

# How to Prevent *Needlestick Injuries:*

## Answers to Some Important Questions



# Introduction

As an employer of health care workers, you want and need to provide a safe and healthful workplace for your employees. In 1991, OSHA published the Bloodborne Pathogens Standard, *Title 29 Code of Federal Regulations, Part 1910.1030*, to protect workers from exposures to bloodborne illnesses. Because needlestick injuries are a major cause of these exposures in the health care setting, it is important to recognize that there are work practices and engineering controls to help reduce these exposures and injuries. This brochure looks at the issue of safer needle devices and how they can help employers like you create a safer workplace to protect your workers.

## Why Do I Need to Worry About Needlesticks?

If you're an employer of health care workers who are potentially exposed to blood and contaminated needles, you should know that there are an estimated 800,000 needlesticks each year in the U.S. About 2 percent, or 16,000, of these are likely to be contaminated with the Human Immunodeficiency Virus (HIV). Needlestick injuries account for up to 80 percent of accidental exposures to blood. Nurses in hospitals are the most frequently injured.

## When Might My Employees Be Injured By a Needlestick?

Needlestick injuries may occur when employees dispose of needles, collect and dispose of materials used during patient care procedures, administer injections, draw blood, or handle trash or dirty linens where needles have been inappropriately discarded.

## Isn't There Just a Small Chance of Such an Injury?

Needlestick injuries may occur when employees dispose of needles, collect and dispose of materials used during patient care procedures, administer injections, draw blood, or handle trash or dirty linens where needles have been inappropriately discarded.

Data from 63 hospitals show that the overall rate of such injuries is 27 per 100 occupied beds annually. Nurses had the most frequent exposures (49.7 percent); physicians ranked second (12.6 percent); nursing assistants accounted for 5.3 percent, and housekeepers, 5.1 percent.<sup>1</sup> Hollow-bore needles are the cause of injury in 68.5 percent of all cases.

## What Can Happen from a Needlestick?

More than 20 pathogens have been reportedly transmitted from needlesticks.<sup>2</sup> The most serious are the transmission of Hepatitis C (HCV), Hepatitis B (HBV), and HIV. In fact, the risk of acquiring HBV or HCV from a contaminated needlestick is greater than for HIV.

## Why Is the Risk Greater from Hepatitis B and C Than from HIV?

The risk of acquiring an infection has to do with the prevalence of these diseases in the patient population at large. For example, an estimated 1.25 million people in the U.S. are chronically infected with HBV and 6,000 die each year from HBV-related liver disease. HCV also is a major cause of chronic liver disease worldwide. In 1997, there were an estimated 4 million people in the U.S. infected with HCV.<sup>3</sup> As many as 85 percent of all HCV-infected persons develop chronic hepatitis and are at increased risk for cirrhosis and primary hepatocellular carcinoma.<sup>4</sup> Liver failure from Hepatitis C is the leading reason for liver transplants in the U.S.

## So, Do I Still Need to Worry About HIV Exposures for Employees?

Yes. The total number of occupationally acquired HIV infections in health care workers continues to increase each year. Of the 52 such cases documented during 1996, 45 were from needlesticks or cuts.<sup>5</sup>

## How Can I Protect Employees Against Potential Exposures?

Make sure that employees use universal precautions, engineering and work practice controls, and personal protective equipment to reduce their exposure to bloodborne pathogens, as required by OSHA's Bloodborne Pathogens Standard.<sup>6</sup>

<sup>1</sup> G. Ippolito; V. Puro; N. Petrosillo; G. Pugliese; B. Wispelwey; P.M. Tereskers; N. Bentley; and J. Jagger, *Prevention, Management & Chemoprophylaxis of Occupational Exposure to HIV* (Charlottesville, VA: Advances in Exposure Prevention, International Health Care Worker Safety Center, 1997).

<sup>2</sup> L.A. Chiarello, Deborah Nagin, and Franklin Laufer, *Pilot Study of Needlestick Prevention Devices*, Report to the Legislature, New York State Department of Health, March 1992, p.16.

