NEEDLESTICK PREVENTION

Ever since the rapid increase in the number of cases of HIV/AIDS and other bloodborne infections such as hepatitis B and C, there has been tremendous interest in the healthcare community in eliminating, or at least minimizing, accidental exposure to blood and other body fluids.

The human immunodeficiency virus, HIV, is the pathogen that causes AIDS. Other bloodborne pathogens include the hepatitis B virus (HBV) and hepatitis C (HCV). There are many other bloodborne infections, including syphilis, but HIV and hepatitis B and C are the main causes of concern.

The Centers for Disease Control and Prevention (CDC) estimates that there are more than 8 million healthcare workers in the United States. There are many ways these workers can come into contact with infected blood, but one of the most dangerous is through needlestick injuries, after the needle has been contaminated by use. Historically, with the use of non-safety syringes, this often happened after an injection during recapping, which is no longer allowed, during the drawing of blood for laboratory testing, during disposal of a syringe or other sharp, and even through contact with an improperly discarded sharp - often referred to as a "downstream injury." When non-safety syringes were still in widespread use, the National Institute for Occupational Safety and Health (NIOSH) estimated that as many as 600,000 to 800,000 needlestick injuries occurred every year. And many of them were unreported, perhaps between 30 and 60 percent. Most contaminated needlestick injuries occur within a few seconds after the needle has been removed from the patient.

Some progress has been made in reducing the number of needlestick injuries over the past several years as a result of government regulations and the increased use of safety devices. However, widespread use of the safest devices would greatly reduce the number of needlestick injuries.
This program will discuss recent changes and specifically address needlestick injuries, safer needle devices, and how you can help prevent needlestick injuries.

**PERSPECTIVE ON THE NEEDLESTICK ISSUE**

In 1978, a medical technician at the University of Wisconsin Hospital contracted hepatitis B from a needlestick injury. The hospital's chief of infectious diseases, Dr. Dennis Maki, and nurse Rita McCormick began groundbreaking research that alerted the medical community to the risk that healthcare workers face for contracting bloodborne diseases from contaminated needles. In their report, published in 1981, Maki and McCormick said that many needlestick injuries occurred during recapping attempts and warned medical workers not to recap needles. Despite the medical community's realization that hepatitis B and many other pathogens were frequently spread by needlestick injuries, it took the deadly specter of HIV/AIDS in the early 1980s to focus attention on the need for needle safety devices. The rise of AIDS in the 1980s and early 1990s made a needlestick injury a terrifying event.

The emotional impact can be severe and long-lasting, even when no infection ultimately results. In one study of 20 healthcare workers occupationally exposed to HIV, 11 reported acute and severe distress, seven others had moderate distress, and six of the 20 quit their healthcare jobs as a result of the exposure. The chance of contracting HIV from an HIV-contaminated needlestick is roughly 0.3 percent - or about one in 300 - but the consequences are serious. The chance of contracting hepatitis C from an HCV-contaminated needlestick is about five percent (or one in 20). If a person has not been vaccinated against hepatitis B, the chance of contracting it from an HBV-contaminated needlestick ranges from 6 to 30 percent, about a one in six chance.

Not every contaminated needlestick results in a seroconversion. But, besides HIV, there are about 20 other
bloodborne pathogens that can be transmitted, and some of them can be just as fatal as HIV/AIDS. And there are documented cases where a medical worker has contracted both HIV and hepatitis from a single needlestick injury.

Over the past several years, however, there has been a gradual but steady decrease in the number of needlestick injuries. This improvement began in 1991, when OSHA released its Bloodborne Pathogens standard, aimed at preventing healthcare worker exposure to blood and body fluids.

A few years later, the CDC issued updated infection control guidelines for hospitals called Standard Precautions, which were designed to prevent transmission of bloodborne pathogens from both recognized and unrecognized sources. Standard Precautions apply not only to blood, but also to all body fluids, secretions and excretions, except sweat.

Standard Precautions guidelines recognize that there are three primary routes of transmission of bloodborne pathogens to healthcare workers. The needlestick injuries we have already discussed, plus broken skin contacting an infected body fluid, and contact with infectious fluids through the mucous membranes of the eyes, nose or mouth.

Among many recommendations for safer practices, these initial regulations strongly urged the adoption of safer needle devices, with built-in engineering controls to prevent needlestick injuries. This improvement was given further impetus in 1999 when OSHA revised its compliance directive and stated for the first time that the use of safer needle devices was mandatory, wherever possible. This new urgency also was reflected in the federal Needlestick Safety and Prevention Act (Public Law 106-430), which was signed into law in 2000. In 2001, OSHA's revised and updated Bloodborne Pathogens standard made it clear that safer devices were indeed mandatory. Frontline healthcare workers must be involved in the evaluation and selection processes of safer needle devices. Under the Medicare Modernization Act of 2003, all public hospitals must comply with the OSHA Bloodborne Pathogens standard;
enforcement is conducted by the Centers for Medicare & Medicaid Services (CMS).

