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DOUGLAS COUNTY HOSPITAL
ALEXANDRIA, MINNESOTA**

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I. SUMMARY

On August 13, 1991, a request for a Health Hazard Evaluation was received from the Administrator of Douglas Hospital in Alexandria, Minnesota, to evaluate the effectiveness of procedures and personal protective equipment used at the hospital to minimize exposures to bloodborne diseases. In response to this request, representatives from the National Institute for Occupational Safety and Health (NIOSH) conducted a site visit on November 18-21, 1991.

NIOSH investigators reviewed policies and procedures, conducted a walk-through survey of several areas of the hospital, distributed questionnaires to 262 employees (277 employees with direct patient contact were present on the days of the survey), and conducted medical interviews with seven employees who had previously reported needlestick exposures.

The hospital's written policies were in compliance with the Centers for Disease Control recommendations for control of bloodborne diseases and the Occupational Safety and Health Administration's "Occupational Exposure to Bloodborne Pathogens" standard. However, in several areas of the hospital the NIOSH investigators noted awkward locations of some containers for the disposal of needles and other sharp objects. There was also a lack of splash-protective equipment in the obstetrics area.

Results of the questionnaire indicated that during 1990 and 1991 (up to November 23), 90 employees incurred 170 exposures (99.2% response rate to question). Only 58 exposures were reported to the hospital during the same period. Forty-two percent of the respondents reported that they were NOT able to follow universal precautions without difficulty (98.1% response rate). Of the individuals that were not able to follow universal precautions, the two most frequently stated reasons were not enough time (59.3%) and interference by protective equipment such as gloves (38.0%).

Nearly all employees understood that gloves should be worn for touching blood and body fluids of all patients, and nearly all employees (92% or more), with the exception of phlebotomists and laboratory personnel, believed that gloves should always be worn for blood draws. Nearly all employees believed that gloves should always be used for IV starts. With the exception of housekeeping personnel, most of the staff correctly believed that needles must never be recapped. However, many employees did not believe that masks, gowns, and goggles should be used whenever the spraying of blood-tainted fluids was remotely possible. Furthermore, most of the

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staff did not correctly know the risks of acquiring an infection with the hepatitis B virus (HBV) or the human immunodeficiency virus (HIV) following a needle stick injury.

The seven interviewed employees reported a total of ten exposure incidents. The most frequently reported exposures (five reports) occurred during administration of a parenteral medication to a patient, or while inserting an intravenous catheter in the patient. Exposures occurred when the worker was accidentally stuck by the needle while picking the device up from the table in order to dispose of it, often because the device slipped or rolled on the table while it was being picked up. The second most commonly reported exposure scenario (three reports) occurred during administration of medications by intravenous piggyback (IVPB) or during disposal of used IVPB sets.

Percutaneous exposures were still occurring at the time of the NIOSH visit, and often under remarkably similar circumstances. The results of the survey suggests that the hospital's system for reporting percutaneous exposures probably underestimates the true incidence of these exposures; such underreporting has been noted in investigations in other hospitals. Additionally, this investigation suggests that the reasons for noncompliance with universal precautions in this small hospital serving local and rural populations are very much like those documented in other studies in large urban medical centers.

While many changes have been made at the hospital to reduce the chance of exposure to bloodborne pathogens, exposures to patients' blood continue to pose a potential health hazard for some workers at the hospital. Sixty-six percent of needlestick exposures reported in this investigation were not reported to the hospital. To further reduce the potential for bloodborne pathogen exposure, recommendations to improve educational programs, implement engineering controls, and improve procedures can be found in Section VIII of this report.

KEYWORDS: SIC 8062 (General Medical and Surgical Hospitals), hepatitis B, HBV, human immunodeficiency virus, HIV, bloodborne virus, bloodborne pathogens, infection control, needlestick injury, mucous membrane exposure, universal precautions.

II. INTRODUCTION

On August 13, 1991, a management request was received from the Administrator of Douglas Hospital in Alexandria, Minnesota, to evaluate the effectiveness of procedures and personal protective equipment used at the hospital to minimize exposures to bloodborne viral infections. In response to this request, NIOSH representatives conducted a site visit on November 18-21, 1991. The goals of the NIOSH investigation were to provide suggestions regarding personal protective equipment and engineering controls, education and training of employees, the hospital's surveillance system, and policies and procedures.

Douglas Hospital is a general medical and surgical hospital licensed for 127 beds, with an average daily census of approximately 50 inpatients. The hospital serves the city of Alexandria (1980 population: 7608) and surrounding rural areas.

