Centers for Disease Control and Prevention
Your Online Source for Credible Health Information

Frequently Asked Questions (FAQs) regarding Assisted Blood Glucose Monitoring and Insulin Administration

Background

The following FAQs summarize inquiries from healthcare personnel received by CDC regarding best practices for performance of assisted blood glucose monitoring and insulin administration, including questions related to cleaning, disinfection, and storage of blood glucose monitoring equipment.

These FAQs are not intended as a comprehensive resource for all issues related to blood glucose monitoring, and insulin administration and additional considerations may be necessary for certain clinical situations or settings. View more detailed information (/injectionsafety/blood-glucose-monitoring.html) related to assisted blood glucose monitoring and insulin administration. Visit CDC's Injection Safety website (/injectionsafety/) for additional information regarding injection safety and CDC's Sharps Safety website (/sharpssafety/) information related to sharps safety and safe disposal of sharps in healthcare settings.

Healthcare personnel are also encouraged to consult guidance provided by the Food and Drug Administration (FDA) (links provided in responses below) as well as the manufacturers of the devices (blood glucose meters, fingerstick/lancing devices, insulin pens) in use at their facilities.

General

1. **What is the difference between "self-monitoring of blood glucose" (SMBG) and "assisted monitoring of blood glucose" (AMBG)?**
   With self-monitoring of blood glucose, individuals perform all steps of monitoring for themselves. With assisted monitoring of blood glucose, the same steps are followed but testing is performed for an individual or multiple persons by someone else (e.g., a caregiver or healthcare professional) [1 (#ref1) , 2 (#ref2)]. Assisted monitoring of blood glucose is typically performed in healthcare settings such as clinics, hospitals, and long-term care settings (e.g., skilled nursing facilities and assisted living facilities).

   Individuals who perform blood glucose monitoring either for themselves or on others must be aware of basic safe practices to protect against infection transmission. These include the following infection control requirements:

   - Fingerstick devices, also called lancing devices, should **never** be shared, even with close family and friends. This guidance includes both the lancet (i.e., the sharp instrument that actually punctures the skin) and the pen-like device that houses the lancet. Neither should be used for more than one person.
   - Whenever possible, blood glucose meters should **not** be shared. If they must be shared, the device should be cleaned and disinfected after every use, per manufacturer's instructions. If the manufacturer does not specify how the device should be cleaned and disinfected then it should not be shared.

Fingerstick/Lancing Devices

1. **My facility uses reusable fingerstick devices. If we change the lancet and disposable components and clean and disinfect the device after use, is it okay to use this device for multiple patients? Single-use, auto-disabling lancets are more expensive.**
   No. Fingerstick devices must never be used for more than one person.

   Due to failures to change the disposable components, difficulties with cleaning and disinfection of reusable components after every use, and their link to multiple hepatitis B virus (HBV) infection outbreaks [3 (#ref3) -5 (#ref5)], CDC and FDA recommend that these devices never be used for more than one person [6 (#ref6) , 7 (#ref7)].

   Use of fingerstick devices for more than one person unnecessarily compromises patient safety, as demonstrated by numerous HBV infection outbreaks and resulting deaths [4 (#ref4) , 8 (#ref8)]. Despite perceived cost-savings from multi-patient use of reusable fingerstick devices, facilities should also consider the additional costs of testing, treatment, and legal action that result from such outbreaks and patient notifications.

2. **Some of the newer fingerstick devices come with cartridges that have multiple lancets preloaded. Is it acceptable to use this type of device for multiple patients so long as you remember to advance to a new lancet each time?**
   No. These devices are not approved nor safe for use on multiple patients. Even if the device is advanced and a new lancet is used for each fingerstick procedure, unused lancets could become contaminated through contact with blood remaining on the end cap or the device barrel [9 (#ref9)]. At least one outbreak of HBV infection resulting from multi-patient use of these devices has occurred in recent years [9 (#ref9)].

