Sharps Injuries among Hospital Workers in Massachusetts, 2009

Findings from the Massachusetts Sharps Injury Surveillance System

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BACKGROUND

Sharps Injuries

Health care worker exposures to bloodborne pathogens as a result of injuries caused by contaminated needles and other sharp devices, also known as percutaneous injuries, are a significant public health concern. Estimates by the U.S. Centers for Disease Control and Prevention (CDC) put the number of sharps injuries in healthcare as well in excess of half a million each year, with about half of those injuries, or approximately 1,000 percutaneous injuries per day, occurring in U.S. hospitals (Panlillio et al., 2004). While several studies report that injuries occur frequently to nurses, physicians and technicians, housekeeping and other support staff are also at risk (Hiransuthikul, Tanthitippong & Jiamjarasrangsi, 2006). As a measure of likelihood of injury among hospital workers, it has been estimated that 28 sharps injuries occur annually for every 100 occupied hospital beds (Perry, Parker & Jagger, 2009).

Sharps injuries have been associated with occupational transmission of hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV) as well as over 20 other pathogens (OSHA, 2001). U.S. Public Health Service guidelines provide recommendations for post-exposure management of all workers who have sustained occupational exposure to bloodborne pathogens (CDC, 2001; CDC, 2005). These guidelines provide information for determining when post-exposure prophylaxis is appropriate. Preventive medical treatment following exposure may decrease the likelihood of infection with HIV and HBV (Cardo et al., 1997; CDC, 2001). The average direct costs, including laboratory costs for tests of both source patients and exposed employees, labor costs associated with testing and counseling, and the costs of post-exposure prophylaxis, are estimated to be $3,042 (ranging from $1,663 to $4,838) (O'Malley, Scott, Gayle, Dekutoski, Foltzer, Lundstrom, et al., 2007).

Sharps injuries are preventable and the overall goal should be their elimination. As a step in that direction, the U.S. Public Health Service has called for the reduction of sharps injuries among health care workers by 30% as a national health objective for 2010 (DHHS, 2006). In addition, health care facilities are required by federal regulations to implement comprehensive plans to reduce these injuries. Preventing sharps injuries requires the combined effort of government agencies, employers, and equipment manufacturers, as well as health care workers themselves. Elements of a successful sharps injury prevention program, as outlined by the CDC, include: promoting an overall culture of safety in the workplace, eliminating the unnecessary use of needles and other sharp devices, using devices with sharps injury prevention features (safety devices), employing safe workplace practices, and training health care personnel (CDC, 2008). Sharps injury surveillance is also a key component of a comprehensive program.

Prior to 2000, while some national data had been collected, little was known about the extent and distribution of sharps injuries among health care workers in Massachusetts. In 2001, pursuant to An Act Relative to Needlestick Injury Prevention (MGL Chapter 111 §53D) the Massachusetts Department of Public Health (MDPH) promulgated regulations requiring acute and non-acute care hospitals licensed by the Department to implement sharps injury prevention plans and also to report sharps injury data to MDPH. This led to the establishment of the Massachusetts Sharps Injury Surveillance System, which has collected data from all MDPH licensed hospitals for the past eight years (2002-2009).

The Massachusetts Sharps Injury Surveillance System

MDPH regulations, mirroring the federal Occupational Safety and Health Administration (OSHA) Bloodborne Pathogen Standard (29 CFR 19101.1030) revised in 2001, require that hospitals licensed by MDPH use devices with sharps injury prevention technology, develop exposure control plans, and maintain logs of worker injuries with contaminated sharps. MDPH also requires that hospitals submit the data from their sharps logs annually to the Department. Data are reported to the Sharps Injury Surveillance System electronically using the Annual Summary of Sharps Injury form. The data reported are compiled and published to guide state efforts to prevent sharps injuries and promote action at the local level. The surveillance system provides information about occupations at risk as well as devices,

procedures and departments associated with sharps injuries. It also serves as a vehicle for hospitals and health care workers in Massachusetts to share information about successful prevention strategies.

The Massachusetts Sharps Injury Surveillance System is intended to provide information that can assist Massachusetts hospitals and health care workers in targeting and evaluating efforts to reduce the incidence of sharps injuries and the associated human and economic costs. Comprehensive reports of surveillance findings for 2002, 2003 and 2004 have been produced, as well as surveillance updates for 2005, 2006, 2007 and 2008.[1] This brief report includes findings from the Massachusetts Sharps Injury Surveillance System for the 2009 data collection period. Findings are presented by hospital bed-size categories, by teaching status as well as for all hospitals combined to allow hospitals to compare their individual experiences with those in similar facilities. Input from hospitals and health care workers regarding the surveillance activities and the content of this report is highly welcome. MDPH looks forward to continued collaboration in maintaining an effective sharps injury surveillance system to improve the health and safety of health care workers in Massachusetts.