According to hospital management, the number of reported employee exposures to blood from patients has increased in recent years. It was not clear to management whether the increase was due to improved reporting or a true increase in exposures. Twenty-four exposures were reported in 1989, thirty-five were reported in 1990, and twenty-three exposures (17 exposures to sharp objects, 6 splashes) were reported for 1991 at the time of the NIOSH visit in November. At the time of the NIOSH visit, management believed that nearly all exposures were being reported to the Employee Health Department.

The hospital's written policies for prevention of bloodborne diseases were consistent with CDC recommendations and the OSHA Bloodborne pathogen standard (the latter was not in effect at the time of the NIOSH evaluation).^{1,2} All employees who are potentially "exposed" to bloodborne pathogens (including nursing staff, laboratory, physical therapy, respiratory therapy, housekeeping, and home health care providers) receive a mandatory 4-hour inservice training program that is specifically tailored to their job category. An "exposure" was defined as an injury resulting from a sharp instrument that was contaminated with blood or body fluids or an open skin or mucous membrane contamination with blood or body fluids. As of November 1991, the training was required once per year. However, there were no training policies for the staff physicians since they were not hospital employees.

At the time of the NIOSH visit, hospital management was considering engineering controls (needleless systems, needles with safety shields or sheaths) to reduced injuries. Puncture-resistant containers (called "sharps containers") for the disposal of used needles, scalpel blades, and other sharp objects were already in use, as were goggles, Aseptex 1800® surgical masks, and latex gloves. The ON-Gard Recapper®, a device intended to prevent needle sticks when recapping, was being used in the Day

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Surgery Wing (ASU); when a parenteral medication was drawn-up in a syringe, the syringe was recapped using the device. The recapped syringe would then be carried to the patient in another room.

Hepatitis B vaccine was available at no charge to employees who were potentially exposed to bloodborne pathogens. Medical examinations are conducted following a potential exposure to bloodborne pathogens. A "fact sheet" on bloodborne pathogens is given to the exposed employee to read. The hospital's policy required that any exposure be recorded on incident forms (includes name, occupation, date, time, and circumstances of exposure) and on OSHA 200 logs. These documents appeared to be completed as specified in the hospital policies.

III. BACKGROUND

More than 5.6 million workers in health care and related occupations are at risk of exposure to bloodborne pathogens, such as human immunodeficiency virus (HIV) and hepatitis B (HBV), and other potentially infectious materials. Approximately 3 million out of the 5.6 million work in hospitals, physicians' offices, and government clinics.³

Hepatitis B The Centers for Disease Control (CDC) estimated the total number of HBV infections in the United States to be 300,000 per year, with approximately 75,000 (25%) of infected persons developing acute hepatitis. Of these infected individuals, 18,000 to 30,000 (6% - 10%) will become HBV carriers, at risk of developing chronic liver disease (chronic active hepatitis, cirrhosis, and primary liver cancer), and infectious to others.¹

CDC has estimated that 12,000 health care workers (HCWs) whose jobs entail exposure to blood become infected with HBV each year, that 500-600 of them are hospitalized as a result of that infection, and that 700-1200 of those infected become HBV carriers. Of the infected workers, approximately 250 will die (12-15 from fulminant hepatitis, 170-200 from cirrhosis, and 40-50 from liver cancer). Studies indicate that 10%-30% of health-care or dental workers show serologic evidence of past or present HBV infection.¹

Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) Of the known AIDS cases in the United States, as of March 31, 1992, 8,088 had been employed in health care. These cases represented 4.8% of the 168,647 AIDS cases reported to the CDC for whom occupational information was known (information on employment in the health care setting was missing for 45,962 reported AIDS cases). The type of job is known for 7,682 (95%) of the 8,088 reported health care workers with AIDS: 227 dental workers, 841 physicians,

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56 surgeons, 1,745 nurses, 1,448 health aides, 151 paramedics, 1,140 technicians, and 421 therapists. The remainder are maintenance workers, administrative staff, etc. Ninety-four percent of the health care workers with AIDS reported nonoccupational risks for HIV infection; 6% were classified as having an undeterminate risk (most of these were still being investigated as of June 1992).⁴

CDC is aware of 31 HCWs in the U.S. who have been documented as having seroconverted to HIV following occupational exposures, including 6 who have developed AIDS. These are cases of "documented" occupational transmission because the worker was known (on the basis of HIV testing) to be HIV seronegative before or at the time of exposure. The seroconverters include 12 laboratory workers (11 of whom were clinical laboratory workers), 12 nurses, 4 physicians, 1 respiratory therapist, 1 health aide, and 1 housekeeper. Twenty-six workers had percutaneous exposures, 4 had mucocutaneous exposures, and 1 had both. Of these exposures, 29 were to HIV infected blood, 1 to an unspecified fluid, and 1 to concentrated virus in a laboratory.⁵

