The Other OSHA Mandate: Plastic Blood Collection Tubes and Blood Culture Bottles

Ever since OSHA revised the Bloodborne Pathogens Standard, managers have focused on eliminating conventional needles. However, most don't realize that the language also applies to glass tubes and blood culture bottles.

by
Dennis J. Ernst MT(ASCP), Director
Center for Phlebotomy Education, Inc.

What do laboratory managers and fire fighters have in common? They both put out fires. Every laboratory manager spends a good bit of his/her day being distracted from the work at hand by urgencies that flare up like grass fires on the prairie. In today's over-regulated healthcare environment, the work at hand usually involves compliance.

Since 2001, the compliance issue that has been dominating the work at hand has been the revised Bloodborne Pathogens Standard (BPS). Ever since the revision, laboratory managers and phlebotomy supervisors have immersed themselves in becoming compliant with its new provision mandating the implementation of safety needles. Committees were assembled, product samples were requested from manufacturers, and evaluations were performed. After significant expense of time, energy, resources and revenue, laboratories converted away from conventional needles toward safer, OSHA compliant sharps. Unfortunately, most don't realize that the revised standard requires another conversion.

Broken Glass Exposures

When most managers think about sharps, they think about needles and lancets. But broken glass exposures are among the most dangerous sharps injuries in healthcare. When blood-filled tubes are dropped and broken, cleaning up the spill puts the healthcare worker at extreme risk for cuts and the implantation of bloodborne pathogens into the wound. In addition, when tubes break in the centrifuge, the user is exposed to aerosols and micro droplets that can contain viruses and other pathogens if inhaled or splattered onto clothing. In addition, the healthcare worker is exposed to hundreds of shards of contaminated glass.The best way to eliminate the risk of broken-glass exposures is to eliminate glass wherever possible. In the last decade, the manufacturing industry has developed plastic versions of nearly all blood collection tubes in use by the majority of clinical laboratories. Because plastic alternatives to blood collection tubes are readily available in the US marketplace, managers and supervisors now have the ability to significantly reduce the potential for employees to sustain a broken glass exposure.

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Many have already converted. Besides their obvious benefit of being shatter resistant, plastic collection tubes are lighter and, therefore, cheaper to dispose of. Although they cost slightly higher than their glass counterparts, the cost to convert to plastic tubes results in an overall savings when disposal costs are factored in to the cost analysis. Factor in the savings to a healthcare facility by preventing an exposure, and the cost differential heavily favors conversion.

Treating an accidental needlestick costs the average facility $4000.[1] That's just for wound care in terms of lost productivity, resources, supplies and follow-up care. Should the employee acquire hepatitis and eventually require a liver transplant, the cost skyrockets to $150,000. If the exposed worker acquires HIV, the accident can cost the facility over $500,000.[2]

The humanitarian and economic reasons for converting to plastic collection vials is obvious and sufficient to motivate most employers to make the switch. For those who need another reason, there's OSHA.

Shifting the Focus

Because most managers have been focusing on safety needle conversion provisions of the revised BPS, OSHA's intent has been lost on other applications of the language of the document. However, managers who don't apply the OSHA's language to glass collection tubes are missing the bigger picture and risking the fines and citations that accompany non-compliance. The critical language exists in both the standard and in the Compliance Directive OSHA released since the revision.

According to the BPS, when safer medical devices are available that reduce the risk of injury to employees, they must be substituted.[3] The passage, familiar to most managers in the context of safer needles, is clearly not limited to those devices. According to Section (d)(2)(i) of the standard, "engineering and work practice controls shall be used to eliminate or minimize employee exposure." This passage remains unchanged from the original BPS issued in 1991. In order to interpret the passage as it applies to glass, one must refer to the definition of "engineering controls" OSHA provides at the beginning of the standard: controls that isolate or remove the hazard from the workplace.

Without further clarification, one can easily see that plastic blood collection tubes would be considered an engineering control. However, when the definition was revised in 2001, a change in a parenthetical within the definition provides further evidence that the revision did not just mandate safer needles, but other safer devices as well. Compare the parenthetical before and after the revision of the BPS.

(Newly inserted language in the revised definition is italicized .)

