & the RxFiles Advisory Committee. Prepared by L. Regier (PharmD, FAPhA) & B. Jentsch (COMPUS) for assistance the University of Alberta.

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### Patients with diabetes who are using insulin

$183,000,000

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### Patients with diabetes who are not using insulin

$317,000,000

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Thanks to CADTH-COMPUS for assistance the development of this document.

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Data provided from Saskatchewan Health; used by permission.
And these new restrictions are okay with the Canadian Diabetes Association, which worked with the government to ensure that...


Majumdar SR. Self-monitoring of blood glucose was not cost-effective in non-insulin-treated type 2 diabetes. ACP J Club. 2008 Nov-Dec;149(4):4-5.


Malanda UL, Welschen LM, Ripplinger II, et al. Self-monitoring of blood glucose in patients with type 2 diabetes who are not using insulin. Cochrane Database Syst Rev. 2012 Jan 18;1:CD005060. [From this review, we conclude that when diabetes duration is over one year, the overall effect of self-monitoring of blood glucose on glycemic control in patients with type 2 diabetes who are not using insulin is small up to six months after initiation and subsides after 12 months. Furthermore, based on a best-evidence synthesis, there is no evidence that SMBG affects patient satisfaction, general well-being or general health-related quality of life. More research is needed to explore the psychological impact of SMBG and its impact on diabetes specific quality of life and well-being, as well as the impact of SMBG on hypoglycaemia and diabetic complications.]


References:


