

Feature

Indirect Costs of Bloodborne Pathogen Exposures

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Bloodborne pathogen exposures and needlestick injuries are a common occurrence in many healthcare facilities. The risks associated with injury and illness--and the emotional impact on the injured worker, family, coworkers and supervisors--have prompted the development of comprehensive programs or referral options throughout the United States. Programs that manage these exposures are generally time-consuming and labor-intensive, and require the expertise of the clinicians and administrators involved. Also, it is clear that there are a number of defined and hidden costs associated with these comprehensive programs. This article reviews some of the expenses related to delivery of care, and explores some of the indirect costs.

The occupational health community has a long-standing history of recommending prevention of injuries and illness as a key component in the care of workers. Elements include the recognition of a risk (e.g., needlestick injuries), the frequency of risk occurrences, and the availability of risk-reduction strategies. These strategies, which take financial and personal resources, include:

Department and employee education

Engineering controls: eg, needleless IV access devices, puncture-resistant sharps disposal containers, and other equipment designs that limit the worker's likelihood of direct contact with specimens

Work-practice controls, which often also incorporate an engineering control--e.g., the use of recapping devices that are stable and readily available, so that, when necessary, workers can recap a needle with only one hand

Administrative controls: e.g., evaluating shift duration to limit fatigue, and reasonable accommodation for injured workers

Personal protective equipment and the education required in its use.

In its Bloodborne Pathogens Standard (pages 64039-64040), the Occupational Safety and Health Administration (OSHA) estimates that, nationally, compliance with this Standard costs over \$460 million per year just for personal protective equipment and training. It also estimates that the engineering and work-practice controls cost almost \$98 million per year. These figures do not include the costs of hepatitis B vaccine, postexposure follow-up, exposure control plans, record-keeping, or housekeeping issues related to the Standard.

In our experience, and that of professional colleagues, postexposure care can conservatively cost from \$800 to \$3,000 in the follow-up of one injured worker. Aside from the usual direct clinical costs associated with the care of injured workers, there is immediate **loss of productivity** on the day of the injury and on subsequent days. It is not uncommon for productivity to be jeopardized by frequent visits for follow-up care and by worker's being distracted; the worker is now concerned about his/her own health and that of his/her family. Further, supervisors are responsible for documenting, and perhaps investigating, the circumstances of the injury--and these activities detract from daily tasks. Coworkers must assume the duties of the injured worker while he/she seeks first aid and follow-up care. Additionally, coworkers who are aware that there has been an injury frequently become involved in the circumstances of that exposure. Several hours of productive work time are likely lost by coworkers as they discuss the event and support the injured colleague.

According to the OSHA Bloodborne Pathogens Standard, postexposure follow-up for a needlestick injury or exposure is generally conducted at baseline, six weeks, and three and six months. Some agencies

also offer a 12-month follow-up visit. The use of zidovudine (formerly called azidothymidine [AZT]) in investigational protocols prolongs the clinical management time and extends the follow-up by at least four or five visits. It is not uncommon for these visits to occur during work hours, obviously interfering with the department's productivity.

Regardless of whether the human immunodeficiency virus (HIV) status of the source is known at the time of the injury, there are always concerns. One concern is that the result may not be accurate, or that the source may be in the HIV antibody-negative "window period," having sustained a recent exposure that has not had time to be manifested as a seroconversion. Unfortunately, we cannot with absolute certainty assure workers that there is no risk. Many workers, when provided with education and assessment of their individual exposure, are able to come to terms with that exposure, thereby reducing the **emotional consequences**. However, even in the best of circumstances, workers are distracted and become preoccupied with "What if...?" questions. This focus on the injury may be shared by other family members, particularly a sexual partner. Their sexual behavior and level of intimacy may be altered by the use of condoms, spermicides, delay of pregnancy, and change in specific sexual practices.

A Hypothetical Situation

It is well recognized that home concerns and work issues are not independent, and that a bloodborne pathogen exposure may affect both spheres. The following scenario, in which the names are fictitious, but the events are real, illustrates many aspects of the effects upon productivity and anxiety levels for affected workers.

