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Tracking BBF Exposures: The Implementation of the Exposure Prevention Information Network (EPINet™) System at VIHA

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Tracking BBF Exposures

The implementation of the Exposure Prevention Information Network (EPINet™) system at VIHA

Final Report to WorkSafeBC

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Executive Summary

A proactive and systematic approach to minimize needle stick injuries (NSIs) and exposures to blood and bodily fluids (BBFs) is to establish a BBF Exposure Control Plan (ECP); an essential element of which is the accurate capture of exposure incident information. We adapted the Exposure Prevention Information Network (EPINet™) system, the acknowledged gold standard for BBF surveillance, to BC Healthcare and incorporated it into the existing Occupational Health and Safety Agency for Healthcare (OHSAH) developed Workplace Health Indicator Tracking and Evaluation (WHITE™) database. This Final Report describes the successful implementation of the WHITE™ EPINet™ surveillance system in the Vancouver Island Health Authority (VIHA). Subsequent to this pilot project, the surveillance database was also implemented in Fraser Health (FH), Northern Health (NH), and Interior Health (IH). This report summarizes EPINet™ data collected at VIHA between January 1, 2000 and November 14, 2005, and includes comparison of exposure incidents among all four health authorities (HAs) for the period September, 2004 to August, 2005.

Data collected through the WHITE™ EPINet™ suggests that the greatest exposure risk is in the Acute Care setting; however, exposure risks also occur in Long-Term Care and in Community settings. The frequency of injury is highest among Operating Room, Surgical, General Medical and Intensive Care Unit (ICU) staff compared to other occupational groups in the acute patient care setting, but the highest risk group is to Laboratory Workers, when exposure frequencies are converted to rates. These data also demonstrate an inadequate usage of personal protective equipment (PPE), especially when looking at BBF splash exposures. Despite the majority of splash injuries involving exposures to the head, less than 10% of those reported exposures acknowledged wearing appropriate personal protective equipment (PPE). Further analysis of incident data as to the

circumstances when the injury occurred, revealed that more than one third of reported percutaneous injuries occurred during disposal of sharps, recapping a needle, or due to a sharp device left in inappropriate places. Alternately this supports the hierarchy of control approach for BBF exposures. These include elimination of unnecessary sharps and injections; engineering out the exposure risks through implementing safety engineered devices and using sharps disposal containers; and establishing relevant safe work procedures, providing education and training, and other administrative controls, and as the last resort, using of appropriate PPE.

The findings of this study indicate that nurses sustain the majority of both needle-stick injuries (62.7%) and splash incidents (65.4%) in healthcare settings. Additionally, other occupational groups who are not involved with direct patient care, such as housekeeping and laundry workers, suffered some exposures, meaning that education, prevention and control measures need to be targeted and pervasive across the healthcare environment.

This project has shown that the WHITE™ EPINet™ module offers an effective tracking system for all BBF related exposures. By integrating the system into the WHITE™ database, the module allows each of the HAs using the system to link incident data to a range of operational background information. This feature provides the potential to further study the incident data to identify associated risk factors so as to guide pertinent corrective actions, including different control measures, implementation of enhanced prevention practices, and post exposure management. Ultimately, this system will provide data to enable the measurement of the effectiveness of interventions. Despite these future benefits, a critical use of the WHITE™ EPINet™ module is still to be realized in terms of monitoring the implementation and evaluating the effectiveness of safety engineered devices that are currently being introduced into VIHA as well as other HAs in BC.

An additional component of this report is the inclusion of the results of a self-administered worker's questionnaire survey conducted at VIHA from late 2003 to early 2004. While beyond the scope of the original grant, the purpose of the survey was to collect baseline data for **future** evaluation of the BBF ECP implementation project and to enable the evaluation of the effectiveness of interventions such as safe needle technology and the incident reporting system on the safety culture of the VIHA. The worker's questionnaire survey, which was conducted in parallel with the WHITE™ EPINet™ implementation at VIHA, demonstrated that under-reporting of NSI and BBF incidents are a major issue. Survey results revealed that over 80% of needle-stick injuries in nurses go unreported, and that those who elect not to report tend to believe that reporting an incident will not result in corrective action. Further, it also suggested that those that do not report an exposure may be influenced by a perceived lack of control over the risk itself. An additional reason for the under-reporting bias is the exclusion from the tracking database of incidents suffered by workers who are not employees of the HAs; specifically contracted workers and physicians.

The findings of this study and the questionnaire survey highlight the need for future research regarding the use of the WHITE™ EPINet™ module to guide the practice of reducing the risk of splash and needle stick injuries among healthcare workers (HCWs). This includes: investigating approaches to reduce under-reporting; examining how to integrate into the EPINet™ system data for medical devices in order to assess the proportion of devices used and the rate of incidents associated with each class of device; developing safety feature evaluation forms for the selection and evaluation of different medical devices; investigating risk beyond the tracking of incidents and their attribution to specific devices towards uncovering "root causes" of exposures; and exploring how the safety culture of organizations can be advanced, in light of underlying causes and potential solutions, to promote prevention strategies.

Currently VIHA and the other health authorities that are utilizing the WHITE™ EPINet™ module face a number of challenges in order to optimize the value of this system. These include improving the reporting rates of sharps and splash injuries; enhancing data linkages for purposes of evaluating sharps and splash injury rates using appropriate denominator data, such as device usage information; and capturing and linking cost data for purposes of computing economic impacts of these exposures.

Finally, it is critical to emphasize the importance of management commitment for the prevention aspect of occupational health. Management commitment to safety can be demonstrated through allocation of necessary resources and delegation of authority to groupings such as BBF prevention committees charged with monitoring the exposure control plan and the evaluation and selection of control measures including safer needle devices. The vehicle for this commitment remains a comprehensive exposure control plan and its effective implementation through bipartite participation.

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Introduction

Research Problem

Blood and body fluid (BBF) exposures constitute a major risk to health care workers (HCWs). HCWs treat patients infected with human immunodeficiency virus (HIV), hepatitis B (HBV), hepatitis C (HCV) and other blood-borne diseases. Transmission can occur from exposure to blood, serum, plasma, saliva, and amniotic fluid.[1] Consequently, HCWs are at an elevated risk of contracting diseases from these pathogens through exposure to BBFs via percutaneous[i] injuries and mucocutaneous[ii] contact.[2] [3] [4] [5]

While HIV, HBV and HCV have captured the spotlight with respect to transmission risks, it has been demonstrated that many more diseases can be transmitted through occupational exposures. These include arboviral infections; babesiosis; blastomycosis; brucellosis; Creutzfeld-Jakob disease; cryptococcosis; diptheria; Ebola virus; cutaneous gonorrhoea; herpes simplex; leptospirosis; malaria; mycobacteriosis, mycoplasma caviae; relapsing fever; Rocky Mountain spotted fever; sporotrichosis; staphylococcus aureus; streptococcal infection; streptococcus pyogenes; syphilis; toxoplasmosis; and tuberculosis[6] [7]. While many of these documented transmissions have occurred in rare, isolated events they serves to emphasize that occupational exposure to BBF can have serious consequences.

Occupational exposure to BBFs, therefore, remains a major threat to the health and safety of HCWs across Canada. In addition to the risk of transmission of a potentially fatal disease, the distress, sickness and absenteeism resulting from BBF exposure constitute a considerable strain on the healthcare system. Workers who come in contact with HIV-contaminated blood must often wait

[i] This is a collective term for penetrating injuries to the skin and refers to the passage of BBF substances through intact skin as a result of injury from needle sticks and other sharp objects such as broken ampoules, surgical blades, bone fragments and teeth (human bites).

[ii] This refers to so called splash injuries of blood and body fluids onto intact or disrupted skin surfaces and mucous membranes. These are also sometimes referred to as blood and body fluid contacts or exposures.

six months to a year to find out if they are positive for infection, all the while suffering physical and psychological effects of exposure and post exposure prophylaxis (PEP) treatment.[8]

WorkSafeBC, as with most other occupational health and safety regulatory bodies, requires that healthcare employers develop and implement an Exposure Control Plan (ECP) if a HCW has or may have occupational exposure to a blood borne pathogen, or to other biohazardous materials as specified by the WorkSafeBC Board[9]. The ECP will: define roles and responsibilities, exposure parameters for conducting risk assessments, safe work policies; list procedures for all potentially hazardous tasks, appropriate controls measures, education and training guidelines; and develop a procedure to review and evaluate compliance with policies.

WorkSafeBC, in order to support the development of effective BBF ECPs in BC Healthcare, provided funding to our research team:

i. to incorporate the EPINet™ surveillance system into the existing WHITE™ database;

ii. to pilot implement the surveillance system in one of BC's six health authorities, the Vancouver Island Health Authority (VIHA); and

iii. to collect preliminary data at this health authority.

In addition to the results related to these objectives, this report also includes a comparison of VIHA EPINet data with that collected from three additional HAs where this system was subsequently also implemented, as well as data collected outside of BC.

Finally, this report summarizes the findings of a self-administered questionnaire distributed among the healthcare workers of three VIHA healthcare facilities. These results are from research activities that were beyond the scope of the original objectives. The data were collected at baseline to identify significant BBF exposure risk factors, rates of near-misses (an incident in which the worker

nearly had an injury or contact with blood and body fluids) and to estimate the true occupational exposure frequency and the frequency of non-reporting.

Background to the present study

The critical impetus to reduce blood and body fluid exposure to HCWs in what was then the Capital Health Region, now the Vancouver Island Health Authority (VIHA), occurred in 1999. A laundry worker at a regional laundry facility sustained a needlestick injury (NSI) in the hand from a lumbar needle. The lack of an appropriate injury investigation or corrective actions, and the number of NSIs prior to this one resulted in an investigation by health and safety officers from the Workers' Compensation Board of BC (WCB)[10], now WorkSafeBC. As a result of their findings and the repeat orders written, the WCB levied a fine against VIHA for deficiencies in their health and safety system. An appeal by the employer, with the support of the healthcare unions was launched to create, as an alternative to the fines, an initiative that could further the health and safety of workers. In a negotiated settlement, the fine was waived, and the funds were re-directed to develop a comprehensive exposure control program to help prevent such occurrences in the future. The British Columbia Nurses' Union (BCNU), the Hospital Employees' Union (HEU), and the Health Sciences Association of BC (HSA) suggested and supported this unique approach, with the sole stipulation that the Occupational Health and Safety Agency for Healthcare (OHSAH, a not-for-profit research and knowledge transfer organization, jointly governed by the healthcare employers and healthcare unions)[11] would oversee the implementation and evaluation of this initiative. To augment the funds available for this initiative, OHSAH submitted a proposal to the WorkSafeBC Policy and Research Division to assess barriers and facilitators to implementing an effective ECP. The WorkSafeBC decision was to fund the first component of this initiative, viz. the implementation of a BBF incident data collection system. The Exposure Prevention Information Network

(EPINet™) database system was chosen for this purpose. In addition, OHSAH secured the involvement of its developer, Dr Janine Jagger from the University of Virginia, as a co-investigator in this study.

OHSAH has continued to support the remaining components of the initial proposal described above. These include a pre-ECP implementation worker survey and a workplace audit, which together with EPINet™ data have allowed a comprehensive risk assessment phase, as well as the continued development and implementation of the ECP itself.

The EPINet™ data system

EPINet™ was developed in 1991 by Dr Janine Jagger and her colleagues from the International Health Care Worker Safety Center (IHCWSC) at the University of Virginia to provide a standardized method for recording and tracking percutaneous injuries and blood and body fluid contacts. The EPINet™ system consists of: a Needlestick and Sharp Object Injury Report; a Blood and Body Fluid Exposure Report (see Appendices 1 and 2); and software programmed in Access® for entering and analyzing the data from the forms. A post-exposure follow-up form is also available (see Appendix 3). Since its introduction in 1992, more than 1,500 hospitals in the U.S. have acquired EPINet™ for use. It has also been adopted in other countries, including Italy, Spain, Japan and U.K.

Prior to this study, VIHA used a data collection system called WinSISES (Windows systeme integre de surveillance des expositions et des seroconversions). Although the two systems have similarities in that they can both track BBF and sharps injuries, EPINet™ offers a number of enhancements, a description of which is available in Table A4-1 (Appendix 4).

EPINet™ also meets all the requirements of the US Needlestick Safety and Prevention Act of 2000 and the 2001 revised Bloodborne Pathogens Standard which require health care facilities to maintain a sharps injury log. The log must include the type and brand of device involved in the

exposure incident, the department where the exposure occurred, and an explanation of how it occurred. EPINet™ provides a wealth of other detail that can help facilities target high-risk devices and products and evaluate the efficacy of new technology designed to prevent NSIs. These features of the EPINet™ system will become increasingly relevant as BC develops its own legislation for the mandatory use of safety engineered medical devices and follows the lead taken by other provinces in Canada. A summary of these developments is found in Appendix 5. As a step towards this, WorkSafeBC has recently updated guidelines for engineering controls[12], and has strongly encouraged employers to use safety-engineered devices to control exposure to BBFs. Their guidelines emphasize that these devices must be properly used, inspected, maintained and replaced as needed to ensure their effectiveness. WorkSafeBC will be conducting consultations on these proposed regulations in January 2006 and will follow through with public hearings in May 2006. Final regulations are to be expected in the fall of 2006.

The WHITE™ EPINet™ module

OHSAH obtained agreement from our colleagues at the IHCWSC to adapt and incorporate the EPINet™ system into the WHITE™ database for use by the BC health authorities. This WHITE™ module is currently being used by four of the six health authorities, VIHA, Fraser Health (FH), Northern Health Authority (NH), and Interior Health (IH) to track BBF exposures and related data. Integration of EPINet™ into WHITE™ has enabled critical data linkage. Enhanced features of this arrangement with WHITE™ not present in EPINet™ include the ability to link to payroll data which facilitates the calculation of rates of injuries; the availability of data to associate BBF injuries with lost-time days, health history and vaccinations, and compensation costs and medical costs; as well as information regarding corrective actions such as worker's post-exposure serological follow-up testing and/or vaccinations, and education and training.

Vancouver Coastal Health (VCH) runs the EPINet™ system independently of WHITE™. VCH, as well as the Provincial Health Services Authority (PHSA) have indicated an interest in implementing WHITE™ as soon as the sustainability of WHITE™ is secured.

Methodology

Implementation of the EPINet™ BBF data collection system

Historical BBF-related exposure data from VIHA for the period between Jan 1, 2000 and Sept 30, 2004, collected using the WinSISES system, were retrieved, converted, and entered into the EPINet™ database. Standard definitions for BBF exposures and injuries, employed by the EPINet™ system, were applied during the conversion between the databases to ensure the compatibility of current and future BBF exposure information. The implementation team from OHSAH conducted training and education for VIHA HCW following installation of EPINet™. A dedicated research assistant was assigned to work with VIHA employees and managers during EPINet™ implementation, and OHSAH remained actively involved during the data collection and entry process of this stage. Each facility was assigned a unique code and categorized by facility type according to existing EPINet™ definitions. Comprehensive lists of departments by facility were integrated into the data collection system. A list of physician specialties was generated to enable rapid follow-up with injured workers once an incident was reported. The study investigators and other specialists from OHSAH worked closely with VIHA employees, managers, and the BBF Steering Committee to address scientific issues related to data collection methods, to optimize routine data collection and analysis procedures, and to provide advice and assistance as required.

