Editorial

Universal Precautions: Still Missing the Point on Needlesticks

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Pressure to solve the longstanding problem of needlestick injuries among healthcare workers has been apparent since the first occupational seroconversion to human immunodeficiency virus (HIV) was reported in 1984.[1] This pressure has steadily increased as subsequent reports confirmed that the once hypothetical route of HIV transmission was a well-established reality, carrying a seroconversion risk of 1 in 250 for those injured by HIV-contaminated needles.[2-4] The accumulated data further revealed that needlestick and sharp object exposures to HIV presented a higher risk of transmission than any other route of occupational exposure.

Official response to the needlestick hazard can be traced back to the 1983 publication of the Universal Precautions guidelines by the Centers for Disease Control (CDC), which recommended that used needles not be bent, broken, or recapped by hand, and that they be discarded promptly in a puncture-resistant disposal container placed near the point of use.[5] In 1988, many of the protective measures recommended by the CDC, including those relating to needle disposal, became enforceable by the Occupational Safety and Health Administration (OSHA). Despite widespread acceptance, there has been little evidence of their effectiveness in reducing needlesticks and much frustration, as continuing risk is encountered by those who are required to handle needles routinely.

The article by Linnemann and colleagues in this issue is a compelling example of an aggressive, long-term program to implement Universal Precautions guidelines in a hospital, and its effects on institutional needlestick rates. The main conclusion is a discouraging one; that the overall rate of needlestick injuries did not decline after implementing the program. An additional important finding was that recapping-associated needlesticks declined after the introduction of new disposal containers, but this did not translate into an overall reduction in needlesticks. Although the outcome is disappointing because the anticipated benefits of implementing Universal Precautions did not occur, few who are employed in the delivery of healthcare are likely to be surprised. These negative results were largely predictable. An examination of the Universal Precautions guidelines and their history provides a possible explanation for the findings of Linnemann and his colleagues.

McCormick and Maki were the first to make an explicit recommendation not to recap used needles in their report published in 1981.[6] In that study, and in studies that followed, an association was noted between recapping needles and the occurrence of needlesticks.[7-9] The CDC adopted the conclusions of these studies when formulating Universal Precautions guidelines. The recommendation was based on the unchallenged assumption that if, for example, 25% of needlesticks occurred while recapping, and recapping ceased, then needlestick rates would drop by 25%. Unfortunately, this assumption

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is neither logical nor correct.

First, it must be recognized that most recapping attempts do not result in needlesticks. Furthermore, studies have consistently shown that the majority of needlesticks occur while handling or coming in contact with exposed needles, and not during the act of recapping.[4,6,7,9] In the Linnemann study, as few as 8% to 20% of needlesticks occurred during recapping; the rest did not. There is a risk of injury during recapping, and there is also a risk of injury while handling exposed needles. Therefore, the consequence of eliminating recapping is a trade-off in which the risk of recapping is replaced by the risk of handling exposed needles.[10]

Healthcare workers give several reasons for recapping despite Universal Precautions guidelines against it.[9,11] A primary motive is to protect themselves from needled devices that must be disassembled before their disposal. Such devices include prefilled cartridge syringes, vacuum tube blood collection holders, and intravenous tubing/needle assemblies, where the alternative to recapping is the manipulation of exposed needles with unprotected hands. Although recapping is certainly hazardous, the recommendation to eliminate recapping only makes sense if the risk of handling exposed needles is lower. The findings of Linnemann and colleagues suggest that it is not.

Although there is a lack of evidence to support its effectiveness, the recommendation against recapping has become firmly entrenched as a principal defense against needlesticks. But despite the mounting intensity of safety messages directed toward healthcare workers, studies have shown that recapping continues.[12,13] Response to persistent recapping has too frequently been to promote further measures to correct the non-compliant behavior, rather than to question the effectiveness of the policy.[8,13,14] One hospital has even endorsed punitive action against employees who report needlesticks, under the assumption that if safety guidelines were followed, needlesticks would not occur. The hospital recommends escalating disciplinary measures with each successive needlestick, up to and including termination of employment.[15] As if the solution to barking up the wrong tree were to bark louder.