Technologist "John Anderson" is covering the clinical laboratory for a community hospital on the Saturday night shift. "Lillian M," a known HIV-positive patient, is admitted to the emergency department (ED) in acute respiratory distress. John is called to the ED to pick up blood gases for Ms. M and to run STAT testing. While picking up the samples from the counter, he is stuck by a used uncapped needle attached to a cartridge syringe. He asks the nurse what the syringe had been used for and is told that it had been used to inject a pain medication through the port on Ms. M's IV line, which is located two feet above the IV insertion site. The nurse apologizes that the needle/syringe had been left on the counter, but states that she put it down to discard later, as she couldn't reach the sharps-disposal container during the emergency. "Besides," she says, "don't worry about it. The needle was upstream in the IV line, and there was no blood contact."

John goes back to the lab, washes the wound, and feels increased anxiety, palpitations, and considerable anger toward the nurse. He returns to the ED where he consults the ED physician regarding the needlestick. The ED physician provides the same assessment as the nurse, stating that it was a low-risk situation, and tells him there is not much to worry about. He tells John he can have further follow-up through the Post Exposure Program (PEP) offered by the Employee Health Office, which he can contact on Monday morning. During the remainder of the night shift, John feels anxious and distracted. He is barely able to complete his tasks, and is visibly shaken when he reports off to "Larry," the day-shift technician, at 7:00 a.m. on Sunday. He relates his experiences to Larry, and they discuss the situation for about half an hour before John leaves.

On Monday morning, John visits the PEP clinician and vents his feelings about the event. After the first visit, he says that he feels much relieved. However, over the next few days he frequently calls the PEP for clarification and to list a series of concerns. He focuses on small changes in bowel habits, skin nevi, faint rash, hair loss, and his perception that his skin texture is changing. Although he admits to sleep disturbances and to distancing himself sexually from his wife, he flatly denies that any of his responses are anxiety related. He also states that he has canceled negotiations for a new car and plans for a family vacation.

Over the next few weeks, John continues to need reassurance that his physical findings are not HIV-related. He refuses to see his family doctor to evaluate other causes. When asked about family support, he relates that his wife is getting "sick of hearing about his worry," and that he had better "do something about it."

Two weeks after the injury, the laboratory supervisor calls the PEP clinician, asking for assistance on how best to help John. He says that John is walking around the department saying that he "knows he has AIDS," is using profanity, has periods of outbursts and anger, and has walked out of the lab on more than one occasion to take the rest of the day off sick. This absenteeism puts a hardship on the lab, as they must call someone to come in early for the next shift. When the PEP clinician tells John of the supervisor's concerns, John denies these actions, but agrees to see the Employee Assistance counselor for one visit. He continues to vehemently reject referral for psychiatric evaluation. The PEP clinician's physician associate is asked to intervene, and ultimately sees John and his wife for several visits.

As expected, John did not become HIV-infected, and his anxiety gradually diminished. Conservatively, John's care required about 15 hours of **professional time** in the first two months following the injury, and an additional 10 hours over the following year. In this case, none of this time was compensated by workers' compensation (WC), as this hospital's WC policy compensated only for illness resulting from injury (e.g., HIV infection resulting from a needlestick). Routine postexposure care without resultant illness was the financial responsibility of the hospital. Although there was clearly a psychiatric crisis, John did not want others to know of his emotional circumstances and refused to file a claim with WC that would have facilitated a psychiatric referral.

This is but one example of the many hidden costs associated with bloodborne pathogen exposures that affect the productivity of many professionals. Clearly, the anxiety potential is great and had impact on the employee, coworkers, ED nurse, clinicians involved, and John's loved ones. It is difficult to put an economic value on these circumstances.

In the Event of Exposure

But what if John had sustained a puncture injury from the *blood gas needle* and *had developed HIV infection* as a result? How would the scenario presented above be different? Clearly, there is significant risk from a hollow-bore needle containing blood from an HIV-positive patient. John would probably have been offered zidovudine by the ED physician, and follow-up at the Employee Health Office would have included counseling and monitoring both for zidovudine side effects and for early signs/symptoms of HIV infection. Once HIV infection was established, workers' compensation would pay for subsequent medical costs. As John became too ill to work, WC would pay some salary support; however, WC does not pay for **pain and suffering**, and is not a source for other significant financial benefits. Litigation options for workers covered by WC are limited, as it is a "no-fault" system. However, John's exploration of possible **litigation options, the hospital's assessment of this potential, involvement by the hospital's risk-management team, and administrative concerns** are additional hidden costs.