Underreporting of Sharps Injuries

Underreporting of sharps injuries by employees is well documented in the literature with estimates ranging from 22% to 99%, and has been found to vary by occupation and by hospital (Perry, 2000; Avarado-Ramy et al., 2003; Kotelchuck et al., 2004; Sohn et al., 2004, Au et al., 2008; Nagao et al., 2009). There are many reasons why healthcare workers may not report sharps injuries: they may perceive that the injuries or the source patients are low risk; they may fear the diseases to which they have potentially been exposed; they may have concerns about job security or the extra paperwork and time involved in follow-up. In addition, they may lack information and training about appropriate reporting procedures or the reporting procedures themselves may be inadequate (Tandberg, Stewart & Doezema, 1991). Hospitals with well established sharps injury surveillance programs and strong safety cultures may identify and report more injuries than hospitals with less well developed programs. Underreporting must be taken into account in interpreting the findings presented in this report. Hospitals, in evaluating their own data, should do so within the context of their own sharps injury surveillance and prevention programs. Assessment of underreporting should be an integral part of sharps injury prevention activities.

METHODS

Population under surveillance

All health care workers in acute and non-acute care hospitals licensed by MDPH, as well as any satellite units (e.g., community health centers, ambulatory care centers) operating under a hospital license, are included in the population under surveillance.

Reportable exposure incident

A reportable exposure incident is defined as an exposure to blood or other potentially infectious materials as a result of an event that pierces the skin or mucous membranes during the performance of an employee's duties. A sharps injury is also considered an exposure incident if the worker is injured with a clean sharp or device (before use) through contaminated gloves or other contaminated mediums. An injury involving a clean device without any contact with infectious materials is not considered an exposure incident. See the MPDH report *Sharps Injuries among Hospital Workers in Massachusetts, 2004: Findings from the Massachusetts Sharps Injury Surveillance System* (www.mass.gov/Eeohhs2/docs/dph/occupational_health/injuries_hospital_2004.pdf) for a more detailed description of the surveillance system and methods.

[1] "Sharps Injuries among Hospital Workers in Massachusetts" for 2002, 2003, 2004, 2005, 2006, 2007, 2008 and 2009 can be downloaded from www.mass.gov/dph/ohsp under "Needlesticks and Other Sharps Injuries" and "Data and Statistics".

Data presented

Frequencies (counts and percents) are presented for each of the data elements collected, with the exception of brand/model of device. Findings are presented for all hospitals combined (Appendix A) as well as by hospital size categories (defined by number of licensed beds) (Appendix B) and by teaching status (Appendix C) to allow hospitals to compare their individual experiences with those in similar facilities. Rates using the number of licensed beds as the denominator are presented by hospital size.

DATA HIGHLIGHTS

All 98 hospitals licensed by MDPH submitted Annual Sharps Injury Reports containing information about sharps injuries sustained by Massachusetts hospital workers in 2009. The number of sharps injuries reported by individual hospitals ranged from 0 to 341, with over half of the hospitals reporting fewer than 20 injuries. The extent to which a high number of reported injuries in a hospital reflects a true higher incidence of injuries or better sharps injury reporting practices is unknown.

The 22 Massachusetts teaching hospitals reported 65% (1,886) of all sharps injuries. Teaching status is strongly correlated with hospital size; nearly half of the teaching hospitals (45%, 10) have over 300 beds. Detailed findings for all hospitals are presented in Appendix A. Summary tables of findings by hospital size and teaching status are provided in Appendices B and C.

Overview

- A total of 2,889 sharps injuries among hospital-based health care workers in Massachusetts were reported for the surveillance period January 1 to December 31, 2009. This is similar to the annual number of sharps injuries reported in previous years.

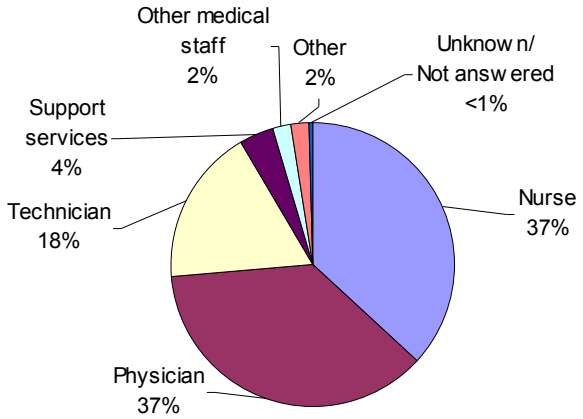
- Eighty-six percent of the injured workers (2,495) were hospital employees, 9% (253) were non-employee practitioners, 4% (108) were students, and 1% (23) were temporary or contract employees.