In addition to the 31 cases described above, CDC is aware of 65 health care workers with possible occupationally acquired AIDS or HIV infection. These are cases where the individuals affected had been the subject of investigations which did not identify other behavioral (such as intravenous drug abuse) or transfusion risks of acquiring the infection. These individuals reported percutaneous exposures or mucocutaneous exposures. However, these workers were not tested and shown to be HIV seronegative before or at the time of their exposures, so their infections are considered to be cases of "possible" rather than "documented" occupational transmission.⁵

IV. EVALUATION CRITERIA

CDC has developed guidelines to reduce the potential for transmission of HBV and HIV to health-care workers and public-safety workers.¹ The central strategy, referred to as "universal precautions," stresses that all patients should be assumed to be infectious for HIV and other bloodborne pathogens. In health care settings, "universal precautions" should be followed when workers are exposed to blood, certain other body fluids (amniotic fluid, pericardial fluid, semen, vaginal secretions, etc.), or any body fluid visibly contaminated with blood. Since neither HIV and nor HBV transmission has been documented from exposure to other body fluids (feces, nasal secretions, sputum, sweat, tears, urine, vomitus), "universal precautions" do not apply to these fluids if they are not bloody. Universal precautions do not apply to saliva, except in the dental setting, where saliva is likely to be contaminated with blood.

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Many of the CDC guidelines for prevention of transmission of HIV and HBV have been adapted into the OSHA standard.² OSHA's regulation on bloodborne pathogens, 29 CFR 1910.1030, was published on December 6, 1991 and took effect as of March 6, 1992. The OSHA standard covers employees who may be occupationally exposed to blood and other potential infectious materials, which includes but is not limited to, physicians, nurses, phlebotomist, emergency medical personnel, operating room personnel, therapists, orderlies, laundry workers, and other health care workers.³

Determining occupational exposure and instituting control methods and work practices appropriate for specific job assignments are key requirements of the standard. The following outline highlights the requirements of the standard.

1. The Written Exposure Control Plan
 - ! Identification of job classifications where there is exposure to blood or other potentially infectious materials.
 - ! Identification of protective measures currently in effect in the facility.
 - ! Establishment of procedures for evaluating the circumstances of an exposure incident.

2. Communicating Hazards to Employees
 - ! Implementation of training programs.
 - ! Training includes information on bloodborne pathogens, OSHA regulations, and the employer's exposure control plan.

3. Preventive Measures
 - ! Hepatitis B Vaccination within 10 working days of initial assignment at no cost to employee.
 - ! Application of the "universal precautions" approach (treat all human blood and other potentially infectious materials as if they were infectious with HBV and HIV).

4. Methods of Control
 - ! Engineering controls- use puncture-resistant, leak-proof containers (color coded red or labeled) to discard or transport sharps and potentially infectious materials.
 - ! Work practice controls that reduce the likelihood of exposure by altering the manner in which the task is performed.

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5. Personal Protective Equipment

- ! Used to reduce workers' risk of exposure.
- ! Includes gloves, face shields, face masks, protective clothing.

6. Procedures When an Exposure Occurs

- ! Employee must be directed to health care professional.
- ! Medical evaluations and follow-up at no cost to individual.

7. Recordkeeping

- ! A medical record must be established for each employee with occupational exposure (confidential and separate from other personnel records).
- ! Records of training are to be kept for 3 years.

V. METHODS

NIOSH investigators conducted a walk-through survey of areas in the hospital where workers would be expected to have the highest potential for exposures to bloodborne pathogens. These areas included the Operating Room, Radiology, Central Supply, Housekeeping/Laundry, General Medical Wards, Physical Therapy, Laboratory, and Respiratory Therapy. The location and placement of the sharps containers were noted. Where possible, the types of procedures were reviewed (especially those involving sharp instruments). Seven employees with previously reported needlestick exposures were privately interviewed by the NIOSH medical officer.

A questionnaire (reproduced in Appendix A) was distributed to all hospital employees on all three workshifts. The questionnaire focused on the following areas: education and training, reasons for not adhering to the universal precautions policy, reasons for not reporting an exposure, and numbers of exposures (as defined in the questionnaire).

VI. RESULTS AND DISCUSSION

WALK-THROUGH SURVEY

In several areas of the hospital (obstetrics, day surgery), sharps disposal containers were located on the inside of the cupboard door under the sink. The location of the containers forced employees to walk across the room, open the door with the syringe

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and needle in hand, and stoop down to dispose of the syringe and needle. Each step in the process of disposing the syringe and needle potentially increased the chance of an injury. Splash-protective equipment did not appear to be available.