Subsequent to the conversion of the WinSISES data into EPINet™, prospective data were collected and entered into the WHITE™ EPINet™ module by the VIHA Workplace Wellness and Safety team.

EPINet™ Data Analysis and Comparisons

This report summarizes EPINet™ data collected at VIHA between January 1, 2000 and November 14, 2005. Bed occupancy data were also obtained from VIHA to determine injury and exposure rates in three of the VIHA facilities. These are referred to as Hospital 1, 2, and 3[iii]. This allowed injury rates to be compared among these three Vancouver Island hospitals and with the summary results of the 2003 EPINet™ percutaneous injury rate report published by the International Healthcare Worker Safety Center at the University of Virginia. In addition, EPINet™ data collected through WHITE™ from three other HAs, FH, IH, and NH, were compared with that from VIHA for the period August 26, 2004 to September 7, 2005, the period for which data was available from all four HAs.

Analysis of the data included calculations of simple means, standard deviations and proportions of reported incidents based on job category, department, type of device used, purpose of use, and instance of the occurrence of injury (before use, after use, before disposal etc.). Rates of injury were determined using the frequency of reported events standardized for the size of the facility (per 100 beds) and for the size of the workforce (per 100 person-years). Additionally, data regarding incidents associated with physicians are not consistently captured by the HAs because they are not considered employees of the HAs and therefore not included in the WHITE™ database. Consequently, physician data was excluded from the comparison with data outside of BC.

Comparisons of BC data to that collected externally included data collected through the Canadian Needlestick Surveillance Network (CNSSN), set up in 2000, to monitor HCWs' occupational exposures in 12 volunteer hospitals across Canada, including St Paul's Hospital in BC[13]. The most recent data reported by CNSSN is for the period April 1st 2000 to March 31st 2002.

[iii] At the time of submitting this report, OHSAH had not obtained permission to report on information from VIHA by facility.

Additional external comparisons were made to data collected through EPINet™ from 48 facilities in the US for the period 2003.

Pre-Implementation Survey

Data were gathered through a self-administered questionnaire (see Appendix 6) in order to identify significant BBF exposure risk factors, rates of near-misses (an incident in which the worker nearly had an injury or contact with blood and body fluids) and to estimate occupational exposure frequency and the frequency of non-reporting. While this survey is not formally part of the WorkSafeBC grant, these latter data on non-reporting are included here to highlight the need for continuing effort to capture exposure incidents into the EPINet™ system. The pre-implementation survey results also provide important information on worker perceptions and behavior.

A stratified convenience sample of subjects was obtained representing the workforce from various departments of three acute care hospitals that were believed to be at higher risk of BBF exposure. Before implementation, the survey was pilot-tested in an acute care hospital setting, allowing for worker input into the survey design and content.

Completed surveys were collected from each work site and then the entered into a survey database. Descriptive statistics and logistic regression models were computed using SPSS V.14. Logistic regression models were developed to examine the relation between predictor variables such a subjects job title, job status, work shift, and work site with the underreporting of BBF exposures.

Research Findings

EPINet™ Data Analysis from VIHA

A total of 1,577 BBF sharps and splash exposures were reported from January 1, 2000 to November 14th, 2005. These included 1,222 NSIs and sharp object injuries and 355 BBF exposures or splash injuries. 1,024 (84.6%) of the sharp injuries involved contaminated items and a further 114 (9.4%) had reported that contamination was unknown.

The vast majority of the reported NSI and splash incidents were from the non-teaching, acute care hospitals, 85.6% n=1042 and 87.9% n=311 respectively . Of the three Vancouver Island hospitals for which occupancy statistics were available, Hospital 2 had the lowest rates for each of the years under review (1.56-3.43 per 100 beds) for the period March 31st 2000 to March 30th, 2005 (Table 1). Hospital 1 and Hospital 3 had rates that were similar to each other (ranging from 6.17 to 14.08 and 4.8 to 15.62 per 100 beds respectively) and both higher than Hospital 2 (ranging from 1.56 to 4.69) for the same period; likely because differences in type of care offered at Hospital 2.

Nurses as a group reported the highest frequency of both NSI and other sharps injuries 761 (62.7%) and splash injuries 229 (65.4%). However, other occupations who do not normally handle sharps were also affected including housekeeping staff and laundry workers. In total, 250 (24.5%) of the 1,019 injuries reported, occurred to those who were not original users or locators of the instruments (Figure 1). Data was not available from VIHA at the time of writing this report regarding the total number of full-time equivalent (FTE) employees for these job categories and thus we were not able to compute exposure rates by job categories.

Table 1. Needlestick Frequencies and Rates for Selected VIHA Non-teaching Hospitals

Time Range§	Hospital 1	Hospital 2	Hospital 3
#Injuries 2000	54	7	20
#beds March 31, 2001	615	204	417
Yearly Injury rate/100 beds	8.78	3.43	4.80
#Injuries 2001	38	8	39
#beds March 31, 2002	564	202	417
Yearly Injury rate/100 beds	6.74	3.96	9.35
#Injuries 2002	37	3	29
#beds March 31, 2003	504	192	377
Yearly Injury rate/100 beds	7.34	1.56	7.69
#Injuries 2003	67	9	31
#beds March 31, 2004	483	192	385
Yearly Injury rate/100 beds	13.87	4.69	8.05
#Injuries 2004	69	4	62
#beds March 31, 2005	490	192	397
Yearly Injury rate/100 beds	14.08	2.08	15.62
#Injuries 2005	14	3	11
#Injuries pro rated to year*	30.3	6.5	23.8
#beds September 16, 2005	490	192	387
Yearly Injury rate/100 beds	6.17	3.38	6.14

*Divide #injuries by conversion factor of 0.4627 to pro rate for a full year.
§Fiscal Year April1st to 30 March following calendar year

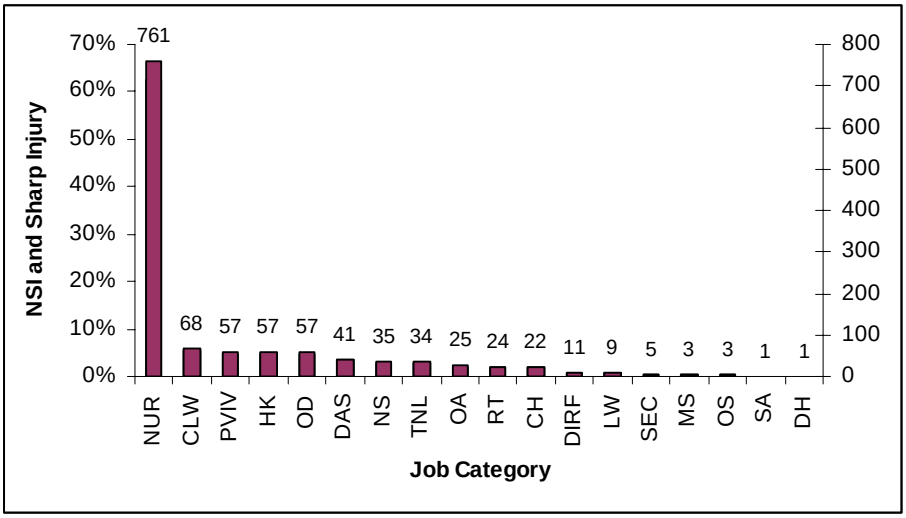

Figure 1. NSI and Sharp Injury by Job Category (VIHA Jan 2000 - Nov 2005)

NUR	**Nurse**	**RT**	**Respiratory Therapist**
CLW	**Clinical Laboratory Worker**	**CH**	**CNA/HHA**
PVIV	**Phlebotomist/ Venipuncture/ IV**	**DIRF**	**Doctor (intern/resident/fellow)**
HK	**Housekeeper**	**LW**	**Laundry Worker**
OD	**Other, describe**	**SEC**	**Security**
DAS	**Doctor (attending.staff)**	**MS**	**Medical Student**
NS	**Nursing Student**	**OS**	**Other Student**
TNL	**Technologist (non lab)**	**SA**	**Surgery Attendant**
OA	**Other Attendant**	**DH**	**Dental Hygienist**

Both NSI and sharps injuries and other BBF exposures occurred in all departments with the majority of injuries occurring in the patient room or ward; 490 (42.4%) for NSI/other sharps and 158 (46.9%) for BBF exposures respectively (Figure 2). Once again, denominator data (number of full time equivalents) required to compute rates of injury by department were not available for VIHA but are presented for Fraser Health and Interior Health.

The source patient was identifiable for 1039 (85.7%) and 317 (90.1%) of NSI and other sharp objects and BBF exposures or splash injuries respectively. For NSI and other sharp injuries recorded, 1024 (84.6%) of implements were thought might be contaminated. While 204 (57.5%) of the splash injuries involved blood or blood products, 42.5% of the body fluids other than blood were deemed to be contaminated with blood. Eyes were the most commonly exposed parts (58.9% of exposures) and 71.3% involved exposures to the head (eyes, nose and/or mouth). Despite this, only 9.3% of those reporting exposure were wearing face protection (goggles, eyeglasses with and without side shields and face shields).

One quarter of the percutaneous injuries (n=273, 25.5%) were associated with disposable syringes and approximately 75% were hollow bore needles (see Figure 3). While proportional rates can be calculated, absolute rates by specific device cannot because there is no information available on the number of procedures performed using a specified device. Of the incidents for which the task associated with the device causing the injury was reported, more than half (n=724, 52.3%) involved hollow bore needles which are likely to be contaminated with blood, and 411 (34.5%) incidents were associated with intramuscular or subcutaneous injections (Figure 4).

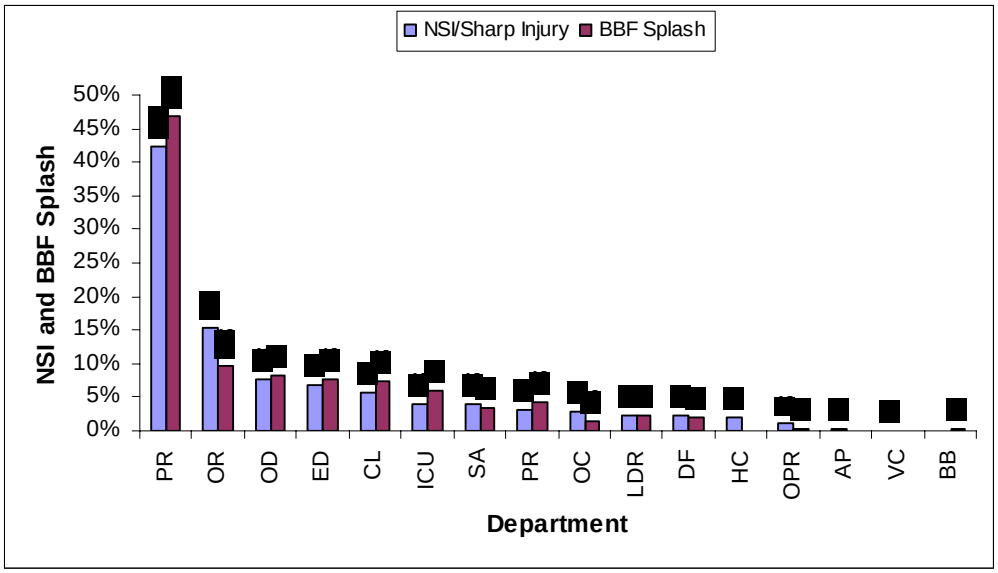

Figure 2. Frequency of NSI / Sharp Injury and BBF Exposure by Department (VIHA Jan 2000 - Nov 2005)

PR	**Patient Room/Ward**	**OC**	**Outpatient Clinic/Office**
OR	**Operating Room/Recovery**	**LDR**	**Labor and Delivery Room**
OD	**Other, describe**	**DF**	**Dialysis Facility**
ED	**Emergency Department**	**HC**	**Home-care**
CL	**Clinical Laboratories**	**OPR**	**Outside Patient Room**
ICU	**Intensive/Critical Care Unit**	**AP**	**Autopsy/Pathology**
SA	**Service/Utility Area**	**VC**	**Venipuncture Center**
PR	**Procedure Room**	**BB**	**Blood Bank**

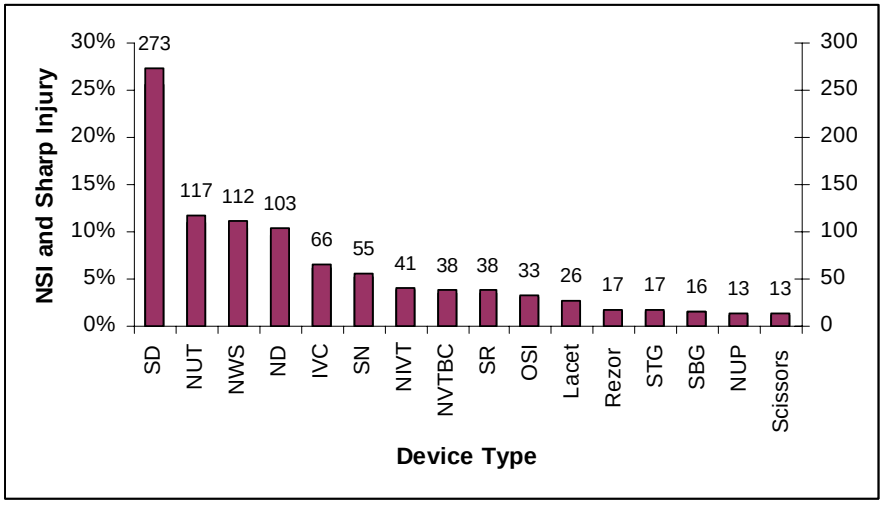

Figure 3. NSI and Sharp Injuries vs. Sharp Devices (VIHA Jan 2000 - Nov 2005)

SD	**Syringe, disposable**	**SR**	**Scalpel, reusable**
NUT	**Needle, unknown type**	**OSI**	**Other sharp item (please describe)**
NWS	**Needle, Winged steel**	**Lancet**	**Lancet**
ND	**Needle, describe**	**Razor**	**Razor**
IVC	**IV catheter**	**STG**	**Specimen/test tube, glass**
SN	**Suture Needle**	**SBG**	**Syringe, blood gas**
NIVT	**Needle on IV tubing**	**NUP**	**Needle, unattached hypodermic**
NVTBC	**Needle/holder vacuum tube blood collection**		

