For safety's sake: Best practice for assisted monitoring of blood glucose

In this section, a panel of experts give their opinions on a recently published article. In this issue, the focus is on an editorial that provides a new paradigm for assisted monitoring of blood glucose with consideration of the special safety needs associated with blood glucose testing in care facilities.

> ***"... best practice may be, where possible, to enable the person with diabetes to self-manage their condition when in hospital or another care setting."***

Simon O'Neill, Director of Care, Information and Advocacy, Diabetes UK

This interesting editorial (Klonoff and Perz, 2010; summarised alongside) introduces the concept of assisted monitoring of blood glucose (AMBG) and argues that, within a care setting where diabetes management is provided by someone other than the patient, there should be strict guidance in place to prevent the risk of transmitting blood-borne diseases.

Klonoff and Perz (2010) highlight a USA study of 18 hepatitis B virus outbreaks that were the result of the improper use of blood glucose monitoring equipment (Thompson and Perz, 2009). At least 147 people were infected during these outbreaks and six people subsequently died from the complications of acute hepatitis B virus infection. Although these numbers are relatively small at a population level, presumably all the cases could have been prevented if better AMBG safety measures had been in place.

The authors remind us that most blood glucose monitoring equipment, including finger prickers and insulin pens, are designed for use by one person only, but in some centres are used for multiple people without adequate safety measures in place. While it may seem obvious not to reuse devices that puncture the skin because of the risk of infection, the authors also highlight the potential risk of blood-borne disease transmission using a blood glucose monitor for multiple people, which is common practice in many care settings in the UK.

It is clear that, even if the risk of disease transmission is small, carers and healthcare professionals carrying out blood glucose monitoring for another person need to be made aware of the risks and to minimise them through the use of single-use devices wherever possible and, if meters need to be shared, that they are adequately cleaned and disinfected before reuse – or, ideally, use the person's own blood glucose meter.

Ultimately, best practice may be, where possible, to enable people with diabetes to self-manage their condition when in hospital or another care setting rather than undertake AMBG, a recommendation supported by Diabetes UK (2009) and NHS Diabetes (2010).

Diabetes UK (2009) *Improving Inpatient Diabetes Care – What Care Adults with Diabetes Should Expect when in Hospital.* Available at: bit.ly/9py5kt (accessed 28.09.10)

NHS Diabetes (2010) *Commissioning Diabetes Emergency and Inpatient Care.* Available at: bit.ly/a2iaDd (accessed 28.09.10)

Thompson ND, Perz JF (2009) Eliminating the blood: ongoing outbreaks of hepatitis B virus infection and the need for innovative glucose monitoring technologies. *J Diabetes Sci Technol* **3**: 283–8

Assisted monitoring of blood glucose: special safety needs for a new paradigm in testing glucose

Klonoff DC, Perz JF (2010) *J Diabetes Sci Technol* **4**: 1027–31

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Evidence of unsafe AMBG practices highlight need for protocol

1 Assisted monitoring of blood glucose (AMBG) can be defined as blood glucose monitoring carried out by a healthcare professional or other carer for a person with diabetes.

2 The authors stress that AMBG should be recognised as distinct from self-monitoring of blood glucose (SMBG) in order to address safety concerns, importantly the transmission of blood-borne diseases in assisted living facilities and during screening activities.

3 A range of USA-based evidence suggests that hepatitis B virus outbreaks resulting from unsafe AMBG practices have become increasingly frequent since 2000, with people with diabetes who are resident in assisted living facilities being primarily affected.

4 The reuse of spring-loaded finger-prick devices and the sharing of blood glucose meters without cleaning and disinfection between uses were the most frequent unsafe practices revealed by surveys undertaken by the Centers for Disease Control and Prevention (CDC).

5 The authors suggest that devices appropriate for use in SMBG may be inappropriate for AMBG, namely multiuse finger-prick devices and blood glucose monitors.

6 It is recommended that single-use disposable finger-prick devices featuring lancets that permanently retract after activation be used for diabetes screening and AMBG.