3. **My facility uses reusable fingerstick devices. However, we dedicate them for single-patient use. Is this acceptable?**
   CDC recommends the use of single-use, auto-disabling fingerstick devices in settings where assisted blood glucose monitoring is performed. This practice prevents inadvertent reuse of fingerstick devices for more than one person. Additionally, the use of single-use, auto-disabling fingerstick devices protects healthcare personnel from needlestick injuries.

   If reusable fingerstick devices are used for assisted monitoring of blood glucose then they should be treated in a manner similar to other personal care items (e.g., razors and toothbrushes) and must never be shared. Facilities must take steps to assure that fingerstick devices are clearly labeled and stored in a manner to prevent inadvertent use for the wrong patient and cross-contamination from the surface of one fingerstick device to another (see Question 3 under Blood Glucose Meters for additional information on storage).

4. **Residents at our assisted living facility do their own blood glucose monitoring and prefer to use the reusable fingerstick devices. Is this acceptable?**
   Reusable fingerstick devices are appropriate for individuals who perform all steps of testing themselves. However, this equipment should be labeled with their name and these individuals should be educated that this equipment should be treated like other personal care equipment (e.g., razors, toothbrushes) and must never be shared. Transmission of HBV infection has been described in residential settings when individuals shared their personal blood glucose monitoring equipment with friends or

family [10 (#ref10) , 11 (#ref11)].

Blood Glucose Meters

1. **How can hepatitis B virus (HBV) be transmitted through the meter? If the blood glucose meter never touches the patient, why does it need to be cleaned and disinfected after each use?**
   Infectious agents, such as HBV, can be transmitted through indirect contact transmission, even in the absence of visible blood [4 (#ref4)]. Indirect contact transmission is defined as the transfer of an infectious agent (e.g., HBV) from one patient to another through a contaminated intermediate object (e.g., blood glucose meter) or person (e.g., healthcare personnel hands) [12 (#ref12)].

   With some blood glucose meters that require pre-loading of the test strip, the device may come into direct or close contact with the patient's fingerstick wound. If blood is transferred from the patient to the meter, and the meter is not cleaned and disinfected after use, subsequent patients can be exposed to this blood when the meter is used on them.

   Indirect contact transmission can also occur even if the patient never directly contacts the meter. Healthcare personnel hands can become contaminated with blood at various points while performing assisted blood glucose monitoring including pricking the patient's finger or handling the test strip. Blood can then be transferred to the meter when healthcare personnel handle the meter to obtain the reading. If the meter is not cleaned and disinfected after use, the blood remaining on the meter can be transferred to subsequent patients via healthcare personnel hands when they handle the meter and then assist with fingerstick procedures. Numerous outbreaks have implicated this mechanism in the spread of HBV infections [3 (#ref3) , 4 (#ref4)].

   Contamination of equipment and transmission of HBV can also occur if healthcare personnel fail to change their gloves and perform hand hygiene between patients.

   A multi-hospital study of blood glucose meters found that 30% were contaminated with blood; contamination was identified at the test strip insertion site as well as on the outside surfaces of meters [13 (#ref13)]. Further, HBV has been demonstrated to remain infectious in dried blood on environmental surfaces for at least 7 days [14 (#ref14)]. For these reasons, blood glucose meters should be cleaned and disinfected after each use, unless they are dedicated to a single patient and appropriately stored to prevent inadvertent contamination (See Question 3 under Blood Glucose Meters (#Meters3)).

2. **What products are acceptable for cleaning and disinfection of blood glucose meters?**
   FDA has recently released guidance for manufacturers regarding appropriate products and procedures for cleaning and disinfection of blood glucose meters. This guidance, including a link to the Environmental Protection Agency (EPA) website can be found at FDA's Website (http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/InVitroDiagnostics/ucm227935.htm) .

