DiabetesDIGEST
The easy way to stay up to date with developments in diabetes

Editorial

David Kerr
Editor-in-Chief

Monitoring blood glucose: A renaissance?

"If you don't care about quality, you can meet any other requirement."

Gerald M Weinberg

"The BMs were normal" is still a common phrase used by junior medical staff on ward rounds. On average, apparently, people with diabetes spend an hour of each waking day on self-management of their condition, and much of this taken up by testing blood glucose levels. Despite financial pressures, self-monitoring of blood glucose (SMBG) remains an integral feature of modern diabetes care, although social media is awash with disgruntled people with diabetes bemoaning attempts at rationing strip availability. Attempts at rationing have been fuelled in part by reports questioning the value of testing if the patient is not at risk of hypoglycaemia. However, more recent evidence suggests that SMBG in this population can be valuable if it is undertaken in a structured format – i.e. someone does something with the results (Klonoff et al, 2011).

For insulin users, understanding the value of SMBG is actually not straightforward, especially when it comes to working out a safe and effective dose of insulin for a meal. The dose calculation does require a high level of numeracy skills (Ginsberg, 2013): *Dose = Carbs/ICR* + SMBG value – Target SMBG divided by the Correction Factor and then minus the "Insulin on Board" *Insulin to Carb Ratio*

Unfortunately there is now good evidence that many people with diabetes (and an equivalent proportion in the background population) struggle with this mathematical manipulation (Marden et al, 2013). To help with this, a new generation of so-called smart blood glucose meters are available, which have software embedded within the electronics to perform the calculations without the need for the patient to get their pocket calculator out. In the background to all of this there are concerns around the regulation of medical devices such as SMBG systems (Boulton et al, 2012). Due to economic circumstances, payers of healthcare are starting to lean on the SMBG industry to provide less expensive testing strip systems. Although this may make simple economic sense, it does run the risk of diminishing the importance of accuracy. The current ISO15197 standard for strip accuracy requires 95% of measured values should fall within 20% of glucose values above 4.2 mmol/L and ±0.83 mmol/L of glucose values below 4.2 mmol/L. This may not be accurate enough. As an example, major trials involving insulin have often used an SMBG value of <3.9 mmol/L to define hypoglycaemia so that a recorded value of 3.9 mmol/L could actually be anywhere between 3.1 and 4.7 mmol/L – values which cross from the normal into the hypoglycaemia range where there may be detectable impairment of cognitive performance. It is likely that stricter recommendations for SMBG strips accuracy will be introduced in the not-too-distant future.

Less expensive strips are likely to be less accurate as improving accuracy costs money. A pragmatic compromise might be that accuracy is less relevant if an individual user is not at risk of hypoglycaemia – therefore we might end up with the situation of using different strips for different clinical scenarios (e.g. less accurate strips for metformin users and very accurate ones for pump users). One way forward would be to ensure that accuracy of strips is clearly labelled in the packaging (Ginsberg, 2013).

Historically, more choice does not always lead to clinical benefits for people living with diabetes and the fact that many junior doctors and nurses still call SMBG values "BMs" does not bode well. BM used to refer to one manufacturer, Boehringer Mannheim – this company was long ago swallowed up by Roche yet for some reason the label still carries on in perpetuity – a pyrrhic victory for the marketing department at BM? Maybe soon diabetes professionals will have to consider who uses what strip rather just how much it costs? ■

Boulton A, Del Prato S (2012) Regulation of medical devices used in diabetology in Europe – time for reform? *Diabetologia* **55**: 2295–7

Ginsberg B (2013) Practical use of self-monitoring blood glucose data. *J Diab Sci Technol* **7**: 532–41

Klonoff D, Blonde L, Cembrowski G et al (2011) Consensus Report: The current role of self-monitoring of blood glucose in non-insulin treated type 2 diabetes. *J Diab Sci Technol* **5**: 1529–48

Marden S, Knott J, Thomas P, Kerr D (2012) Impact of numeracy and literacy on achieved glycaemic control in type 1 diabetes. *Diabetic Medicine* **29**: 662–9

David Kerr
Consultant Physician, Diabetes and Endocrine Centre, Bournemouth and Founder of VoyageMD.com