VASCULAR ACCESS

COMPARISON OF INFUSION-RELATED PHLEBITIS BETWEEN CATHETERS UTILIZED FOR NEEDLESTICK PROTECTION

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OBJECTIVE. The main purpose of this randomized clinical study was to examine the development of infusion-related phlebitis between marketed intravenous (I.V.) catheters made of radiopaque FEP polymer [Fluorinated Ethylene Propylene (PROTECTIV* I.V. Catheter Safety System)] and OCRILON* Polymer [OCR polyurethane (PROTECTIV PLUS I.V. Catheter Safety System)]. The secondary purpose was to examine the incidence of needlestick injuries between the PROTECTIV I.V. Catheter Safety System, the PROTECTIV PLUS I.V. Catheter Safety System, and other I.V. access devices in use.

METHODS. Infusion-related phlebitis data consisted of 1014 I.V. catheters in hospitalized adult subjects. I.V. team nurses scored insertion sites according to a 4-point phlebitis scale each day that the I.V. dwelled and then for three days post-infusion if subjects remained hospitalized. Infusion-related phlebitis data were analyzed with survival analysis techniques. Needlestick injury data were analyzed by comparing incidence (number of needlesticks/amount of purchased product) of needlestick injuries between products.

RESULTS. The results of the Kaplan-Meier analysis suggested that the proportion of catheters without phlebitis was consistently higher for the OCRILON Polymer group than for the FEP polymer group up to 72 hours after insertion. The results of the Cox proportional hazards model suggested that there were 11 variables in the final model that contributed to the risk of phlebitis, one of which was catheter material. OCRILON Polymer catheter material reduced the risk of phlebitis by nearly 60% when compared to FEP polymer (relative risk = 0.41; p = 0.007).

Prior to the introduction of the PROTECTIV I.V. Catheter Safety System (6/91 - 5/93) there were 17 reports of needlestick injuries due to contaminated stylets (incidence = 14.3 per 100,000 catheters). Reports of needlestick injuries post-introduction (6/93 - 2/95) indicated that there were 0 reports for the PROTECTIV I.V. Catheter Safety System (0 incidence) and the PROTECTIV PLUS I.V. Catheter Safety System (0 incidence) and two reports from other types of peripheral I.V. access devices (incidence = 8.8 per 100,000 catheters).

CONCLUSION. I.V. catheters made of OCRILON Polymer were found to have a smaller risk of phlebitis and to dwell longer phlebitis-free than the catheters made of FEP polymer. The incidence of needlestick injuries due to stylets has decreased at St. Joseph's Hospital since the introduction of the PROTECTIV I.V. Catheter Safety System and the PROTECTIV PLUS I.V. Catheter Safety System.

INTERLINK, NEW TECHNOLOGY FOR SAFER VENOUS ACCESS

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There have always been risks for health care workers associated with needle stick injuries. A few manufacturers have responded by developing needleless venous access systems. InterLink allows for a closed system access, via the injection cap. This enables the nurse to use clean technique for most procedures (blood sampling, tubing change, heparinization), with sterile technique for injection cap change.

This new technology came at a time when we were faced with increasing CVL sepsis in the Bone Marrow Transplant (BMT) population. Since some CVL sepsis is thought to originate from "hub" contamination, it was our hypothesis that CVL sepsis may decrease with the use of a needleless system.

InterLink was trialled on the BMT unit for 7 months with the results shown in the Table.

The antibiotic cost of treating each CVL sepsis in this trial was on average $1430.90. Even if only one episode of CVL sepsis was prevented each month, this would more than pay for the Interlink supplies.

Not only was the rate of CVL sepsis decreased, but nursing time for CVL procedures was reduced and virtually eliminated the risk of needlestick injury.

The success of the trial has lead to hospital wide introduction of Interlink for CVL access

IMPLEMENTATION, IMPACT, AND COMPLIANCE WITH USE OF SAFETY DEVICES (SDS) TO REDUCE PERCUTANEOUS INJURIES DURING PHLEBOTOMY (PIPS)

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	7 MONTHS PRE-INTERLINK	7 MONTHS USING INTERLINK
# BMT Pts	23	35
# Pt Days	2174	2435
Incidence of sepsis	23	10
Septic rates	10.58/1000 pt days	4.11/1000 pt days
Cost of antibiotics to treat sepsis	$33,699.13	$13,521.06
Cost of CSD supplies	$13,696.00	$17,615.50

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OBJECTIVES. Few data are available on the efficacy of SDs to reduce PIPs or user activation of SD safety features. In Jan. 1993 we began an ongoing study to determine the effect of SDs on PIPs.

METHODS. During phase I six hospitals performed baseline surveillance of PIPs and surveyed phlebotomists, nurses, medical students, and residents (PNMRs) to determine rates of underreporting of all needlestick injuries to conventional hospital surveillance systems and the average daily number of phlebotomy procedures performed. During phase II hospitals implemented SDs requiring user activation of the safety feature (e.g., resheathable and bluntable needles) for vacuum tube blood collection needles (VNs) and winged steel needles (WSNs) and continued surveillance. Sharps disposal containers (SDCs) were inventoried to determine rates of SD use and activation.

RESULTS. The proportion of all needlestick injuries reported to the conventional system varied significantly by occupation (p<.0001): 89% for phlebotomists, 65% for nurses, 40% for medical students, and 32% for residents. From Jan. 1993 through Nov. 1994, PIP rates per 100,000 phlebotomy procedures for PNMRs (adjusted for underreporting and use of SDs) were reduced 41%, from 3.9 with standard devices to 2.3 with SDs; for VNs alone, PIP rates were reduced 82%, from 3.4 to 0.6, and for WSNs alone, rates were reduced 16%, from 4.3 to 3.6. Review of SDCs found that 92% of phlebotomy devices were SDs; however safety features were activated for only 74% of VNs (range by hospital=17-100%) and 60% of WSNs (range=27-90%). Of 27 PIPs associated with SDs, 15 (56%) occurred before activation of the safety feature was appropriate; 5 (18%) during activation; and 1 (4%) after activation. For the remaining 6 (22%) PIPs, the safety feature was not activated. Timing of PIPs in relation to needle use varied by device type: 66% vs. 96% of PIPs occurred during or after use of the needle for standard devices and SDs respectively, whereas 34% vs. 4% occurred during or after disposal.

CONCLUSIONS. Preliminary data suggest that SDs may prevent at least 40% of PIPs. Underreporting of PIPs and variations in use and activation of SDs must be considered when evaluating SD impact.