<sup>3</sup> U.S. Department of Health and Human Services, National Institutes of Health, *Consensus Development Statement: Management of Hepatitis C*. Available online at [odp.od.nih.gov/consensus/statements/cdc/105/105\\_stmt.html](http://odp.od.nih.gov/consensus/statements/cdc/105/105_stmt.html).1997.

<sup>4</sup> Centers for Disease Control and Prevention, *HIV/AIDS Surveillance Report* 88(2), 1996.

<sup>5</sup> Centers for Disease Control and Prevention, Division of HIV/AIDS Prevention, National Center for HIV, STD, and TB Prevention, *HIV/AIDS Surveillance Report* 8(2): Atlanta, GA 1996.

<sup>6</sup> *Title 29 Code of Federal Regulations*, Part 1910.1030.



## Can't Needles Penetrate Most Personal Protective Equipment?

You're correct. Most personal protective equipment can be easily penetrated by needles. Most needlestick injuries, however, result from unsafe

needle devices rather than carelessness by health care workers. Safer needle devices have been shown to significantly reduce needlesticks and exposures to potentially fatal bloodborne illnesses.<sup>7</sup>

## What's a Safer Needle Device?

A safer needle device has built-in safety controls to reduce needlestick injuries before, during, or after use and to make needlesticks less likely.

## Will These Devices Prevent Needlestick Injuries?

Not all needlestick injuries are preventable, but the number can be reduced by using devices containing needles with built-in safety

features or other devices that eliminate the use of needles altogether. Using needleless IV connectors, self re-sheathing needles, or blunted surgical needles, for example, can help reduce the risk of injury. In fact, almost 83 percent of injuries from hollow bore needles are potentially preventable.<sup>8</sup>

## How Do These Devices Work?

In general, properly designed devices should (1) provide a barrier between the hands and the needle after use; (2) allow or require

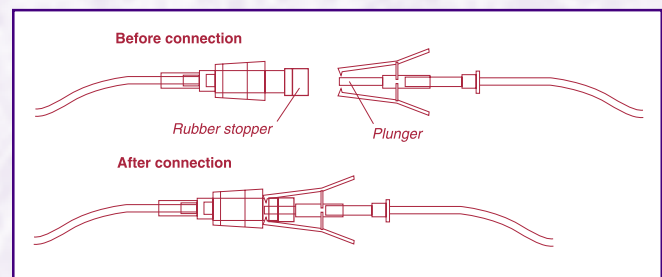
the worker's hands to remain behind the needle at all times; (3) have safety features integral to the device itself rather than as accessories; (4) be in effect before disassembly and remain in effect after disposal to protect downstream workers; (5) be simple and easy to operate, with little or no training; and (6) not interfere with the delivery of patient care.

## Are There Specific Safety Features I Need to Know About?

Yes, that would be helpful. For example, it is good to know whether the feature is active or passive or whether the engineering control is

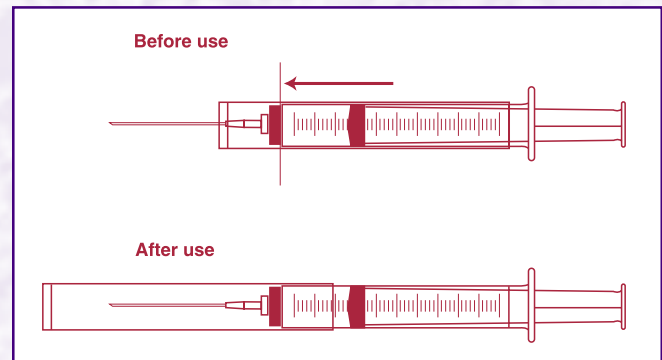
part of the device. Types of safety features include the following:

- **Passive safety features** remain in effect before, during, and after use; workers do not have to activate them. Passive features enhance the safety design and are more likely to have a greater impact on prevention. (See Figure 1.)
- **Active devices** require the worker to activate the safety mechanism. Failure to do so leaves the worker unprotected. Proper use by health care workers is the primary factor in the effectiveness of these devices. (See Figure 2.)
- An **integrated safety design** means that the safety feature is built in as an integral part of the device and cannot be removed. This design feature is usually preferred. (See Figure 1.)
- An **accessory safety device** is a safety feature that is external to the device and must be carried to, or be temporarily or permanently fixed to, the point of use. This design also is dependent on employee compliance, and according to some researchers, is less desirable.