By making safer needle devices mandatory, the government has encouraged a further decline in the incidence of needlestick injuries. If all facilities would comply with the mandates, the number of needlestick injuries would decline dramatically. The law requiring the use of safer devices takes precedence over any purchasing contract. The law also provides that frontline healthcare workers be members of the committee that selects a facility's safety needle devices, and that such decisions not be deferred to a facility's purchasing department.

SAFER NEEDLE DEVICES

OSHA insists that a safer needle device must incorporate built-in engineering controls to prevent needlestick injuries. The Food and Drug Administration (FDA) and OSHA have set a number of criteria that a safer needle device should meet:

1. The device should provide a barrier between the healthcare worker's hands and the needle, after use.
2. The device ideally works passively (i.e., it does not require activation by the user).
3. The design should keep the worker's hands behind the needle at all times.
4. The safety feature should be an integral part of the device, not an add-on accessory.
5. The user should be able to tell that the safety feature has been activated.
6. The safety feature should be in effect before any disassembly and prevent reuse.
7. The safety feature should remain in effect after disposal to protect any downstream workers.
8. It should be simple and easy to use.
9. It should be safe and effective for patient care.
10. Finally, it should require little or no special training.
Let's look at a few common types of safer needle devices. One type of syringe has a transparent plastic shield that, after use is slid forward to lock into place and cover the needle. This requires that two hands be used. On some devices, the shield swings into place. In either event, the protective feature is activated only after the needle has been removed from the patient. Because of that, the healthcare worker is exposed to the contaminated needle and there is the potential for needlestick injury. Independent evaluators of safety needle devices have found that two-handed, manually activated devices are not as effective in reducing exposure to contaminated needles. These kinds of devices fail to meet most of the ten criteria listed above. Unfortunately, many facilities have experienced a significant increase in needlestick injuries when using two-handed, sliding-shield syringes.

Another device, the automated retractable-needle syringe, looks much like an ordinary syringe, but it provides pre-removal activation. Once the medication is injected, the needle automatically retracts directly from the patient into the barrel of the syringe, so the healthcare worker has no exposure to the contaminated needle. This virtually eliminates any risk for needlestick injury. It also requires the use of only one hand. The integral safety mechanism and attached needle design prevent removal of the safety feature and encourage user compliance.

Attached needle designs also maintain a closed system, reducing the risk of medication leakage or contamination. Scientific analysis shows that piercing vial stoppers does not result in needle dulling. Changing needles between drawing up a medication and injecting it into a patient is unnecessary. Removing needles from syringes should be avoided whenever possible to prevent potential contamination. This is especially important when injecting medication directly into intravenous lines because of the risk of bloodstream infections.

Some other retractable needle syringes have manually-activated retraction. Those generally require the use of two hands and do not eliminate exposure to a contaminated
needle, so there is a potential for needlestick injury. Automated retraction syringes have been shown to be vastly safer than manually activated devices.

Another device is a blood-drawing needle with a self-blunting tip. Before use, the tip of the needle appears like any sharp collection needle. After use, further pressure on the blood collection tube causes a blunt insert to snap into place inside the needle tip.

Other safer needle devices use hinged shields, and protective encasements that receive an IV stylet as it is withdrawn from its catheter.

These are a few of the many types of safer needle devices that have been developed over the last decade, and include safer devices for intravenous therapy. No one device is appropriate for all uses or all institutions. Many healthcare facilities are encouraged by major manufacturers to standardize devices, which limit choices and may exclude the safest technology. Device selection must not be restricted by attempts to standardize. The safest device should be chosen for each procedure.

Studies have shown that safer IV devices, in conjunction with a program of needlestick awareness, have reduced needlestick injuries in IV therapy from 62 to 88 percent. Safer phlebotomy devices have reduced needlestick injuries by up to 82 percent. OSHA now prohibits the removal of contaminated needles and the reuse of blood tube holders, therefore, you should not remove contaminated blood collection needles from holders.

You should learn how to use the safer devices in your facility. For example, we will review the operation of a retractable phlebotomy device.

1. Screw the capped needle assembly onto the body of the retractable-needle phlebotomy device.
2. When ready to use, remove the needle cover carefully.
3. Insert the needle into the vein and then insert blood collection tubes as you normally would with any phlebotomy device.

4. Once the last tube has been filled with blood and removed - and with the needle still in the patient's vein - close the end cap of the tube holder securely. The needle will automatically retract from the patient's vein and disappear completely into the body of the tube holder. This retractable blood collection tube holder features pre-removal activation, so the healthcare worker is never exposed to the contaminated needle.

5. Properly discard the single-use tube holder with the needle inside it.

Safer needle devices have the greatest potential for effectively lowering the incidence of needlestick injuries in the United States. However, be aware that the FDA does not require devices labeled "safety" to actually be safer. It is up to you and your committee to determine the effectiveness of safety devices and to continually access new technologies to effectively reduce the risk of needlestick injuries.

