Perilous Infection-Control Practices
With Needles, Syringes, and Vials

Vigorous Monitoring Is Crucial

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Problem: A survey of 5,446 health care professionals in 2010 revealed an alarming lapse in basic infection-control practices associated with the use of syringes, needles, multiple-dose vials, single-use vials, and flush solutions. Survey respondents were primarily registered nurses (89.5%) who worked in hospitals.

Although most nurses and other practitioners appeared to follow infection-control practices consistent with current recommendations of the Centers for Disease Control and Prevention (CDC), some survey respondents clearly placed patients at risk for transmission of blood-borne diseases, according to information sent to the Institute for Safe Medication Practices (ISMP) from the survey’s sponsor, Premier Healthcare Alliance. The survey revealed some disturbing results:

- Nearly 1% of respondents acknowledged that they sometimes or always reused a syringe for more than one patient after changing only the needle.
- Six percent of respondents admitted to sometimes or always using single-dose or single-use vials for multiple patients.
- Fifteen percent of respondents reported using the same syringe to re-enter a multiple-dose vial numerous times. Of this group, about 7% reported saving these multiple-dose vials for use with other patients.
- Nine percent of respondents sometimes or always used a common bag or bottle of IV solution as a source of flushes and drug diluents for multiple patients.

Each of these unsafe practices has been associated with disease transmission and is explicitly prohibited by the CDC. The comments provided by respondents demonstrated a general lack of awareness, as well as many misconceptions, regarding safe infection-control practices. For example, one frequent comment was that the reuse of a single-dose vial depended on the size of the vial; this reflects the erroneous notion that a large volume of medication alone makes it suitable for multiple patients.

Respondents also thought that changing the needle on a used syringe was sufficient protection against disease transmission if aspiration of blood did not occur and if there was no visible blood in the syringe. Although most respondents called reuse of a syringe “appalling,” some respondents appeared unaware that disease could be transmitted when they reused a syringe after the needle was changed. Pathogenic contaminants not visible to the eye can enter the syringe after injection, particularly while the needle is still attached to the syringe.

The ISMP has published numerous articles about this problem, including a special alert that appeared in the February 2009 edition of the ISMP newsletter after a hospital placed more than 2,100 insulin-dependent diabetic patients at risk for acquiring blood-borne diseases when staff used insulin pen devices for multiple diabetic patients after changing only the pen’s needle between patients.

The danger of reusing a syringe to withdraw a medication or solution from a multiple-dose container might not seem obvious; rather, health care practitioners probably undertake this unsafe practice without much thought when multiple doses of the medication (e.g., lidocaine) or solution (e.g., saline) are required during a single procedure. If syringes are deliberately reused after changing the needle, clinicians might erroneously believe that the spread of any residual pathogens will be halted by the bacteriostatic or preservative agents in the multiple-dose vials. Although common preservatives used in multiple-dose vials may be bacteriostatic, they do not destroy all bacteria and do not have antiviral or antifungal activity. Furthermore, even if the preservative effectively stops bacteria from reproducing, there is a 2-hour window during which contaminating organisms may remain viable in a multiple-dose vial before the preservative fully exerts its effect.

Respondents’ comments regarding the use of a bag or bottle of IV solution (e.g., saline) as a common source of flushes or drug diluents for multiple patients suggest some awareness of the risk of contamination. Nevertheless, other respondents erroneously suggested that this practice was safe because they discarded the solution after 24 hours. However, limiting use to a 24-hour period does not prevent disease transmission if the bag becomes contaminated. Further, use of a contaminated solution for large groups of patients can result in widespread disease transmission.

It has been more than 15 years since the ISMP first wrote about the risks associated with these practices. In fact, a hepatitis B outbreak related to the reuse of syringes to access multiple-dose heparin vials was the topic of a feature article during the inaugural year of the ISMP Medication Safety Alert! in 1996. Since then, the topic has been covered in dozens of feature articles in ISMP publications.

According to the CDC, since the year 2000, there have been more than 50 outbreaks of blood-borne transmission of hepatitis B, hepatitis C, and HIV that required more than 125,000 potentially exposed patients to be notified and more than 600 who became infected to be identified. The study authors suggested that these outbreaks represented only a portion of the incidence of blood-borne pathogen transmission caused by unsafe injection practices. Many outbreaks and continued on page 666
sporadic transmissions of hepatitis B and C, for example, go unrecognized, because patients who are infected may be asymptomatic initially or may have mild, nonspecific symptoms for years.

**Safe Practice Recommendations:** Given the lapses in infection-control practices and misconceptions regarding unsafe injection procedures described in this survey, academic settings, licensing bodies, and health care providers must enhance their ongoing surveillance of proper technique and devote resources to ensure staff knowledge and skills associated with even the most basic concepts of infection control and injection safety.

The One and Only Campaign (one needle, one syringe, only one time), led by the CDC and the Safe Injection Practices Coalition, offers free posters, educational brochures for health care practitioners and patients, and a 13-minute video on the topic.

All staff members should understand that any form of syringe or needle reuse is dangerous and should be avoided. The current CDC guidelines recommend that syringes and needles be used only once. Single-dose or single-use vials should be used clinically only for one dose for one patient and then discarded after initial entry into the vial. If multiple-dose vials are used, both the needle and syringe used to access the vial must be sterile, and strict attention must be paid to aseptic technique. The ISMP and the CDC also recommend limiting the use of multiple-dose vials of medication to individual patients, whenever possible, as an extra barrier of protection against unrecognized reuse of a syringe or other means of unintended vial contamination. It is safest to use prefilled syringes or single-dose vials, if possible, to reduce the risk of contamination.

Certainly, it can make sense to use multiple-dose vials in some settings: for a single patient; during aseptic pharmacy compounding; and with the use of expensive medications, which should be prepared and dispensed from the pharmacy in unit doses.

The relatively inexpensive drugs and solutions that often require multiple entries into the vial (e.g., sodium chloride injection 0.9%, bacteriostatic water, lidocaine) should not be saved for use by other patients. These drugs should be provided in single-use containers that are discarded after the first use. Also, bags or bottles of IV solutions should not be used as a communal supply for multiple patients unless these items are used during aseptic pharmacy compounding with a fluid-dispensing system.

**REFERENCES**