**Figure 1. Needleless IV Connector**

These connectors use devices other than needles to connect one IV to another. Examples of needleless connectors include 3-way stopcocks and plunger-type systems. An example of the plunger-type system is shown here. These devices are passive and integral to the system.



**Figure 2. Self-Resheathing Needle**

Initially, the sleeve is located over the barrel of the syringe with the needle exposed for use. After the device is used, the user slides the sleeve forward over the needle where it locks in place and provides a guard around the used needle.

<sup>7</sup> Centers for Disease Control and Prevention, Division of HIV/AIDS Prevention, National Center for HIV, STD, and TB Prevention, *HIV/AIDS Surveillance Report*, 9(1): Atlanta, GA, 1997.

<sup>8</sup> Ippolito, et al, 1997.



## Does OSHA Require the Use of Specific Devices?

No. OSHA does not require employers to institute specific devices, but it does require that employers evaluate the effectiveness of existing controls and review the feasibility of instituting more advanced engineering controls. Further, OSHA's Bloodborne Pathogens Standard<sup>9</sup> requires that employers establish a written exposure control plan as well as engineering and work practice controls to eliminate or minimize employee exposure. Additionally, employers are required to provide post-exposure follow-up if an employee sustains a needle puncture and to record the injury on the OSHA 200 log in some cases.

## What Steps Do I Need to Take to Have a Comprehensive Prevention Program and to Implement Safer Needle Devices?

As an employer of health care workers, you have the flexibility to develop individual worksite-specific needlestick prevention programs to protect employees. Such a program would mean that you have a mechanism in place to select and evaluate safer medical devices in a systematic manner. In evaluating safer needlestick devices, ideally you should evaluate your workplace and base your choices for these types of products on the following:

- **The needs of the primary users.**
- **The need of the patients** who must continue to receive safe, efficient, and comfortable care. (Workers are likely to reject products that they think will interfere with patient care in any way.)

In addition, a comprehensive needlestick prevention program might include the following:

- Creating a multidisciplinary team to investigate and assess needlestick incidents.
- Defining prevention priorities on the basis of collection and analysis of an institution's injury data.
- Developing design and performance criteria for product selection according to needs for patient care and health care worker safety.
- Planning and implementing an evaluation of products in clinical settings.<sup>10</sup>

To evaluate and select appropriate safer needle devices, you also should review available needlestick injury data including the personnel involved, the devices used, and the circumstances and frequency of needlestick events. This information can help in determining how employees can maximally benefit from a product change to safer needle devices. Although not required by OSHA, the collection and evaluation of complete needlestick injury data are key to identifying injury patterns and then implementing an effective abatement plan. (See also, the sample "Safety Feature Evaluation Form," for help in determining the most appropriate device for your employees.)

**SAFETY FEATURE EVALUATION FORM**

**SAFETY SYRINGES**

SAMPLE

Number of times used: \_\_\_\_\_

Please circle the most appropriate answer for each question. Not applicable (N/A) may be used if the question does not apply to this particular product.

<b>During Use:</b>	yes.....no.....N/A
1. The safety feature can be activated using a one-handed technique.....	1 2 3 4 5 N/A
2. The safety feature <del>does</del> not obstruct vision of the tip of the sharp.....	1 2 3 4 5 N/A
3. Use of this product requires you to use the safety feature.....	1 2 3 4 5 N/A
4. This product <del>does</del> not require more time to use than a non-safety device.....	1 2 3 4 5 N/A
5. The safety feature works well with a wide variety of hand sizes.....	1 2 3 4 5 N/A
6. The device is easy to handle while wearing gloves.....	1 2 3 4 5 N/A
7. This device <del>does</del> not interfere with uses that do not require a needle.....	1 2 3 4 5 N/A
8. This device offers a good view of any aspirated fluid.....	1 2 3 4 5 N/A
9. This device will work with all required syringe and needle sizes.....	1 2 3 4 5 N/A
10. This device provides a better alternative to traditional recapping.....	1 2 3 4 5 N/A
<b>After Use:</b>	
11. There is a clear and unmistakable change (audible or visible) that occurs when the safety feature is activated.....	1 2 3 4 5 N/A
12. The safety feature operates reliably.....	1 2 3 4 5 N/A
13. The exposed sharp is permanently blunted or covered after use and prior to disposal.....	1 2 3 4 5 N/A
14. This device is no more difficult to process after use than non-safety devices.....	1 2 3 4 5 N/A
<b>Training:</b>	
15. The user <del>does</del> not need extensive training for correct operation.....	1 2 3 4 5 N/A
16. The design of the device suggests proper use.....	1 2 3 4 5 N/A
17. It is not easy to skip a critical step in proper use of the device.....	1 2 3 4 5 N/A