Original definition: Engineering controls: "controls (e.g., sharps disposal containers, self-sheathing needles) that isolate or remove the bloodborne pathogens hazard from the workplace."

Revised definition: Engineering controls: "controls (e.g., sharps disposal containers, self-sheathing needles, *safer medical devices, such as sharps with engineered sharps injury protections and needleless systems*) that isolate or remove the bloodborne pathogens hazard from the workplace."

The inclusion of "safer medical devices" in the revised definition reflects OSHA's intent to broaden the definition to cover other devices, sharps with engineered sharps injury protections being only one example. The term "devices," one would think, incorporates supplies as well.

OSHA on Glass

Further evidence that the use of glass blood collection tubes subject the employer to OSHA citation and fines can be found in the latest Compliance Directive, specific instructions to OSHA's field inspectors on how to interpret and enforce the provisions of the BPS. Two passages in Section (d)(2)(i) provide the following guidance to inspectors:[4]

> *"If no engineering controls are being used to eliminate or minimize exposure, a citation should be issued.... If a combination of engineering and work practice controls used by the employer does not eliminate or minimize exposure, the employer shall be cited for failing to use engineering and work practice controls."*

Not enough evidence? How about these statements by Richard Fairfax, OSHA's Director of Enforcement Programs, in the February, 2003 issue of *MLO* magazine.

> *"Since plastic can be easily substituted for glass in most all cases, we expect employers to use plastic where appropriate.... Since plastic tubes are readily available that do not compromise specific clinical or diagnostic tests, a facility that is not using them would have to justify why they are not being used for each specific procedure or test and document that in their exposure control plan.*

Statistics

It is not certain exactly how many healthcare workers suffer broken glass exposures, but some statistics provide insight. OSHA estimates that 2800 broken glass exposures occur each year in the US.[5] However, other estimates reflect a more prevalent problem. EPINet, the exposure tracking system developed by the International Healthcare Worker Safety Center at the University of Virginia, tracks percutaneous injuries at over 70 U.S. hospitals. According to EPINet data gathered over a seven-year span between 1993-1999 (excluding 1996 for which no data is listed), 124 healthcare workers reported broken glass exposures from specimen collection tubes.[6]

If that number is applied to the estimated 6000 hospitals in the US, multiplied by two to account for the fifty percent of healthcare workers who work outside of hospital settings, and further multiplied according to EPINet's estimate that 39% of exposures go unreported,[7] (other sources report that laboratorians have an underreporting rate of 92%), then it is reasonable to extrapolate that each year in the U.S., 4924 healthcare workers suffer broken glass exposures from blood specimen collection tubes. This more than justifies OSHA's concern.

Since 1999, the last year in which EPINet statistics on broken glass injuries are available, many facilities have undoubtedly converted from glass tubes to plastic. Therefore, a reduction in the statistic should be proportionate. Nevertheless, when one worker is exposed to potentially contaminated blood because the employer opted out of converting to plastic collection tubes, that's one exposure too many. Adding further pressure to administrators is an article that appeared in *Healthcare Purchasing News* reporting that the time is ripe for CEOs to face criminal charges for injuries and deaths that result when their companies violate regulatory statutes.[8]

Companies that manufacturer blood collection supplies and equipment are successfully converting clinical laboratories away from glass for all of these reasons. But it's not just glass blood collection tubes that are getting the heave-ho. BioMérieux is introducing the first plastic bottle for blood cultures. The company is replacing their glass BacT/ALERT vials with safer, plastic versions as the industry's first alternative to glass blood culture vials. Since OSHA wants glass substituted with safer materials whenever possible, managers will be hard-pressed to document a justifiable reason not to comply now that an alternative is available. OSHA does not accept financial limitations as justification.

Once the industry fully converts to plastic substitutes wherever possible, healthcare workers and laboratory managers emerge as the real winners---healthcare workers because they will be less likely to suffer from broken glass exposures and laboratory managers because they can go back to the demands of other regulatory agencies and, of course, putting out fires.

Dennis J. Ernst is the director of the Center for Phlebotomy Education, Inc. and editor of Phlebotomy Today, and online newsletter accessible at www.phlebotomy.com.

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