EFFECTIVENESS OF A NEEDLELESS INTRAVENOUS SYSTEM IN TWO HOSPITALS

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This study assessed the impact of a needleless intravenous connection system on the rate of reported percutaneous injuries, both overall and intravenous connection related (IVCR) injuries, in two hospitals in Houston, Texas. Incidence rates were compared 3 years before and 1 year after hospital-wide implementation of the device. The overall injury rate was reduced 27.1% (rate ratio=1.37, 95% CI=1.22-1.54, p=<.0001) at one hospital and 38.6% (rate ratio=1.63, 95% CI=1.34-1.97, p=<.0001) at the other hospital. The rate for IVCR injuries was reduced 62.5% (rate ratio=2.67, 95% CI=1.89-3.78, p=<.0001) at one hospital and 69.9% (rate ratio=3.35, 95% CI=1.87-6.02, p=<.0001) at the other. Rate ratios for all non-IVCR injuries were 1.21 and 1.44, demonstrating a lower magnitude of injury reduction due to factors other than device implementation. Effectiveness was also assessed by a survey of randomly selected device users to determine satisfaction with the device, frequency of use and barriers to use. Of the respondents (n=478, response rate=50.9%), approximately 94% expressed satisfaction with the needleless system and recommended continued use. The survey also revealed that duo compatibility, accessibility, and other technical problems, needles were still being used for activities that could have been performed with the needleless system. It was concluded that the device was effective in reducing numbers of reported percutaneous injuries, users were satisfied with the device, but barriers to universal usage exist.

BARRIER PROTECTION

POTENTIAL PATHOGENS ON NONSTERILE GLOVES

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Recently the FDA issued a warning to health professionals to check non-sterile examination gloves for mold or dampness before using them. (March 1993/FDA Medical Bulletin). Studies concerning glove permeability, defects, and tactile perception have been conducted. Two recent studies addressed bacterial and fungal contamination (AADS:1991, #R54 and AADS:1993, #88) but definitive identification of microorganisms was not done. The objective of this study was to examine non-sterile gloves for definitive identification of contaminants.

In this study six different brands of non-sterile gloves from five different countries were tested. An ungloved hand (positive control) and air from a positive flow sterile hood (negative control) were used. The fingers of gloved hands were smeared across three different media: potato dextrose agar (PDA), sheep blood with trypticase soy agar (TSAB), and phenol red mannitol salt agar (PRMSA). Following inoculation, PDA plates were incubated at 30^{o} C for one week, PRMSA and TSAB agar were each incubated at 37^{o} C for forty-eight hours. Each brand of glove was tested 10 times, inside and outside on each media. Identification was made by standard methods.

Differences in proportions were analyzed using Bonferroni-adjusted chi-square tests or, if expected frequencies were less than 5, Fisher Exact tests. Lab results showed that organisms were isolated most frequently on TSAB (10.6%), less frequently on PDA (5.6%), and least frequently on PRMSA (3.3%) (p<0.005). Frequencies of isolation from countries differed significantly (p<0.005) with the brand from the USA showing no growth to gloves from China showing the most (50.0%). Certain potential pathogens were identified. The most frequent were: *Bacillus sp., Staphylococcus epidermidis, Micrococcus sp.,* and *Aspergillus fumigatus* .

Current literature suggests that the organisms identified in this

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study are of no public health significance for immunocompetent persons. However, persons who are immunosuppressed, may acquire a variety of infections from the organisms isolated. Consequently, only sterile gloves should be used when treating immunosuppressed persons. Since it is not always known if a person is immunosuppressed, universal precautions should be applied and sterile gloves should be used with all patients.

UNDERREPORTING OF BLOOD AND BODY FLUID (BBF) EXPOSURES IN HEALTHCARE SETTINGS: AN ALARMING ISSUE.

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INTRODUCTION. BBF exposures put healthcare workers (HCWs) at risk of acquiring bloodborne infections. Post-exposure prophylaxis for hepatitis B virus (HBV) and perhaps for human immunodeficiency virus (HIV) may prevent transmission. It is therefore important for HCWs to report these exposures to the employee health services (EHS). The objective of this study was to estimate the extent of underreporting of BBF exposures to the EHS in acute care hospitals (ACHs).

METHODS. A one year BBF exposure incidence study was conducted in 5 Montreal ACHs from Nov. 1st 1991 to Oct. 31st 1992. HCWs had to report anonymously their exposures (percutaneous, mucosal and non intact skin) directly to the research team and independently from their reports to the EHS. The two databases (reports to study and reports to EHS) were used to estimate the total number of exposures with the capture/recapture method and to estimate underreporting to the EHS. Date of exposure, age, sex, job title, and work station of HCWs were used to identify identical cases in both databases. Furthermore, at the end of the study period, a questionnaire was given (by supervisor or by mail) to the HCWs of 4 out of 5 hospitals. HCWs had to state the number of exposures they sustained during the study period and the number they reported to EHS during that period, thus providing another means to estimate underreporting to EHS.

RESULTS. 838 exposures were reported either to the EHS or to the research team. The results of estimation of underreporting by the capture/recapture method are shown in the table. The average underreporting for the 5 hospitals was 47% (range:29-61) (see Table).

1,804 HCWs completed the retrospective questionnaire. 373 HCWs sustained 759 percutaneous exposures and 277 HCWs sustained 663 muco-cutaneous exposures. 34.4% of exposed HCWs reported none of their percutaneous exposures to the EHS and 75.1% did so for their muco-cutaneous exposures. Underreporting of exposures was 69.6% for percutaneous and 86.4% for muco-cutaneous. Being vaccinated against HBV was significantly related to reporting (RR:1.72, 95% CI 1.32-2.27).

DISCUSSION. Underreporting in that study is at a level that could be qualified as alarming. This could cause a bias in the estimation of seroconversion rate, impede proper identification of causes of exposures and prevent HCWs from receiving prophylactic treatment.

THE RESISTANCE OF SURGICAL, CLINICAL, AND SERVICE PERSONNEL PROTECTIVE GLOVE BARRIERS TO NEEDLE PENETRATION

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OBJECTIVE. Evaluate the peak force required to penetrate 19 commercially available barriers (18 gloves and 1 adhesive pad) by 15 types of needles. A review of occupational HIV seroconversion cases, a hospital personnel survey, and published literature led to the selection of hypodermic and suture needles as penetration probes. The following independent variables were evaluated: barrier task (surgical, clinical, service personnel), material (woven, extensible, woven-extensible, woven-leathern), hollow-bore needle gauge (14, 18, 22, 26) and point bevel (12 , 30 , 45), and suture needle point (cutting, tapered, blunt).