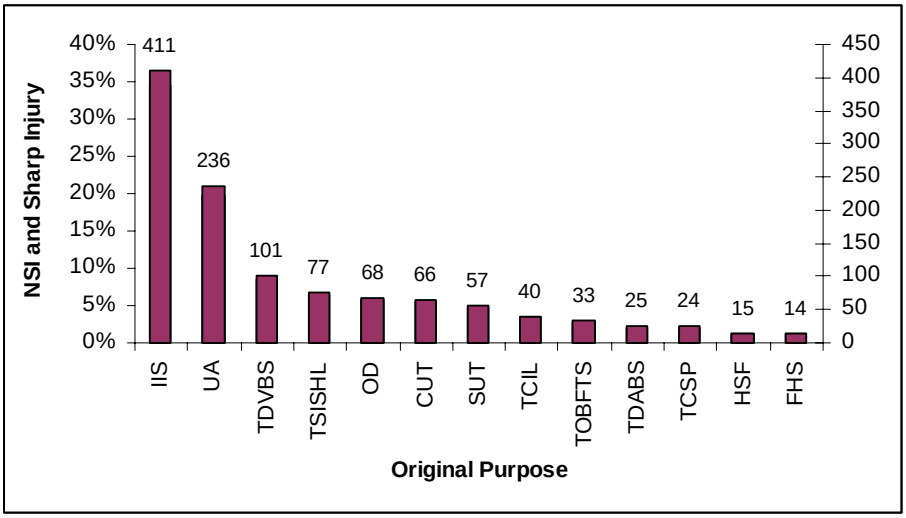

Figure 4. NSI and Sharp Injuries vs. Purpose of Sharp Items (VIHA Jan 2000 - Nov 2005)

IIS	**Injection, intramuscular/subcutaneous**	**TCIL**	**To connect IV line**
UA	**Unknown/not applicable**	**TOBFTS**	**To obtain a body fluid or tissue sample**
TDVBS	**To draw a venous blood sample**	**TDABS**	**To draw an arterial blood sample**
TSISHL	**To start IV or setup heparin lock**	**TCSP**	**To contain a specimen or pharmaceutical**
OD	**Other, describe**	**HSF**	**Heparin or saline flush**
CUT	**Cutting**	**FHS**	**Fingerstick/heel stick**
SUT	**Suturing**		

Of 897 incidents, the associated sharp succeeded in penetrating a single pair of gloves for 45.5% of the injuries (n=408) and double pair of gloves for 4.0% of the injuries (n=36) and in 453 (50.5%) of the cases, no gloves were worn. For those injuries caused by a needle only, 12 (2.4%) were thought to include a safety design. A further 235 of the 498 incidents involving needles, the presence of safety features was unknown. For those items that had no engineered protection, 36.1% were considered preventable if a safety feature had been incorporated according to incidents reported in the EPINet. Injured employees also felt that other engineering, administrative or prevention practices besides an engineered protection for that device could have prevented 46.7% of the NSI and sharps exposures. Only 47 (5.3%) of the reported incidents recorded the depth of injury involving a severe, deep stick, or cut with profuse bleeding. The vast majority of incidents involved moderate skin puncture with some bleeding (n=407 or 45.5%) or superficial, little or no bleeding (n=440, 49.2%), respectively which carry a lower risk of pathogen transmission. Almost 95% of the incidents where location of injury was reported (n=1023) listed an injury involving the hands. Only

360 (30.8%) of these incidents occurred during the use of the item while 425 (36.4%) of these incidents were because of inappropriate or careless disposal of the items (Figure 5).

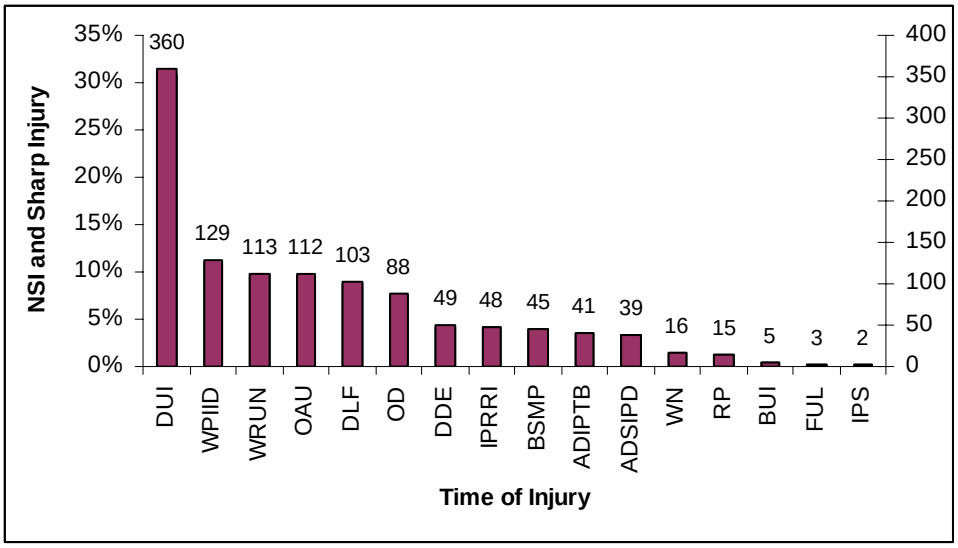

Figure 5. NSI and Sharp Injury vs. Time of Injury (VIHA Jan 2000 - Nov 2005)

DUI	**During use of item**	**BSMP**	**Between steps of a multi-step procedure**
WPIID	**While putting the item into the disposal container**	**ADIPTB**	**After disposal, item protruding from trash bag**
WRUN	**While recapping a used needle**	**ADSIPD**	**After disposal, stuck by item protruding from disposal**
OAU	**Other after use, before disposal**	**WN**	**Withdrawing a needle from rubber or other resistance**
DLF	**Device left on floor, table, bed or other inappropriate**	**RP**	**Restraining patient**
OD	**Other, describe**	**BUI**	**Before use of item**
DDE	**Disassembling device or equipment**	**FUL**	**From item left on or near disposal container**
IPRRI	**In preparation for reuse of reusable instruments**	**IPS**	**Item pierced side of disposal container**

Comparative EPINet™ Data Analysis across four health authorities

The frequency of NSIs across VIHA, FH, IH and NH are compared for the period August 26, 2004 to September 7, 2005[iv], the period for which data were available from WHITE™. Amongst all the HAs, nurses are by far the occupational category with the highest proportion of reported injuries for NSI and other sharp incidents combined, as well as for NSI alone (Table 2). Approximately two-thirds of all reported injuries involve nurses. A further 3-4% of reported injuries were associated with nursing students, certified nursing assistants and home-health assistants; and between 2.1 and 10.7% of all NSIs and other sharps injuries were reported by housekeeping and laundry workers across the four health authorities. One HA captured incident data regarding

[iv] It is important to note that at the time of submitting this report, OHSAH had not obtained permission to report on information below the HA level (i.e. at the Health Service Delivery Area, or the facility level). OHSAH's policy is not to make information obtained from WHITE™ available to third parties without their consent.

physicians; however, physicians are not generally considered as employees of the HAs and therefore are not included in the WHITE™ database.

Table 2. Reported Needlestick Injuries (NSI) by Health Authority and Occupation, August 26, 2004 - Sept 7, 2005*

Health Authority**	Fraser Health	Interior Health	VIHA	Northern Health	Total
No. of NSI and other sharps incidents	204	104	234	28	570
Needlestick and Sharps by Occupation					
Physicians	-	-	16 (6.9%)	-	16 (2.8%)
Nurses	***156 (76.5%)***	***64 (61.5%)***	***139 (59.4%)***	***18 (64.3%)***	***377 (66.1%)***
Nursing Student	-	-	16 (6.8%)	-	16 (2.8%)
Respiratory Therapist	2 (1.0%)	-	6 (2.6%)	-	8 (1.4%)
Surgery and Other Attendant	6 (2.9%)	2 (2.9%)	1 (0.4%)	-	9 (1.6%)
Phlebotomist/Venipuncture/IV team	13 (6.4%)	6 (5.8%)	3 (1.3%)	2 (7.1%)	24 (4.2%)
CNA†/HHA	2 (1.0%)	-	4 (1.7%)	-	6 (1.1%)
Clinical Lab Worker	7 (3.4%)	13 (7.3%)	17 (7.3%)	5 (17.9%)	42 (7.4%)
Technologist (non lab)	8 (3.9%)	3 (2.9%)	4 (1.7%)	-	15 (2.6%)
Housekeeper/Laundry/Security	-	9 (8.7%)	5 (2.1%)	3 (10.7%)	17 (3.0%)
Other	10 (4.9%)	6 (5.8%)	23 (9.9%)	-	39 (6.8%)
Number of Needlestick Injuries	155	83	157	22	417
Needlestick Injuries by Occupation					
Physicians	-	-	6 (3.8%)	-	6 (1.4%)
Nurses	***122 (78.7%)***	***51 (61.4%)***	***102 (65.0%)***	***15 (68.2%)***	***290 (69.5%)***
Nursing Student	-	-	9 (5.7%)	-	9 (2.2%)
Respiratory Therapist	2 (1.3%)	-	6 (3.8%)	-	8 (1.9%)
Surgery and Other Attendant	2 (1.3%)	1 (1.2%)	-	-	3 (0.7%)
Phlebotomist/Venipuncture/IV team	12 (7.7%)	6 (7.2%)	3 (1.9%)	2 (9.1%)	23 (5.5%)
CNA/HHA	2 (1.3%)	-	2 (1.3%)	-	4 (1.0%)
Clinical Lab Worker	7 (4.5%)	12 (14.5%)	10 (6.4%)	3 (13.6%)	32 (7.7%)
Technologist (non lab)	4 (2.6%)	1 (1.2%)	4 (2.5%)	-	9 (2.2%)
Housekeeper/Laundry	-	6 (7.2%)	2 (1.3%)	2 (9.1%)	10 (2.4%)
Other	4 (2.6%)	6 (7.2%)	13 (8.2%)	-	23 (5.5%)

***period chosen as it is the only period for which data are availabe for the four HAs using WHITE™**
**** One of the Health Authorities did not give OHSAH permission to release the data to the Minister by Health Service Delivery Area, or Facility. Thus, while these data are available, these fields are not included in this report. †CNA represents Certified nursing assistant; HHA represents Home-Health assistant**

The frequency and rate per 100 person-years of NSIs by sub-sector, acute department and occupation are reported for only two of the four health authorities (Table 3) because of unresolved coding issues. Laboratory workers have the highest rates of NSIs in both health authorities despite the fact that their injuries account for only 4.5 to 14.5% of all NSI injuries as indicated in Table 2.

Table 3. Frequency and rate of Needle Stick injuries by Subsector, Acute Department, and Occupation August 26, 2004 - Sept 7, 2005*

	Fraser Health		Interior Health	
	Number of reported needle-stick injuries	**Needle-stick rates (per 100 person-years)**	**Number of reported needle-stick injuries**	**Needle-stick rates (per 100 person-years)**
Overall	154	1.4	79	0.8
Sub-sector				
Acute care	***134***	***1.9***	***67***	***1.1***
Community	11	0.6	4	0.2
Long term care	6	0.3	8	0.4
Corp. office	2	0.5	0	0.0
Acute Department				
ICU	***8***	***2.9***	1	0.6
ER	8	1.7	5	2.1
Rehab/extended care	4	0.9	3	0.5
General Med	***46***	***3.0***	***18***	***2.3***
Surgery/OR	***26***	***3.1***	***11***	***1.6***
Psych	0	0	2	1.5
Pediatric	0	0	1	2.5
Admin/HR Finance	3	0.5	0	0.0
Maintenance	2	0.2	6	1.0
Lab	***29***	***2.7***	***12***	***2.0***
Health Services	6	1.1	4	0.4
Float Staff	2	1.9	2	1.3
Occupation				
Registered Nurses (RN)	***109***	***2.7***	35	1.3
Licensed Practical Nurses (LPN)	***9***	***1.9***	***12***	***2.1***
Care Aide (CA)	6	0.4	7	0.4
Facility support services	1	0.2	4	0.4
Health sciences professionals	8	0.6	8	0.8
Management and clerk	0	0	1	0.1
Admin/HR Finance	0	0	0	0.0
Maintenance	1	0.7	0	0.0
Lab	***20***	***10.5***	***10***	***6.1***
Health Services	0	0	1	0.1
Excluded and unknown	0	0	1	1.1

***period chosen as it is the only period for which data are availabe for the four HAs using WHITE™**

Comparison of rates of reported injury in acute departments between FH and IH demonstrate injury rates in FH Surgery/Operating Rooms being much higher than for IH (3.1 per 100 person-years versus 1.6 per 100 person-years, respectively). Similarly, the rate of injury is more than double for the occupation 'registered nurses' at FH (2.7 per 100 person-years) compared to IH (1.3 per 100 person-years). Within occupation however, the rate among 'general medical nurse' at IH is greater than that of 'surgical/OR nurse', whereas the opposite is true at FH.

When examining injury incidents by source, user, purpose and occasion, approximately 1 in 5 injuries did not occur to the original user of the sharps implement (Table 4). Moreover, between 32.7 and 50% of injuries in these four HAs occurred after the use of the implement but before disposal, a finding consistent with the VIHA data presented above.

Table 4. Needle Stick injuries, source, user, purpose and occasion by Health Authority

	Fraser Health	Interior Health	VIHA	Northern Health
	Reported needle-stick injuries			
Overall	**155 (100%)**	**83 (100%)**	**157 (100%)**	**22 (100%)**
Type of Sharp Instrument	**156 (100%)**	**85 (100%)**	**157 (100%)**	**22 (100%)**
Disposable syringe [a]	62 (39.7%)	40 (47.1%)	50 (31.8%)	14 (63.6%)
Other syringe [b]	11 (7.1%)	4 (4.7%)	6 (3.8%)	3 (13.6%)
Needles on IV/catheter [c]	39 (25.0%)	16 (18.8%)	57 (36.3%)	1 (4.5%)
Other needle [d]	44 (28.2%)	25 (29.4%)	44 (28.0%)	4 (18.2%)
Original User	**156 (100%)**	**85 (100%)**	**156 (100%)**	**22 (100%)**
Yes	110 (70.5%)	56 (65.9%)	99 (63.5%)	15 (68.2%)
No	19 (12.2%)	19 (22.4%)	19 (12.2%)	6 (27.3%)
Unknown	27 (17.3%)	10 (11.8%)	36 (23.1%)	1 (4.5%)
N/A	-	-	2 (1.3%)	-
Purpose for Sharps Use	**156**	**85 (100%)**	**157 (100%)**	**22 (100%)**
Injection into skin [e]	63 (40.4%)	38 (44.7%)	72 (45.9%)	11 (50.0%)
Injection into IV [f]	14 (9.0%)	9 (10.6%)	36 (22.9%)	1 (4.5%)
Suturing[g]	5 (3.2%)	-	-	1 (4.5%)
Obtain Sample [h]	40 (25.6%)	22 (25.9%)	34 (21.7)	6 (27.3%)
Other	13 (8.3%)	7 (8.2%)	1 (0.6%)	2 (9.1%)
Unknown	21 (13.5%)	9 (10.6%)	14 (8.9%)	1 (4.5%)
Occasion	**137 (100%)**	**85 (100%)**	**150 (100%)**	**22 (100%)**
During use of sharp [i]	39 (28.5%)	17 (20.0%)	47 (31.3%)	4 (18.2%)
After use but before disposal [j]	61 (44.5%)	37 (43.5%)	49 (32.7%)	11 (50.0%)
During disposal	15 (10.9%)	13 (15.3%)	23 (15.3%)	4 (18.2%)
After disposal [k]	12 (8.8%)	17 (20.0%)	21 (14.0%)	3 (13.6%)
Other	10 (7.3%)	1 (1.2%)	10 (6.7%)	-

[a]Disposable syringe: insulin, tuberculin, 20-25-gauge needle, other
[b]Other syringe: Pre-filled cartridge syringe, blood gas syringe, and syringe other type
[c]Needles on IV/catheter: Winged steel needle, IV catheter stylet, vacuum tube blood collection, spinal or epidural needle, arterial catheter introducer needle, central line catheter, drum catheter, other vascular catheter needle
[d]Other needle: unattached hypodermic needle, not sure what kind, other needle
[e]Injection into skin: intra-muscular, subcutaneous, other through skin; heparin or saline flush
[f]Injection into IV: into IV site, to connect IV line, to start IV or set up Heparin Lock; to place an Arterial/Central line
[g]Surgery: suturing, cutting, drilling, electrocautery
[h]Obtain sample: draw venous blood, draw arterial blood; obtain body fluid or tissue sample; finger stick/heel stick;, contain a specimen or Pharmaceutical glass item
[i] During use: between steps of multi-step procedure (item slipped, patient jarred item); withdrawing needle from rubber or other resistant material.
[j]After use but before disposal: disassembling device or equipment; in preparation for reuse (sorting, disinfection, sterilizing); while recapping used needle; in transit to trash, cleaning;
[k]After disposal: device left on floor, table, bed or other inappropriate place; item left on or near disposal container; item protruding from opening of disposal container; item pierced side of disposal container; item protruded from trash bag or inappropriate waste container

International Comparison

An institutional comparison of annual NSI rates per 100 beds from the Canadian Needlestick Surveillance Network (CNSSN), [14] is made using the most recent data reported by the network, April 1st 2000 to March 31st 2002 (Table 5). According to these data, there were 2,621 reported occupational exposures in the 12 participating sites with an overall rate of exposure of 3.8 per 100 full time equivalents (FTEs) or 15.3 exposures per 100 beds. For needle stick injuries (NSIs) the rate was 10 exposures per 100 beds while for splash injuries this was 2.1 per 100 beds.