7 People who regularly undergo AMBG should have a blood glucose monitor for their exclusive use. Where unavoidable, sharing of monitors should be minimised and the monitors be consistently cleaned and disinfected between each use. Furthermore, shared monitors should be designed specifically for AMBG applications, with validated instructions for cleaning and disinfection.

8 Further to the safe performance of AMBG, the authors reminded readers that insulin pens should not be shared for the same concerns regarding safety.

9 The CDC, in conjunction with a range of stakeholders, have developed recommendations for the prevention blood-borne pathogen transmission during blood glucose monitoring and insulin administration in healthcare settings.

10 The authors concluded that AMBG, while similar to SMBG, is a distinct practice that requires purpose-designed equipment and additional safety standards. By attention to these issues, people with diabetes, people being screened for diabetes, healthcare professionals and carers will be better protected from the risk of AMBG-related disease transmission.

Dr Rowan Hillson MBE, National Clinical Director for Diabetes, Department of Health

"*Primum non nocere*." This statement is attributed to Thomas Sydenham – a great observer and a physician who applied common sense to medical problems. Modern technology allows us to do infinitely more than Sydenham and his colleagues, but his good sense still applies; if we do a test, we must make sure it is appropriate and that it is safe for the patient and everyone else.

Blood glucose is a common, but by no means the only, point-of-care test performed using finger-prick samples by healthcare professionals and carers. Klonoff and Perz's article (2010, summarised alongside) is a timely reminder that assisted monitoring of blood glucose has spread hospital-acquired infection in the past and could do so again. This must not be allowed to happen in the UK. The Medicines and Healthcare products Regulatory Agency (MHRA) issued warnings to this effect in 2005 and 2006 (MRHA, 2005a; 2006).

It seems obvious that finger-prick samples must be taken with a lancet that is used to prick one patient only and not the staff member doing the test or anyone else. Staff have a legal responsibility to follow manufacturers' single-use advice for both lancets and insulin needles. It is usual medical practice to clean monitoring equipment used on more than one person, but this is not always the case with glucose meters. It should be. The user guides include cleaning instructions. The MHRA has issued advice on point-of-care testing (*Box 1*; MHRA, 2005b).

It also seems obvious that insulin pens should be used for a single person only. Indeed, that person should be administering his or her own insulin wherever safe and possible. All healthcare professionals should be aware of the National Patient Safety Agency's (2010) Rapid Response Report, *Safer Administration of Insulin*, and the NHS Diabetes e-learning website www.diabetes.nhs.uk/safe_use_of_insulin.

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Medicines and Healthcare products Regulatory Agency (2005a) *Medical Device Allert MDA/2005/063*. MHRA, London. Available at: http://bit.ly/bdQ1GX (accessed 18.10.10)

Medicines and Healthcare products Regulatory Agency (2005b) *Point of Care Testing – Top 10 Tips*. MHRA, London. Available at: http://bit.ly/9k48Ny (accessed 18.10.10)

Medicines and Healthcare products Regulatory Agency (2006) Single-use medical devices: implications and consequences of reuse. *Device Bulletin* **4**. Available at: http://bit.ly/bDHibS (accessed 18.10.10)

National Patient Safety Agency (2010) *Safer Administration of Insulin*. NPSA, London. Available at: http://bit.ly/95slXW (accessed 18.10.10)

Box 1. The Medicines and Healthcare products Regulatory Agency's (2005b) top 10 tips for point-of-care testing (POCT).

1 Involve your local hospital laboratory
Your local hospital pathology laboratory can play a supportive role in providing advice on a range of issues including the purchase of devices, training, interpretation of results, troubleshooting, quality control, and health and safety.

2 Management
Many people will be involved in the creation, implementation and management of a POCT service. It is vital that an appropriate POCT coordinator is identified and a POCT committee established.

3 Health and safety
Be aware of the potential hazards associated with the handling and disposal of body fluids, sharps and waste reagents outside of a laboratory setting.

4 Training
Training must be provided for staff who use POCT devices. Only staff whose training and competence has been established and recorded should be permitted to carry out POCT.