Of the above questions, which three are the most important to your safety when using this product?

Are there other questions which you feel should be asked regarding the safety/ utility of this product?

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<sup>9</sup> 29 CFR, Part 1910.1030, (c)(1)(ii)(B) and (d)(2)(i).

<sup>10</sup> L.A. Chiarello, "Selection of Safer Needle Devices: A Conceptual Framework for Approaching Product Evaluation," *Am J Infection Control* 23(6):386-395, 1995.



## How Can I Get More Information or Assistance on This Topic?

For OSHA assistance, you can contact the bloodborne pathogens coordinator in your nearest regional office listed elsewhere in this booklet. See also **Other Resources** listed in this brochure. OSHA also

provides other services and assistance, including:

- **Consultation Program**—This service is delivered by state government agencies or universities employing professional safety health and consultants. Primarily developed for smaller employers with more hazardous operations, comprehensive assistance includes an onsite appraisal of all work practices and environmental hazards and all aspects of the employer's present job safety and health program. Largely funded by OSHA, the service is provided at no cost to the employer and is available on request to employers who want help in establishing and maintaining a safe and healthful workplace.
- **Electronic Information—Internet:** OSHA standards, interpretations, directives, interactive software, compliance assistance materials, and additional information are available or can be ordered on the World Wide Web at [www.osha.gov](http://www.osha.gov). See in particular, *Safer Needle Devices: Protecting Health Care Workers*, under **Index**, *Needlestick Injuries*, and **News Room, Publications**, on the OSHA home page.

**CD-ROM:** includes directives, standards, interpretations, and other materials on CD. Available from the U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 or at (202) 512-1800. Specify *OSHA Regulations, Documents, and Technical Information on CD-ROM*, (ORDT), Order No. S/N729-013-00000-5; \$43 per year and \$15 per single copy. Issued quarterly.

- **Grants**—OSHA gives training and education grants to various non-profit groups to develop programs to help small businesses establish safety and health programs.
- **Mentoring**—OSHA's Voluntary Protection Programs (VPP) recognize worksites where employers and employees work together to achieve safety and health excellence. Small firms can be matched with and mentored by a VPP site that will share its safety and health

experience and expertise. For more information on VPP, contact your VPP coordinator in your nearest OSHA regional office.

- **Publications**—OSHA has many published materials, including specific topics for small businesses, that are available or ordered online at [www.osha.gov](http://www.osha.gov). Publications lists and single copies of various OSHA materials can be obtained by sending a self-addressed label to the OSHA Publications Office, P.O. Box 3753, Washington, DC 20013-7535, or by calling (202) 693-1888.

OSHA regulations are contained in *Title 29 of the Code of Federal Regulations*, Parts 1904 (Recordkeeping), 1910 (General Industry), 1911 through 1925 (Maritime), 1926 (Construction), and 1928 (Agriculture). All OSHA regulations are available or can be ordered online at [www.osha.gov](http://www.osha.gov). Printed copies of OSHA regulations are sold by the Government Printing Office and can be ordered online as indicated above.