Occupation and Department

- Nurses sustained more injuries (37%, 1,073) than any other occupational group, followed by physicians (37%, 1,065). Close to half of the injuries in the physician category were sustained by interns and residents. Physicians accounted for proportionately more injuries in large hospitals (> 300 licensed beds) (47%, 812).

- Technicians, such as surgical technicians and phlebotomists, sustained 18% (517) of the injuries. Four percent (122) of the injuries were sustained by support service workers, of whom a third (80) were housekeepers.

Figure 1. Sharps Injuries among Hospital Workers by Occupation, Massachusetts, 2009, N=2,889

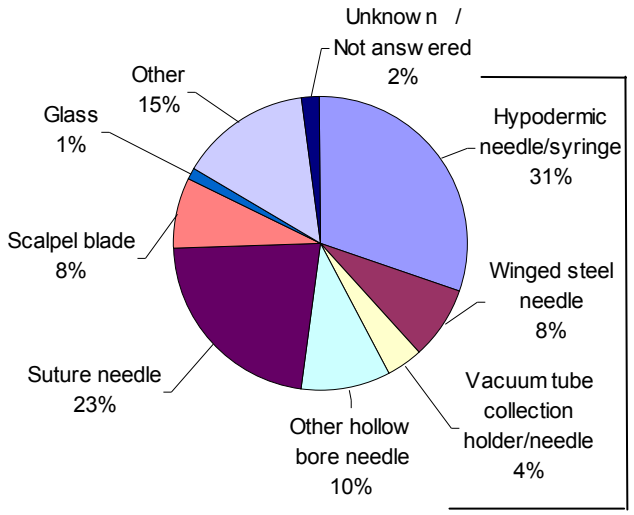


Data Source: Massachusetts Sharps Injuries Surveillance System, 2009

- Injuries occurred most frequently in operating rooms (33%, 963) followed by medical surgical wards (19%, 545). Nine and seven percent of injuries occurred in emergency departments (263) and intensive care units (211) respectively.

Type of Device

Figure 2. Sharps Injuries among Hospital Workers by Device involved in the Injury, Massachusetts, 2009, N=2,889

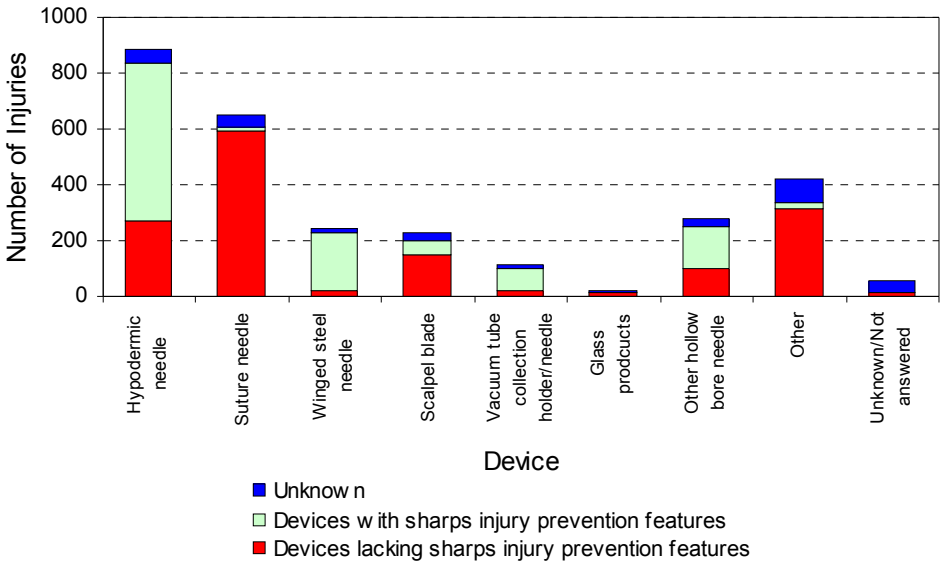


Data Source: Massachusetts Sharps Injuries Surveillance System, 2009

- Hollow bore needles, which include hypodermic needles/syringes, winged steel needles, vacuum tube collection devices and IV stylets, as a group accounted for 52% (1,511) of all injuries reported. Hypodermic needles/syringes accounted for more injuries (31%, 884) than any other type of device. While most frequent, injuries with hypodermic needles/syringes generally involve less direct blood exposure and thus present less risk than injuries involving winged steel needles and vacuum tube collection devices. Injuries with these two types of devices accounted for 8% (240) and 4% (112) of all injuries, respectively.

- Injuries involving solid sharp devices, including suture needles, scalpels and glass, accounted for 31% (902) of all injuries. Injuries involving suture needles accounted for 23% (653), followed by scalpel blades (8%, 231) and glass items (1%, 18).