5 Always read the instructions
… and be particularly aware of situations when the device should not be used.

6 Standard operating procedures (SOPs)
SOPs must include the manufacturers' instructions for use.

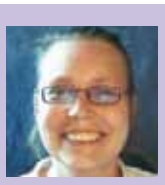
7 Assuring quality
The analysis of quality control material can provide assurance that the system is working correctly.

8 Results
Results should be reviewed by appropriately qualified staff with particular reference to the patient's history.

9 Record keeping
… is essential and must include patient results, test strip lot number and operator identity.

10 Maintenance
In order that devices continue to perform accurately they must be maintained according to the manufacturers' guidance.

"Perhaps the recommendation made by Klonoff and Perz with the most far-reaching consequences for UK practice is that glucose meters should be assigned to individuals, wherever possible, in live-in care institutions."



Esther Walden, Diabetes Inpatient Specialist Nurse, Norfolk and Norwich University Foundation Trust and Chair, Diabetes Inpatient Specialist Nurse Group

The article by Klonoff and Perz (2010; summarised on pages 222–3) raises some important issues regarding the safety of people with diabetes and staff involved in their care.

It would be hoped, in the UK at least, that the use of auto-disabling single-use lancets for assisted monitoring of blood glucose (AMBG) would be standard practice. If this is not the case in areas where nursing staff are available, acute and primary care trusts should insist on a change in practice to minimise the risk of blood-borne disease transmission. In live-in institutions without dedicated nursing care, people with diabetes are often able, and should be encouraged, to perform self-monitoring of blood glucose – in which case people should receive individual blood glucose monitoring meters and spring-loaded finger-prick devices, as if they were living independently. For those not capable of self-monitoring, district nursing teams should carry single-use lancets and a PCT-approved blood glucose meter.

As Klonoff and Perz say, insulin pens should never be shared and UK documents already emphasise this (Fowler and Rayman, 2010; National Patient Safety Agency, 2010). People with diabetes admitted to institutional care should have individual prescriptions filled, including insulin pen devices and suitable needles. If the person is unable to self-administer, single-use insulin syringes, auto-retracting pen needles or safe needle disposal devices should already be in use.

Perhaps the recommendation made by Klonoff and Perz with the most far-reaching consequences for UK practice is that blood glucose meters should be assigned to individuals, wherever possible, in live-in care institutions. The issues of robust user training and stringent quality control procedures for each meter, coupled with significant cost implications, make the adoption of this recommendation highly improbable in large care facilities like acute hospitals. However, Klonoff and Perz rightly suggest the need for operational policies – written collaboratively between diabetes and infection control departments – and staff training that includes appropriate cleaning guidance. To promote safe practice before guidance is available, individual staff members should ensure blood glucose meter cleaning is part of their normal routine.

Fowler D, Rayman G (2010) *Safe and Effective use of Insulin in Hospitalized Patients*. NHS Diabetes, London. Available at: http://bit.ly/bJ0YC0 (accessed 18.10.10)

National Patient Safety Agency (2010) *Rapid Response Report: Safer Administration of Insulin*. NPSA, London. Available at: http://bit.ly/atbN9t)accessed 18.10.10)

"The data discussed in this article do raise the question of why current practice is so poor?"

Pratik Choudhary, Clinical Lecturer in Diabetes, King's College London

In this editorial Klonoff and Perz (2010; summarised on pages 222–3) raise the important issue of the risk of transmission of blood-borne diseases during blood glucose monitoring performed by healthcare professionals or carers, rather than the person with diabetes themselves, and introduce the concept of assisted blood glucose monitoring. Their discussion is of particular relevance to the current UK-wide drive to improve inpatient diabetes care.

The recommendations made by Klonoff and Perz are practical suggestions that should be incorporated in local guidance. However, the recommendations highlight the need for universal precautions when handling blood and related prodcuts. The data discussed in this article do raise the question of why current practise is so poor?

There may be a number of factors, with education, training and cost likely to be the most important. As healthcare professionals take on more specialised roles, many routine activities – such as blood glucose monitoring in nursing homes, hospitals and assisted-living facilities – may fall to other care providers, who may lack training in safety procedures.

This article also raises the question of the balance between better education, better systems and better technology, all of which have a role to play in safeguarding people with diabetes and those who provide their care.