Table 5: Comparative NSI Rates per 100 Beds per Year

Data Source	NSI Rate /100 Beds/Year	Time Period
EPINet™ VIHA		
- Hospital 1	7.80	March 31, 2000 – March 30, 2002
- Hospital 2	3.69	
- Hospital 3	7.07	
Canadian Needlestick Surveillance Network (CNSSN)	10	April 1, 2000 – March 31, 2002
EPINet™ USA		
- Non-teaching hospitals	18.70	January 1, 2003 – December 31, 2003
- Teaching hospitals	26.80	

The injury rate for the similar period from US EPINet data estimated NSI rates of 23.9 per 100 beds among 48 comparable facilities including 10 teaching hospitals (26.8 per 100 beds) and 38 non-teaching hospitals (18.7 per 100 beds). A further comparison between the US EPINet™ data and data from this study focuses on job category (Table 6). The data from VIHA showed that a higher proportion of needlestick injuries occurred among nurses than observed from the US data (63.5% and 50.2% respectively). Additionally, only 7 of the total VIHA needlestick and sharp object injuries reported in 2003 were ascribed to attending physicians (3.1% of total – data not shown). No

incidents were recorded for interns, residents or fellows[v]. Data reported from the US EPINet™ Network for 2003 found that injuries related to attending physician and to interns, residents and fellows made up 182 (10.7%) and 193 (11.4%) of the total respectively (data not shown)..

Table 6. Comparison of Needlestick and Sharp Injury by Job Category, (VIHA and Adjusted U.S. EPINet (2003) Data)

Data Resource	VIHA	US EPINet Data *
Nurse	***141 (63.5%)***	***642 (50.2%)***
Clinical Laboratory Worker	26 (11.7%)	41 (3.2%)
Housekeeper	13 (5.9%)	43 (3.4%)
Other, describe	12 (5.4%)	111 (8.7%)
Other Attendant	7 (3.2%)	38 (2.9%)
Nursing Student	6 (2.7%)	9 (0.7%)
Technologist (non lab)	6 (2.7%)	80 (6.3%)
Phlebotomist/ Venipuncture/ IV Team	4 (1.8%)	91 (7.1%)
Security	3 (1.4%)	2 (0.2%)
Respiratory Therapist	2 (0.9%)	31 (2.4%)
Surgery Attendant	1(0.5%)	153 (11.9%)
CNA/HHA	1(0.5%)	33 (2.6%)
Paramedic	-	2 (0.2%)
Laundry Worker	-	3 (0.2%)
Total Number of NSI Injury Recorded in 2003	222	1279

* US EPINet data was adjusted based on the VIHA job category. Data of Doctors, Medical and other students, Dentist and Dental Hygienist were excluded

Worker Survey Data

The worker survey was conducted within VIHA over a four-month period (October 2003 to February 2004). A total of 1001 participants from 75 departments in three hospitals within VIHA were surveyed including emergency departments, operating rooms, renal units, pediatric, surgical and medical wards, laundry, housekeeping and equipment sterilization processing.

Nine hundred fifty seven of the 1,001 respondents from the survey recalled 453 percutaneous injuries in the 12 months prior to the survey (Table A6-1, Appendix 6.2). Nine hundred fifty of these respondents acknowledged not reporting 355 (78%) of these incidents. For nursing and patient care responders, the percentage of injuries not reported was 81.4%. Of the

[v] For the period January 2000 to November 2005 there were a total of 11 needlestick injuries recorded from interns, fellows and residents making up 0.9% of the total injuries for this period. 41 (3.4%) of injuries were recorded from attending physicians for this period.

nursing staff who responded to this questionnaire (n=573), 23.9% reported one or more needle-stick near-misses in the last year (data not shown), followed by support services (14.7%), therapists and aids (12.5%) and medical technicians (11.8%).

According to the responses given by surveyed healthcare workers the odds of under-reporting exposure incidents are 2.32 times higher among nurses 95%CI (1.27-4.27) as compared to medical technicians (Table 7). Likewise, the risk of under-reporting was statistically elevated among full-time staff (OR=1.79, 95%CI 1.05-3.05) and among workers who regularly cycle through day, evening and night shifts (OR=1.58, 95%CI 1.07-2.33). Respondents from Facility 2 and 3 from this health authority were more likely not to report these injuries compared to those from Facility 1.

Table 7. Odds ratios and 95% confidence intervals (CIs) of unreported percutaneous injuries in relation to workplace predictors in nurses

Variable	Unadjusted OR (95% CI) for unreported percutaneous injury *	p-value
Occupation		
Medical technician	1.00 (ref)	
Support service	0.63 (0.28, 1.44)	0.275
Nurse	**2.32** (1.27, 4.27)	0.007
Therapists and aids	0.98 (0.35, 2.71)	0.967
Other (student, volunteer, doctor, other)	**2.55** (0.93, 7.01)	0.070
Job status		
Casual	1.00 (ref)	
Part time	1.34 (0.72, 2.48)	0.359
Full time	**1.79** (1.05, 3.05)	0.033
Work shift		
Day	1.00 (ref)	
Evening or night	0.43 (0.13, 1.42)	0.164
Not regular	1.49 (0.86, 2.60)	0.158
Day and evening, day and night, or day, evening and night	**1.58** (1.07, 2.33)	0.022
Facility		
1	1.00 (ref)	
2	**2.72** (1.22, 6.10)	0.015
3	**3.36** (1.51, 7.51)	0.003

Note:*Odds Ratios (ORs) derived from logistic regression models

Examining the contributing factors associated with under-reporting among nurses, the odds of not reporting a percutaneous injury by nurses are 1.69 times greater in subjects who felt they are somewhat or very likely to contract a blood borne disease from work as compared to subjects who felt that they are extremely or very unlikely to contract such a disease (Table 8).

Table 8. Odds ratios and 95% confidence intervals (CIs) of unreported percutaneous injuries in relation to predictors in nurses

Variable	Unadjusted OR (95% CI) for unreported percutaneous injury *	p-value
To get a BBF injury from your work		
1 (extremely and very unlikely)	1.00	
2 (unlikely)	1.60 (0.73, 3.50)	0.240
3 (somewhat and very likely)	1.78 (0.93, 3.42)	0.083
To contract a blood borne disease from your work		
1 (extremely and very unlikely)	1.00	
2 (unlikely)	1.31 (0.76, 2.25)	0.331
3 (somewhat and very likely)	**1.69** (1.02, 2.79)	0.041

Summary and Conclusions

This study has demonstrated the successful introduction and implementation of the EPINet™ system at the health authority level as well as its integration into the WHITE™ system as a functional module.

The WHITE™ EPINet™ module now offers BC health authorities an effective tracking system for BBF related exposures through the linkage of EPINet™ data with those in WHITE™, for corrective actions, including enhanced prevention and post exposure management, and the monitoring of interventions to reduce these exposures. A critical use of the WHITE™ EPINet™ module is still to be realized in terms of monitoring the implementation and evaluating the effectiveness of safety engineered devices that are currently being introduced into VIHA as well as other HAs in BC.

VIHA and the other health authorities that are utilizing the WHITE™ EPINet™ module face a number of challenges in order to optimize the value of this system. These include improving the reporting rates of sharps and splash injuries; enhancing data linkages for purposes of providing sharps and splash injury rates as well as device specific injury rates; and capturing and linking cost data for purposes of computing economic impacts of these exposures. Key findings demonstrated by the EPINet™ data and the worker survey include the following:

1. The recorded exposures in the EPINet™ data, even when viewed as under-estimates due to under-reporting, are relatively few in comparison, for example, to musculoskeletal injuries and therefore are likely to have lower direct[vi] and indirect[vii] economic impact. During the period

[vi] **Direct economic impacts**, in this context, usually refer to costs associated with baseline and follow up lab testing of source patient and HCW; the cost of PEP and other treatment; and the costs associated with seroconversion. Direct costs usually excluded from these calculations include fixed costs that may be associated with a needlestick prevention program, such as surveillance, administration, and building space, as these are not directly related to an individual needlestick event. In addition, costs associated with any legal liability or change in compensation premiums is also not usually included in calculations to estimate direct costs.

1995-2004 WorkSafe BC received a total of 101 needlestick injury claims resulting in 988 lost days at a cost of $88,000; at which time there were 1,142 claims for tendonitis from repetitive motion resulting in 100,468 lost days at a cost of $11, 834,000 (see Appendix 7.1 for a further breakdown of these claims to WorkSafe BC.). This does not negate the importance of these BBF injuries and exposures as these carry the risk of developing a severely disabling and potentially fatal disease and must therefore be taken very seriously. Considerable information has been accumulated on source, user, purpose and occasion leading to needle-stick injuries, and these data complement the international literature and support the introduction of safer alternatives.

2. Under-reporting is a major issue. The worker survey revealed that over 80% of needle-stick injuries in nurses go unreported and that those who elect not to report tend to believe that this will not result in corrective action. As mentioned, these data also suggest that those that do not report an exposure may be influenced by a perceived lack of control over the risk itself. These possible reasons for under-reporting of BBF exposures are part of a number of explanations that have been documented and/or suggested in the literature and include perception that the injury did not represent a significant exposure, occupation, years in occupation, lack of knowledge about the reporting mechanism, concern about confidentiality and professional discrimination, loss of pay, fear of reprisal, and time constraints and concern about excessive paperwork[15, 16]. A more recent review of workplace injury reporting trends across a range of industrial sectors emphasizes that under-reporting is promoted by the presence of a poor safety culture and that one aspect critical to the successful implementation of any reporting culture is the need for active and visible management commitment to the scheme[17].

[vii] **Indirect economic impacts** here refer to time and wages, normally associated with assigned responsibilities that are diverted to receiving or providing exposure-related care. This includes lost productivity associated with the time required for reporting and receiving initial and follow-up treatment for the exposure; healthcare provider time to evaluate and treat an employee; and healthcare provider time to evaluate and test the source patient, including obtaining informed consent for testing if applicable. Various indirect intangible costs are usually not part of this calculation, such as any pain and suffering or societal impact resulting from an exposure or seroconversion.

3. An additional reason for under-reporting that became evident during the analysis of the EPINet™ data because of the apparent the exclusion of incidents suffered from contracted workers and physicians. While missing data from contract workers may not be viewed as under-reporting, as these workers are not currently expected to report exposure incidents into the EPINet™ system, these incidents are occurring within the VIHA domain and require attention[viii]. Furthermore, these contracted workers do not work in isolation and have contact with direct VIHA employees. Regarding missing data from physicians, it has been mentioned that these HCWs need to be linked into the WHITE™ data system so that reported injuries from them can be entered directly into the WHITE™ EPINet™ module, a step that will require coordination with the payroll and financial reporting departments among the HAs using the WHITE™ database. Whatever the explanations for under-reporting, these have serious implications for post-exposure prophylaxis as well as prevention strategies, and must be addressed through clear policy directives and support mechanisms. This is clearly a key area for further investigation.

4. The group that sustains the majority of both needle-stick and splash injuries in healthcare is nurses. This is in keeping with data on workplace needlestick injury claims received by WorkSafeBC in which 49.6% of 488 claims over the period 1995-2004 were from registered nurses (Appendix 7.2). This suggests that particular attention needs to be given to this occupational category. However, all occupational groupings suffered exposures meaning that prevention and control measures need to be pervasive across the healthcare environment. This is

[viii] VIHA has contracted out aspects of food handling and cleaning services to two agencies that are part of the same holding group. This group has developed a 'Sharps Alert' to be completed by outsourced employees working in VIHA from these two agencies in the event of any exposure. Completed forms are then submitted to various VIHA and sub contracted agency individuals / committees (in effect since September 2005). No summary data based on these reports was available at the time of preparing this report. See Appendix 8 and 9 for reproduced copies of these 'Sharps Alert' forms.

especially important for those occupations that do not normally handle sharps and who are affected by so called 'downstream' exposures.

5. Despite that the majority of splash injuries involve exposures to the head, less than 10% of those reporting these exposures acknowledged wearing PPE which is in keeping with studies conducted elsewhere[18]. Furthermore, it appears that adherence to standard precautions and procedures such as proper disposal of sharps, not recapping needles, and avoiding leaving sharps in inappropriate places (such as improved usage of neutral zones) may reduce more than one third of reported percutaneous injuries[ix]. It is important to emphasize that although injuries from protective needle devices are infrequent, the use of such devices does not eliminate exposure. Further many items do not have protective alternatives at this time. Thus the need for PPE and well-designed, puncture-resistant sharps disposal containers for BBF related exposures will remain[19]. These control measures require urgent attention.

6. The Acute Care setting is where the risk is highest; however, risk of exposures also occurs in Long-Term Care and the Community setting. While Operating Room, Surgical Staff, General Medical Staff and ICU Staff seem to have particularly elevated risks compared to most other occupational groups in the acute patient care setting, the highest risk group is Laboratory Workers when one converts exposure frequencies to rates. Thus, while all groups need attention, priority should be given to those groups with the highest rates of injuries.