On the Medical Ward, the sharps disposal container was kept inside a small storage cabinet located outside the patient room door. In order to dispose of a used syringe and needle, the employee was required to open the room door (toward him- or herself) and leave the room while holding the syringe and needle, open the cabinet door, and dispose of the syringe. On the Surgical Ward, the sharps containers were located inside the patient's room near the door.

During a "Code" (emergency resuscitation) in the Emergency (ER) area, one person on the Code team distributes the necessary personal protective equipment to the rest of the team. During a Code, the needles and syringes, scalpels, sutures, and other sharps are placed into a basin on the cart which carries the resuscitation equipment and drugs. After the Code is completed, the contents of the basin are transferred into sharps disposal containers. Although the NIOSH investigators did not observe a "Code" at Douglas Hospital, the nature of these activities resulted in a substantial risk of blood exposures.

MEDICAL INTERVIEWS

Seven employees with previously reported needlestick exposures were privately interviewed by the NIOSH medical officer. In order to protect the confidentiality of each interviewee, the information they reported is presented here in a generalized form.

These employees reported a total 10 exposure incidents. The most frequent reported exposures (5 reports) occurred during administration of a parenteral medication to a patient, or while inserting an intravenous catheter in the patient. In these incidents, the employee laid the used syringe or catheter stylet on the bedside table while repositioning the patient or applying a dressing. The exposure occurred when the worker was accidentally stuck by the needle while picking the device up from the table in order to dispose of it, often because the device slipped or rolled on the table while it was being picked up.

The second most commonly reported exposure scenario (3 reports) occurred during administration of medications by intravenous piggyback (IVPB) or during disposal of used IVPB sets. The employees reported being stuck by a needle dangling from a used IVPB set still hanging on the IV pole, during insertion of the IVPB needle into

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an injection port, or while carrying the used IVPB system for disposal. The remaining incidents involved exposures during administration of a parenteral medication or during cleanup following an invasive procedure.

The employees interviewed generally reported that they were satisfied with the hospital's response after their exposure. Some employees reported difficulty in obtaining appropriate post-exposure medications or counseling, but these reports were in the minority.

QUESTIONNAIRE RESULTS

On November 20-21, 1991, a questionnaire was distributed and collected from 262 employees; 277 employees with direct patient contact were working on these days. The respondents also included employees who were not working on those two days but had returned to the hospital on November 21 to pick up a paycheck. Grouped by job, the respondents were 40.8% registered nurses, 13.4% licensed practical nurses, 10.3% laboratory personnel and phlebotomists, 8.8% housekeeping, 5.3% radiology technicians, 5.3% nursing assistants and student nurses, and 16% other.

Exposure incidents Of the respondents, 260 (99.2%) answered the question about exposure to blood or blood products (question 16). The analysis indicated that during 1990 and 1991 (up to November 23, 1991), 90 of those 260 employees incurred 170 exposures. In contrast, hospital records indicate that 58 exposures were reported to the hospital during the same period.

Respondents were not asked how long they had worked at Douglas Hospital in 1990 and 1991, but assuming all 260 employees who answered the question had worked there the entire period, this would represent 170 exposures during 498 person-years of work, or 0.34 exposures per person-year. Some of the respondents may have begun working during the study period or taken leave for part of the study period, and thus would not have been at risk of incurring an exposure the entire time. It is therefore possible that this figure underestimates the true number of exposures per person-year. When tested in linear regression models or by analysis of variance, the number of exposures was not significantly related to respondent gender ($p=0.74$), job group ($p=0.79$), years of experience ($p=0.18$), or workshift ($p=0.19$).

The exposure incidence can be compared with those described in other published reports. In one study of housestaff physicians (medical students and resident physicians), 159 exposures were incurred in 221 person-years (0.72 exposures per person-year) among housestaff on a medical ward, and 213 exposures in 166 person-years (1.28 exposures per person-year) among housestaff in operating rooms.⁶ In

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another survey of housestaff, 58 needlestick exposures were incurred in 86 person-years (0.67 exposures per person-year).⁷ These comparisons should be made with care, as recall failure and underreporting may have resulted in underestimation of the true number of percutaneous exposures in these reports, as well as in our survey at Douglas Hospital. In addition, the populations surveyed in these reports were medical students and physicians in training programs; there were no physicians in the survey group at Douglas Hospital. The differences in job tasks and training in these populations may result in different risks of exposure, with ensuing differences in exposure incidences.

