

# Global Guideline for Type 2 Diabetes

## Chapter 8: Self-monitoring

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## Recommendations

### ■ Standard care

- SM1 Self-monitoring of blood glucose (SMBG) should be available for all newly diagnosed people with Type 2 diabetes, as an integral part of self-management education.
- SM2 SMBG (using meter and strips) on an ongoing basis should be available to those on insulin treatment.
- SM3 SMBG should be considered on an ongoing basis for people using oral agents, but not insulin, where it is used:
- to provide information on hypoglycaemia
  - to assess glucose excursions due to medications and lifestyle changes
  - to monitor changes during intercurrent illness.
- SM4 SMBG should be considered on an intermittent basis for people not using insulin or oral agents, where it is used:
- to assess glucose excursions due to lifestyle changes
  - to monitor changes during intercurrent illness.
- SM5 Structured assessment of self-monitoring skills, the quality and use made of the results obtained, and of the equipment used, should be made annually.

### ■ Comprehensive care

- SM<sub>C</sub>1 This would be as *Standard care*, but SMBG (using meter and strips) on an ongoing basis could be offered to all people with Type 2 diabetes on insulin or oral agents.

### ■ Minimal care

- SM<sub>M</sub>1 SMBG using meters with strips, or visually read blood glucose strips, should be considered for those on insulin therapy.

## Rationale

Self-monitoring of glucose is widely used in the care plans of many people with Type 2 diabetes. It is often used to complement HbA<sub>1c</sub> measurement to assess blood glucose control and, in the case of self-monitoring of blood glucose (SMBG), provides real-time feedback of blood glucose levels. Its use can be considered in relation to:

- outcomes (a decrease in HbA<sub>1c</sub> with the ultimate aim of decreasing risk of complications)
- safety (identifying hypoglycaemia)
- process (education, self-empowerment, changes in therapy).

Self-monitoring should only be considered when the person with diabetes is prepared to learn the skill, record the findings, understand the data, and act appropriately on the data.

Urine glucose testing is cheap but has limitations. Urine free of glucose is an indication that the blood glucose level is below the renal threshold, which usually corresponds to a blood glucose level of about 10.0 mmol/l (180 mg/dl). Positive results do not distinguish between moderately and grossly elevated levels, and a negative result does not distinguish between normoglycaemia and hypoglycaemia.

## Evidence-base

The rather unsatisfactory evidence-base surrounding self-monitoring is addressed by guidelines from NICE [1,2] and the CDA [3]. Most of the evidence has focused on self-monitoring in relation to outcomes. Studies on self-monitoring in Type 2 diabetes were found to have been limited by small numbers, short duration, inconsistencies in monitoring and in the training of patients in technique or use of data, and failure to stratify by treatment type. A meta-analysis in 2000 found eight randomized trials, but no evidence for clinical effectiveness of this component of care [4]. A large observational study subsequently found evidence for improved glycaemic control with more frequent self-monitoring, regardless of therapy, but there was no stratification of new and ongoing users [5], and the NICE working group drew attention to the problem of separating out the effects of motivation in observational studies [1].

It is generally accepted that SMBG is useful in insulin-treated Type 2 diabetes [1,3,5]. Two recent meta-analyses of RCTs have examined its effect in people with Type 2 diabetes not treated with insulin [6,7]. Both showed that SMBG achieved a statistically significant reduction of 0.4 % in HbA<sub>1c</sub>. However, it was acknowledged that the quality of

the studies was limited and that a well designed RCT was needed to resolve this issue. Two accompanying point-of-view papers reached opposite conclusions about the value of SMBG [8,9].

There are many unresolved questions about SMBG, including frequency and timing of testing, its value in new users and ongoing users, and if and how users act on the results.

There are limited data on the impact of SMBG on quality of life and treatment satisfaction. From the two studies which reported on this [10,11], there was no difference compared with people who were not performing SMBG.

Also there are few data on self-monitoring using urine glucose testing. The meta-analysis by Welschen et al. [7] included two studies which compared SMBG and self-monitoring of urine glucose and reported a non-significant reduction in HbA<sub>1c</sub> of 0.17 % in favour of SMBG.

Two large cohort studies of self-monitoring of blood glucose in people with Type 2 diabetes, and including people not using insulin, have been submitted for publication at the time of writing (one presented at an ACE meeting in January 2005, and one presented as late-breaking data at the 2005 ADA Scientific Sessions). The data of these studies support the recommendations given above. However, a very recent publication addressing the same issue could not find such supportive evidence [12].

## Consideration

Self-monitoring of blood glucose is accepted as an integral part of self-management of people on insulin therapy. However, the data are less clear for people who are not being treated with insulin, and therefore the decision as to whether to recommend SMBG for this group will largely be determined by cost and individual and health-care system resources. Priority lists may be needed to decide which individuals should be offered SMBG on an ongoing basis. These might include people recently diagnosed with diabetes, with more erratic lifestyles, people having problems of hypoglycaemia, and those particularly keen to tighten their blood glucose control.

There is little evidence to support the use of urine testing. However, it should be noted that a recent IDF position statement has drawn attention to the fact that urine strips are cheap and that urine testing, although grossly inaccurate as a measure of blood glucose control, was used prior to the 1970s as the only means of self-monitoring, and could still be useful if its limitations are clearly understood [13].

## Implementation

Provision should be made for the supply of glucose strips on a continuing basis. When providing meters, education in their use and in interpretation of results from them should be given. Review of technique, data interpretation, and meter function should be a part of Annual Review (see *Care delivery*).

## Evaluation

Provision of self-monitoring education and equipment should be assessed, and protocols and a record of review as part of Annual Review should be available. There should be evidence of the results being made use of by the person with diabetes and in other clinical consultations with health-care professionals.

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