7. Rate comparisons across HAs based on full time equivalent (FTE) personnel were limited because of issues related to coding of job categories among payroll data. Only for two of the HAs (FH and IH) were data linkages between EPINet™ data and payroll data possible, allowing comparisons of needlestick injury rates per 100 person-years by nature of facility, type of acute

[ix] The work practice control called the "neutral zone" is a technique for passing instruments on a basin or tray instead of from hand to hand and serves as an effective method for reducing injuries in the surgical setting.

department and occupation. These data linkages are not yet established for the remaining two HAs (VIHA and NH). Despite these limitations the data collected identified the rate of injury and incident in Surgery/Operating Room-FH (3.1 per 100 person-years) is much higher than that for IH (1.6 per 100 person-years). While there are several possible explanations for these differences, including differences in the nature of the procedures undertaken and differences in reporting, it is possible that there are effective prevention and control measures used in the Surgical/OR of IH that could be explored by FH.

8. Comparisons of the VIHA data to injury rates among healthcare institutions in the US are limited because BC rates (as well as those reported by the CNSSN) are likely to suffer from more severe under reporting than those from the US where engineering controls have been mandatory since 2000. Moreover, the authors of the US report show that injury rates increased with higher average daily census (ADC). The rates reported for hospitals with ADC's of less than 100, 100 – 300 and greater than 300 were 18.0, 21.5 and 24.8 per 100 beds respectively[20]. Other limitations with international comparisons include the teaching status of the reporting hospitals which will result in a mix of patients and potentially more complex of procedures, as well as the inclusion of physicians in US EPINet reports. These differences also impact on the comparison of nurse reported injuries which accounted for 63.5% of injuries at VIHA but only 50.2% of injuries in the US EPINet™ Network data.

9. The survey data results obtained from healthcare workers at VIHA indicated a very high rate of under-reporting of injuries. These high rates of under-reporting are in keeping with other studies in the literature and range from 40-70% for NSI [21] and 26-85% for sharps injuries[22]. While this can be accounted for in part by inappropriate risk perception it also suggests that the more a person feels they have lost control over this risk the more the person is likely to shy away from reporting an exposure. This may be explained also by a belief that reporting an incident will not

impact on the outcome and/or help prevent further occurrences and/or provide the person with meaningful support. Current research undertaken by OHSAH seeks to examine the issue of under reporting among HCWs in BC.

Implication for Future Research on Occupational Health

Future research on EPINet™

The findings in this report highlight the need for future research regarding the use of the WHITE™ EPINet™ module to reduce the risk of splash and needle stick injuries among HCWs.

1. A critical issue associated with the use of EPINet™ data for evidence-based policy decisions is the quality of the data. The results of this report confirm the observations of other EPINet™ users regarding the under-reporting of incidents, particularly splash BBF exposures. Research in needed to evaluate interventions to reduce under-reporting. In part this issue can be addressed through training and education. Other activities that might serve to increase the likelihood of reporting include posting of signs and flyers and the use of formal and informal discussion groups. Additional research to assess specific exposures, not captured by the WHITE™ EPINet™ module, to contracted workers, including medical staff, is also required including investigating approaches to sharing information and harmonizing prevention approaches between outsourced agencies and VIHA[x]. Incomplete data capture from physicians is of particular concern. Surveillance data captured elsewhere consistently shows that this is a high-risk group that tends to under-report BBF exposures. For example, Tandberg and Stewart showed that emergency physicians formally reported only one eighth of their injuries compared with their emergency medical technician and nursing colleagues[23]. Specifically, with management

[x] OHSAH and the School of Occupational and Environmental Hygiene at UBC have recently received a development grant from WorkSafe BC to help develop the protocol and project scope to examine current measures for controlling exposure to cleaning chemicals and how they relate to asthma risk. This will include developing collaborative relationships between the contractors of out sourced cleaning staff and the health authorities.

level support, each health authority should formulate a policy to encourage reporting across all occupation categories and develop adequate systems and data linkages to facilitate this.

2. A further aspect of the EPINet™ system that requires enhancement is the ability to monitor and evaluate safety-engineered devices. As mentioned earlier, provincial workplace regulators in Canada are moving towards the requirement of these devices. Health authorities are faced with an overwhelming choice of options and eager suppliers wishing to exploit the opportunities the new regulations might provide. Therefore, there is a clear need to establish a systematic procedure to screen, evaluate, test, and finally select the appropriate safety device for a particular application. At present, assessments of the number of injuries caused by specific devices used by department or site, based on timing of device roll-out, or comparisons within departments over time are the only means of providing a comparative measure of the impact of new devices on lowering injury rates. However, comparisons across acute care settings, where exposures are most frequent, are confounded by differences in the degree of acute care offered and the intensities and complexities of risk procedures in these settings. This necessitates a comparison of injury rates attributed to specific devices and requires an estimation of device usage as a denominator in the rate calculation. It is important to emphasize that the EPINet™ system was designed precisely for this application, viz. to evaluate medical devices in terms of the rate of incidents associated with each class of device[24]. Future research could examine how to integrate denominator data for devices into the EPINet™ system for this purpose. These opportunities must be explored soon because two of the HA's have already introduced engineered solutions to the workplaces and another will do so imminently.

3. There is the need to evaluate the efficacy of safety devices themselves. The Training for Development and Innovative Technologies project (TDICT), based on the San Francisco General campus is one group OHSAH works closely with. This group could collaborate further

to evaluate medical devices as it has developed safety feature evaluation forms for the selection and evaluation of over 20 different medical devices. In addition, TDICT are developing scenarios for simulated testing to approximate the real life use of various products for the medical industry[25]. These approaches are reinforced by recommendations from NIOSH concerning safety feature characteristics for evaluating and selecting needlestick injury prevention products. These include that the device is needleless; the safety feature is an integral part of the device; the device preferably works passively (requires no activation by the user). If user activation is necessary, the safety feature can be engaged with a single-handed technique and allows the worker's hands to remain behind the exposed sharp; the user can easily tell whether the safety feature is activated; the safety feature cannot be deactivated and remains protective through disposal; the device performs reliably; the device is easy to use and practical; and the device is safe and effective for patient care[26]. Encouragement of safety device evaluation using generic assessment forms for those devices and procedures assessed at a local level is a priority.

4. A further area of research concerns the need to adopt proactive infection control measures through the investigation of risk beyond the tracking of incidents and their attribution to specific devices towards uncovering "root causes" of exposures. Moreover, determining underlying causes will better inform choices of appropriate engineered solutions. One example of this approach is a root cause analysis (RCA)[27]. This type of analysis prompts the investigators to ask what happened, how did it happen, why did it happen, and what can be done to prevent it from happening in the future? One suggested area of research is how best to couple incident tracking with RCA in existing health and safety committees (JOSHC) and other groupings responsible for interventions to reduce BBF exposures such as safer sharps committees. These groupings are existing portals of communication that are well placed to draw together information, to interpret the facts, and then to make recommendations regarding a site's needs to enhance their safety and

injury prevention strategy. It is critical that these groupings are bipartite so that employer-employee consensus is achieved concerning the interpretation of data and how to respond.

5. Finally, the means by which the safety culture of the organization can be advanced must be explored, in light of underlying causes and potential solutions, so that efficacious recommendations are also effectively implemented. An important aspect of safety culture has to do with the inclusion of frontline employees in decision-making processes. It is likely that the acceptance of procedure and equipment changes in the workplace is likely to be associated with the level of involvement of worker representatives in this process. Future research could evaluate the effectiveness of participatory mechanisms, such as bipartite safer sharps committees at the department level, for these purposes.

Providing support to heath authorities

One area where OHSAH has already provided substantial support to the health authorities is by incorporating the EPINet™ tracking system with the WHITE™ database currently operational in four health authorities. As mentioned, the WHITE™ system provides much more information with which incidents can be examined (contributing factors, shift time, etc) than simply relying on the data available through EPINet™ alone. Moreover incident and WorkSafeBC claim reporting modules are integral to WHITE™ and allow for evaluation of incidents in terms of lost time and cost of claims.

Additionally, OHSAH is providing scientific support to VIHA and VCH as they develop and implement their ECPs. This agency is a standing member of the VIHA and VCH committees overseeing the implementation of their BBF-ECPs. Once implementation is complete, we will guide the implementation and analyze and report on the post-implementation survey for these two Health Authorities.

Finally, OHSAH has archived in web-based format relevant resources, references, and links for all health authorities to access. This archive includes summaries of current literature regarding BBF, regulatory updates, safety engineered devices evaluation, and information exchanges, and will be regularly updated[28].

Safety culture and behaviour

The under-reporting of exposure events is a sign that information that could potentially be gained is under valued. It is also a symptom of less than optimal relationships between the practitioners of workplace wellness, the workers at risk of injury, and the management of the health authority. Changes to advance the safety culture in the healthcare workplace with respect to BBF exposures should be researched further but some recommendations could be implemented forthwith. These include the following:

- Management should have a clear policy that indicates the value of reporting all needlestick and splash incidents, in order for appropriate safety procedures to be developed. The policy must encourage staff to report all incidents but in a manner that does not increase worker anxiety or leave them feeling that their employment is at risk but gives the message that these injuries are not merely an inevitable outcome of practice. The benefits of comprehensive data collection of incidents will contribute to the local as well as national and international body of knowledge.
- Front-line HCWs should receive 'report-backs' regarding frequency and rates of incidents for their departments and sites, as should JOSH committees.
- Workers must be fully engaged in the screening, evaluation, piloting and selection of all safety engineered products to maximize opportunities where workers' observations can be shared and ultimately to facilitate acceptance of change.

- The tracking of communication activities to support an improvement in safety culture and behaviour is required to assess the effectiveness of these interventions.
- Training and education for all levels of employees in all aspects of sharp/BBF exposure prevention is a key feature of the ECP. Accountability and responsibility for exposure prevention is multi-disciplinary and should be a priority at all levels of the organization. Compliance with relevant legislation and directives, together with evidence-based practice should be emphasized.

Policy and Prevention

Identification of policy and prevention implication arising from the research

The review of the EPINet™ data for VIHA suggests a number of policy considerations. These include the following and are in keeping with international recommendations to implement a hierarchy of controls starting with the **elimination** of unnecessary sharps and injections to eliminate the hazard. For example, many of the needlesticks and sharp injuries are from the use of unnecessary needles. These include needles used to connect IV lines or access IV ports in order to draw blood from intravenous, arterial or central lines. These needles could be replaced by 'needle-less' or blunt cannula devices[29]. In addition, needles on syringes sometimes used as laboratory tools can also be eliminated. Eliminating unnecessary injections by using oral instead of injectable medications eliminates the hazard.

Engineering controls are the second most effective measure in the hierarchy of controls. Safer needle devices have been shown to reduce 62 to 88% of all needlestick injuries[30, 31] . Results show that a large percentage of needlestick injuries were from hollow-bore needles, which can be mostly replaced by safety engineered devices.

Administrative and work practice controls, such as educating workers about hazards, reporting of exposures, implementing universal precautions, eliminating needle recapping, and providing sharps containers for easy access that are within sight and arm's reach, are the third measure in the hierarchy of controls and are emphasized in the current WorkSafeBC regulations.

1. The problem of incident under-reporting has been emphasized throughout the report and is an important aspect of administrative controls. WorkSafe BC requires that employers initiate investigations into accidents and incidents for employees that fall under their jurisdiction. The WHITE™ EPINet™ system is an effective tool to alert employers to those incidents that warrant further investigation either on an individual basis or in response to grouped incidents by facility, occupational category, department and device..

2. This report has suggested that Root Cause Analysis investigation is one consideration for probing more deeply into BBF incidents. However, a growing category of workers that are falling outside the scope of these measures are physicians and outsourced employees. Policies are required on how to effectively capture exposure incidents related to these workers as well as prevention programs to reduce exposures and monitor these incidents. This entails establishing minimum requirements for medical staff as well as contracted agencies and ensuring that they adhere to those. Also required are guidelines for coordination between health and safety departments within the health authorities and the medical staff or outsourced agencies. These guidelines must supplement the requirement for such coordination as stipulated in the workers Compensation Act[xi].

[xi] Section 118 (1) of the Act requires that the prime contractor of a multiple-employer workplace must ensure that the activities of employers, workers and other persons at the workplace relating to occupational health and safety are coordinated.

3. The data presented also demonstrate the inadequate use of appropriate PPE. Specific safe work procedures, as part of exposure control plans, need to be developed and followed based on the results of work place risk assessment and previous injury records. In a study involving three Virginia hospitals, Jagger found a 59% reduction in IV access needle injuries following an education program and implementation of universal precautions. There was an additional 84% reduction in injuries after implementation of a safety IV catheter[32].

4. Studies from NIOSH[33] and CDC[34] confirm the results of our study that a high proportion of total injuries occur in the operating room. In addition to introducing safe needle technologies, we support the adoption of the "neutral zone" procedure where instruments are placed in a basin or on a tray instead of being handed from one person to another. This procedure has been recommended as an effective safe work practice for reducing injuries in surgical settings.[35] A trial of this procedure in BC is warranted.

As a necessary component of any successful safety strategy and in addition to the implementation of safety engineered devices, health authorities must provide adequate **training and education** related to the new technology. In the US, the Needlestick Safety and Prevention Act requires that employers include non-managerial frontline healthcare employees in the process of evaluating and selecting safe engineered devices[36]. Some health authorities in BC have already integrated this inclusive device-selection process into their BBF exposure control plan initiatives[37]. One potential resource is the Needlestick Safety and Prevention Guide provided by the America Nursing Association (ANA). It is structured as a three-step process for device selection, which includes screening devices, simulation exercises, and pilot testing prior to making the final decision[38]. Training and education are essential for all aspects of an ECP and should be provided consistently and regularly to HCWs to increase awareness of and ensure compliance with safety policy and prevention measures.

Finally, it is critical to emphasize that **management commitment** to occupational health is essential for prevention. Management commitment to safety can be demonstrated through allocation of necessary resources and delegation of authority to groupings such as BBF prevention committees charged with monitoring the exposure control plan and the evaluation and selection of control measures including safer needle devices[39].

An identification of relevant user groups for the research results

The results of this study should benefit all of those health authorities using the EPINet™ system within BC including four of the six health authorities that have this incorporated as a WHITE™ module. The report should also be of interest to workplace health and safety personnel throughout the health sector in BC, as well as joint occupational health and safety committees and union representatives. It is expected that the information in this report will be of special interest to all of those working towards the introduction of safety engineered devices throughout BC.

A description of any policy-related interactions undertaken by the applicant

OHSAH has been involved with the VIHA BBF Steering Committee since it was initiated in January 2003. OHSAH has assisted this committee with its ongoing activities including help with the establishment of the EPINet™ database and its integration into WHITE™, providing EPINet™ educational sessions to VIHA employees, overseeing the organization of an authority wide BBF educational campaign, participating in reviewing terms and references for the committee and reviewing roles and responsibilities of the stakeholders, assisting with the collaboration and communication among VIHA senior managements, union representatives, OHS personnel, and joint health and safety committee members, assisting the authority with moving towards implementation of safe needle technologies, and most recently, developing the safe needle devices roll out strategy.

OHSAH has also presented the results of the worker survey and prepared dissemination materials on the survey results. OHSAH will lead the follow up survey, which will be conducted after the ECP implementation, during 2006.