Seventy Douglas Hospital employees indicated that their exposures (during 1990 and 1991) were from contaminated needles or scalpels (Question 17). Fifty-four employees said that they reported a total of 65 exposures of all kinds to Employee Health at the hospital; this is greater than the total of 58 exposures which employee health records indicated had been reported. Fifty-two employees said they reported fewer exposures than they actually incurred; of these, 29 said that they did not report any of their exposures (seven employees did not answer the question about number of exposures reported). Some people may have misunderstood Question 18. It may not have been clear whether "these exposures" in Question 18 refer to those in Question 16 or those in Question 17.

Respondents were asked to choose one or more reasons from a list of potential reasons for not reporting an exposure. Of the 52 employees who under-reported their exposures, 38 (73%) gave at least one reason for not reporting. The most frequently stated reasons were: not perceived as a health risk (29 respondents, 56% of those who indicated unreported needlesticks), concern about occupational discrimination (4 respondents, 8%), and concern about confidentiality (3 respondents, 6%). Fewer than 2 (4%) of the respondents selected other choices (i.e. insufficient time, employee health not open, too embarrassed, too angry, too depressed, too frustrated, did not know reporting procedure, would rather not know HIV serology, or too fearful). Eight respondents (15 percent) indicated unspecified "other reasons" for not reporting an exposure. The order given for these reasons differs from that seen in other investigations. In one investigation the most frequent reason for not reporting a needlestick was insufficient time (32% of unreported exposures), and the next most frequent was that the exposure was not perceived as a health risk (26%).⁷

Adherence to Universal Precautions One hundred eight (42%) of the respondents reported that they were not always able to completely follow universal precautions without difficulty (98.1% response rate). Among the 108 individuals who were not able to follow universal precautions without difficulty, the most frequently stated reasons were as follows: not enough time (59.3%), interference by protective equipment such as gloves (38.0%), protective materials not always immediately

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available (17.6%), less likely to use universal precautions if patient appears to be at lower risk for hepatitis B or HIV infection (16.7%), and forgetting to use universal precautions (13.9%). Only 3.7% of the respondents indicated that they did not know when they should take precautions.

These results are comparable to those found in studies in other centers. In an investigation conducted in the emergency room of an East Coast university inner-city facility in an inner-city setting, the most common reasons given for not adhering to universal precautions were lack of time to don protective materials (47% of respondents) and interference in skillful performance of procedures (33%).^{8,9} A similar study was conducted in the emergency department of a university-affiliated medical center in a major midwestern city. The reasons most commonly given for non-compliance in that study were not enough time (67.8% of respondents), reduced dexterity (60.7%), and impression that some patients "appear to be at lower risk for HBV or HIV" (48.2%).¹⁰ Our investigation suggests that, as in large urban hospitals, the lack of time to use universal precautions and concerns about interference with skillful performance are the two most frequent reasons for noncompliance in small rural hospitals.

Hepatitis B Immunization 79.9% of the staff reported that they had received the Hepatitis B vaccine (98.9% response rate for the question).

Assessment of Knowledge Questions 5 through 10, 14, and 15 were intended to assess the level of knowledge regarding universal precautions and the risks of HBV and HIV infection following an exposure. The results of these questions can be found in Table 1. Nearly all employees (98% overall) understood that washing hands after wearing gloves for patient care is always necessary (Question #5). Similarly, nearly all employees understood that gloves should be worn for touching blood and body fluids of all patients (Question #7), and nearly all employees (92% or more) believed that gloves should always be worn for IV starts (Question #8). Similarly, most employees correctly believed that gloves should always be worn for blood draws (92% overall, 63% for phlebotomists & laboratory workers - Question #9). With the exception of housekeeping personnel, the staff generally believed that needles must never be recapped. Most of the staff did not believe that masks, gowns, and goggles should be used whenever the spraying of blood-tainted fluids is remotely possible (Question #6). Although respondents may have been confused by the use of the word "remotely," CDC guidelines do not define a likelihood below which universal precautions are unnecessary. In addition, most of the staff did not correctly know the risks of acquiring HBV or HIV following a needle stick injury (Questions 14 and 15). Lack of knowledge of universal precautions and the risks of infection, as determined

by the number of questions answered incorrectly, did not significantly predict the number of needlestick exposures reported by the respondent ($p=0.24$ by linear regression).

VII. CONCLUSIONS

Douglas Hospital has implemented written policies and procedures that are designed to reduce sharps injuries, and has provided employees with devices such as puncture-resistant containers and the ON-Gard Recapper®. However, several concerns remain. Most importantly, percutaneous exposures were still occurring at the time of the NIOSH visit, and often occurred under remarkably similar circumstances. In addition, our survey suggests that the hospital's system for monitoring percutaneous exposures probably underestimates the true incidence of these exposures; such underreporting also occurs in other hospitals.⁷ The reasons most commonly given for underreporting differ from those reported in major urban centers. Finally, this investigation suggests that the reasons for noncompliance with universal precautions in this small hospital serving local and rural populations are very much like those in large urban medical centers.