METHODS. Of the 19 barriers selected for this study, 4 were advertised as puncture resistant, 9 as cut resistant, 5 as both cut and puncture resistant, and 1 latex barrier was not advertised as cut or puncture resistant. Test parameters and equipment similar to penetration test methods which do not use needles as penetration probes were reviewed. A material test apparatus lowered a load cell, needle holder, and needle at a constant 50.8 cm/min through barriers and an 11.0 mm hole drilled through a teflon support plate. After penetration, peak force was recorded. Barriers were penetrated in both palm and finger locations, with the exception of the adhesive pad. A randomized block experimental method was designed to minimize variation introduced by changing needles after penetrating 19 barriers. As a result of two separate analyses of needle dulling, it was determined that there was no need to account for a dulling effect in subsequent analyses. The data were analyzed by ANOVA, producing lists of mean penetration forces, and the significance level for a variety of comparisons and contrasts.

RESULTS. Penetration forces decreased as needles became thinner and bevels more acute. Mean peak penetration forces varied widely: 77.9 Newtons (17.5 pounds) for the woven-extensible

EXPOSURES	HOSP. A	HOSP. B	HOSP. C	HOSP. D	HOSP. E	TOTAL
EHS only	31	173	153	12	210	579
Study only	6	23	35	7	40	111
Both	14	49	29	6	26	124
Total	51	245	217	25	276	814
Estimated total	**64**	**326**	**402**	**39**	**599**	**1,332**
95% CI	49-79	281-371	303-501	20-58	430-768	1,186-1,478
Underreporting (%)	**29**	**32**	**55**	**54**	**61**	**47**

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adhesive pad, 48.8 Newtons (11.0 pounds) for the woven-leathern barrier, and 27.3 Newtons (6.1 pounds) for a woven-extensible barrier. Penetration forces dropped rapidly for all woven, extensible, and some woven-extensible barriers, ranging from 1.1 to 0.05 Newtons (0.25 to 0.01 pounds).

CONCLUSION. Within material, task, and probe categories, some barriers provide significantly increased puncture resistance when compared to similarly characterized barriers. Analyses of barrier material categories indicate the adhesive pad is most resistant to puncture, followed by woven-leathern and woven-extensible barriers. Among glove task categories, service personnel and surgical barriers were most difficult to penetrate. Clinical barriers were easiest to penetrate. This analysis will assist glove purchasers and manufacturers in evaluating needle or material variables which influence barrier penetration resistance.

CASE-CONTROL STUDY OF HIV SEROCONVERSION IN HEALTH CARE WORKERS AFTER PERCUTANEOUS EXPOSURES TO HIV-INFECTED BLOOD

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OBJECTIVE. To determine risk factors for HIV seroconversion in health care workers (HCWs) after a percutaneous exposure (PE) to HIV-infected blood.

METHODS. Cases were HCWs who seroconverted to HIV after a PE to HIV-infected blood, reported from national surveillance of occupationally acquired infection. Controls were HCWs in CDC's prospective HCW surveillance project who did not seroconvert after PE to HIV-infected blood. Analyses included variables related to the HCW (age, race, sex, use of zidovudine [ZDV] postexposure, occupation), PE (needle gauge, use of gloves, depth of PE, visible blood on device, type of procedure, emergency, location in hospital), and source patient (SP) (stage of disease and use of antiviral drugs).

RESULTS. Univariate analysis of available data from 23 cases and 679 controls reported since 1988 found the following risk factors: visible blood on device, deep PE, large diameter of hollow needle, drawing blood/vascular access procedures, emergency, SP with AIDS, terminal illness in SP, and lack of ZDV use by HCW. For all PEs (needles and other sharp objects), logistic regression identified the following risk factors: deep PE (OR=16.8, 95% confidence interval [CI]=4.2-67.2), visible blood on object (OR=5.7, 95% CI=1.5-21.7), drawing blood/vascular access procedure (OR=3.3, 95% CI=0.9-11.5), terminal illness in SP (OR=7.8, 95% CI=2.3-26.1), and lack of ZDV use by HCW (OR=8.5, 95% CI=1.8-41.0). For PE due to needles only (92% of the 702 PEs), risk factors were large gauge (<18) of hollow needle (OR=14.3, 95% CI=2.7-74.9), deep PE (OR=6.0, 95% CI=1.9-19.1), visible blood on needle (OR=5.6, 95% CI=1.8-17.8), emergency (OR=6.2, 95% CI=1.1-34.6), and lack of ZDV use by HCW (OR=3.9, 95% CI=1.0-16.0).

CONCLUSION. These preliminary data suggest that a larger inoculum of blood and later stage of SP illness are risk factors for HIV transmission after PE to HIV-infected blood. More data are needed to assess other risk factors.

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NEEDLESTICK INJURIES RESULTING FROM PACKAGE HANDLING AT A BULK MAIL FACILITY

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OBJECTIVE. The purpose of this investigation was to evaluate the potential for occupational exposure to bloodborne pathogens as a result of handling containers of medical specimens and medical waste.

METHODS. A walk-through survey of the facility was conducted. Written policies and programs for bloodborne pathogens and emergency response procedures were evaluated. Incident reports and medical records were reviewed, and informal interviews were conducted with management and employees.

RESULTS. During the walk-through survey, a damaged plastic envelope found in the first class mail area contained a blood sample and used needle. Several packages with biohazard labels were also pulled out of the bulk mail conveyor stream during the walk-through; two were damaged but the contents remained intact. The Occupational Safety and Health Administration 200 log of recorded incidents identified incidents with loose needles and sharps containers in the conveyor system. Three reported exposures involved employees whose fingers were stuck by potentially contaminated hypodermic needles while handling packages. The written bloodborne pathogen and emergency response plans for the facility were found to be in compliance with current Occupational Safety and Health Administration (OSHA) regulations.

CONCLUSIONS. The facility has implemented written policies and procedures that are designed to reduce employee exposures to medical waste and specimens that are shipped through the mail. Even though regulations mandate biohazards be sent by at least first class mail, these types of packages are often shipped incorrectly and, as a result, are entering the mechanized conveyor system, where the packages can be easily damaged. Recommendations were made to improve employee and consumer education on proper shipping techniques.

REDUCTION OF BLOODBORNE EXPOSURES IN A COMMUNITY TEACHING HOSPITAL

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OBJECTIVE. Healthcare workers' (HCW) risk of exposure to bloodborne pathogens was brought to the forefront by the AIDS epidemic, and with it came an increased emphasis on HCW safety. Greenville Memorial Hospital (GMH) began aggressive efforts in 1990 to assess the circumstances of HCW blood and body fluid exposures (BBE) and to enact changes in practice in order to minimize HCW risk of exposure.

