Current Trends in Phlebotomy

Historically, needlestick safety procedures were not as they are today; one common practice in the 1980s was inserting the needle into the patient’s mattress after blood collection. Additional lab practices that would seem ridiculous today were the use of sharps containers with grooves to facilitate removal of the needle so the tube holder could be reused, eating lunch in the lab, and not wearing gloves.

To the great benefit of our patients and ourselves, the Needlestick Safety and Prevention Act (Public Law 106-430, 106th Congress, H.R. 5178) forced change to these activities. Signed into law on November 6, 2000, the legislation changed the Bloodborne Pathogens Standard under the Occupational Safety and Health Act (OSHA) to provide increased protections to workers from exposure to human immunodeficiency virus (HIV), hepatitis B and hepatitis C viruses, and other viruses and infections. Today, all laboratory employees must use engineering and work-practice controls to eliminate or minimize exposure.

Should the risk of occupational exposure remain even with the implementation of such controls, then personal protective equipment (PPE) is required. According to OSHA, the term engineering controls—now considered the primary means of eliminating or minimizing needlestick injuries (NSIs)—indicates controls (eg, self-sheathing needles, sharps containers with engineered sharps injury protections, and entirely needleless systems) that isolate or remove the hazard of bloodborne pathogen transmission from the workplace. As with any device that will be used by a specific group of staff, employers should solicit those employees for input on the identification, evaluation, and selection of effective safety devices and work practice controls. In general, the most common phlebotomy engineering controls in use today are devices that have needle sheathing or some other cover component, and those that allow for needle or lancet retraction.

Blood Splatter and Winged Infusion Devices

The unfortunate irony is that the very approach to reducing the risk of NSIs actually may increase the risk of exposure through blood splatter (i.e., the microaerosolization). Currently, a main focus in phlebotomy is reducing the splash associated with the use of winged infusion devices for venipuncture. One study performed in 2010, which evaluated 18 different devices representing six different design types, demonstrated that minute splatters may go unnoticed during use of winged phlebotomy devices with engineered sharps injury protection, particularly during activation of the safety devices, thereby potentially exposing the mucous membranes and non-intact skin of health care workers, and others in the vicinity, to bloodborne pathogens. Many of the splatters were invisible to the naked eye, which is particularly dangerous because health care personnel must be aware of any and all exposures in order to seek the appropriate post-exposure care. The risk of splatter is particularly high if users do not adhere strictly to manufacturer’s directions. As a result, it is imperative that phlebotomists are trained properly on all devices and practice the published techniques for each device to minimize potential splash. Likewise, manufacturers must continue to explore and engineer devices that address not only NSIs, but also the issue of splatter.

There are a number of phlebotomy safety needles on the market that address the issue of splatter, as well as the concern of NSIs (see TABLE 1). Manufacturers are implementing controls designed to eliminate splatter after blood collection, as well as different sheathing or retracting mechanisms to prevent NSIs.

Single-Use Tourniquets

In recent years, dramatic viral infections, such as Ebola, have placed the use and quality of PPE in the spotlight. Similarly, hospital-acquired bacterial infections, such as those involving Clostridium difficile and methicillin-resistant Staphylococcus aureus, have heightened awareness of good work practice controls for disinfection and patient isolation, and spawned the use of single-use products, such as tourniquets. A 2012 study conducted in England found that just over a third of non-disposable venipuncture tourniquets were positive for S. aureus, and that about one-third of those were MRSA positive. Despite recommendations by the Clinical and Laboratory Standards Institute (CLSI), a 2013 survey by the Center for Phlebotomy Education found that only about two-thirds of respondents work in facilities with single-use policies for tourniquets. Of those who reuse tourniquets, the two most common answers to the question of how frequently they discard tourniquets used on multiple patients were:

- I cannot remember the last time I threw away a tourniquet
- At the end of a shift

Although phlebotomists attending a recent American Society for Clinical Laboratory Science-Central New England (ASCLS-CNE) conference confirmed that their area hospitals use tourniquets only once for inpatients, several outpatient services admitted to reusing tourniquets, while others confirmed that reuse occurred when the tourniquet was placed on top of clothing. The Community College of Rhode Island is now instituting a single-use tourniquet policy in the classroom, and Women and Infants’ Hospital also has adopted such a policy.
Bar Coding to Improve ID

Another positive trend in phlebotomy is the use of bar code scanners to improve patient identification. Like many facilities, Women and Infants’ Hospital is in the process of exploring several different vendors’ offerings and will be converting to this technology in the near future. The following four components represent the structure of a closed-loop system:

1. Bar-coded patient wristbands containing demographic information
2. Wristband printers to print wristbands on admission
3. Small hand-held bar code readers scan bar-coded wristbands and upload patient information to the LIS prior to drawing blood. As valuable as this method is, it should never supplant the tried and true method of asking patients to state their name, date of birth, and address prior to venipuncture; rather the technology should be used in conjunction with the routine method of patient ID.
4. Compact label printers that can be carried on the phlebotomist’s tray and used at the bedside to print labels for the blood draw. After the patient ID is verified, the labels for the corresponding blood work are printed for that patient only. Printing only one patient’s labels at a time helps eliminate errors associated with multiple patient labels being printed simultaneously on the same label printer, as this contributes to mislabeled specimens being sent to the lab.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Safety Description</th>
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<tbody>
<tr>
<td>Becton, Dickinson and Company</td>
<td>The BD Vacutainer Eclipse blood collection needle has a built-in safety shield that is aligned with the bevel of the needle. The safety shield permanently locks into place to reduce the risk of NSIs.</td>
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<tr>
<td>Becton, Dickinson and Company</td>
<td>BD Vacutainer Safety-Lok blood collection set has a safety mechanism that can be activated immediately after the blood draw and that helps protect against NSIs. Also, it is offered with a pre-attached holder for added convenience and to help ensure OSHA single-use holder compliance.</td>
</tr>
<tr>
<td>Covidien</td>
<td>The Monoject blood collection tube holder provides simultaneous front- and back-end needle protection through clinician-controlled retraction, making it safe to dispose after use. The needle retracts into the blood tube holder to reduce sharps disposal space.</td>
</tr>
<tr>
<td>Gaven Medical/CardioMed</td>
<td>With the Punctur-Guard Winged Set, the needle blunts while still inside the patient’s vein, protecting the vessel and eliminating exposure during needle withdrawal. The one-handed activation technique allows users to provide undistracted care to the venipuncture site at all time.</td>
</tr>
<tr>
<td>Greiner Bio-One</td>
<td>The Vacuette Quickshield safety tube holders are equipped with a mechanism that encloses the needle immediately after venipuncture, to help prevent NSIs. The safety device is solid plastic with no vents for splash to escape. In addition to its safety features, the product incorporates an ergonomic design.</td>
</tr>
<tr>
<td>Greiner Bio-One</td>
<td>The Vacuette blood collection/infusion set is a sterile winged needle intended for single use and connected to flexible tubing either with or without a Luer adapter. The winged needle has a safety mechanism that is activated after blood collection while the needle is still in the vein, thereby providing protection against NSIs.</td>
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Conclusion

Many laboratory procedures and tasks are becoming increasingly automated, thereby reducing the risk of bloodborne pathogen exposure among other benefits; nevertheless, the basic action of phlebotomy remains a necessarily manual procedure. As such, both physical and procedural protection must be afforded to phlebotomists to guard against the acquisition and transmission of infectious diseases. The best way for phlebotomists and patients to remain safe is for phlebotomists to adhere strictly to manufacturers’ instructions for equipment use and to remain vigilant with regard to good practice techniques, including positive patient identification.

References


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