VIII. RECOMMENDATIONS

1. At the present time, there are more than eighty Food and Drug Administration (FDA)-approved medical devices that employ risk-reduction technology for bloodborne infections.¹¹ These devices should be evaluated and implemented by Douglas Hospital on a case-by-case basis, depending on the specific needs of the hospital. Such evaluations could be conducted by a safety committee with representatives of the different groups who will use the devices (nurses, physicians, housekeepers, therapists, laboratory technicians, etc), as well as infection control staff and management representatives. The following are some general recommendations which should be considered when evaluating a new needlestick prevention device.
 - ! Consider whether the needlestick prevention device provides protection from contaminated needles after use.
 - ! Assess whether continuous user training is needed to use the device.
 - ! Determine whether the device requires activation. An ideal needlestick prevention device should not require activation.
 - ! Assess the needlestick prevention device compatibility with existing devices.

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- ! Clinically evaluate each needlestick prevention device to determine its effectiveness and utility.

The acceptability and willingness of the staff to use a new device will depend on the amount of time it takes to become comfortable with a device, ease or difficulty of use, and the effect on basic technique. It has been suggested that up to 88% of percutaneous injuries could be eliminated by implementation of risk-reduction technologies.¹²

2. The hospital should, wherever possible, change to the use of intravenous medication connector (IVPB) systems which reduce the risk of needlestick injuries. Since the time of the NIOSH visit, the Food and Drug Administration has published a Safety Alert which recommends the use of needleless systems or systems with needles recessed in safety sheaths.¹³ Hypodermic needles should only be used when there is a medically-required need to penetrate the skin or other tissue.
3. Sharps containers should not be located in awkward locations (i.e. on the inside of a cabinet door under the sink) because these locations force employees to make several unnecessary movements while holding the syringe. Locating the sharps disposal container outside the patient room also increases the possibility of injury due to unnecessary movements and manipulations while holding the needle and opening the door. A system should be developed which allows the worker to dispose of the used device as soon as possible after use, preferably without the need to put the device down and later pick it up again.

Sharps containers should be selected according to their design for ease of use and minimized potential for needlesticks. Dr. June Fisher and a team at San Francisco General Hospital have developed evaluation criteria for the selection of appropriate sharps containers.¹⁴ To prevent children and others from putting their hands into the containers, the hospital should consider using sharps containers that have guards which prevent hands or fingers from entering the containers.

4. Given that 20.1% of the survey respondents had not received the Hepatitis B vaccine, the hospital should make certain that the vaccination series has been received by all employees who wish to be vaccinated. In addition, it may be useful to conduct additional training to assure that those who initially refused vaccination are informed of the substantial benefits and minimal risks of the vaccination.¹⁵

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5. In the labor and delivery area, provisions for face shields or other appropriate eye protection should be implemented.
6. Training programs should stress the importance of reporting all sharps injuries. Increased emphasis on the hazards of sharps injuries, the procedures used to report injuries, and the benefits of reporting injuries to the employee may increase reporting. The hospital should in turn make certain that the most current information regarding health risks after exposure and the most current recommended post-exposure treatments are immediately available to workers on all workshifts.¹⁶ Training programs should also provide sufficient experience in the use of protective equipment. Workers should have the opportunity to gain familiarity with protective equipment in order to minimize reductions in dexterity.
7. Materials furnished for universal precautions should be reevaluated periodically by occupational health and safety staff and by the health care workers who use those materials. The evaluation criteria should include an assessment of efficacy; for example, whether the use of a needle sheathing device has reduced the number of needlesticks. Materials and their location should also be evaluated for ease of access and use, and physical or procedural barriers which discourage use should be modified.

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4676 Columbia Parkway
Cincinnati, Ohio 45226

XI. DISTRIBUTION AND AVAILABILITY OF REPORT

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Copies of this report have been sent to:

1. Douglas Hospital
2. Employee representative
3. Occupational Safety and Health Administration, Region V
4. Minnesota Health Department

For the purpose of informing affected employees, copies of this report shall be posted by the employer in a prominent place accessible to the employees for a period of 30 calendar days.