METHODS. BBE data collected during 1990 and 1991 were tabulated and maintained manually. 1993 and 1994 BBE data were collected and entered in the Exposure Prevention Information Network (EPINET) computer program. Ongoing analysis led to implementation of safety devices, alterations in enforcement of procedures and education of HCW at risk.

RESULTS. A total of 1315 BBE were reported during the 4 years: 1041 (79%) were sharp object injuries (SOI); 249 (19%) were mucocutaneous exposures (ME), and 25 (2%) were from unknown routes of exposure. The number of SOI per year were 156, 275, 301, and 309 for 1994, 1993, 1991, and 1990, respectively. Rates per 10,000 hospital days were not significantly different for 1993, 1991, and 1990 (16.2, 17.1, and 17.3); however, a substantial reduction was seen in 1994 (rate = 8.9, $p < 0.05$ for all comparisons to 1994). No significant reduction in ME occurred.

Nurses were involved in 42% (551/1315) of BBEs; surgical technicians in 12% (154/1315); and physicians in 11% (139/1315). The patient's room (32%) and the operating room (24%) were the most prevalent locations of occurrence.

Injuries occurring during recapping of needles fell from 32 (10%) in 1990 to 4 (2.5%) in 1994; those from improper disposal of sharps from 94 (30%) in 1990 to 26 (17%) in 1994; and those from IV-related exposures from 59 (19%) in 1990 to 15 (9%) in 1994. BBE in the OR were reduced by 50% between 1993 (100) and 1994 (51), and incidents occurring in patient rooms decreased by 48% between 1993 (113) and 1994 (59).

CONCLUSIONS. Reduction of SOI at GMH appears to be the result of multiple factors. Use of the EPINET program enabled more timely and concise analysis of exposure data. Use of needleless IV systems and IV needles with protective sleeves as well as education and alterations in behavior/practice all seem to have played a role.

THE ITALIAN SIROH-EPINET STUDY ON SHARP INJURIES IN HEALTH CARE WORKERS

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OBJECTIVE. To evaluate the effectiveness of a data collection system (SIROH-EPINet) designed for an adequate management of information on sharp injuries (SI) reported by health care workers (HCW) in order to target preventive interventions.

METHODS. From January 1 1994, 36 Italian hospitals used the SIROH-EPINet system to track SI. Data included: demographic and occupational characteristics of the exposed HCW and his/her serostatus with regard to HIV, HCV and HBV; a detailed description of the accident, of barrier garments and preventive measures, of post-exposure treatment and prophylaxis; clinical and serological data on the source patient. Forms were checked and recorded on a data base file at the coordinating centre.

RESULTS. Up to March 1 1995, 2705 SI were collected of which 2205 have been analyzed to date. Among identifiable source patients (SP), 90/1331 tested were HIV+, 411/1439 HCV+ and 114/1477 HBsAg+; overall, 539 exposures (25%) were at risk for at least one bloodborne infection. In 25% of cases the HCW knew the SP serostatus at the time of the SI. Most SI occurred in surgical departments (35%); nurses (53%) and student nurses (14%) are the most exposed. Hollow-bore needles account for 72% of SI (n=1586): disposable syringes (41%) and winged steel needles (31%) are the most represented, but SI with IV catheters are not negligible (7.3%). Blood-filled needles accounted for 20%. In 32% of cases, the injured HCW was not the original user of the item. 241 SI occurred while recapping, and 261 while putting the item into the disposal container, which in 39% of cases was not nearby at the time of the accident. 95% of the SI involved hands; in 48% the sharp pierced the HCW's gloves. 69% of HCW were vaccinated against HBV or immune at the time of the accident. 30% had a postexposure prophylaxis (either for HBV or with AZT).

CONCLUSIONS. The SIROH-EPINet data collection system provides an accurate and easily interpretable picture of SI occurrence for allowing targeted preventive interventions.

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PROSPECTIVE MULTICENTER STUDY OF NEEDLESTICK AND OTHER PERCUTANEOUS INJURIES IN ANESTHESIA PERSONNEL

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OBJECTIVES. Anesthesia personnel (Anesth) are at risk for infections with human immunodeficiency virus (HIV), hepatitis viruses B and C (Hep B,C), and other pathogens from contact with blood and body fluids of infected patients. A blood contaminated percutaneous injury (PI), such as an accidental needlestick, is the single most important occupational source of HIV and Hep B,C infection. Additional data in Anesth are needed. This study investigates contaminated PI (CPI) [needlesticks and other PI] in Anesth and formulates strategies to reduce CPI.

METHODS. After IRB approval, data from Anesth sustaining CPI were collected at 11 hospitals. Additional information was provided by the Employee Health Service and on demographics of needles used and cases performed at each hospital. Data collected from mid-1993 through 12/31/94 were analyzed using Epi Info Version 6.

RESULTS. 983 Anesth (563 full-time-equivalent Anesth) [Attending, Resident, CRNA, and SRNA] reported 105 CPI during 250,708 anesthetics, and 12 CPI in non-anesthetic procedures. 94% of CPI were produced by a needle with the types as follows: disposable syringe 42%, IV catheter stylet 21%, suture 20%, others 17%. 99% of needles were blood contaminated. 79% of needles were hollow-bore, 20% were solid. No devices causing CPI had "safety designs". The sharp devices were used for: intradermal local anes-

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thesia 22%, suturing vascular cath 19%, insert IV cath 14%, insert CVP or PA cath 9%, cutting 8%, obtain venous blood 4%, insert art cath 3%, others 21%. 15% of CPI were related to needle recapping. 30% of CPI were due to needles presumed to be blood-filled and occurred during these procedures: insert IV cath 46%, insert CVP or PA cath 29%, obtain venous blood 14%, insert art cath 11%.

CONCLUSIONS. Most CPI in Anesth are from blood contaminated needles used for intradermal local anesthesia, vascular catheter insertion or suturing vascular catheters. Most CPI result from hollow needles and 30% are blood-filled hollow needles, a feature probably associated with the greatest risk of transmission of blood-borne pathogens. All identified devices causing CPI lacked safety designs. Most CPI are potentially preventable. CPI associated with the greatest risk of pathogen transmission are related to insertion of vascular catheters or obtaining blood. These data should be utilized to: 1) modify anesthesia work practices and 2) allocate funds for effective needlestick-prevention devices.

A SURVEY OF POTENTIAL BLOODBORNE PATHOGEN EXPOSURES IN A BIOMEDICAL RESEARCH LABORATORY SETTING

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The National Institutes of Health has an aggressive Bloodborne Pathogen Exposure Control Program designed specifically for non-patient care research personnel. For research personnel, exposure determinations are based on the type of work being performed rather than the job classification. Individual employees are required to register as "users" of human blood, body fluids, or other tissues, as well as known human pathogens classified at Biosafety Level 2 (BL-2) and above. The registration initiates enrollment in medical surveillance programs, administration of necessary immunizations, inspection of laboratories, and requisite training. Accident, injury, and illness tracking is an integral component of the overall program.