Currently, OHSAH is actively involved in the VIHA BBF ECP development and implementation stages. In addition to participating in the monthly steering committee meeting and helping to review and finalize the VIHA BBF ECP document, OHSAH has also developed a BBF ECP Implementation Plan for VIHA detailing the communication strategies, actions, and time lines to follow. OHSAH is also assisting with the development of a Risk Assessment Tool, a BBF ECP Implementation Checklist for Unit Managers, and a BBF Inspectional Checklist in collaboration with WorkSafeBC and VIHA Workplace Wellness personnel.

Dissemination/Knowledge Transfer

Scientific publications

OHSAH is considering three publications from this work. The first is a "lessons learned paper" reflecting on the development and implementation of the EPINet™ system, within the context of an Exposure Control Plan, into the health authorities in BC. The second is a paper focusing on the determinants of under-reporting of BBF exposures. The third is a paper that looks more closely at the 'near-miss' data collected through the worker survey at VIHA and also implemented at FH and VCH.

Knowledge Transfer

WHITE™ EPINet™ Reports

OHSAH has submitted a report to the Ministry of Health analyzing needlestick injuries across those authorities using the WHITE™ EPINet™ module and is currently finalizing standard reports for ongoing dissemination of WHITE™ EPINet™ data to these health authority users.

OHSAH Website

Findings and insights from this study will be added to the OHSAH website and the report will be posted on the website.

Health Authority Presentations

OHSAH has made various presentations highlighting the EPINet™ system as well as the analysis of data collected through EPINet™ to the Health Authorities.

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Appendices

Appendix 1: Needlestick and Sharp Object Injury Report

Needlestick & Sharp Object Injury Report

EPINet™ FOR MICROSOFT® ACCESS
EXPOSURE PREVENTION INFORMATION NETWORK

V1.2/US 3/2001

Last Name: _____ First Name: _____

Injury ID: *(for office use only)* S_____ Facility ID: *(for office use only)* _____ Completed By: _____

1) Date of Injury: ☐☐ ☐☐ ☐☐☐☐ 2) Time of Injury: ☐☐

3) Department where Incident Occurred: _____

4) Home Department: _____

5) **What is the Job Category of the Injured Worker:** (check one box only)

- ☐ 1 Doctor *(attending/staff)*; specify specialty _____
- ☐ 2 Doctor *(intern/resident/fellow)* specify specialty _____
- ☐ 3 Medical Student
- ☐ 4 Nurse: specify ☐ 1 RN ☐ 2 LPN ☐ 3 NP ☐ 4 CRNA ☐ 5 Midwife
- ☐ 5 Nursing Student
- ☐ 18 CNA/HHA
- ☐ 6 Respiratory Therapist
- ☐ 7 Surgery Attendant
- ☐ 8 Other Attendant
- ☐ 9 Phlebotomist/Venipuncture/IV Team
- ☐ 10 Clinical Laboratory Worker
- ☐ 11 Technologist *(non-lab)*
- ☐ 12 Dentist
- ☐ 13 Dental Hygienist
- ☐ 14 Housekeeper
- ☐ 19 Laundry Worker
- ☐ 20 Security
- ☐ 16 Paramedic
- ☐ 17 Other Student
- ☐ 15 Other, describe: _____

6) **Where Did the Injury Occur?** (check one box only)

- ☐ 1 Patient Room
- ☐ 2 Outside Patient Room *(hallway, nurses station, etc.)*
- ☐ 3 Emergency Department
- ☐ 4 Intensive/Critical Care unit: specify type: _____
- ☐ 5 Operating Room/Recovery
- ☐ 6 Outpatient Clinic/Office
- ☐ 7 Blood Bank
- ☐ 8 Venipuncture Center
- ☐ 9 Dialysis Facility *(hemodialysis and peritoneal dialysis)*
- ☐ 10 Procedure Room *(x-ray, EKG,etc)*
- ☐ 11 Clinical Laboratories
- ☐ 12 Autopsy/Pathology
- ☐ 13 Service/Utility *(laundry,central supply,loading dock,etc)*
- ☐ 16 Labor and Delivery Room
- ☐ 17 Home-care
- ☐ 14 Other, describe: _____

7) **Was the Source Patient Identifiable?** (check one box only)
☐ 1 Yes ☐ 2 No ☐ 3 Unknown ☐ 4 Not Applicable

8) **Was the Injured Worker the Original User of the Sharp Item?** (check one box only)
☐ 1 Yes ☐ 2 No ☐ 3 Unknown ☐ 4 Not Applicable

9) **The Sharp Item was:** (check one box only)

- ☐ 1 Contaminated (known exposure to patient or contaminated equipment)
- ☐ 2 Uncontaminated (no known exposure to patient or contaminated equipment)
- ☐ 3 Unknown

was there blood on the device? ☐ 1 Yes ☐ 2 No

10) **For What Purpose was the Sharp Item Originally Used?** (check one box only)

- ☐ 1 Unknown/Not Applicable
- ☐ 2 Injection, Intra-muscular/Subcutaneous, or Other Injection through the Skin *(syringe)*
- ☐ 3 Heparin or Saline Flush *(syringe)*
- ☐ 4 Other Injection into *(or aspiration from)* IV injection site or IV Port *(syringe)*
- ☐ 5 To Connect IV line *(intermittent IV/piggyback/IV infusion/other IV line connection)*
- ☐ 6 To Start IV or Set up Heparin Lock *(IV catheter or winged set-type needle)*
- ☐ 7 To Draw Venous Blood Sample
- ☐ 8 To Draw Arterial Blood Sample
- ☐ 16 To Place an Arterial /Central Line
- ☐ 9 To Obtain a Body Fluid or Tissue Sample *(urine/CSF/amniotic fluid/other fluid, biopsy)*
- ☐ 10 Finger stick/Heel Stick
- ☐ 11 Suturing
- ☐ 12 Cutting
- ☐ 17 Drilling
- ☐ 13 Electrocautery
- ☐ 14 To Contain a Specimen or Pharmaceutical *(glass item)*
- ☐ 15 Other; Describe _____

if used to draw blood was it? ☐ Direct stick? ☐ Draw from a Line?

11) **Did the Injury Occur?** (check one box only)

- ☐ 1 Before Use of Item *(item broke/slipped, assembling device, etc.)*
- ☐ 2 During Use of Item *(item slipped, patient jarred item, etc)*
- ☐ 15 Restraining patient
- ☐ 3 Between Steps of a Multi-step Procedure *(between incremental injections, passing instruments, etc.)*
- ☐ 4 Disassembling Device or Equipment
- ☐ 5 In Preparation for Reuse of Reusable Instrument *(sorting, disinfecting, sterilizing, etc.)*
- ☐ 6 While Recapping Used Needle
- ☐ 7 Withdrawing a Needle from Rubber or Other Resistant Material *(rubber stopper, IV port, etc.)*
- ☐ 16 Device Left on Floor, Table, Bed or Other Inappropriate Place
- ☐ 8 Other After Use-Before Disposal *(in transit to trash, cleaning, sorting, etc.)*
- ☐ 9 From Item Left On or Near Disposal Container
- ☐ 10 While putting Item into Disposal Container
- ☐ 11 After Disposal, Stuck by Item Protruding from Opening of Disposal Container
- ☐ 12 Item Pierced Side of Disposal Container
- ☐ 13 After Disposal, Item Protruded from Trash Bag or Inappropriate Waste Container
- ☐ 14 Other: Describe: _____

1 of 3

12) What Type of Device Caused the Injury? (check one box only)

- ☐ Needle-*Hollow Bore*
- ☐ Surgical
- ☐ Glass

Which Device Caused the Injury? (check one box from one of the three sections only)

Needles *(for suture needles see "surgical instruments")*

- ☐ 1 Disposable Syringe
  - ☐ a Insulin
  - ☐ b Tuberculin
  - ☐ c 24/25-gauge needle
  - ☐ d 23-gauge needle
  - ☐ e 22-gauge needle
  - ☐ f 21-gauge needle
  - ☐ g 20-gauge needle
  - ☐ h "Other"
- ☐ 2 Pre-filled cartridge syringe (includes Tubex™ *, Carpuject ™* -type syringes)
- ☐ 3 Blood gas syringe (ABG)
- ☐ 4 Syringe, other type
- ☐ 5 Needle on IV line *(includes piggybacks & IV line connectors)*
- ☐ 6 Winged steel needle *(includes winged-set type devices)*
- ☐ 7 IV catheter stylet
- ☐ 8 Vacuum tube blood collection holder/needle *(includes Vacutainer™ *–type device)*
- ☐ 9 Spinal or Epidural Needle
- ☐ 10 Unattached hypodermic needle
- ☐ 11 Arterial catheter introducer needle
- ☐ 12 Central line catheter needle *(cardiac, etc.)*
- ☐ 13 Drum catheter needle
- ☐ 14 Other vascular catheter needle *(cardiac, etc.)*
- ☐ 15 Other non-vascular catheter needle *(ophthalmology, etc.)*
- ☐ 28 Needle, not sure what kind
- ☐ 29 Other needle, please describe: _____

Surgical Instrument or Other Sharp Items *(for glass items see "glass")*

- ☐ 30 Lancet (finger or heel sticks)
- ☐ 31 Suture needle
- ☐ 32 Scalpel, reusable *(scalpel, disposable code is 45)*
- ☐ 33 Razor
- ☐ 34 Pipette *(plastic)*
- ☐ 35 Scissors
- ☐ 36 Electro-cautery device
- ☐ 37 Bone cutter
- ☐ 38 Bone chip
- ☐ 39 Towel clip
- ☐ 40 Microtome blade
- ☐ 41 Trocar
- ☐ 42 Vacuum tube *(plastic)*
- ☐ 43 Specimen/Test tube *(plastic)*
- ☐ 44 Fingernails/Teeth
- ☐ 45 Scalpel, disposable
- ☐ 46 Retractors, skin/bone hooks
- ☐ 47 Staples/Steel sutures
- ☐ 48 Wire *(suture/fixation/guide wire*
- ☐ 49 Pin *(fixation, guide pin)*
- ☐ 50 Drill bit/bur
- ☐ 51 Pickups/Forceps/Hemostats/Clamps
- ☐ 58 Sharp item, not sure what kind
- ☐ 59 Other sharp item: Describe: _____

Glass

- ☐ 60 Medication ampule
- ☐ 61 Medication vial *(small volume with rubber stopper)*
- ☐ 62 Medication/IV bottle *(large volume)*
- ☐ 63 Pipette *(glass)*
- ☐ 64 Vacuum tube *(glass)*
- ☐ 65 Specimen/Test tube *(glass)*
- ☐ 66 Capillary tube
- ☐ 67 Glass slide
- ☐ 78 Glass item, not sure what kind
- ☐ 79 Other glass item: Describe: _____

12a) Brand/Manufacturer of Product: (e.g. ABC Medical Company) _____

12b) Model:

☐ 98 Please Specify: _____ ☐ 99 Unknown

13) If the Item Causing the Injury was a Needle or Sharp Medical Device, Was it a" Safety Design" with a Shielded, Recessed, Retractable, or Blunted Needle or Blade?

- ☐ 1 Yes
- ☐ 2 No
- ☐ 3 Unknown

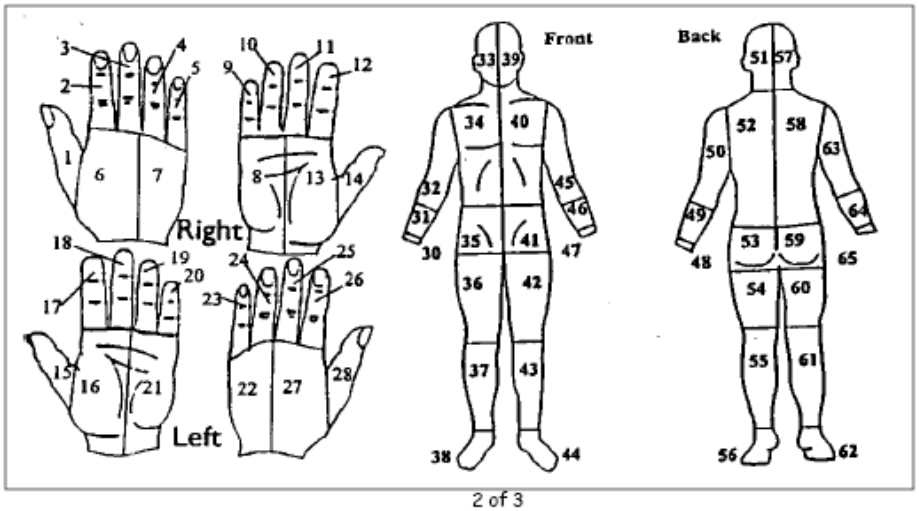
13a) Was the Protective Mechanism Activated?

- ☐ 1 Yes, fully
- ☐ 2 Yes, partially
- ☐ 3 No
- ☐ 4 Unknown

13b) Did Exposure Incident Happen?

- ☐ 1 Before activation
- ☐ 2 During activation
- ☐ 3 After activation
- ☐ 4 Unknown

14) Mark the Location of the Injury:



15) **Was the Injury?**
- ☐ 1 Superficial *(little or no bleeding)*
- ☐ 2 Moderate *(skin punctured, some bleeding)*
- ☐ 3 Severe *(deep stick/cut, or profuse bleeding)*

16) **If Injury was to the hand, did the Sharp Item Penetrate?**
- ☐ 1 Single pair of gloves
- ☐ 2 Double pair of gloves
- ☐ 3 No gloves

17) **Dominant Hand of the Injured Worker:**
- ☐ 1 Right-handed
- ☐ 2 Left-handed

18) **Describe the Circumstances Leading to this Injury** *(please note if a device malfunction was involved)*:

_____
_____
_____

19) **For Injured Healthcare Worker: If the Sharp had no Integral Safety Feature, Do you have an Opinion that such a Feature could have prevented the Injury?** ☐ 1 Yes ☐ 2 No ☐ 3 Unknown

Describe: _____
_____
_____
_____

20) **For Injured Healthcare Worker: Do you have an Opinion that any other Engineering Control, Administrative or Work Practice could have prevented the Injury?** ☐ 1 Yes ☐ 2 No ☐ 3 Unknown

Describe: _____
_____
_____
_____

Cost:

	Lab charges (Hb, HCV, HIV, other)
_____	Healthcare Worker
_____	Source
	Treatment Prophylaxis (HBIG, Hb vaccine, tetanus, other)
_____	Healthcare Worker
_____	Source
_____	**Service Charges** (Emergency Dept, Employee Health, other)
_____	**Other Costs** (Worker's Comp, surgery, other)
_____	**TOTAL** (round to nearest dollar)

Is this Incident OSHA reportable? ☐ 1 Yes ☐ 2 No ☐ 3 Unknown

If Yes, Days Away from Work? _____

Days of Restricted Work Activity? _____

Does this incident meet the FDA medical device reporting criteria? (Yes if a device defect caused serious injury necessitating medical or surgical intervention, or death occurred within 10 works days of incident.)

☐ 1 Yes *(If Yes, follow FDA reporting protocol.)* ☐ 2 No

* Tubex™ is a trademark of Wyeth Ayers; Carpuject™ is a trademark of Sanofi Winthrop; VACUTAINER™ is a trademark of Becton Dickinson. Identification of these products does not imply endorsement of these specific brands.