Workers' compensation options differ from state to state and from facility to facility, but there are general minimum requirements for all employers. Most employees are not familiar with the details of WC, and when injured may find themselves in a complex maze of regulations and requirements, which adds to their anxiety.

Healthcare facilities are aware of the need to provide a safe work environment for their employees, and have developed strategies to do so. The financial ramifications of **health and safety programs** include many direct costs and even more indirect--or hidden--costs. Additionally, in this era of specialization, employees with the same specialty working in different facilities frequently know each other and discuss internal facility issues. Different facilities' approaches to health and safety, and their responses to exposure concerns, become well known in the community. These factors can clearly affect the **retention of qualified workers** and the cost of **recruitment and replacement**.

Summary

Each bloodborne pathogen exposure present unique set of circumstances that require careful, confidential, compassionate care by several qualified professionals. Facilities that do not take these responsibilities seriously jeopardize their employees and themselves. Conservatively estimated, and in our experience, the direct costs of care are only about a quarter of the hidden costs of exposure: **loss of**

productivity, employee education, workers' compensation premiums, absenteeism, recruitment, and retention.

Many institutions provide regular health and safety updates to staff, including how to access postexposure care. Supervisors may consider inviting the facility's workers' compensation expert to provide a program about WC benefits. It is clear that healthcare worker safety is a team effort worthy of continuous attention by the facility's leaders and employees alike.

Editorial Commentary

Jean M. Slockbow er, PhD
Editor

The risk of occupational exposure to bloodborne pathogens is a major concern to all of us in healthcare delivery. The majority of healthcare workers' exposures to blood are through needlesticks or other sharp instrument injuries. It is essential, therefore, that we all work together to achieve a safer work environment--through shared information, education, strict adherence to proper techniques and infection control guidelines, and better protective technology. This issue of **LAB NOTES** is devoted entirely to safety-related articles, covering topics as varied as economics, regulations, preventive measures, product evaluation techniques, and exposure tracking. **LAB NOTES'** mission is to help you, our readers, make today's healthcare workplace safer.

In Control

Special Section: Practical Information Concerning Efforts to Understand and Control Infectious Disease

EPINet--Networking for Safety

No man, or woman, is an island - nor is the healthcare community. And because life-threatening infectious diseases may be transmitted by percutaneous injury, it is important for hospitals and other healthcare institutions to communicate their safety data to each other. This shared information can help to identify common areas of concern and can reduce duplication of effort in addressing these problems.

EPINet™* (Exposure Prevention Information Network), one such vehicle for gathering and sharing information, is a computer-based system that tracks incidences of reported sharps injuries and exposures to blood or body fluids. A product of six years of epidemiological research, EPINet was developed in 1991 by Janine Jagger, PhD, MPH, Associate Professor of Neurosurgery and Director of the International Health Care Worker Safety Research and Resource Center at the University of Virginia at Charlottesville. Since it became generally available in September 1992, EPINet has grown to include approximately 1,200 U.S. hospitals. It is also the national tracking system for Italy, Canada, and Australia.

An important aspect of the EPINet system is that it has been designed to identify the types of devices causing percutaneous exposures. This information is necessary for device-specific risk assessments, product evaluations, and clinical trials of "safety" devices (i.e., those designed to prevent needlestick or other sharps injuries).

How EPINet Works

In the event of a percutaneous injury, the healthcare worker fills out a simple, one-page incident report form. Included on this form are questions on what type of device was involved in the injury and where in the hospital the incident occurred. This form is turned in to the hospital's employee health department, where the information is entered into a database using EPINet software. As reports are filed, the hospital continues to build a database. Seventy hospitals now participate in the data-sharing network. Each of the hospitals sends a disk of all reported injuries to the Health Care Worker Safety Center at quarterly intervals, to be merged with data from other participating hospitals. The Center then provides reports on the merged database. In this way, participating hospitals have statistics specific to their own institutions and data that show how they compare to other hospitals.