What can be done to reduce the risks of handling exposed needles? There is evidence that certain categories of needlesticks can be prevented by puncture-resistant disposal containers placed near the point of use.[11,13] While all possible means to reduce needlestick risk should be implemented, expectations of the potential benefits should also be realistic. Injuries that are preventable by puncture-resistant containers include those that occur when needles pierce the sides of disposal containers. Injuries that occur while carrying exposed needles to the trash can also be minimized by reducing the distance to disposal containers.

However, most categories of needlesticks will remain unaffected by even the best disposal systems. Such needlesticks include those that occur during the use of devices, those associated with disassembly of devices, those used in multistep procedures, and those caused by needles protruding from the openings of overfilled trash containers. In one study, these types of needlesticks accounted for 82% of the total, leaving only 18% preventable by improved disposal systems.[9] Of the 18%, some, but not all, injuries are likely to be prevented by improved disposal systems.

While the limitations of Universal Precautions in reducing this occupational hazard are disappointing, needlesticks remain potentially the single most preventable hazard in the healthcare workplace. A change in perspective is necessary in order to focus on the correctable causes of the problem. In reality, needlesticks are not caused by recapping, improper needle disposal, or carelessness. They are caused by hazardous devices that healthcare workers are required to handle under difficult circumstances. The replacement of hazardous devices with safer ones has more potential for reducing needlestick injuries than any other approach.

For example, as many as 50% of needlestick injuries in hospital settings could be prevented by one method alone; the elimination of unnecessary exposed needles.[9] All exposed needles on intravenous lines or syringes used to access intravenous ports or injection sites are unnecessary. An array of needleless and covered needle devices are currently available that would allow an immediate reduction in risk. Another potential opportunity is the elimination of unnecessary needles from certain procedures, such as using a single needle technique rather than two needles for obtaining blood cultures, and eliminating the heparin step from the multistep procedure used for flushing intravenous lines and injection ports.[16,17]

Exposed needles are necessary only for devices that must penetrate the skin, including intravenous catheters, blood drawing devices, and syringes used for intramuscular or subcutaneous injections. Safer designs for these devices should integrate a rigid cover for the needle that can be put in place immediately after use, allowing the hands to remain behind the needle as it is covered. The safety feature should be in effect before disassembly and should remain in effect after disposal, to

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protect users and trash handlers, and for environmental safety. Based on available needlestick data, devices meeting the above criteria have the potential to reduce overall needlestick rates by nearly 90%.[9] Furthermore, the technology to accomplish this level of prevention already exists, yet is not widely available.

The CDC confirms a total of 24 seroconversions to HIV among occupationally exposed healthcare workers as of February 1991 (Marcus, personal communication; 1991). Unfortunately, there is no surveillance system that can capture all or even most cases in which healthcare workers have seroconverted to HIV as a result of needlestick injuries. If 800,000 needlesticks occur in hospital settings each year, which we believe is a conservative estimate, and 2% of hospital patients are HIV seropositive, then 16,000 HIV-contaminated needlesticks will occur each year; a figure that will increase as the number of HIV-seropositive patients grows. At a seroconversion rate of 1 in 250, approximately 64 healthcare workers will seroconvert to HIV each year; 57 of the seroconversions would be preventable.

All potential routes should be employed in order to bring safer technology into the hands of healthcare workers as quickly as possible. The relevant government agencies, including the CDC, the Food and Drug Administration, OSHA, and the National Institutes of Health, have critical roles to play in implementing effective safety guidelines, enacting medical device safety standards, requiring safer devices in the workplace, and providing research funds necessary to support a rapid transition to disease-preventing, life-saving technology. Product manufacturers must make an immediate commitment to providing safer devices and to eliminating conventional, hazardous needled devices from the marketplace. And finally, healthcare workers must express the urgency of their need by demanding that safer products be provided to them. A society with the engineering capacity to place a man on the moon can certainly design and produce safer needled devices. Until this transition is complete, needlesticks will continue to take their relentless, and unnecessary, toll.

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