Self-monitoring of blood glucose should be targeted

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There is a constant flurry in the medical journals of papers reviewing the effectiveness and cost efficacy of self-monitoring of blood glucose (SMBG). The technology is improving all the time. Swifter and more accurate test results obtained with smaller blood volumes and meters with more memory and the ability to record date and time, activity and energy intake. This means that ever more detailed information can be provided and more intelligent interrogation and application of the results is possible.

Not surprisingly, with every technological improvement, a new gismo (often offered free by the manufacturer to the user) is made available. But these often require the prescription of more expensive test strips. On the other hand, most of the available reports, and the ones reviewed in this quarter's digest are no exception, suggest only moderate, if any, clinical benefit from SMBG, at least in terms of improved glycaemic control and improved patient wellbeing. Understandably in today's evidence based and cost-conscious NHS, these results are used to try and limit the prescribing of meters and strips — a move that often meets with resistance from patients and patient-support organisations.

There are problems with these reports, however. They usually compare outcomes in a testing and a non-testing group. Attribution bias is common as those patients who choose to test may have a particular reason for doing so. Closer analysis of the data provided in this paper by Davis et al suggests that although the HbA_{1c} was not significantly different in those doing any SMBG compared with those doing no SMBG (7.3% versus 7.5%), those testing had longer-duration diabetes, were more often treated with insulin or oral hypoglycaemic agents, and had a higher incidence of self-reported hypoglycaemia. Interestingly, they were also more active and likely to be married or have a long-term partner. One interpretation of these data is that the people who are testing are those who are more at risk of hypoglycemia and are testing to allow them to achieve the same (or slightly better) glycaemic control, while minimising the risk of hypoglycaemia (increased by insulin, oral agents, and exercise). Their partners may be drawing attention to early hypoglycaemia.

Perhaps a fairer interpretation of the data is that those who undertake SMBG should minimise the amount of routine data collection but instead be encouraged to test proactively if they have a question to answer. They should test if they think they might be hypoglycaemic, if they need to know the result (am I safe to drive?) and if they can act on the result (increase or decrease insulin, etc). It seems testing to minimise hypoglycaemia is safe, effective and a reasonable part of good glycaemic management and an under-reported end point in these studies.

DIABETOLOGIA

Beta-cell function reduced in offspring of young-onset type 2 diabetes mothers

Readability	✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓✓

1 Animal studies suggest that *in utero* exposure to maternal hyperglycaemia results in impaired beta-cell function in the offspring, but human data are limited.

2 Adults without diabetes (n=568) born to parents with young-onset type 2 diabetes were included.

3 Offspring of mothers (n=327) with young-onset type 2 diabetes had lower early insulin response (log EIR 4.32 versus 4.63; P=0.02) and higher HbA_{1c} (4.89% versus 4.68%; P=0.02) than offspring of fathers with diabetes.

4 The authors concluded that the children of mothers with young-onset type 2 diabetes have a reduced beta-cell function.

Singh R, Pearson E, Avery PJ et al (2006) Reduced beta cell function in offspring of mothers with young-onset type 2 diabetes. *Diabetologia* **49**: 1876–80

DIABETES CARE

Is self-monitoring of blood glucose appropriate for all?

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 The study was undertaken to establish if self-monitoring of blood glucose (SMBG) improves glycaemic control in patients with type 2 diabetes.

2 Data were analysed from an observational, community-based study performed in Freemantle, Australia. Results were recorded for 1286 people at baseline, and 531 completed annual reviews over a 5-year period.

3 Seventy per cent of people at baseline performed SMBG (median of four tests per week). People were more likely to be performing SMBG if they took shorter duration insulin, attended diabetes education, attended diabetes-related clinics, were taking insulin without oral hypoglycaemia drugs or were reporting hypoglycaemic episodes.

4 Mean HbA_{1c} levels were similar regardless of whether or not the person was performing SMBG.

5 The authors point out that the annual cost of SMBG in 2000 was A$162 (£66) per patient with type 2 diabetes. This represents an annual cost of A$51 million (£20.6 million) for the entire Australian population with type 2 diabetes. They also noted that SMBG increases the burden of self-care for people with diabetes.