- **Small Business Liaison**—OSHA's liaison is available to answer questions on small business issues at 202-693-2317.
- **State Plans**—Twenty-five states and territories operate their own federally approved occupational safety and health programs. The states conduct most OSHA enforcement through their own standards, which are at least as effective as Federal OSHA's, but may have different or additional requirements. Many states offer additional programs of assistance to small businesses. For more information on state plans, see the list of plans at the end of this brochure or visit **Outreach** on OSHA's Web site at [www.osha.gov](http://www.osha.gov).
- **Training and Education**—OSHA's Training Institute in Des Plaines, IL, and OSHA's Training Education Centers provide basic and advanced courses in safety and health. OSHA's area offices offer information services, such as audiovisual aids, technical advice, and speakers for special engagements. For more information, contact the Institute at 1555 Times Drive, Des Plaines, IL 60018, (847) 297-4810, or fax (874) 297-4874. A list of courses also can be found under **Outreach** on OSHA's Web site at [www.osha.gov](http://www.osha.gov).

**Emergencies**—For life-threatening situations only, call (800) 321-OSHA. Complaints will go immediately to the nearest OSHA area or state office for help.



# Other Resources

**American Hospital Association—AHA report,** December 1996, *Implementing Safer Needle Devices* (Item No. 196310). Call (800) AHA-2626 to order copies.

**American Nurses Association—ANA position papers** on safer needle devices. Call (202) 652- 7130.

**EPINet Program—**Includes manuals and software, data collection tools, and tracking and reporting systems for surveillance of bloodborne exposures, tracking device specific injuries, and evaluating the efficacy of safer needle devices. Call EPINet Program (800) 528-9803.

**The Service Employees International Union's (SEIU) Guide to Preventing Needlestick Injuries—**Includes a listing of safer needle devices, checklist for compliance with OSHA's bloodborne pathogen standard, safe device feature evaluation checklist, and guide for post-needlestick exposure followup. To order, send a check for \$5.00 (pre-paid orders only) to the SEIU Mailroom, 1313 L St., NW Washington, DC 20005.

# Other Websites

CDC AIDS Clearinghouse - [www.cdcnac.org](http://www.cdcnac.org)  
EPINet - [www.med.virginia.edu/~epinet](http://www.med.virginia.edu/~epinet)  
CDC Hepatitis Branch - [www.cdc.gov/ncidod/diseases/hepatitis/hepatitis.htm](http://www.cdc.gov/ncidod/diseases/hepatitis/hepatitis.htm)

**OSHA Regional Offices -** For more information, contact the bloodborne pathogens coordinator at the nearest OSHA Regional Office.

**Region I**  
(CT,\* MA, ME, NH, RI, VT\*)  
JKF Federal Building  
Room E-340  
Boston, MA 02203  
Telephone: (617) 565-9830

**Region II**  
(NJ, NY,\* PR,\* VI\*)  
201 Varick Street  
Room 670  
New York, NY 10014  
Telephone: (212) 337-2378

**Region III**  
(DC, DE, MD,\* PA, VA,\* WV)  
Gateway Building, Suite 2100  
3535 Market Street  
Philadelphia, PA 19104  
Telephone: (215) 596-1201

**Region IV**  
(AL, FL, GA, KY,\* MS, NC,\* SC,\* TN\*)  
Atlanta Federal Center  
61 Forsyth Street, SW, Room 6T50  
Atlanta, GA 30303  
Telephone: (404) 562-2300

**Region V**  
(IL, IN,\* MI,\* MN,\* OH, WI)  
230 South Dearborn Street  
Room 3244  
Chicago, IL 60604  
Telephone: (312) 353-2220

**Region VI**  
(AR, LA, NM,\* OK, TX)  
525 Griffin Street  
Room 602  
Dallas, TX 75202  
Telephone: (214) 767-4731

**Region VII**  
(IA,\* KS, MO, NE)  
City Center Square  
1100 Main Street, Suite 800  
Kansas City, MO 64105  
Telephone: (816) 426-5861

**Region VIII**  
(CO, MT, ND, SD, UT,\* WY\*)  
1999 Broadway, Suite 1690  
Denver, CO 80202-5716  
Telephone: (303) 844-1600

**Region IX**  
(American Samoa, AZ,\* CA,\* Guam, HI,\* NV,\* Trust Territories of the Pacific)  
71 Stevenson Street  
Suite 420  
San Francisco, CA 94105

**Region X**  
(AK,\* ID, OR,\* WA\*)  
1111 Third Avenue  
Suite 715  
Seattle, WA 98101-3212  
Telephone: (206) 553-5930

\*These states and territories operate their own OSHA-approved job safety and health programs (Connecticut and New York plans cover public employees only). States with approved programs must have a standard that is identical to, or at least as effective as, the federal standard.