EPINet provides a powerful and comprehensive tool for collecting, analyzing, and reporting risk-related data. It identifies which personnel are injured by job classification, what device was involved in the injury, where the injury occurred (e.g., patient's room, emergency department), and what procedure was being performed at the time of the injury. EPINet is the first system available to monitor needlesticks and to evaluate the effectiveness of interventions to prevent needlesticks.

The Health Care Worker Safety Center has recently started a bimonthly publication, *Advances in Exposure Prevention*, designed to disseminate information collected from the 70-hospital EPINet data-sharing network. Each issue of *AEP* includes an "EPINet Report," an extensive research article based on EPINet data and focusing on some aspect of bloodborne pathogen exposures in the healthcare setting. Recent issues have included articles on blood drawing, blood and body fluid exposures to skin and mucous membranes, and suture needle and scalpel blade injuries. For information on how to subscribe, contact the Health Care Worker Safety Center as shown at the end of this article.

According to the CDC...

"Needlestick injuries account for 80% of reported occupational HIV exposures which could lead to AIDS."

- Emergency Care Research Institute (ECRI).

Needlestick-prevention devices. *Health Devices*. 1991; 20: 154-180.

EPINet in Use

Florida's North Broward Hospital District (NBHD) has been using EPINet in its four hospitals since September 1992, making it one of the first facilities to begin using this system. Recently, *LAB NOTES* spoke with Marc Gomez, MPH, CIH, CSP, Director of Safety and Occupational Health at NBHD, and his assistant, Janet Narushko, regarding their use of EPINet.

The hospital district, covering the northern two-thirds of Broward County, serves a population of two thirds to three quarters of a million people. It comprises four hospitals/medical centers and 20 satellite facilities, which include primary care and large physician practices. The hospitals range in size from 200 to 800 beds, and in type from inner-city to suburban specialty facilities.

Each of the four hospitals has an employee health department, where staff members report a needlestick or other blood exposure, complete an EPINet form, and receive treatment and counseling. According to Gomez and Narushko, at first employees were hesitant to fill out the form, feeling that they would be accused of poor work habits, but the employees now regard it as an important practice. This form is then entered into the EPINet system, and a disk is sent quarterly to the Health Care Worker Safety Center at the University of Virginia, where EPINet was developed.

NBHD has kept statistics on needlesticks since 1987--five years before they started using EPINet. As seen in the following graph, during the 1988/89 fiscal year (July-June), the needlestick frequency rate (NFR) was 7.8, meaning 7.8 needlesticks per 100 full-time equivalent (FTE) employees (e.g., two half-time employees = one FTE). Then in September 1992--when EPINet was instituted--the NFR dropped to 4.9. And at the end of fiscal year 1993/94, the NFR dropped to 3.5. This represents an approximately 55% reduction in needlesticks in a five-year period.

In an effort to reduce the incidence of needlesticks *before using EPINet*, NBHD implemented two changes: the use of protected needles, and placement of sharps disposal containers closer to point-of-use areas. *After EPINet was instituted*, the data identified that many needlesticks were occurring to healthcare workers performing fingersticks on infants, who often cry and squirm. As a solution, NBHD began using a retractable lancet. After analyzing the latest data, NBHD has decided to switch to a needleless IV system throughout the hospital, which is currently in progress.

EPINet has identified the operating room as another area of potential risk of sharps injuries--in the passing of suture needles and scalpels from scrub nurses to physicians and back again. In response, NBHD is evaluating the concept of a "hands-free neutral zone." As Gomez explains this, instead of passing an instrument directly to another staff member, the first person places it on a tray for the second to pick up.

Cost is an important consideration when deciding on the appropriate risk-reduction device. NBHD is a tax-assisted facility that provides care to the indigent population--a population that is growing due to increasing numbers of patients who do not have health insurance. Also, tightened budgets make it difficult to justify the higher costs of new needlestick-prevention devices. Therefore, NBHD conducts clinical trials in which a safety product is tested, for example, at one nursing unit at each of the hospitals for a week or a month, depending on the device being piloted. Employee acceptance is tracked. Then after numerous devices are tested, a decision is made based on cost and effectiveness.

As Gomez summarizes, "EPINet is really a simple system. It allows you to track where your problems are and track your successes -- and that's what you need, in order to justify the potential added expenditure for some safety devices."