Over a four-year period (Oct 1, 1990-Sept 30, 1994), 4% of all accidents, injuries, or illnesses reported to the Occupational Medical Service were potential bloodborne pathogen exposures in non-patient care personnel. In addition to potential exposures to primate (human and nonhuman) retroviruses and human hepatitis viruses, percutaneous and mucous membrane exposures to malaria, toxoplasmosis, adenoviruses, vaccinia, Epstein-Barr virus, Creutzfeld Jakob disease agent, rabies, and Herpes simiae (Monkey B) predominated. Forty-eight percent of all potential bloodborne pathogen exposures in non-hospital personnel resulted from macaque bites, scratches, mucous membrane exposures to saliva or saliva containing materials, or wounds sustained from equipment potentially contaminated with macaque secretions.

REDUCTION IN PERCUTANEOUS INJURIES IN VARIOUS-SIZED Health Care Facilities Documented by a Computerized SURVEILLANCE SYSTEM

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OBJECTIVE. To quantify reductions in percutaneous injuries (PI) from 1993 to 1994, as documented by a computerized surveillance system and as stratified by hospital size, job category, and severity of injury.

METHODS. PI incidence rates per 100 occupied beds, based on average daily census (ADC), were calculated and compared. Hospital size, based on ADC, was defined as small (100), intermediate (101 - 299) and large (300). A survey was conducted each year documenting the dates facilities implemented engineering controls and educational efforts.

RESULTS. Forty-five health care facilities in South Carolina reported percutaneous injuries in 1993 and 1994 using the EPINet™ surveillance system. There were 1,812 sharp-object injuries (SOI) in 1993 and 1,480 in 1994, representing a significant PI incidence rate reduction of 6.2 (from 33.1 to 26.9) per 100 occupied beds (95% confidence interval [CI], 4.1, 8.2). Statistically significant rate reductions were seen in the intermediate and large hospitals (4.5 and 11.1 respectively, $p < 0.05$), with no significant reduction in the small hospitals. Significant reductions were found for nurses, surgical/other attendants, and phlebotomist/IV team, but not for physicians, clinical laboratory workers, technologists, housekeeping, or other employees. Reductions were significant for superficial (2.6; 95% CI: 1.1, 4.0) and moderate (2.5; 95% CI: 1.1, 3.8) injuries, but not for severe injuries. Overall, 42% (1,397 of 3,292) of the injuries occurred in employees who were not the original user of the sharp object.

CONCLUSION. Reductions in rates of percutaneous injuries (1993 to 1994) were demonstrated using data available through a computerized surveillance system. The greatest reductions occurred in large and intermediate hospitals, and in certain job categories and injuries. The surveillance system assisted practitioners to target intervention strategies. Engineering controls certainly played a part in the overall reduction, along with education and awareness efforts.

PERCUTANEOUS/MUCOCUTANEOUS INJURY REPORTING IN A COUNTY TEACHING HOSPITAL

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INTRODUCTION. Surveillance of the type, location, and job category of employees involved in all reported percutaneous injuries has been ongoing at our institution since 1986.

OBJECTIVE. To determine if health care workers were reporting all percutaneous and mucocutaneous injuries.

METHODS. The Infection Control Department distributed anonymous surveys to healthcare personnel from 1992 to 1995. Data elicited included the number of percutaneous and mucocutaneous injuries experienced and reported in the last 5 years and in the last year, the reasons for not reporting every exposure when applicable, and the frequency of reporting in the last year versus 5 years ago.

RESULTS. Five hundred forty nine surveys were received. Job classifications included physicians, surgeons, dentists, registered nurses, licensed vocational nurses, nurses aides, and operating room tech-

nicians. Overall, of the respondents, (245) 45% had no injuries, (163) 30% had been injured and had reported all injuries, and (141) 26% had *not* reported all injuries. Reasons for not reporting included sterile/clean needlestick (39%), little or no perception of risk to employee (26%), too busy (9%), and dissatisfaction with follow-up procedures (8%). Forty percent of physicians did not report all injuries vs. 26% of RNs. Twenty-three percent of respondents stated that they reported injuries with more frequency than they did one year ago.

CONCLUSION. Reasons stated for not reporting injuries indicate a need for continued education in the risk of acquiring bloodborne pathogens from such injuries. In addition, problems identified on the follow-up treatments of injuries should be addressed. Furthermore, the results illustrate the importance of targeting prevention efforts to specific groups, such as physicians, that would not be identified by routine reporting mechanisms. Other institutions may find this or a similar survey to be useful in obtaining information on percutaneous/mucocutaneous injury reporting.

SURVEILLANCE FOR OCCUPATIONAL EXPOSURE TO HIV IN CANADA

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BACKGROUND. A passive surveillance system for occupational exposure to HIV was initiated in Canada in September 1985. The goal of the system was to monitor the circumstances of occupational exposure to HIV, occupational seroconversion and possibly to calculate the rate of occupational seroconversions.

METHODS. A common surveillance report form is used by all participants. Eligibility requires a documented parenteral, mucous membrane or direct contact to non-intact skin exposure to the blood or body fluids of a person with AIDS, symptomatic HIV infection, or asymtpomatic HIV infection. Participants receive HIV testing at the time of exposure, 6 weeks, 12 weeks and 6 months. The report documents the time, location, nature and circumstances of the exposure.

RESULTS. Since the initiation of the study, 554 persons have reported occupational exposure to HIV. Almost 70% of the reports are from nurses. Almost 60% of the exposures are due to needlestick injury although surgical instrument injuries (6%), mucous membrane (11%), skin contact/intact (2%), skin contact/nonintact (14%) and skin contact/unknown (8%) are also reported. Two hundred and one of the exposures are considered by the occupational health nurse reporting the incident to be avoidable - 23% due to recapping a used needle, 22% due to improper disposal of a used needle and 55% due to skin exposure. No seroconversions have been reported in any of the exposures. Only two occupational seroconversions have ever been reported in Canada.

CONCLUSIONS. Occupational exposures to HIV may be common in Canada, but seroconversions are rare. The collection of information about the circumstances of exposure is important to persons developing policy regarding blood and body fluid precautions. Under-reporting to this surveillance system and reporting bias limit the interpretability of this data. At this time the surveillance system is being reviewed to include reporting of exposure to Hepatitis B, Hepatitis C and possibly other bloodborne pathogens. In addition, there will be a pilot project using electronic interfaces and broader networking to improve occupational reporting of exposure to blood borne pathogens.