While it is essential that you report any needlestick injury to your supervisor, be aware, that the FDA is not automatically notified. Therefore, the FDA encourages healthcare workers to report needlestick injuries resulting from the use of poorly designed needle devices. Reporting unsafe devices allows the FDA to take regulatory action and ultimately will prompt manufacturers to design safer, more effective devices. Reporting can be done online at www.fda.gov/medwatch, or by submitting the FDA MedWatch Form 3500 by mail or fax.

Safer needle devices are only part of a program of needlestick safety.
It is important to recognize that preventing needlestick injuries is only one part of a comprehensive program to prevent the spread of bloodborne infections in your facility.

You should follow all the CDC guidelines for Standard Precautions, and the OSHA regulations for Universal Precautions. This begins with considering all patients potentially infectious and performing hand hygiene before and after contact with each patient. In addition, follow all guidelines concerning gloving and the use of other personal protective equipment.

Even with the attention to bloodborne precautions and the use of safer needle devices, a study by the University of Virginia, in 2003, revealed there are still far too many needlestick injuries. NIOSH recommends a number of other steps you should take to protect yourself and others from needlestick injuries. First, you should avoid the use of sharps altogether if safe and effective alternatives are available, such as blunt suture needles.

If your job involves possible exposure to blood or blood products, OSHA requires your facility to offer you hepatitis B vaccination as a precaution. There is currently no vaccination for either hepatitis C or HIV.

Use the safer needle devices provided by your employer, and use them correctly.

Take an active part in any bloodborne pathogen training offered in your facility, and follow all the recommendations concerning safer needle devices.

The law requires that frontline healthcare workers be involved in the evaluation and selection of their institution's safer needle devices. The decision is too important to be made exclusively by a facility's purchasing department or to be based simply on purchase price or contracts. Remember that no single device will be appropriate for all purposes. As
new devices come to your attention, mention them to your supervisor for consideration. Clinicians can - and should - notify OSHA if their facilities are not in compliance. Such action can save a hospital millions of dollars in fines and liability.

Never recap contaminated needles. Use safer needle devices instead, and discard the used devices appropriately. Before you begin any procedure involving a needle, plan for its safe handling and disposal. Know how you are going to activate the safety mechanism and know where the sharps disposal container is located.

Dispose of any used needle promptly, even if it has a safety device built in. Use an appropriate sharps disposal container.

Assure that filled sharps containers are promptly removed and replaced. It can be extremely dangerous to attempt to force "just one more" used device into a filled container. Inform your supervisor if you notice a container that is filled beyond its maximum limit.

Also inform your supervisor about any hazards from needles that you notice in your work environment. If you are aware of any needlestick injuries occurring in your facility as a result of poorly designed devices, contact the FDA, in addition to notifying your supervisor. Help protect others as well as yourself.

**Needlestick Injuries**

If you receive a needlestick injury, there are a number of steps you should take. Immediately wash the point of injury thoroughly, and then inform your supervisor.

File an exposure incident report with your supervisor. OSHA requires employers to establish a log to record and track all contaminated needlestick and sharps injuries. The Sharps Injury Log must contain the type and brand of the device involved in the injury, if it is known.
Consult an employee health nurse or doctor without delay. A post-exposure confidential evaluation and follow-up will be provided free of charge. It includes documentation of the incident.

Whenever feasible and permitted by law, the source individual's blood will be tested to determine if there was infection. The results will be documented and made available to you.

OSHA also recommends that your blood be drawn immediately after exposure to be used as a baseline for comparison in later evaluations. Follow-up testing will determine if transmission of any agents has occurred. For HIV, though, the infection may not show up in the blood for 6 to 12 weeks, or even longer. For HBV, blood tests can also tell you if you have had an HBV infection in the past and whether you are a carrier or have a naturally-acquired immunity.

If medically indicated, the exposed individual is also entitled to post-exposure prophylaxis, which is a treatment that is performed in an attempt to reduce the risk of infection. According to the CDC, insufficient data has been obtained to verify the effectiveness of post-exposure prophylaxis. Prevention of needlestick injuries is the key.

Finally, you are entitled to medical counseling about your risk of infection and your risks of infecting others - and you have a right to an evaluation of any reported illnesses. Whether you are infected or not, your employer or supervisor must keep your condition and medical records confidential. It is also your employer's responsibility to put in place a comprehensive program to reduce the incidence of needlestick injuries.

Your employer must analyze any needlestick injuries that occur at your workplace and identify any trends or hazardous practices. A facility must have an ongoing program to evaluate new safety needle technology and implement safer devices until the risk of needlestick injuries has been eliminated.
They must also study local and national information about risk factors and successful interventions made at other facilities.
REFERENCES


