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Percutaneous Injuries in the Dialysis Setting

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IN 1999, DURING THE COMMENT PERIOD FOR California OSHA's revised Bloodborne Pathogens standard mandating the use of safety-engineered devices in health care facilities, a state dialysis association sought an exemption from the safety device requirement, arguing that "there is a very low rate of exposure incidents in the dialysis industry."

Data on percutaneous injuries from the multihospital Exposure Prevention Information Network (EPINet), coordinated by the International Health Care Worker Safety Center at the University of Virginia, show that the types of exposures sustained by dialysis workers are more likely to involve large-bore, blood-filled needles, and are therefore more apt to transmit bloodborne pathogens, than exposures sustained by non-dialysis workers. Working in a blood-intensive environment, dialysis personnel also treat patients who are at higher risk of being infected with bloodborne pathogens, particularly hepatitis C, than the general population.

National statistics are not available on how many needlesticks occur in dialysis settings each year, nor for the total number of dialysis workers infected with a bloodborne pathogen, but the Centers for Disease Control and Prevention (CDC) has identified four dialysis workers among health care workers occupationally infected with human immunodeficiency virus (HIV). While there are safety devices on the market to address the types of high-risk exposures that dialysis workers experience, dialysis facilities have been significantly behind acute-care facilities in adopting this technology.

Percutaneous Injuries in Dialysis Settings (cont.)

To understand more about percutaneous injuries in dialysis settings, we looked at six years of data (1993-1998) from the EPINet network, with 84 hospitals contributing data. During this period, there were 119 sharp-object injuries sustained by health care workers in dialysis settings.

Figure 1, showing the job categories of injured dialysis workers, indicates that nurses sustained the majority of injuries (58%). Not only do nurses in dialysis facilities sustain more injuries than any other workers in that setting, they also have a higher rate of injury compared to nurses overall. At the American Nephrology Nurses Association's annual symposium, the International Health Care Worker Safety Center presented data showing that the percutaneous injury (PI) rate for dialysis nurses was more than twice that for all other types of nurses: .39 PI/yr. for dialysis nurses compared to .17 PI/yr. for all other nurses.[1]

The second highest job category was technicians (23%). Of this group, about one-third identified themselves specifically as dialysis technicians (some of the others may also have been dialysis techs, but did not label themselves as such). Jobs in the "other" category (9%) included renal therapist, respiratory therapist, lab specialist, certified nurse assistant, medical student, and attendant.

Figure 2 shows the devices causing injuries in dialysis facilities. Syringes were responsible for the largest number of injuries (46%); of these, only about one-fourth (or 13% of injuries overall) involved syringes used for blood-drawing, which would be considered "high-risk" for blood-borne pathogen transmission. (High-risk injuries are those involving blood-filled

Figure 1. Job Category of Injured Dialysis Workers

84 hospitals, 1993-1998, 119 cases

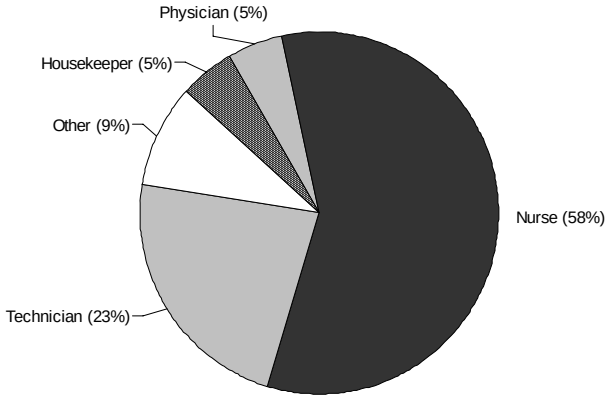

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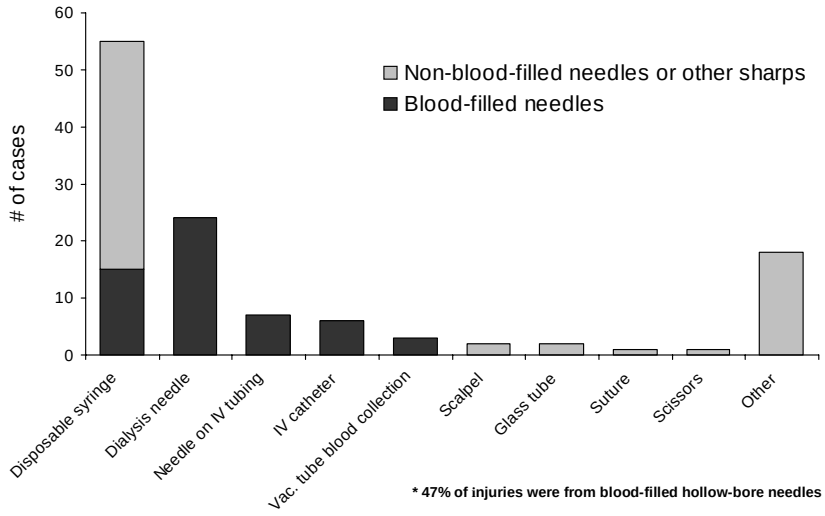
Figure 2. Devices Causing Injuries in Dialysis Facilities*