DENTAL

OCCUPATIONAL EXPOSURES AMONG DENTAL WORKERS (DWS)

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Since 1987 health care workers (HCWs) exposed to HIV infected source blood have been enrolled in the Italian Study on the Risk for Occupational HIV Infection. Since 1994, exposures to any source blood also were included. 45 hospitals participate in the study. The aim of this study was to describe the nature and circumstances of exposures amound DWs. 98 DWs (40 nurses, 38 dentists, 9 hygienists, 5 housekeepers, 4 surgeons, 1 student nurse, 1 other) reported 55 needlesticks, 26 cuts, 10 mucous membrane contaminations, 4 non intact and 3 intact skin contaminations. In 84 cases, exposures were self-inflicted. DWs were aware of HIV status of the source in 80% of cases. Data on circumstances of sharp injuries were available for 66 DWs. Devices included 19 hollow bore needles (15 to inject anesthetic), 12 explorers, 6 levers, 6 suture needles, 5 probes, 4 curettes, 4 surgical wires, 2 scalers, 2 burs, 6 drill/scalpel/probe/plier/other items. 23 injuries occurred during use of device, 19 sorting/disinfecting/sterilizing, 9 recapping needles, 8 after use (4 before disposal, 2 putting the item into the container, 1 item protruding from container, 1 item protruding from trash bag), 4 passing instruments, 3 disassembling. Hands/fingers were wounded in 64 cases, with a superficial, moderate and severe injury in 20, 37 and 9 cases, respectively. Gloves were worn in 59 cases. Of 17 mucocutaneous exposures, 10 occurred in the operating room, 5 in dental laboratory and 2 in the ward. 8 occurred during surgical intervention, 6 tooth extraction/dental treatment, 3 cleaning-up items, 1 caring for a patient. All 10 mucous membrance contaminations involved eyes; in 5 cases masks and in 1 case a face shield were worn. After a 12-month follow-up, no HIV, HCV and HBV seroconversion occured to the 60 HIV, 10 HCV and 2 HBV exposed DWs, respectively.

In conclusion, the highest rate of sharp injuries amoung DWs was self-inflicted, during use of devices such as hollow bore needles or during decontamination procedures. Some needlesticks are still related to recapping needles. Mucocutaneous contaminations are more frequent in the operating room and during tooth extraction.

****Participants: Angarano G, Baccaro C, Bianciardi L, Bombonato M, Bonazzi L, Cestrone A, Chiodera A, Chirianni A, Contegiacomo P, Corradi MP, Desperati M, Francavilla E, Nelli M, Orazi D, Perna MC, Raineri F, Salvi A, Sileo C.***

EXPOSURE INCIDENT EPIDEMIOLOGY IN A SAN FRANCISCO DENTAL SCHOOL

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Bloodborne exposure incidents continue to occur in spite of implementation of OSHA-required and CDC-recommended precautions. The objectives of this study were to quantify variables that appear to affect the risk of sustaining an exposure injury, and identify possible preventive measures. We included type of procedure, devices involved, length of time the individual had been working, and when during the academic quarter the procedure was taking place. We also assumed that a substantial number of source patients would be HIV-positive because students would be more likely to report incidents involving patients known to be HIV-infected.

The methods used included a six-page survey and frequency distribution of survey results. The number of students in a class year is approximately 145. The approximate number of active patients is 10,000. Of these, 1500 (15%) are HIV positive patients enrolled in the Ryan White CARE program. Of the 54 source patients interviewed, 50% stated they were known to be HIV-positive. The total number of patient contacts in a given year is approximately 95,200. The number of reported exposure incidents for the academic year 1993-1994 was 60, resulting in an exposure incident rate of 1 exposure per 1,587 patient contacts.

The results of the survey provided some insight into how and when exposures occur, and allowed us to begin to confirm factors which contribute to exposures. The majority of exposures (55.2%) occurred in the final 60-75 minutes of each clinic session, with 2/3 of those occurring in the final 30 minutes. Less than 4% of exposures occurred in the first 60-75 minutes of clinic. Exposures were most likely (43.1%) to occur in the middle third of an academic quarter and, surprisingly, least likely (20.7%) to occur at the end of a quarter when there is increased pressure to complete cases. The devices involved included instruments (49.1%), needles (37.3%), body fluid splash (5.1%), dental bur (5.1%), and scalpel blade (3.4%). All exposures were classified into categories of risk dependent upon amount of body fluid and depth of puncture or laceration. We identified no massive exposure. There were 76.4% possible exposures, 20% doubtful exposures, with only 3.6% classified as definite. This supports the common assumption that risks in dentistry are generally low. The procedures in progress when the exposures occurred were instrumentation (38.5%), cleaning (25%), injection (17.3%), and other (19.2%). No individual procedures stood out as specifically exposure-prone.

We concluded that the high percentage (50%) of HIV-positive source patients was due to under-reporting. When the source patient did not have documented high-risk factors for bloodborne diseases, students were less likely to report the incident and obtain medical-follow-up. We found that the end of the day and during clean-up were the most common times during which exposures occurred. Therefore, greater awareness and caution must be exercised at these times. Because instruments and needles accounted for 86.4% of all injuries, methods of handling sharps during patient care and while cleaning, better personal protective equipment, and safer devices such as self-sheathing needles should be evaluated and implemented when found to be beneficial. Continued evaluation of how exposures occur will enable us to institute changes in behaviors, devices and work practices to reduce exposure incidents.

OCCUPATIONAL BLOOD EXPOSURES IN DENTISTRY: 1987-1993

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Recent data from observational and self-reported studies indicate comparable percutaneous exposure (PE) rates among US dentists, oral surgeons, hygienists, and assistants of about 0.3/month (vs. 1/mo. dentists in 1987). Two PE/1000 hrs of observation were reported among dentists (vs. 34/1000 hrs, general surgeons). Most dentists (>50%) indicate ≥1 PE in past year; 20% of all dental workers reported ≥1 PE in past month. Instruments commonly associated with injuries were: dentists/burs, syringe needles, and sharp instruments (e.g., scalers, lab knives); oral surgeons/wires (during fracture reductions); hygienists/scalers; assistants/all sharps. PEs occurred during use (e.g., sharp slipped under force or patient moved unexpectedly) and after use (e.g., during clean-up, needle re-capping, bur scrape).

Most PEs occur to hands/fingers outside the mouth and are self-inflicted. Few data exist to associate PEs with types of procedure, duration or time of day of patient visit, or worker experience. Among oral surgeons: 0 PEs were observed during >4,000 outpatient procedures; skin contacts with blood were reported most often.