Appendix 2: EPINet™ Blood and Body Fluid Exposure Report

Blood and Body Fluid Exposure Report

EPINet™ FOR MICROSOFT® ACCESS
EXPOSURE PREVENTION INFORMATION NETWORK

V1.2/US 3/2001

Last Name: _____ First Name: _____

Exposure ID: *(for office use only)* B_____ Facility ID: *(for office use only)* _____

1) **Date of Exposure:** ☐☐ ☐☐ ☐☐☐☐ 2) **Time of Exposure:** ☐☐ ☐☐

3) **Department where Incident Occurred:** _____

4) **Home Department:** _____

5) **What is the Job Category of the Injured Worker:** (check one box only)

- ☐ 1 Doctor *(attending/staff)*; specify specialty _____
- ☐ 2 Doctor *(intern/resident/fellow)* specify specialty _____
- ☐ 3 Medical Student
- ☐ 4 Nurse: specify ☐ 1 RN ☐ 2 LPN ☐ 3 NP ☐ 4 CRNA ☐ 5 Midwife
- ☐ 5 Nursing Student
- ☐ 18 CNA/HHA
- ☐ 6 Respiratory Therapist
- ☐ 7 Surgery Attendant
- ☐ 8 Other Attendant
- ☐ 9 Phlebotomist/Venipuncture/IV Team
- ☐ 10 Clinical Laboratory Worker
- ☐ 11 Technologist *(non-lab)*
- ☐ 12 Dentist
- ☐ 13 Dental Hygienist
- ☐ 14 Housekeeper
- ☐ 19 Laundry Worker
- ☐ 20 Security
- ☐ 16 Paramedic
- ☐ 17 Other Student
- ☐ 15 Other, describe: _____

6) **Where Did the Exposure Occur?** (check one box only)

- ☐ 1 Patient Room
- ☐ 2 Outside Patient Room *(hallway, nurses station, etc.)*
- ☐ 3 Emergency Department
- ☐ 4 Intensive/Critical Care unit: specify type: _____
- ☐ 5 Operating Room/Recovery
- ☐ 6 Outpatient Clinic/Office
- ☐ 7 Blood Bank
- ☐ 8 Venipuncture Center
- ☐ 9 Dialysis Facility *(hemodialysis and peritoneal dialysis)*
- ☐ 10 Procedure Room *(x-ray, EKG,etc)*
- ☐ 11 Clinical Laboratories
- ☐ 12 Autopsy/Pathology
- ☐ 13 Service/Utility *(laundry,central supply,loading dock,etc)*
- ☐ 16 Labor and Delivery Room
- ☐ 17 Home-care
- ☐ 14 Other, describe: _____

7) **Was the Source Patient Identifiable?** (check one box only)

☐ 1 Yes ☐ 2 No ☐ 3 Unknown ☐ 4 Not Applicable

8) **Which Body Fluids were Involved in the Exposure?** (check all that apply)

- ☐ Blood or Blood Products
- ☐ Vomit
- ☐ Sputum
- ☐ Saliva
- ☐ CSF
- ☐ Peritoneal Fluid
- ☐ Pleural Fluid
- ☐ Amniotic Fluid
- ☐ Urine
- ☐ Other, Describe: _____

Was the body fluid visibly contaminated with blood? ☐ Yes ☐ No ☐ Unknown

9) **Was the Exposed Part:** (check all that apply)

- ☐ Intact Skin
- ☐ Non-Intact Skin
- ☐ Eyes (*conjunctiva*)
- ☐ Nose (*mucosa*)
- ☐ Mouth (*mucosa*)
- ☐ Other, Describe: _____

10) **Did the Blood or Body Fluid:** (check all that apply)

- ☐ Touch Unprotected Skin
- ☐ Touch Skin Between Gap in Protective Garments
- ☐ Soak through Barrier Garment or Protective Garment
- ☐ Soak through Clothing

11) **Which Barrier Garments were Worn at the Time of Exposure:** (check all that apply)

- ☐ Single Pair Latex/Vinyl Gloves
- ☐ Double pair Latex/Vinyl Gloves
- ☐ Goggles
- ☐ Eyeglasses *(not a protective item)*
- ☐ Eyeglasses with Side shields
- ☐ Face shield
- ☐ Surgical Mask
- ☐ Surgical Gown
- ☐ Plastic Apron
- ☐ Lab Coat, Cloth *(not a protective garment)*
- ☐ Lab Coat, Other
- ☐ Other, Describe: _____

12) **Was the Exposure the Result of:** (check one box only)

- ☐ 1 Direct Patient Contact
- ☐ 2 Specimen Container Leaked/Spilled
- ☐ 3 Specimen Container Broke
- ☐ 4 IV Tubing/Bag/Pump Leaked/Broke
- ☐ 10 Feeding/Ventilator/other Tube Separated/Leaked/Splashed. Specify Tubing: _____
- ☐ 5 Other Body Fluid Container Spilled/Leaked
- ☐ 6 Touched Contaminated Equipment/Surface
- ☐ 7 Touched Contaminated Drapes/Sheets/Gowns, etc.
- ☐ 8 Unknown
- ☐ 9 Other, Describe: _____

If Equipment Failure, Please Specify: **Equipment Type:** _____

Manufacturer: _____

13) **For How Long Was the Blood or Body Fluid In Contact with Your Skin or Mucous Membranes?** (check one)

- ☐ 1 Less than 5 Minutes
- ☐ 2 5-14 Minutes
- ☐ 3 15 Minutes to 1 Hour
- ☐ 4 More than 1 Hour

14) **How Much Blood/Body Fluid Came in Contact with Your Skin or Mucous Membranes?** (check one)

- ☐ 1 Small Amount (up to 5 cc, or up to 1 teaspoon)
- ☐ 2 Moderate Amount (up to 50 cc, or up to quarter cup)
- ☐ 3 Large Amount (More than 50 cc)

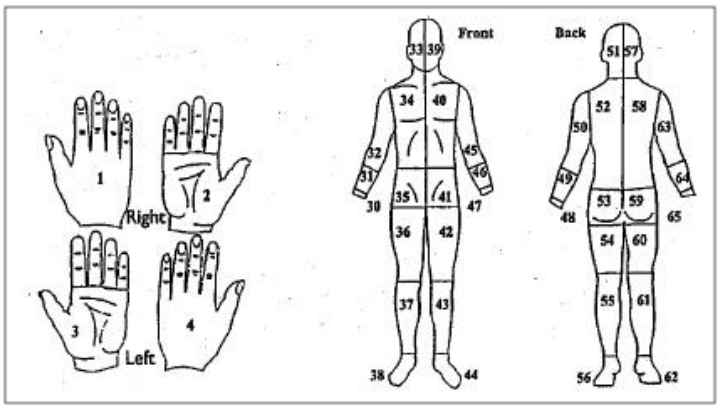
15) **Location of the Exposure:**

Write the number of the location of up to three exposed body parts in the blanks below.

Largest area of exposure: _____

Middle area of exposure: _____

Smallest area of exposure: _____



16) **Describe the Circumstances Leading to this Exposure** *(please note if a device malfunction was involved)*:

_____
_____
_____
_____
_____

17) **For Injured Worker: Do you have an Opinion that any other Engineering Control, Administrative or Work Practice could have prevented the Injury?** ☐ 1 Yes ☐ 2 No ☐ 3 Unknown

Describe: _____
_____
_____
_____

Cost:

_____ **Lab charges** *(Hb, HCV, HIV, other tests)*
_____ Healthcare Worker
_____ Source
Treatment Prophylaxis *(HBIG, Hb vaccine, tetanus, other)*
_____ Healthcare Worker
_____ Source
_____ **Service Charges** *(Emergency Dept, Employee Health, other)*
_____ **Other Costs** *(Worker's Comp, surgery, other)*
_____ **TOTAL** *(round to nearest dollar)*

Is this Incident OSHA reportable? ☐ 1 Yes ☐ 2 No ☐ 3 Unknown

If Yes, Days Away from Work? _____

Days of Restricted Work Activity? _____

Does this incident meet the FDA medical device reporting criteria? (Yes if a device defect caused serious injury necessitating medical or surgical intervention, or death occurred within 10 works days of incident.)

☐ 1 Yes (If Yes, follow FDA reporting protocol) ☐ 2 No

Appendix 3: EPINet™ Post Exposure Follow-Up

Post Exposure Follow-Up

EPINet™
FOR MICROSOFT® ACCESS
EXPOSURE PREVENTION INFORMATION NETWORK

V1.2/US 3/2001

Injury ID: (for office use only) _____ **Facility ID:** (for office use only) _____

Date of Injury/Exposure: _ _ / _ _ / _ _ _ _

Source Patient:

1) **Was the source patient identifiable?**
☐ source known and tested ☐ source known but not tested, reason: _____ ☐ source not known

2) **Was the source patient positive for the pathogens below?** (even if tested before this exposure?)

Pathogen	Test *(circle)*	Result *(circle result)*			Date Drawn
Hepatitis B	HbsAg	positive	negative	not tested	_ _ / _ _ / _ _ _ _
	HbeAg	positive	negative	not tested	
	Anti HBs	positive	negative	not tested	
	Anti HBc	positive	negative	not tested	
Hepatitis C	Anti-HCV EIA	positive	negative	not tested	_ _ / _ _ / _ _ _ _
	PCR-HCV	positive	negative	not tested	
	RNA	positive	negative	not tested	
HIV	Anti-HIV	positive	negative	not tested	_ _ / _ _ / _ _ _ _
	#CD4 Cells	count _____		not tested	
	Antigen Load	RNA copies/ml _____		not tested	
	Other				_ _ / _ _ / _ _ _ _
Other	_____	_____			_ _ / _ _ / _ _ _ _

3) **If source patient was believed to be in high risk group for blood borne pathogens, check all that apply:**
☐ Blood Product Recipient ☐ Elevated Enzymes ☐ Sexual ☐ Dialysis
☐ Injection Drug Use ☐ Hemophilia ☐ Other, Describe: _____

4) **If the source patient was HIV positive, had he been treated with any of the following before exposure?**
☐ Unknown ☐ 3TC ☐ IDV
☐ AZT ☐ ddC ☐ Other Anti-Retroviral: _____

5) **Additional source patient comments:** _____
_____
_____

Health Care Worker:

1) **Health Care Worker was seen by:** ☐ Employee ☐ Emergency Room ☐ Other, Describe: _____

2) **Was the Health Care Worker Vaccinated against HBV before exposure?** ☐ No ☐ 1-Dose ☐ 2-Doses ☐ 3-Doses
If yes, anitbody level upon completion, if tested: _____ *Date tested:* _ _ / _ _ / _ _ _ _

2a) **Was Health Care Worker Pregnant?** ☐ Yes ☐ No ☐ Not Applicable
If yes, which trimester? ☐ First ☐ Second ☐ Third

3) **Results of baseline tests**:

Pathogen	Test *(circle)*	Result *(circle result)*			Date Drawn
Hepatitis B	HbsAg	positive	negative	not tested	_ _ / _ _ / _ _ _ _
	HbeAg	positive	negative	not tested	
	Anti HBs	positive	negative	not tested	
	Anti HBc	positive	negative	not tested	
Hepatitis C	Anti-HCV EIA	positive	negative	not tested	_ _ / _ _ / _ _ _ _
	Anti-HCV supp.	positive	negative	not tested	
	_____	positive	negative	not tested	
HIV	Anti-HIV	positive	negative	not tested	_ _ / _ _ / _ _ _ _
Other	_____	_____			_ _ / _ _ / _ _ _ _
Other	_____	_____			_ _ / _ _ / _ _ _ _

4) Circle all Post Exposure Treatment/Prophylaxis Given to the Health Care Worker and FILL IN THE DOSAGES

Treatment	Dose	Date Given	Duration/Comments
HBIG	1. _____	__/__/____	_____
	2. _____	__/__/____	_____
HBV Vaccine	1. _____	__/__/____	_____
	2. _____	__/__/____	_____
	3. _____	__/__/____	_____
	Booster: _____	__/__/____	_____
HIV Antiretroviral Specify: _____		__/__/____	_____
HIV Antiretroviral Specify: _____		__/__/____	_____
HIV Antiretroviral Specify: _____		__/__/____	_____
Other, Specify _____		__/__/____	_____

5) Result of Follow-Up Tests: (Space provided for repeated test results, however, testing protocols may vary in different institutions.)

Pathogen	Test *(circle)*	Result *(circle result)*			Date Drawn
Hepatitis B	Panel 1				
	HbsAg	positive	negative	not tested	__/__/____
	Anti HBs	positive	negative	not tested	
	Anti HBc	positive	negative	not tested	
	Panel 2				
	HbsAg	positive	negative	not tested	__/__/____
	Anti HBs	positive	negative	not tested	
	Anti HBc	positive	negative	not tested	
	Panel 3				
	HbsAg	positive	negative	not tested	__/__/____
	Anti HBs	positive	negative	not tested	
	Anti HBc	positive	negative	not tested	
Hepatitis C	Anti-HCV (test 1)	positive	negative	not tested	__/__/____
	Anti-HCV (test 2)	positive	negative	not tested	
HIV	Anti-HIV (test 1)	positive	negative	not tested	__/__/____
	Anti-HIV (test 2)	positive	negative	not tested	__/__/____
	Anti-HIV (test 3)	positive	negative	not tested	__/__/____
	Anti-HIV (test 4)	positive	negative	not tested	__/__/____
Other	_____	_____			__/__/____
Other	_____	_____			__/__/____

6) Additional Comments:

_____
_____
_____
_____
_____

Appendix 4: Comparison of WINSESIS and EPINet™

WINSESIS	EPINet™
Similarities	
• Injury tracking BBF & needlestick injuries & follow-up • Can create graphs & export to other statistical analysis packages.	
Differences	
• Not user friendly • Time for data entry per incident– 10 minutes • Some questions must be answered or one cannot continue with data entry • Certain functions required use of "Ctrl" + "Function" keys • Can manage serological follow-up tests (generate list of workers due or past due for testing)	• User friendly • Time for data entry per incident– 3 minutes • Only date is necessary – other missing information can be added at a later date • Standardized surveillance system (national/international) • Option to customize answer options • Option to add in customized questions • Includes "facility type" so can compare similar institutions within one authority • Documents if HCW is pregnant • Auto saves files/records • All entries are operated with mouse clicks & drop-down menus • Tracks BBF exposures, Sharp-object injuries & follow-up with separate and shorter forms, therefore less cumbersome • Contains less variables/fields and takes up less computer memory • Can be linked to other workplace information systems such as WHITE™. This allows tracking of HCW vaccinations, training & education, and injuries. • Absent but can be linked to WHITE™ for this function • EPINet™ is free from the University of Virginia with some free technical support to EPINet™ users if needed

Appendix 5: Provincial Legislative Developments Concerning the Use of Safety Engineered Medical Devices in Canada

Ontario announced Bill 179 ("Safe Needles Save Lives Act"), an Act intended to reduce the incidence of needlestick injuries in 2005. The first reading of this bill was completed in March 2005. The bill requires the employer to provide safety engineered sharps where a worker is required to use a medical sharp, and to consult with joint health and safety committee or the health and safety representative for appropriate safety engineered medical sharps selection. Accordingly, training needs to be provided, and safe work procedures need to be developed in consultation with the joint health and safety committee[xii].