84 hospitals, 1993-1998, 119 cases



*** 47% of injuries were from blood-filled hollow-bore needles**

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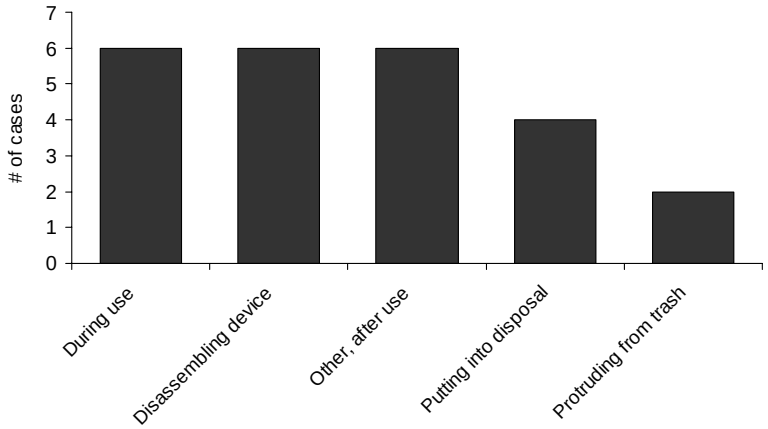
Figure 3. How Injuries Occurred with Dialysis Fistula Needles

84 hospitals, 1993-1998, 24 cases



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Percutaneous Injuries in Dialysis Settings (cont.)

needles.) Dialysis fistula needles caused the most high-risk injuries (20%); of these, none involved a safety-engineered device. Fistula needles are large bore (typically 14- and 15-gauge), so percutaneous injuries from these needles involve a larger inoculum of blood—and a greater risk of bloodborne pathogen transmission—than smaller-gauge needles. Other blood-filled, hollow-bore devices causing dialysis injuries were needles on I.V. tubing (6%), I.V. catheters (5%), and vacuum tube blood collection needles (3%). The "other" category (15%) included injuries from medication ampules and unattached hypodermic needles.

Data from the EPINet network indicate that across all health care settings, 23% of percutaneous injuries involve blood-filled, hollow-bore needles and thus are in the high-risk category. This fraction is much higher for the dialysis setting. Overall, 47% of percutaneous injuries to dialysis workers were from blood-filled, hollow-bore needles. This means that when a dialysis worker sustains a needlestick injury, it is twice as likely to involve a blood-filled needle as injuries sustained by other health care workers.

Figure 3 shows how injuries occurred with dialysis fistula needles. Injuries were equally divided between three categories: "during use" (25%), which includes cannulation with the fistula needle; "disassembling device" (25%), which includes removal of the fistula needle; and "other, after use" (25%). Disposing of fistula needles accounted for 17% of injuries. Injuries in the "disassembling device" category were 21% higher for fistula needles compared to other sharps in the dialysis setting. Removing fistula needles and disassembling dialysis sets can be particularly hazardous because the health care worker is often trying to apply pressure to the access site to stem bleeding while simultaneously handling the needle. Another unique characteristic of the dialysis setting is that two fistula needles are used when establishing access for dialysis—one for arterial and one for venous access. The two-needle procedure means increased risk of needlestick.

Although this report does not include data on blood splashes, spraying and other mucocutaneous exposures to blood and body fluids in the dialysis setting, this is clearly an additional serious risk that dialysis workers face, as documented in other studies.[2] Mucocutaneous blood exposures typically occur while applying pressure to puncture sites to stem bleeding, which can result in blood sprays, as well as during emergency interventions or from inadvertent breaks in blood circuits. Dialysis workers must be provided with, and trained to use consistently, barrier garments that prevent blood contact (not cotton lab coats), and eye protection, such as face shields and goggles, that prevents blood dripping into the eyes.

In conclusion, EPINet data show that there is a serious and urgent need to implement safety-engineered sharp devices in the dialysis setting, particularly for high-risk devices such as fistula and blood-drawing needles, in order to reduce dialysis workers' exposure risk. Fistula needles that provide a protective shield to cover the sharp after use and during disassembly and disposal have the potential for preventing as many as 75% of injuries from this device. Blood drawing from dialysis lines should be carried out with needleless equipment.

Many dialysis facilities operate independently, outside the sphere of major health care institutions, and have been slower to adopt safety devices. Clearly, however, with the passage of the federal Needlestick Safety and Prevention Act in November 2000, the time has come to accelerate the transition to safety devices and intensify efforts to provide the best protective equipment for health care workers in the dialysis setting. ❐

References

1. Jagger J, Bentley M. Occupational blood exposures among renal dialysis workers. Poster presentation at 30th National Symposium of the American Nephrology Nurses' Association. Baltimore, MD: April 1999.

2. Petrosillo N, Puro V, Jagger J, Ippolito G and the Italian Multicenter Study on Nosocomial and Occupational Risk of Infections in Dialysis. The risks of occupational exposure and infection by human immunodeficiency virus, hepatitis B virus, and hepatitis C virus in the dialysis setting. *Am J Infect Control*. 1995;23:278-85.