**TABLE 1
KNOWLEDGE OF UNIVERSAL PRECAUTIONS
RESULTS OF QUESTIONNAIRE
DOUGLAS COUNTY HOSPITAL
HETA #91-342**

QUESTION #	CORRECT ANSWER	% ANSWERED CORRECTLY
5	Washing your hands after wearing gloves for patient care is <u>always</u> necessary.	All 98 Licensed Practical Nurse 97 Registered Nurse 98 Housekeeping 95 Phlebotomist & Lab 96 Radiology technician 100
6	Masks, gowns, and goggles should be worn whenever the spraying of blood-tainted fluids is <u>remotely possible</u> .	All 40 LPN 46 RN 43 Housekeeping 22 Phlebotomist & Lab 26 Radiology Technician 50
7	Gloves should be worn for touching blood and body fluids, mucous membranes and non-intact skin of <u>all patients</u> .	All 99 LPN 97 RN 100 Housekeeping 100 Phlebotomist & Lab 100 Radiology Technician 100
8	Gloves should <u>always</u> be worn for IV starts.	All 98 LPN 100 RN 97 Housekeeping 100 Phlebotomist & Lab 100 Radiology Technician 93
9	Gloves should <u>always</u> be worn for blood draws.	All 92 LPN 100 RN 92 Housekeeping 100 Phlebotomist & Lab 63 Radiology Technician 93
10	Needles must <u>never</u> be recapped.	All 82 LPN 97 RN 89 Housekeeping 57 Phlebotomist & Lab 88 Radiology Technician 93
14	If a person were to receive a needle stick exposure to a patient infected with HIV (the AIDS virus) the person's chances for becoming infected <u>about 1 in 200</u> .	All 25 LPN 24 RN 28 Housekeeping 23 Phlebotomist & Lab 40 Radiology Technician 14
15	If a person received a needle stick injury from a needle that had been used on a patient who was infected with hepatitis B, that person's chances of becoming infected are about <u>1 in 20 to 1 in 3</u> .	All 23 LPN 21 RN 22 Housekeeping 9 Phlebotomist & Lab 44 Radiology Technician 14

XIII. APPENDIX A - Questionnaire

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)
CENTERS FOR DISEASE CONTROL
U.S. PUBLIC HEALTH SERVICE
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

SURVEY OF DOUGLAS COUNTY HOSPITAL PERSONNEL (HETA 91-342)

You have been asked to participate in a NIOSH research investigation. This health hazard evaluation is being conducted in response to a request that was submitted by the administration of Douglas County Hospital. This request asked for assistance in reducing the number of employee exposures to blood and other body fluids. We ask your assistance in helping us to gather information about employee exposures and work practices at the hospital. In order to protect your confidentiality, your responses on this questionnaire will be anonymous.

Please read each question completely and carefully.

THIS SECTION (ITEMS 1-4) IS INTENDED TO COLLECT DEMOGRAPHIC DATA. NO ATTEMPT WILL BE MADE TO USE SUCH DATA TO CONNECT SURVEY ANSWERS TO ANY INDIVIDUAL RESPONDENT.

1. Please estimate your number of years experience in the health care field: _____ YEARS.

2. Please indicate your current job title (choose ONLY ONE):

- | | |
|---|---|
| <input type="checkbox"/> RN | <input type="checkbox"/> Housekeeping |
| <input type="checkbox"/> LPN | <input type="checkbox"/> Respiratory care |
| <input type="checkbox"/> Nursing assistant | <input type="checkbox"/> Phlebotomist |
| <input type="checkbox"/> student nurse | <input type="checkbox"/> Laboratory (describe): _____ |
| <input type="checkbox"/> Contract or agency nurse (not
a Douglas County Hospital employee) | <input type="checkbox"/> Radiology technician |
| <input type="checkbox"/> Staff MD | <input type="checkbox"/> Administrative staff |
| <input type="checkbox"/> Resident MD | <input type="checkbox"/> Maintenance staff |
| <input type="checkbox"/> Student MD | <input type="checkbox"/> Other (describe) _____ |

3. Please indicate the shifts you usually work:

("day" is about 7am-3pm,
"evening" is about 3pm-11pm,
"night" is about 11pm-7am)

- days and evenings evening only
 days and nights nights only
 evenings and nights days only
 other (describe) _____

4. Your gender is: _____ Female _____ Male

THIS SECTION (ITEMS 5-12) ATTEMPTS TO DETERMINE KNOWLEDGE OF UNIVERSAL PRECAUTION RECOMMENDATIONS. PLEASE READ AND ANSWER EACH ITEM CAREFULLY.

5. "Washing your hands after wearing gloves for patient care is _____ necessary."

(The correct choice for the blank above is):

- "always"
 "sometimes"
 "never"

6. "Masks, gowns, and goggles should be worn whenever the spraying of blood-tainted fluids is _____."

