Injuries from Phlebotomy Needles

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Over the last three years, the issue of reusing blood tube holders, and the safety concerns associated with this practice, have become a subject of debate, as detailed in the previous article (“Reuse of Blood Tube Holders, Redux”). To help shed light on the issue, the International Healthcare Worker Safety Center analyzed data on injuries from phlebotomy needles from the EPINet sharps injury database. The Center coordinates a network of healthcare facilities around the country that contribute data on a voluntary basis to its EPINet database.

Nine years of EPINet data (1993-2001) from 90 facilities indicate that approximately 5% of sharps injuries (1288/25,043) were caused by phlebotomy needles.1 (On the EPINet form, the device is denoted as “vacuum tube blood collection holder/needle.”) Of phlebotomy needles causing injury, 91% were used to draw venous blood, and 3% to draw arterial blood; thus, 94% of injuries from phlebotomy needles involved a blood-filled needle, the type that is highest risk for bloodborne pathogen transmission. For all other devices, the fraction of injuries involving blood-filled needles was 21%.

Figure 1 shows phlebotomy needle injuries by job category: nurses sustained the highest proportion of injuries (41.2%), followed by phlebotomists/venipuncture/IV teams (32.8%), clinical lab workers (7.4%), and non-surgical attendants (4.8%). The “other” category includes housekeepers, respiratory therapists, and paramedics.

Figure 2 shows the location of phlebotomy needle injuries: 50% occurred in patient rooms, followed by emergency departments (13.5%), outpatient clinics and offices (10.5%), intensive care/critical care units and venipuncture centers (4.4% each), clinical labs (4.3%), and home-care settings (3.8%).

Figure 3 (next page) shows the mechanism of injury (when the injury occurred in the use/disposal cycle) for phlebotomy needles. Almost one-fourth (23.4%) occurred during use, and 4.5% between steps of a multi-step procedure. The highest proportion of injuries, 28%, occurred after use but before disposal; for all other devices, 21.9% of injuries fell in this category. Of note, 11.4% of phle-
botomy needle injuries occurred during disassembly of the device, more than double the proportion—5.2%—for all other devices. This is important because injuries that occur when the worker is removing a phlebotomy needle from a blood tube holder are most likely to be placed in the “disassembly” category or, alternatively, in the “other after use, before disposal” category.

Injuries related to disposal were also markedly higher for phlebotomy needles compared to all other devices: 21.9% for phlebotomy needles vs. 15.5% for all other devices. In particular, the fraction of injuries that occurred while putting the sharp in the disposal container were much higher for phlebotomy needles (16.6%) compared to all other devices (7.2%). One possible mechanism of these injuries, among others, is needle removal. Some phlebotomy systems are designed with a release mechanism: the worker places the tube holder, with needle attached, over the sharps container and activates the release mechanism on the holder to eject the needle into the container. Another mechanism of needle removal is by means of a notched opening in the disposal container, sometimes called an “unwinder”: the worker places the needle in the unwinder and twists or pulls back the tube holder to release the needle. These two release mechanisms do not include an integrated needle safety feature, as specified in the bloodborne pathogens standard.

Needlesticks from the Back End of Phlebotomy Needles

On the EPINet Needlestick and Sharp-Object Injury report form, the injured worker indicates the type of device that caused the injury; among the choices is “vacuum tube blood collection holder/needle.” But the report form does not distinguish whether an injury from a double-ended phlebotomy needle involved the “front end” (the end that is inserted into the patient) or the “back end” (the end that punctures the blood tube). Elsewhere on the form, however, the worker is asked to describe the circumstances leading to the injury, and can give additional details about the exposure. These text descriptions have been entered into the EPINet database since 2000; there are now two years of descriptions (2000 and 2001) available.

Of the 146 injuries from phlebotomy needles in the EPINet database for 2000 and 2001, 114 included injury descriptions. We reviewed all the phlebotomy needle injury descriptions, and found that 12, or 10.5% (12/114), indicated that the injury involved the back end of the needle.* Of the 12 back-end injuries, 5 could be directly related to removing the needle from a blood tube holder (in the other 7 descriptions, needle removal was not mentioned). In addition to the 12 back-end injuries, another 7 descriptions of phlebotomy needle injuries indicated that the injury occurred while removing the needle from a blood tube holder (but did not specify which end of the needle caused the injury).

The texts for these 19 descriptions are provided below. Text in italics or brackets indicate editorial comments.