If you would like more information on EPINet, or if you would like to subscribe to AEP, contact:

International Health Care Worker Safety Research and Resource Center
Box 407, Health Sciences Center
University of Virginia
Charlottesville, VA 22908
Phone: 804-924-5159
Fax: 804-982-0821
epinet@virginia.edu

*EPINet is a trademark of the University of Virginia

How to Evaluate Safety

The following is a 10-point procedure to keep in mind when evaluating safety products to determine which ones are most appropriate for your institution.

1. **Form a task force** -- a multidisciplinary team, ranging from initial purchaser of device to end user in a variety of hospital locations. The task force will then proceed with points 2 through 10.
2. **Gather, evaluate, and analyze data** -- a database management software package for tracking injury records, such as the EPINet® program (see "IN CONTROL" section for related article), can be helpful.
3. **Check resources** -- there are a variety of well-known documents and guidelines available regarding safety devices.
4. **Look for existing clinical studies or abstracts on products to be evaluated** -- representatives of the task force should check recent journals in their respective areas of expertise for the latest information on safety products.
5. **Before product evaluation, ask the seller, manufacturer, or distributor representative for a copy of product specifics** -- this identifies the product's features, benefits and user instructions.
6. **Be patient** -- conscientious decision-making takes time. After a product is chosen for evaluation, users will experience a learning curve that will add time to the process. Even though it is a time-consuming process, it will serve the facility well to evaluate only one device at a time; This allows manufacturer to design improvements as decisions are being made.
7. **Establish trial areas with controls** -- choose two or three areas of the healthcare institution for trial of the new product, and match those with two or three similar areas that will continue to use traditional products.
8. **Evaluate the device for reduction of the exact type of injury the device claims to prevent** -- don't analyze overall injury-reduction data, which may include data on injury-prevention programs and the use of sharps containers. Look for data pertaining to the specific type of injury the safety device is designed to prevent.
9. **Have healthcare workers evaluate the product** -- employees' perception of how well the device prevents injuries is important. Surveys should be quantifiable, objective, and concise. Include questions on how the product is used, such as:
 - Does it utilize a passive safety design?
 - Does it require a change in behavior?
 - Can it be used in a variety of applications?
10. **Determine if injuries are due to the device being used incorrectly** -- if the device was used incorrectly, investigate why. If a barrier to effective use exists, check whether this barrier can be overcome in the implementation phase. If it can't, send it back to the manufacturer and select another device. If the problem is a device failure, again, send it back and refocus the task force on another choice.

Adapted, with permission, from *Infect Control Hosp Epidemiol* (1993;14[11]:659-660), © 1993, SLACK Incorporated.

OSHA Compliance Update

OSHA Bloodborne Pathogens Standard: Compliance Update

By Diane O. Fleming, PhD, President, Mid-Atlantic Biological Safety Association; Faculty, Johns Hopkins University, School of Hygiene and Public Health, Environmental Health Engineering; and Independent Biosafety Consultant

The OSHA Bloodborne Pathogens Standard (29 CFR 1910.1030) applies to all occupational exposure to blood or other potentially infectious materials (OPIM) as defined by OSHA (Occupational Safety and Health Administration). Employees covered by this Standard are those who are potentially exposed to blood or OPIM during the course of their work. This "at-risk" group tends to include, but is not limited to:

- Healthcare providers
- Emergency-response personnel
- Firefighters
- Security guards
- Blood bank phlebotomists
- Pathologists
- Embalmers
- Personnel who work with clinical specimens in the laboratory or in clinical trials
- Personnel who work with etiologic agents of bloodborne diseases.

How To Implement Compliance?

Each employer should determine whether employees have actual or potential exposure to blood or OPIM by evaluating their routine and nonroutine tasks and procedures, without regard to the use of personal protective equipment and clothing. All employees are then identified as to risk category, with records being kept to document how the exposure determinations were done and who is considered at-risk. A written description of the exposure determination and the schedule and methods to be used to reduce the risk are then compiled into the required Exposure Control Plan (ECP).

Universal Precautions--a system of infection prevention that utilizes engineering controls, personal protective equipment, and safe work practices--are a key element in exposure control to protect employees from exposure to, and disease from, bloodborne pathogens. Barrier devices and precautions play an important role in this system.