- "certain to occur"
 "likely to occur"
 "remotely possible"

7. "Gloves should be worn for touching blood and body fluids, mucous membranes, and non-intact skin of _____"

(The correct choice for the blank above is):

- "all patients"
 "only certain patients in high risk groups"
 "only patients known to carry infectious agents"

8. "Gloves should _____ be worn for IV starts."

(The correct choice for the blank above is):
 "always" "sometimes" "never"

9. "Gloves should _____ be worn for blood draws."

(The correct choice for the blank above is):

- "always" "sometimes" "never"

10. "Needles must _____ be recapped"

The correct choice for the blank above is):

- "always"
 "usually"

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"occasionally"
 "never"

11. What type of instructions have you received on Universal Precautions? (check all choices that apply to you):

I've been to a inservice on the subject since being employed at Douglas
 I've been to a inservice on the subject in the last 12 months
 I've read the recommendations on the subject in professional journals
 Other (fill in blank): _____

12. I am always able to completely follow universal precautions without difficulty.
 YES NO

12A. If the answer to #12 was "NO": From your own experience, what factors do you believe prevent you from completely following the universal precaution policy? (Check ALL that apply):

Often not enough time to use such precautions.
 I often forget to take precautions when I should.
 If the patient appears to be at lower risk for hepatitis B or HIV infection, I'm less likely to use universal precautions.
 The material is often not immediately available.
 I don't always know when I should take precautions.
 The gloves (or other materials) interfere with my patient skills (i.e. gloves decrease dexterity).

THIS SECTION (ITEMS 13-15) DEALS WITH TWO BLOOD-BORNE PATHOGENS: HEPATITIS B VIRUS, (HBV); AND THE AIDS VIRUS, WHICH IS REFERRED TO AS THE HUMAN IMMUNODEFICIENCY VIRUS (HIV)

13. Have you received the hepatitis B vaccine? This consists of the completion of a series of three injections given over a six-month period.

Choose ONE answer:

YES
 NO

14. If a person were to receive a needlestick exposure to a patient infected with HIV (the AIDS virus) what do you believe that person's chances are for becoming infected with HIV?

Choose ONE answer:

about 1 in 2000 (0.05%)
 about 1 in 200 (0.5%)
 about 1 in 50 (2%)
 about 1 in 20 to 1 in 3 (5-33%)
 about 1 in 2 to 3 in 4 (50-75%)
 almost certain to become infected (near 100%)

15. If a person were to receive a needlestick injury from a needle that had been used on a patient who was actively infected with hepatitis B, what do you believe that person's chances are for becoming infected with hepatitis B?

Choose ONE answer:

about 1 in 2000 (0.05%)
 about 1 in 200 (0.5%)
 about 1 in 50 (2%)
 about 1 in 20 to 1 in 3 (5-33%)
 about 1 in 2 to 3 in 4 (50-75%)
 almost certain to become infected (near 100%)

ITEMS 16-19 ARE INTENDED TO ESTIMATE THE RATE OF EXPOSURE TO BODY FLUIDS.

The following definition should be used to answer items 16-19: "A significant blood or body fluid exposure is:

... an injury resulting from a sharp instrument that is contaminated with blood or body fluids (a needle or a scalpel)
... open skin or mucous membrane contamination with blood or body fluids
... human bite resulting in broken skin

16. In 1990 and 1991 how many times can you recall having experienced a significant exposure as defined above?

none
 once
 twice
 three times
 four times

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_____ five times

If six or more times, please provide an estimate:
_____ times

17. How many of these exposures were injuries from contaminated needles or scalpels?

FILL IN BLANK: _____ were sharp injuries

18. How many of these exposures did you report to employee health at Douglas County Hospital?

FILL IN BLANK: _____ were reported

19. If you had some exposures which you did not report to employee health at Douglas County Hospital, what reasons kept you from reporting? (check ALL that apply)

- _____ Not perceived as health risk
- _____ Insufficient time
- _____ Employee health not open at time of exposure
- _____ Too embarrassed to report the exposure
- _____ Too angry to report the exposure
- _____ Too depressed about the exposure
- _____ Too frustrated to report the exposure
- _____ Concerned about confidentiality
- _____ Concerned about occupational discrimination
- _____ Did not know the reporting procedure
- _____ Would rather not know own HIV serology
- _____ Too fearful of AIDS to report the exposure

_____ Other (please describe) _____

THIS CONCLUDES THE QUESTIONNAIRE. PLEASE RETURN IT TO THE NIOSH INVESTIGATOR. THANK YOU FOR YOUR HELP!