**U.S. Department of Labor**  
Occupational Safety and Health Administration  
OSHA 3161

The following is the most recent copy of the Sample “Safety Feature Evaluation Form,” developed by the Training for Development of Innovative Control Technology Project (TDICT), Trauma Foundation, San Francisco General Hospital, 1001 Potrero Avenue, Building 1, Room 300, San Francisco, CA 94110. OSHA has permission to reprint this form in both traditional and electronic publishing formats. Since the form is copyrighted, however, extensive use of the form by others may require additional permission from the copyright holders. Other evaluation forms for different devices also are available from TDICT.

# GUIDELINES FOR THE USE OF SAFETY FEATURE EVALUATION SHEETS

SAMPLE

## **Coordinators:**

Determine which products are to be evaluated and provide at least four or more test samples for each individual evaluating the product. (Each evaluator should have enough samples to disassemble and examine the design thoroughly.)

Set up a testing station for each type of device which allows testers to evaluate products in a simulated patient procedure. Provide training dummies (injection pads, oranges, etc.) as necessary.

Provide visual instructions and demonstrate proper use of each device.

Review the instructions and rating system with each evaluator.

Encourage each evaluator to comment on the sheets and prioritize the questions at the end of the evaluation. This will provide a useful decision making tool and will help alert you to specific areas of concern which may not have been covered by the questionnaire.

## **Evaluators:**

Re-enact all steps of intended or possible procedures performed with the device being tested.

Attempt to misuse the device and circumvent or disable the safety feature.

Answer each question, including the short answer section at the end. If you do not understand a question, please write comments directly on the sheets.

**NOTE:** Certain assumptions have been made in the development of these forms based on information about currently available products. We recognize the likelihood that the ideal product may not exist.



# SAFETY FEATURE EVALUATION FORM

## SAFETY SYRINGES

SAMPLE

Number of times used:

Please **circle** the most appropriate answer for each question. Not applicable (N/A) may be used if the question does not apply to this particular product.

### During Use:

agree.....disagree

1. The safety feature can be activated using a one-handed technique.....1 2 3 4 5 N/A
2. The safety feature **does not** obstruct vision of the tip of the sharp.....1 2 3 4 5 N/A
3. Use of this product requires you to use the safety feature.....1 2 3 4 5 N/A
4. This product does not require more time to use than a non-safety device...1 2 3 4 5 N/A
5. The safety feature works well with a wide variety of hand sizes.....1 2 3 4 5 N/A
6. The device is easy to handle while wearing gloves.....1 2 3 4 5 N/A
7. This device **does not** interfere with uses that do not require a needle.....1 2 3 4 5 N/A
8. This device offers a good view of any aspirated fluid.....1 2 3 4 5 N/A
9. This device will work with all required syringe and needle sizes.....1 2 3 4 5 N/A
10. This device provides a better alternative to traditional recapping.....1 2 3 4 5 N/A

### After Use:

11. There is a clear and unmistakeable change (audible or visible) that occurs  
when the safety feature is activated.....1 2 3 4 5 N/A
12. The safety feature operates reliably.....1 2 3 4 5 N/A
13. The exposed sharp is permanently blunted or covered after use and prior to  
disposal.....1 2 3 4 5 N/A.
14. This device is no more difficult to process after use than non-safety  
devices.....1 2 3 4 5 N/A

### Training:

15. The user **does not** need extensive training for correct operation.....1 2 3 4 5 N/A
16. The design of the device suggests proper use.....1 2 3 4 5 N/A
17. It is **not** easy to skip a crucial step in proper use of the device.....1 2 3 4 5 N/A

Of the above questions, which three are the most important to **your** safety when using this product?

Are there other questions which you feel should be asked regarding the safety/ utility of this product?