The employer should ensure a clean and sanitary worksite, with proper cleaning and disinfection of environmental and work surfaces after contact with blood or OPIM. There also are certain hazard-communication requirements, which include labels and signs. All infectious wastes are placed in leakproof containers or bags that can be identified from other wastes by labels or color-codes, and sharps are to be discarded into puncture-resistant, leakproof containers. Etiologic agents require special labels for transport and special warning signs on doors to areas-of-use. Federal, state, and local regulations regarding these materials must also be met.

Information should be given to the healthcare provider to indicate those employees who were identified during the exposure determination at-risk. They are to be offered hepatitis B vaccination free of cost. A confidential medical evaluation and a follow-up report of occupational exposure to blood or OPIM, counseling, testing, and expected treatment are to be described in the ECP and made known to employees in advance of any exposure.

Mandatory, annual training programs are to include:

- An explanation of the Standard

- Information on the epidemiology of the human immunodeficiency virus (HIV), hepatitis B virus (HBV) and other bloodborne diseases, to include modes of transmission
- Methods for recognizing tasks with the potential for exposure
- The use and limitations of the Universal Precautions engineering controls, personal protective equipment, and work practices used to reduce the risk of exposure
- Information on the location, decontamination methods, and disposal of personal protective equipment and clothing
- Emergency procedures following a spill or exposure
- An explanation of any signs, labels, or color-codes used.

Inspection Results

Since December 6, 1991, when the OSHA Bloodborne Pathogens Standard (29 CFR 1910.1030) became effective, OSHA inspectors have been monitoring compliance by performing on-site inspections of healthcare facilities.

The inspectors have been trained to look for the required elements of this Standard and are actively citing violations. They are issued enforcement procedure documents from the Office of Health Compliance Assistance, which provide even more detail on the nuances of the required elements. Data obtained from OSHA* show that for a 12-month period last year (1/94-12/94), there were 3,313 total violations of 29 CFR 1910.1030, which resulted in \$2,059,416 in penalties. Of these violations, 2,419 were listed as serious, with a total of \$2,020,848 in fines.

In looking at the recent compliance with this Standard, as shown in the table on page 5, the most frequently cited sections in a 12-month period (10/93-9/94) involved failure to comply with required elements of housekeeping, engineering and work-practice controls, and personal protective equipment.

Conclusion

Since healthcare facilities know what is required of them and are being checked for compliance, let's each be sure that we are doing our part by complying with the required elements that relate to our jobs, including active participation in the annual retraining for protection from bloodborne pathogens.

Sections of the OSHA Bloodborne Pathogens Standard Most Frequently Cited in Cases of Noncompliance

Section Number	Number of Violations	Area Violated
C01	9	Exposure Control Plan (ECP)
C02	5	Elements of ECP
D01	1	Methods of compliance; Universal Precautions
D02	19	Engineering and work practice controls
D03	15	Personal protective equipment
D04	22	Housekeeping
E01	1	HIV and HBV research labs production facilities
E02	3	Work practice criteria

E04	1	Production facility criteria
F01	8	Hepatitis B vaccination and postexposure follow-up
F02	5	Hepatitis B vaccination made available
F03	9	Postexposure evaluation and follow-up
F04	6	Information provided to healthcare professional
F05	6	Healthcare professional's written opinion
G01		Communication of hazards to employees
	4	- labels
	4	- signs

*OSHA's department of data management service provided computer print-outs of audits of industries in which violations were found. These audits are one of the many health and safety standards used for checking compliance.

Hepatitis B Vaccination: Protection? Or Not?

Hepatitis B, one of the most serious forms of hepatitis, can be transmitted through infected blood and blood products. Healthcare workers, laboratory technicians, and others who may routinely come into contact with these materials are at risk of acquiring the hepatitis B virus (HBV). The CDC (Centers for Disease Control and Prevention) estimates that 8,700 healthcare workers become infected with HBV each year. Of that number, about 200 will die, and others will become carriers.¹

In accordance with the Occupational Safety and Health Administration's (OSHA) Bloodborne Pathogens Standard, employers will make available the hepatitis B vaccine, at no cost, to all employees who have occupational exposure. The vaccination program was put into effect because this virus is so easily transmitted and has such serious consequences. According to the American Liver Foundation, HBV is much more infectious than the human immunodeficiency virus (HIV). There can be 500 million HBV particles in one teaspoon of a carrier's blood, compared to five to 10 HIV particles of the causative agent of acquired immunodeficiency syndrome (AIDS).²

Did you know...?