   An excerpt from this guidance reads:

   "The disinfection solvent you choose should be effective against HIV, Hepatitis C, and Hepatitis B virus. Outbreak episodes have been largely due to transmission of Hepatitis B and C viruses. However, of the two, Hepatitis B virus is the most difficult to kill. Please note that 70% ethanol solutions are not effective against viral bloodborne pathogens and the use of 10% bleach solutions may lead to physical degradation of your device. View a

list of Environmental Protection Agency (EPA) registered disinfectants effective against Hepatitis B (http://www.epa.gov/oppad001/list_d_hepatitisbhiv.pdf) "

Healthcare personnel should consult the manufacturers of blood glucose meters in use at their facilities to determine what products, meeting the criteria specified by the FDA, are compatible with their meter prior to using any EPA-registered disinfectant for disinfection purposes. If manufacturers are unable to provide this information then the meter should not be used for multiple patients.

3. **If blood glucose meters are dedicated for single-patient use, where should they be stored?**
Blood glucose meters dedicated for single-patient use should, ideally, be stored in the patient's room in a manner that will protect against inadvertent use for additional patients and cross-contamination via contact with other meters or equipment.

   An evaluation of instrument storage areas in hospital found that 20% of areas where blood glucose meters were stored were contaminated with blood [13 (#ref13)]. If facilities are not able to safely store meters in patient rooms, they need to take steps to ensure that meters are not inadvertently used for the wrong patient and that cross-contamination from the surface of one meter to another does not occur.

   If the blood glucose meter becomes contaminated through inappropriate storage, subsequent patients could be exposed to infectious agents, even if the meter itself does not have direct patient contact (see Question 1 under Blood Glucose Meters).

4. **If blood glucose meters are dedicated for single-patient use, do they need routine cleaning and disinfection? If so, how often?**
If meters are dedicated for single-patient use and facilities have taken steps to assure that they are stored in a location to prevent inadvertent use for the wrong patient and/or cross-contamination (see Question 3 under Blood Glucose Meters), then meters should be cleaned and disinfected according to manufacturer's instructions and, at a minimum, anytime they are being reassigned to a different patient. Facilities are reminded, however, that if the manufacturer of the device in use does not specify how the device should be cleaned and disinfected, then it should not be shared or reassigned to a different patient (see Question 1 under General (#General1) and information at the page on CDC's Injection Safety website titled Infection Prevention during Blood Glucose Monitoring and Insulin Administration (/injectionsafety/blood-glucose-monitoring.html)).

   Care must be taken by personnel handling meters, whether designated for multi- or single-patient use, to remove gloves and perform hand hygiene after each patient use and after cleaning and disinfecting meters.

Insulin Pens and Insulin Administration

1. **My facility uses insulin pens. If we change the needle and/or insulin cartridge, is it okay to use this device for multiple patients?**
No. Insulin pens are approved and labeled only for single-patient use. Under no circumstances may they be used for more than one person. Part of safe injection practices includes never using the same syringe for more than one patient [12 (#ref12)]. Changing only the needle and reusing the cartridge of an insulin pen is a form of syringe reuse that represents a serious medical error. Changing the cartridge does not protect against contamination and does not make these devices safe for multi-patient use [15 (#ref15)].

   If insulin pens are in use in a facility, they should be clearly labeled with the patient's name and stored in a manner to prevent inadvertent use for more than one person

and/or cross-contamination. Failure to do so has resulted in large scale patient notifications and an alert from FDA reminding consumers and healthcare personnel that these devices must never be used for more than one person [16 (#ref16)].

2. **My facility uses multi-dose vials of insulin. Can these vials be used for more than one person?**
   Multi-dose vials should be dedicated to a single patient whenever possible. If they must be used for more than one person, they should not be stored or accessed in the immediate patient treatment area. This is to prevent inadvertent contamination of the vial through direct or indirect contact with potentially contaminated surfaces or equipment that could then lead to infections in subsequent patients. If a multi-dose vial enters the immediate patient treatment area (e.g., patient room), it should be dedicated to that patient only.