Available data suggest that PEs among dentists are less frequent than among general surgeons and have decreased since 1987, as compliance with universal precautions (e.g., careful handling and disposal of sharps) has increased. Safer work practices (e.g. using instrument instead of fingers to retract tissue), safer instrument design (e.g. self-sheathing needles, changes in dental unit design), and continued worker education may reduce PEs among dental workers. Appropriate use of personal protective equipment, suction, and rubber dams should minimize skin and mucous membrane exposures to blood and blood-contaminated saliva.

RISK ASSESSMENT

THE CORRELATION BETWEEN WORKSTRESS, ORGANIZATIONAL FACTORS AND BLOODBORNE EXPOSURES

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OBJECTIVE. While both workstress and organizational factors have been hypothesized to play a significant role in occupational injury and illness, few studies have examined this relationship in health care workers. Because certain subgroups of hospital-based health care workers have been found to have high rates of both occupational bloodborne exposure and occupational workstress, a cross-sectional study was conducted to determine the relationship between exposure, workstress and organizational factors.

METHODS. Study subjects were recruited from three large, geographically distinct hospitals. Subjects were stratified by occupation and randomly selected to receive a self-administered, confidential questionnaire. The questionnaire included items on sociodemographics, self-reported history of recent injuries and exposures, workstress, perceived organizational safety management and psychosocial factors such as attitudes and perception of risk. Working conditions, such as work pace, workload, cognitive demands, and role ambiguity, were also evaluated. Workplace bothers, such as environmental conditions (temperature, space

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constraints, noise levels, etc.) and verbal abuse at work, as well as safety climate were also measured.

RESULTS. A total of 1716 usable questionnaires were returned for a final response rate of 57%. The majority (79%) of respondents were female, employed as nurses (53%) and college educated (81%). On univariate analysis the following sociodemographic characteristics were found to be significantly associated with a history of 5 or more bloodborne exposures (in the previous six months): employed as a physician, less than 45 years of age, job tenure of less than 10 years, and more than 16 years of education. High exposure rates were also correlated with psychosocial factors; workers with low levels of tolerance towards HIV/AIDS had higher exposure rates than workers who were tolerant. Higher exposure rates were also associated with workstress factors, high workstress scores were correlated with high exposure rates and workers reporting verbal abuse also had higher exposure rates. Certain organizational factors were also correlated with exposure, these included: low levels of PPE availability, high workload, poor environmental conditions at work (i.e., noise, temperature, etc.), poor perceived safety climate (organizational safety management). Finally, behavioral factors were also correlated with exposures - workers who reported low levels of compliance with Universal Precautions were significantly more likely to have exposures than those with high levels of compliance.

On multivariate analysis, the following factors were correlated with exposures: occupation, age, compliance with Universal Precautions, safety climate, HIV/AIDS tolerance, verbal abuse and workstress.

CONCLUSION. These data support other safety-related findings linking workstress and organizational factors with injury rates in other occupational settings. Prevention strategies addressing these factors should positively impact bloodborne exposure rates.

REDUCTION OF BLOOD CONTACTS (BCS) DURING GYNECOLOGIC SURGICAL PROCEDURES (GSPS).

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OBJECTIVE. BCs, especially percutaneous injuries (PIs), during GSP may lead to transmission of bloodborne pathogens. Data on the efficacy of interventions to prevent such contacts are limited. We initiated a two phase observational study in three New York City hospitals to assess the frequency of BCs in GSPs (phase I) and the efficacy of selected interventions (phase II).

METHODS. From March 1993-June 1994, trained observers recorded information about protective equipment, surgical techniques, BCs, and intervention use. Interventions included blunted suture needles (BSN), double gloving, and educational programs to promote safer surgical techniques.

RESULTS. BSN use increased from 1% to 55% of suture needles used between the first study quarter and the last. Standard suture needle-related PIs per 100 procedures decreased concomitantly from 5.8 to 1.0 in the last study quarter ($p<.001$). No PIs occurred with BSN; in contrast, injury rates per 1000 needles used were 2.1 and 14.2 for standard and straight needles, respectively. Surgeons reported few problems with BSN; among 656 surgeon-procedures in which BSN were used, difficulty penetrating tissue and tissue tears were noted in 5% (26) and <1% (4), respectively. Hospital-specific baseline rates of double-gloving among surgeons ranged from 27% to 91%. The rate of double-gloving among surgeons at the hospital with the lowest baseline rate increased to 48% of surgeon-procedures in the last study quarter and was associated with a decrease in blood-hand contact rates from 71 to 32 per 100 procedures. Overall, the rate of blood-hand contact was over 8 times higher for single-gloved vs double-gloved surgeons.

CONCLUSIONS. Significant reductions in PI and blood-hand contact occurred following increases in the use of BSN and double-gloving.

THE RISK OF OCCUPATIONAL HIV INFECTION IN HEALTH CARE WORKERS: THE ITALIAN MULTICENTER STUDY

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OBJECTIVE: To assess the risk of HIV seroconversion (SC) after occupational exposures (OE) (percutaneous injury, mucous or non-intact skin contamination) to HIV in health care workers (HCW).

METHODS: In 35 Italian hospitals, details of OE were collected and recorded on standardized forms, and exposed HCW were tested for HIV at the time of the accident and followed clinically and serologically up to 12 months.

RESULTS: From 1986 when the SIROH started through December 1994, 2,342 OE to HIV were reported. Four SC were documented out of 2,307 HCWs followed for at least 6 months (mean 11, median 12, SD 7).

Exposure	SC/tot	%Rate	95% CI
Percutaneous injury	3/1546	0.19	0.04-0.57
by hollow-bore needles	2/1235	0.16	0.02-0.58
blood filled	2/345	0.58	0.07-2.08
nonblood filled	0/826	0	0-0.45
by solid needles/sharps	1/311	0.32	0.01-1.78
Mucous contamination	1/311	0.32	0.01-1.78
Nonintact skin	0/452	0	0-0.81

CONCLUSIONS: The large sample obtained during the 9-year study period, and the standardized data collection provide specific information on the risk of HIV transmission by different routes of occupational exposure. According to data coming from the literature, the risk seems high after hollow-bore, blood-filled needlestick injuries. However, these data allow an estimate of the unnegligible risk of infection after solid needle injury and mucous contamination.