"Although the fear of contracting AIDS has overshadowed the concern about acquiring...HBV through an accidental needlestick, the risk of acquiring--and dying from--HBV is actually much greater."

- Emergency Care Research Institute (ECRI). Needlestick-prevention devices. *Health Devices*. 1991; 20: 154-180.

Many healthcare workers already have been vaccinated for HBV, following the three-step dosing schedule recommended by the manufacturers of either the plasma-derived or recombinant DNA hepatitis B vaccines. Results of a 1992 American Hospital Association survey of 150 hospitals indicated greater employee acceptance of the hepatitis B vaccine *after* the OSHA Standard went into effect.³ Reasons for this acceptance include the OSHA-required inservice training and greater employee awareness of HBV as an important pathogen.

However, several studies have now shown that there is a need for postvaccination testing for antibodies (anti-HBs) to the hepatitis B surface antigen (HBsAg), to ensure immune protection.^{4,5} Two areas of concern are nonresponsiveness to the vaccination in a small number of people and controversy over how long postvaccination immune status is maintained.

Nonresponsiveness

In a study conducted at the Southwest Region Blood Services of the American Red Cross in Tulsa, Oklahoma,⁴ 30 out of 244 surveyed employees (12%) had not seroconverted, which was comparable to a 1993 study of Connecticut public safety personnel. Other studies have shown nonseroconversion rates of zero, 5%, and <10%.^{4,5} Incorrect administration of the vaccine may have been part of the problem in the 12% nonseroconversion rate; the doses may have been administered subcutaneously rather than *intramuscularly in the deltoid muscle* as recommended by the vaccine manufacturers.

Postvaccination Immunity

The length of retention of immune status following hepatitis B vaccination is uncertain. Originally, it was thought that once immune status was achieved, one was protected for life from developing clinical hepatitis. The Advisory Committee on Immunization Practices (ACIP), for example, does not recommend booster doses following routine hepatitis B vaccination.³ However, some researchers now recommend boosters when antibodies to HBsAg drop below 10 IU/L.⁶ To ensure full protection, the Southwest Region Blood Services developed a routine postvaccination testing program to detect nonseroconversion, plus a recheck of employees' anti-HBs levels in two to seven years following seroconversion. According to the

1992 survey,³ 50% of the hospitals conduct routine postvaccination serologic testing for anti-HBs on all employees and 15% routinely administer hepatitis B vaccine booster doses to all employees every three, five or seven years.

Hepatitis B is a serious health threat. Determining hepatitis B vaccination policies under the OSHA Standard is complex. Are you protected?

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More on Safety

The following are suggested readings on safety-related issues. These titles are just a sampling of the many informative selections that are in general circulation.

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Becton Dickinson Vacutainer Systems New Products News

As the world's leading manufacturer of sharps products, Becton Dickinson VACUTAINER Systems is committed to helping make today's healthcare workplace safer. Developing products that set new safety standards is a large part of that commitment, but an equally important factor is promoting correct and conscientious use of those laboratory products. As a step toward accomplishing this goal, the **Vacutainer Safety InstituteSM** is being established.

The Vacutainer Safety Institute's mission is to help our customers prevent healthcare-worker injuries associated with specimen collection and handling, and the serious human and economic costs that result. The Institute will accomplish this goal by becoming a significant *resource* for safety information, education, and training programs; serving as a *forum* for discussion and resolution of safety-related issues; and providing a *platform* for launching new and practical safety products and solutions.

Programs that will be available through the Vacutainer Safety Institute, listed by category, include:

- **Education**-Job Safety Analysis, phlebotomy training, safety seminars and mailings, and training videos.
- **Information**-Safety database, reprint service, article searches, speakers bureau, safety conferences, library of government regulations, and glossary of regulatory terms.
- **Innovation**-The Institute will serve as a continuing forum in which customers share their experiences and suggestions.

Look to this column in future issues of *LAB NOTES* for updates on the Vacutainer Safety Institute. The Vacutainer Safety InstituteSM is funded by a grant in aid from Becton Dickinson Vacutainer Systems.