   Additional information related safe injection practices and handling of multi-dose vials (/injectionsafety/providers/provider_faqs.html) .

References

1. Infection prevention during blood glucose monitoring and insulin administration (/injectionsafety/blood-glucose-monitoring.html) .
2. Klonoff DC, Perz JF. Assisted monitoring of blood glucose: Special safety needs for a new paradigm in testing glucose. [PDF - 5 pages] (http://www.journalofdst.org/September2010/PDF/VOL-4-5-EDT1-KLONOFF.pdf) *J Diabetes Sci Technol* 2010;4(5):1027-1031
3. Centers for Disease Control and Prevention. Transmission of hepatitis B virus among persons undergoing blood glucose monitoring in long-term-care facilities–Mississippi, North Carolina, and Los Angeles County, California, 2003-2004 (http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5409a2.htm) . *MMWR* 2005;54:220-223.
4. Thompson ND, Perz JF. Eliminating the blood: Ongoing outbreaks of hepatitis B virus infection and the need for innovative glucose monitoring techniques. [PDF - 6 pages] (http://journalofdst.org/March2009/Articles/VOL-3-2-ORG3-THOMPSON.pdf) *J Diabetes Sci Technol* 2009;3(2):283-288.
5. Polish LB, Shapiro CN, Bauer F, Klotz P, Ginier P, Roberto RR, Margolis HS, Alter MJ. Nosocomial transmission of hepatitis B virus associated with a spring-loaded finger-stick device. N Engl J Med 1992;326:721-5.
6. CDC Clinical Reminder: Use of fingerstick devices on more than one person poses risk for transmitting bloodborne pathogens (/injectionsafety/Fingerstick-DevicesBGM.html) .
7. FDA Communication: Use of fingerstick devices on more than one person poses risk for transmitting bloodborne pathogens. (http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm224025.htm)
8. Centers for Disease Control and Prevention. Notes from the field: Deaths from acute hepatitis B virus infection associated with assisted blood glucose monitoring in an assisted-living facility – North Carolina, August-October 2010 (http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6006a5.htm) . MMWR 2011;60:182.
9. Gotz HM, Schutten M, Boorsboom GJ, Hendriks B, van Doornum G, de Zwart O. A cluster of hepatitis B virus infections associated with incorrect use of a capillary blood sampling device in a nursing home in the Netherlands, 2007. Eurosurveillance 2008;13:1-5.
10. Farkas K, Jermendy G. Transmission of hepatitis B infection during home blood glucose

monitoring. Diabetic Medicine 1997;14:263.
11. Stapleton J. Transmission of hepatitis B during blood glucose monitoring. JAMA 1985;253:3250.
12. Centers for Disease Control and Prevention (CDC). Guideline for isolation precautions: preventing transmission of infectious agents in healthcare settings 2007. [PDF - 225 pages] (/hicpac/pdf/isolation/Isolation2007.pdf) Atlanta (GA): US Department of Health and Human Services. CDC; 2007.
13. Louie RF, Lau MJ, Lee JH, et al. Multicenter study of the prevalence of blood contamination on point-of-care glucose meters and recommendations for controlling contamination. Point of Care 2005;4:158-163.
14. Bond WW, Favero MS, Petersen NJ, et al. Survival of hepatitis B virus after drying and storage for one week. Lancet 1981;1(8219):550-1.
15. CDC Injection Safety Frequently Asked Questions (/injectionsafety/providers/provider_faqs_med-admin.html)
16. FDA: Information for Healthcare Professionals: Risk of transmission of blood-borne pathogens from shared use of insulin pens (http://www.fda.gov/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/DrugSafetyInformationforHeathcareProfessionals/ucm133352.htm) .

Page last reviewed: March 2, 2011
Page last updated: March 8, 2011
Content source: Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases (NCEZID)
Division of Healthcare Quality Promotion (DHQP)

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348, 24 Hours/Every Day - cdcinfo@cdc.gov