****SIROH participants: Angarano G, Arici C, Arione R, Baccaro C, Bertucci R, Bianciardi L, Bombonato M, Bonaventura ME, Bonazzi L, Bottura P, Cestrone A, Chiodera A, Chiriaco P, Contegiacomo P, Corradi MP, Cristini G, Crosato I, Daglio M, D'Anna C, De Gennaro M, Desperati M, Francavilla E, Francesconi M, Giamperoli A, Ianeselli A, Lodi A, Lubreglia G, Maccarrone S, Marchegiano P, Monti A, Nativi A, Nelli M, Orazi D, Orefice E, Perna MC, Pietrobon F, Pischedda L, Poli***

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ENVIRONMENTAL RISK FACTORS RELATED TO PERCUTANEOUS AND MUCOCUTANEOUS EXPOSURE INCIDENTS IN NURSING STUDENTS

Susan D. Schaffer Phd, RN

OBJECTIVE. This descriptive study utilized a mailed survey of 1,580 newly licensed Virginia registered nurses to examine selected physical and psychosocial environmental risk factors for percutaneous (needlestick) and mucocutaneous (splash) exposure incidents that occurred while they were nursing students.

RESULTS. Five hundred eighty surveys were returned (36%). There were 56 total exposure incidents experienced by 42 respondents, with detailed descriptions provided for 44 incidents. Although HIV or HBV infections were not reported, the true infectious disease outcome is unknown because of incidents that were not reported when they occurred (11 of 44) and because of post-exposure follow-up for reported incidents that fell short of Occupational Safety and Health Administration guidelines (12 of 44). According to guidelines described by Jagger et al. (1988), 20 of 31 percutaneous exposure incidents were potentially preventable through use of safety engineered devices. Similarly, 4 of 10 mucocutaneous exposure incidents occurring during routine procedures were potentially preventable through use of personal protective equipment.

CONCLUSIONS. The influence of limited use of safety devices and personal protective equipment in the occurrence of nursing student exposure incidents suggests that active steps by schools of nursing to ensure student access to and use of personal protective equipment and safety engineered devices may minimize exposure incident risk for students. Educational efforts are needed to increase student reporting of exposure incidents and to ensure that reported incidents are followed up appropriately.

REDUCTION OF HEALTHCARE WORKER BLOODBORNE EXPOSURES IN A COMMUNITY TEACHING HOSPITAL OPERATING ROOM

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OBJECTIVE: This study describes Operating Room (OR) healthcare worker blood and body fluid exposures (BBE) and factors that may have influenced the reduction in incidence of exposure between 1993 and 1994 at Greenville Memorial Hospital (GMH), a 676-bed community teaching hospital.

METHODS: We analyzed OR BBE (sharp object injuries [SOI] and mucocutaneous exposures) utilizing an EPINET database. We initiated quality improvement activities through an OR team of surgical technicians and nurses. The team made recommendations for changes in and enforcement of procedures to (a) minimize injury potential, (b) improve eye protection, and (c) require circulating nurses wear eye protection. Results of team findings were included in mandatory OR education programs.

RESULTS: 100 BBE were reported during 1993 (87 SOI and 13 mucocutaneous exposures); 51 BBE occurred during 1994 (46 [90%] SOI and 5 [10%] mucocutaneous exposures). These figures indicate a 50% reduction in events between 1993 and 1994 and a reduction of 3.0 per 1000 OR procedures ($p < 0.05$).

Reductions occurred in 3 main job categories: surgical technicians were exposed 36 times during 1993 and 18 times during 1994 (50% reduction); surgeons 34 times in 1993 and 12 in 1994 (65% reduction); and RNs 21 times in 1993 and 6 in 1994 (71% reduction). In 1993, 55 (63%) and in 1994, 30 (65%) of injuries were experienced by workers other than the original user.

Significant reductions in SOI occurred in the use of the following devices and purposes: disposable syringe (20 in 1993 and 6 in 1994 [70% reduction] used mainly for injections; the suture needle (27 in 1993 and 17 in 1994 [37% reduction]) for suturing; and the blade (13 in 1993 and 8 in 1994 [38% reduction]) for cutting.

SOI occurred most frequently during use (33 in 1993 and 10 in 1994), between steps (19 in 1993 and 18 in 1994), and during disassembly (8 in 1993 and 1 in 1994).

Of the 18 mucocutaneous exposures, 100% involved the head, with 13/18 (72%) to the eyes, and 5 (38%) involving skin contact; 14/18 (83%) were blood exposures.

CONCLUSIONS: GMH experienced a substantial overall reduction (50%) in BBE in the OR between 1993 and 1994. Factors appearing to be most important in affecting reduction were improvement and/or enforcement of safe practices, OR team assessment of exposures, and increased awareness through education.

TRAINING

USE OF A QUALITY IMPROVEMENT MODEL TO DECREASE THE INCIDENCE OF NEEDLESTICKS

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The Methodist Hospital in Houston, Texas, with 904 operational beds, is the primary adult teaching healthcare facility for the Baylor College of Medicine. Located in the Texas Medical Center, Methodist has earned world-wide recognition for advances in cardiology, cardiovascular surgery and new treatments for cancer. Methodist is committed to providing as safe a work place as possible for both employees and non-employees. The Infection Control and Safety Departments monitor, evaluate and report the incidence of on-the-job injuries. During 1992, data analysis performed by Infection Control revealed two predominant activities associated with needlestick injuries: I.V. therapy and the handling of suture needles in operating rooms. Eighty-seven percent of the needlesticks related to I.V. therapy occurred following entry into the I.V. system with hollow bore needles.

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As 85% of all needlesticks occurred in the patient care setting (nursing units and operating rooms), the Hospital's Nursing Safety Committee utilized the Infection Control data to develop corrective action plans to reduce the incidence of these two types of needlesticks. A quality improvement process of Plan-Do-Check-Act was utilized. A thorough analysis of cause and effect was performed and interventions were recommended including the evaluation of an anti-needlestick device. Multiple interventions took place during the first quarter of 1993. By year's end, Infection Control noted a 38% reduction in needlesticks following entry into the I.V. system. Needlesticks associated with the handling of sutures were slower to decline. After various strategies were employed including education, engineering controls and behavior modification, a reduction of 76% in needlesticks following entry into the I.V. system and a reduction of 39% in needlesticks associated with the handling of suture needles were noted by the end of 1994. An estimated annual cost-savings of $37,000 related to the management of needlesticks was calculated as a result of the needlestick reduction.

CONCLUSION. A multi-disciplinary collaborative effort among the departments of Nursing, Operating Rooms, Infection Control, Safety and Materials Management contributed to the overall decrease in needlestick injuries associated with entry into the I.V. system and the handling of suture needles. Utilizing a quality improvement model provided a structured approach to needlestick reduction and cost associated with the management of needlestick injuries.

Classified Marketplace

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