I. Descriptions: Needlesticks from the Back End of a Phlebotomy Needle, Associated with Removing Needle from Blood Tube Holder

(1) “After drawing blood . . . disconnected needle from blood tube holder. Stuck self with covered end that pierces blood tube.”

(2) “Did the venipuncture; unsuccessful attempt. Withdrew the needle, unscrewed the hub from the needle. Stuck self with the rubber end of the needle where it did not penetrate the patient.”

(3) “I picked up the blood tube holder, twisted off the blood drawing piece and set it on the bed. In the dark I grabbed the blood drawing piece end to end between index finger and thumb. Rubber cover over needle was pushed back and needle penetrated through gloved thumb.”

(4) “[I was] disposing of needle in the sharps container. Due to the spring-type action the needle (tube holder end) pushed back up poking me in the thumb. The phlebotomy needle did not fit in the unwinder in the sharps container to eject the needle into the container.”

(5) “Venipuncture was performed [and] safety device
was] activated; was taking needle apart from holder and stuck finger.” [This appears to be a back end needlestick since the worker indicates that the safety feature—which would have shielded the front end of the needle—was activated. This is an interpretation.]

II. Descriptions: Other Needle-sticks from the Back End of a Phlebotomy Needle

(1) “Associate picked up what she thought was plastic lying on the floor with a tissue that was lying near it. Got stuck with needle used for inside blood tube holder.”

(2) “After drawing blood was disposing of phlebotomy needle and holder; finger slid inside holder and stuck finger with needle inside of holder.”

(3) “Stuck finger with phlebotomy needle after drawing blood. Rubber did not come back down over needle.”

(4) “I was taking blood tube holder off of butterfly so that I could hook syringe to butterfly for next step of . . . test and I punctured rubberized end of needle into finger on right hand.”

(5) “Upon disposing of needle into sharps container she was stuck by a phlebotomy needle that had not gone down into the sharps container. The rubber end of the phlebotomy needle is the end that stuck her.”

(6) “Needlestick through glove from phlebotomy needle after central line blood draw. Adaptor stuck in end of central line lumen; outer cylinder came off, exposed the sharp.”

(7) “Bottom end of butterfly needle stuck my thumb as I was disposing of it.” [Butterfly needles are sometimes connected to blood tube holders—with a single-ended phlebotomy needle attached—for the purpose of blood drawing.]

III. Descriptions: Needlesticks from Phlebotomy Needles Associated With Needle Removal Problems

(1) “While removing needle from holder, stuck self with needle.”

(2) “Disconnected blood tube holder from needle insert, needle poked thumb.”

(3) “While removing needle from blood tube holder for disposal, needle pricked skin.”

(4) “Needle was recapped and I was twisting the needle off the needle holder and the needle poked out the side of the cap.”

(5) “After blood draw tried to engage safety device, device stuck so she tried to manually remove needle, stuck palm.”

(6) “Associate finished drawing blood from a patient and went to put [needle] in a sharps container and realized there was no remover [i.e., needle unwinder]. She then set it on the counter behind her and got stuck.”

(7) “After using phlebotomy needle/blood tube holder, was disposing of needle and it would not break off [i.e., would not disengage from holder]. Then attempted to put cap back on needle when punctured right index finger.”

We looked separately at injury descriptions for safety-engineered phlebotomy needles in the 2000-2001 data; of 62 injuries, 51 included injury descriptions. Of these 51, 7 specified that the injury involved the back end of the needle (7/62=11%). These data indicate that, even with safety phlebotomy needles, the back end of the needle still poses an injury risk.

Conclusions

EPINet injury data on phlebotomy needles demonstrate that needlesticks from the back end of phlebotomy needles are not a rare event in healthcare settings. Although the rubber sheath covering the back end provides little or no protection to the healthcare worker, workers may be less likely to perceive the risk since the back end sharp is hidden by the sheath.

Because phlebotomy needles are high-risk for bloodborne pathogen transmission, it is especially important to utilize all possible engineering and work practice controls to minimize injury risk. The back end of a phlebotomy needle poses its own set of injury risks, in addition to those from the front end of the needle.

For optimal protection, both ends of the needle should be covered (or, in the case of the back end, remain covered) after use. As these devices are currently configured, the tube holder provides the only protection for the back end of the needle after use. Unless another shielding mechanism is provided to cover the back end of the needle, the needle and tube holder should be disposed of as a unit after blood drawing procedures in order to minimize high-risk injuries to healthcare workers.

References