In June 2005, **Manitoba** announced the requirement to use safety engineered needles in medical workplaces in the Workplace Safety and Health Amendment Act. This includes requiring the employer to ensure the employee uses only safety-engineered needles when hollow-bore or intravenous needles are used in a medical workplace if it is reasonably practicable to do so. The amendment also requires the development of procedures to be followed after a needle stick injury and the process of investigation and the report required. The Act comes into force on January 1, 2006[xiii].

In October 2005, **Saskatchewan** announced impending regulations to mandate the use of safer needles in health care and correctional facilities. This will include physical barriers or controls to cover needles after use. Workplaces are also required to describe how they will evaluate, select and use needle safe devices by January 2006 as well as how representatives of workers will use the devices and be consulted in their identification, evaluation and selection. Employers also need to describe how affected workers will be trained before July, 2006.

[xii] http://www.ontla.on.ca/documents/Bills/38_Parliament/Session1/b179.pd
[xiii] http://web2.gov.mb.ca/laws/statutes/2005/c01505e.php

Appendix 6.1: VIHA BBF Survey Questionnaire

Unique Identifier:

Blood and Body Fluid Exposure Survey for VIHA Healthcare Workers

ENTIRELY CONFIDENTIAL AND USED FOR EVALUATION PURPOSES ONLY

Occupation: ❑ Phlebotomist / Venipuncture / IV Team ❑ Nurse ❑ Doctor
❑Clinical Laboratory Worker ❑ Technologist ❑ Nursing Assistant ❑ Housekeeper
❑ Respiratory Therapist ❑ Laundry Worker ❑ Surgical Attendant ❑ Security
❑ Other, Describe: _____

Job Status (check all appropriate boxes): ❑ Full-time ❑ Part-time ❑ Casual ❑ Contract

Number of Work Hours per week (approx.): _____ **Age:** _____

Usual Working Shift(s): ❑ Day ❑ Evening ❑ Night ❑ Not regular

Sex: ❑ Male ❑ Female

1. What hospital or facility do you work at? _____
   ❑ If you are working at more than 1 facility please indicate the name(s) of the other facility(-ies) here_____

2. How long, **in months/years**, have you been in?:

   Your current position? _____ Your current work facility? _____ The healthcare industry? _____

   Other current work facilities (if applicable)? _____

3. In a **typical week during the past 3 months**, how often did you handle:

	0/wk	1-5/wk	6-10/wk	11-20/wk	>20/wk	Not Applicable
Hollow-bore Needles (e.g. butterflies, IV cannulas)	❑	❑	❑	❑	❑	❑
Solid needles (e.g. suture needles)	❑	❑	❑	❑	❑	❑
Other sharps (e.g. lancets, scalpels)	❑	❑	❑	❑	❑	❑
Tubes and drains (e.g. catheter, penrose)	❑	❑	❑	❑	❑	❑

4. *Near-misses*, or close calls, are when you have almost had an incident (injury or contact) with blood and body fluids. In the **PAST MONTH** how many near-misses have you had? _____

Next page over

Unique Identifier:

5. In the **PAST YEAR** please specify the **total number** of reported and non-reported incidents and near-misses to blood and body fluids as follows:

	# Reported	# Non-reported	# Near-Misses
Needle-stick injuries	_____	_____	_____
Cuts with sharp objects	_____	_____	_____
Splashes to eyes or mouth	_____	_____	_____
Contacts with open wounds on your skin	_____	_____	_____

If you've had NO blood and body fluid incident or injury in the* PAST YEAR *(i.e. no answers in question 5) please proceed to question 9.

6. Please provide details for your **MOST RECENT** blood and body fluids incident involving injury from a **sharp object / needle**:

In which facility did the incident occur? _____

In which department of this facility did the incident occur? _____

When did the incident occur (hh:mm)? _____ AM/PM Do not remember ❑

Which device was involved in the incident?

❑ Blood-Filled Hollow Bore Needle ❑ IV Catheter ❑ Injection Device

❑ Other Blood-Drawing Device, please specify _____ ❑ Surgical Device

❑ Glass ❑ Other, please describe _____

❑ Don't know

Did the device have a "safety design" with a Shielded, Recessed, Retractable, or Blunted Needle or Blade?

❑ Yes ❑ No ❑ Unknown

For what procedure was the sharp object/needle originally used?

❑ Unknown / Not applicable ❑ To connect IV line

❑ Injection ❑ To obtain a Body Sample

❑ To Start IV or Set up Heparin Lock ❑ Suturing

❑ To Draw Arterial Blood Sample ❑ Cutting

❑ To Draw Venous Blood Sample ❑ Drilling

❑ To Place an Arterial / Central Line ❑ Other; Describe: _____

When the incident occurred, what were you specifically doing within that procedure?

_____

_____

_____

What personal protective equipment were you wearing at the time of the incident (check all that apply)?

❑ Single pair of gloves ❑ Goggles ❑ Surgical mask ❑ Gown

❑ Double pair of gloves ❑ Face shield ❑ N95 respirator ❑ Booties

❑ No personal protective equipment ❑ Other, please list: _____

Unique Identifier:

7. Was the injury:
   - ❑ Superficial (little or no bleeding)?
   - ❑ Moderate (skin punctured, some bleeding)?
   - ❑ Severe (deep stick/cut, or a lot of bleeding)?

8. Did you receive any treatment (e.g., vaccine, drugs, first-aid, etc.) after the injury occurred? ❑ Yes ❑ No

   If "Yes",

   Did you follow all the recommendations from the treatment? ❑ Yes ❑ No

   If "No"

   What stopped you from receiving any treatment?

   _____

   _____

   _____

9. Have you received training on handling procedures involving Blood and Body Fluids?

   ❑ Yes ❑ No

   If "Yes",

   How long was the training session held for? _____

   When was the training held (month/year)? _____

10. Are you aware that as a health care worker potentially exposed to Blood and Body Fluids, you are eligible to receive vaccination for Hepatitis B?

    ❑ Yes ❑ No

11. The Hepatitis B vaccination consists of three (3) doses. Have you received all three (3) doses of the Hepatitis B vaccine?

    ❑ Yes ❑ No If "No", please explain why not:

    _____

    _____

12. Where would you go first if you happened to have a needle-stick injury or cut with sharp object?

    ❑ Nowhere ❑ Emergency ❑ First Aid ❑ Family Physician

    ❑ Occupational Health ❑ Staff Health Nurse ❑Other (specify) _____

13. How likely do you believe that you will ever get a blood and body fluid injury from your work?

    ❑ Extremely unlikely ❑ Very unlikely ❑ Unlikely ❑ Somewhat likely ❑ Very likely

14. How likely do you believe you will ever contract a blood borne disease from your work?

    ❑ Extremely unlikely ❑ Very unlikely ❑ Unlikely ❑ Somewhat likely ❑ Very likely

15. How easy or difficult do you find it to follow all safe working procedures when working with blood and body fluids (BBF)?

    ❑ Very easy ❑ Moderately easy ❑ Somewhat easy ❑ Somewhat difficult ❑ Very difficult

Next page over

Unique Identifier:

16. If you did become infected with hepatitis B (HBV) from an exposure at work how severely do you think this would affect you?

❑ Minimal effect ❑ Slight effect ❑ Moderate effect ❑ Serious effect ❑ Completely devastating

17. If you did become infected with hepatitis C (HCV) from an exposure at work how severely do you think this would affect you?

❑ Minimal effect ❑ Slight effect ❑ Moderate effect ❑ Serious effect ❑ Completely devastating

In the following questions we would like to get your opinion about health and safety at your workplace. Please tell us how much you agree or disagree with each of the statements below.

	Strongly Disagree 1	2	3	4	**Strongly Agree** 5	**No Comment**
18. The existing safety program for blood and body fluids (BBF) protects me adequately	❑	❑	❑	❑	❑	❑
19. Employees, supervisors, and managers work together to ensure the safest possible working conditions with respect to blood and body fluids (BBF)	❑	❑	❑	❑	❑	❑
20. Reporting of needle-stick injuries and/or cuts with sharp objects is a top priority in your workplace	❑	❑	❑	❑	❑	❑
21. Staff are encouraged to become involved in safety and health matters	❑	❑	❑	❑	❑	❑
22. Safety is regularly discussed at departmental meetings	❑	❑	❑	❑	❑	❑
23. In my organization, compromises or shortcuts are not taken when worker protection from infectious diseases is at stake	❑	❑	❑	❑	❑	❑
24. I feel comfortable reporting health and safety violations in my workplace to my department supervisor	❑	❑	❑	❑	❑	❑
25. Unsafe work issues are corrected by supervisors	❑	❑	❑	❑	❑	❑
26. Personal Protective Equipment (e.g., gloves, face masks, gowns) are available to prevent blood and body fluid (BBF) exposure	❑	❑	❑	❑	❑	❑

Please tell us about any concerns you have regarding blood and body fluid exposures -- if you have any suggestions on how to improve health and safety in your workplace we would appreciate your comments:

_____
_____
_____
_____

Thank you for your participation in this survey

Appendix 6.2: BBF Survey Results (Selected)

Table A6- 1. Total percutaneous injuries (reported and unreported) in the past year by type of exposure / injury and occupation

Type of injury	Occupation	Total injuries (number of subjects)	Unreported injuries (number of subjects)	Percentage of injuries unreported
Percutaneous				
	Medical technicians	26 (122)	17 (122)	65.4%
	Support services	34 (188)	18 (185)	52.9%
	Nursing and patient care	393 (647)	320 (643)	81.4%
Total		**453 (957)**	**355 (950)**	

Appendix 7.1: WorkSafe BC Occupational Disease Data by Type of Disease (1995-2004): Subsector 7660: Healthcare and Social Assistance

Type of disease	Number of claims[1] 1995 - 2004	Days lost 1995 - 2004	Claims cost [2] in thousands of dollars
Needlestick injury [3]	101	988	88
HIV treatment	535	8,373	813
Hepatitis	13	4,169	1,048
Other infectious disease	298	3,187	330
Bursitis: repetitive motion	458	44,789	7,758
Tendinitis: repetitive motion	1,142	100,468	11,834
Carpal Tunnel Syndrome	252	29,785	3,695
Stress	481	42,335	5,706
Other occupational diseases	1,594	32,909	9,900
Total	**4,874**	**267,003**	**41,172**

* The 'number of claims' is the count of claims accepted for short term disability (std) benefits, long term disability(ltd) benefits or survivor benefits in the period. Claims with only health care benefits are not included in the count.
# The 'claim costs' are the dollars of std paid in the period plus the value of the ltd & survivor reserves and awards set up in the period (regardless of the year the claim was counted). The "claim cost" exclude health care and rehabilitation cost.
** Needlestick injuries only include traumatic injuries such as puncture wounds and laceration. This excludes claims for HIV treatment and Hepatitis that were caused by needlestick injuries or BBF splash exposure.

Note: the count and cost statistics have been adjusted for the effect of uncoded claims. The adjusted statistics are rounded and shown as whole numbers. These whole numbers will not necessarily add up to the row and column totals shown because the totals are rounded independently

Appendix 7.2: WorkSafe BC Needlestick Injury Claim Records by Occupation (1995-2004): Subsector 7660: Healthcare and Social Assistance

Occupations	Number of claims*	Percentage
Registered nurses	242	49.6%
Medical laboratory workers	55	11.3%
Light duty cleaners	37	7.6%
Social service, community workers	25	5.1%
Registered nursing assistants	20	4.1%
Nursing aides and orderlies	18	3.7%
Other	17	3.5%
Janitors; building caretakers	14	2.9%
Dental assistants	12	2.5%
Home support worker	10	2.0%
Business, finance jobs	8	1.6%
Other service jobs	6	1.2%
Laundry worker	4	0.8%
Dentists	3	0.6%
Other medical technicians	3	0.6%
Dental hygienists	3	0.6%
Other aide,assistant in health services	2	0.4%
Other government workers	2	0.4%
Kitchen worker	2	0.4%
Doctors	1	0.2%
Physiotherapists	1	0.2%
Other health services workers	1	0.2%
Other trade, transport	1	0.2%
Processing, mfg, utilities	1	0.2%
Total	**488**	**100%**

*The 'number of claims' is the number of short term disability, long term disability, and fatal claims accepted in the year (for all years of injury). It excludes health-care-only claims. It excludes incidents not reported to the board.

Note: The counts of claims include laceration injuries as well as claims accepted for disease conditions or for reactions to disease treatment programs. The counts are on the reclassified basis, that is, where an employer has been retroactively reclassified from one cu to another, these counts reflect the reclassifications for all years.

Appendix 8: Reproduced Sharps Alert Form from VIHA Sub Contracted Food Handling Agency

Name of Vendor

Food Services
VIHA

SHARPS ALERT!

Date: _____

ATTENTION: Site: _____ Unit:_____

Room/bed#: _____

Please identify the sharp concern / hazard discovered

Sharps found in / on: ☐ Food ☐ Tray ☐ Other:_____	Type of sharp: Needle Scalpel Suture Safety pin Glass Knife / Razor / Fork Other:_____
☐ Exposed ☐ Unexposed	

Supervisor Signature: _____ Date: _____

Patient Care / Resident Care Manager: Please bring the above to the attention of your staff members. Thank you.

Patient Care / Resident Care Managers Response to **Vendor** Director:

_____
_____
_____

Patient Care Manager Signature: _____ Date: _____

cc:
H&S

- ☐ **Vendor** Regional Director
- ☐ **Vendor** Healthcare Patient Care / Long Term Care Manager
- ☐ Site Health Food Service Contract Manager
- ☐ VIHA Patient Care Manager
- ☐ VGH JOH&S committee chair
  (Ops manager – VIHA Regional Laundry)

Appendix 9: Reproduced Sharps Alert Form from VIHA Sub Contracted Housekeeping / Linen Services Agency

Name of Vendor
Housekeeping / Linen Services Department
Vancouver Island Health Authority

Occupational Health Services
R E C E I V E D
date

Issued by: **Vendor /** Linen Services Department
Category: Sharps Alert Record Form

Sharps Alert!!

Department Unit: _____ Site:_____

Manager:_____ Date of Incident:_____

Your attention is drawn to the following **SAFETY** concern/hazard discovered while servicing your area

- □ I.V. Bag with Need attached; sink or waste container
- □ Sharps container not “snapped”
- □ Improper waste deposited in sharps container
- □ Syringe found on top of sharps container
- □ Sharps found in regular waste container (black bag)
- □ Improper separation of biomedical / regular waste
- □ Sharp found in bedding on floor
- □ Other _____

Please bring the above concern to the attention of your staff members. A copy of this form will be sent to VIHA Wellness & Safety for investigation and tracking purposes.

Vendor Employee Name: _____ Date: _____

Vendor Supervisor / Manager: _____ Date: _____

cc: **Vendor** H&S Reports Binder
VIHA Wellness & Safety / Contract Manager
Vendor H&S Rep / Committee

Received **date**

Additional copies of this publication may be obtained by contacting:

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