6 The authors concluded that SMBG was not associated with benefit in terms of glycaemic control in people with type 2 diabetes. However, they believe that SMBG may still be of value in identifying and preventing hypoglycaemia and dose adjustment in insulin-treated patients.

Davis WA, Bruce DG, Davis TME (2006) Is self-monitoring of blood glucose appropriate for all type 2 diabetic patients? *Diabetes Care* **29**(8): 1764–70

DIABETIC MEDICINE

Adding insulin glargine is more likely to reduce HbA_{1c} in people with no, or submaximal, oral therapy

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 Insulin therapy is often not offered until patients with type 2 diabetes are unresponsive to other therapies. The investigators in this study set out to find if glycaemic control could be improved by adding insulin earlier.

2 People with type 2 diabetes for at least 6 months and an HbA_{1c} in the range 7.5–11 % (n=405) were included in the Implementing New Strategies with Insulin Glargine for Hyperglycaemia Treatment (INSIGHT) study. There were two treatment arms: insulin glargine in the evening and self-titration by 1 unit/day if the fasting blood glucose was >5.5 mmol/l or conventional therapy with a doctor managing the oral glucose-lowering medication.

3 The primary outcome in this 24-week study was two consecutive HbA_{1c} results of ≤6.5 %.

4 People receiving insulin glargine were 1.68 times more likely to achieve two consecutive HbA_{1c} levels ≤6.5 % (95 % confidence interval 1.00–2.83; P=0.049) than those receiving conventional therapy. Patients receiving insulin glargine also had a greater reduction in HbA_{1c} (1.55 % versus 1.25 %; P=0.005).

5 People receiving insulin glargine had lower levels of fasting plasma glucose (P=0.0001), non-HDL cholesterol (P=0.02), triglycerides (P=0.02).

6 There were no differences in the episodes of hypoglycaemia for the two arms.

7 The investigators concluded that adding insulin glargine is more likely to result in a lower HbA_{1c} than conventional therapy with oral agents in people with type 2 diabetes with no, or submaximal, oral medication.

Gerstein HC, Yale JF, Harris SB et al (2006) A randomized trial of adding insulin glargine vs avoidance of insulin in people with type 2 diabetes on either no oral glucose-lowering agents or submaximal doses of metformin and/or sulphonylureas. The Canadian INSIGHT (Implementing new strategies with insulin glargine for hyperglycaemia treatment) study. *Diabetic Medicine* **23**: 736–42

BMC FAMILY PRACTICE

Physician assessment of patient compliance is a valuable prognostic factor for mortality

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓✓✓

1 This study set out to establish whether a primary care physician's assessment of patient compliance with treatment is a valuable prognostic marker to identify patients at risk of death.

2 People over the age of 40 with type 2 diabetes at 11 primary care practices in South Germany were eligible for inclusion in this prospective, cohort-study (n=1014). The mean age at baseline was 69 years, and 45 % of participants were male. Patients and physicians completed a questionnaire at baseline. Physicians assessed patient compliance on a four-point scale (very good, rather good, rather bad and very bad).

3 Assessment of patient compliance by a physician was a predictor of all-cause mortality. Gender, age and a history of macrovascular disease were also predictors of all-cause mortality. Patients whose compliance was described to be 'very bad' by a physician were significantly more likely to die during follow-up (odds ratio 2.67; 95 % confidence interval 1.02–6.97).

4 Factors used by physicians in determining compliance included: self-acceptance of disease, treatment adherence, patient's interest in the physician's explanations, attendance at appointments, good self-management and a good physician–patient relationship.

5 Among patients with type 2 diabetes, assessment of patient compliance by a primary care physician is a valuable prognostic marker for mortality. The authors suggest that physicians could identify and target patients requiring help with compliance.

Rothenbacher D, Ruter G, Brenner H (2006) Prognostic value of physicians' assessment of compliance regarding all-cause mortality in patients with type 2 diabetes: primary care follow-up study. *BMC Family Practice* doi:10.1186/1471-2296-7-42