Figure 3. Sharps Injuries among Hospital Workers by Presence of Engineered Sharps Injury Prevention Feature, Massachusetts, 2009, N=2,889



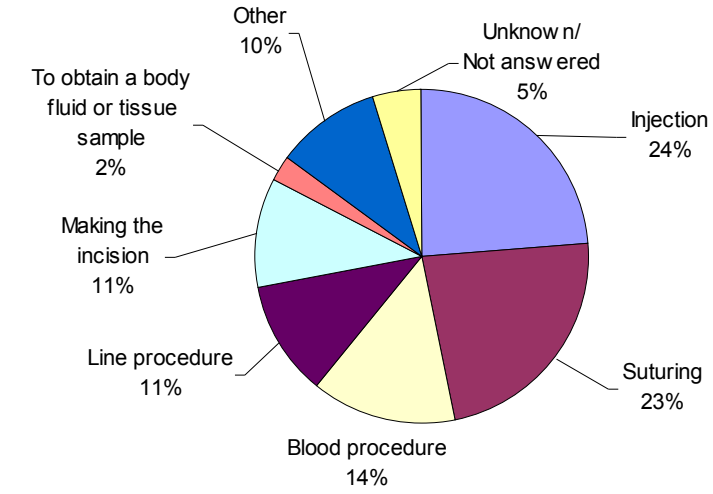
Data Source: Massachusetts Sharps Injuries Surveillance System, 2009

- Of the 2,598 (90%) injuries with devices for which information regarding the presence of engineered sharps injury prevention features was recorded, over half (58%, 1,498) involved devices without engineered sharps injury prevention features. Hypodermic needles/syringes lacked these features in 31% (270) of the injuries associated with these devices, even though hypodermic needles/syringes with engineered sharps injury prevention features have been available on the market for the past 13 years. By contrast, only 10% (24) of winged steel needles and 16% (18) of vacuum tube collection holder/needles associated with injuries lacked these features.

Procedure for which the Device was Used and When the Injury Occurred

- Devices involved in injuries were most frequently used for injections (24%, 690) and suturing (23%, 655) followed by blood procedures (14%, 413). In medium size hospitals injuries were most often related to injections (28%, 269), as was the case in small sized hospitals (24%, 48). Suturing accounted for 25% of injuries in large hospitals (434 injuries), in contrast to 19% and 20% in medium and small sized hospitals respectively.

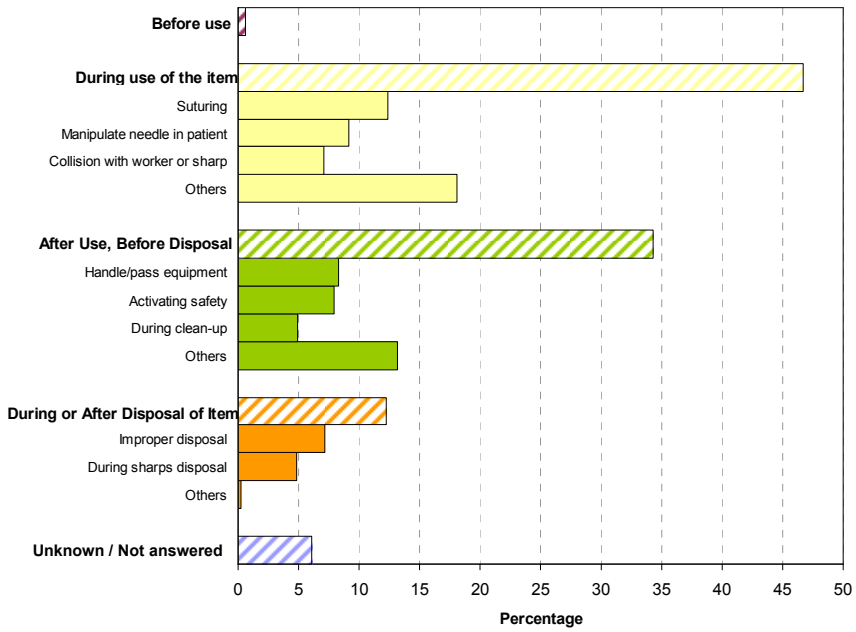
Figure 4. Sharps Injuries among Hospital Workers by Purpose or Procedure for which the Device was used, Massachusetts, 2009, N=2,889



Data Source: Masschusetts Sharps Injuries Surveillance System, 2009

- Injuries occurred during the use of devices in 47% (1,350) of the cases. After use of the device (47%, 1,345) was an equally dangerous time to handle a device. These included injuries sustained after use but before disposal of devices (34%, 991) and injuries occurring during or after disposal (12%, 354).

Figure 5. Sharps Injuries among Hospital Workers by When and How the Injury Occurred, Massachusetts, 2009, N=2,889



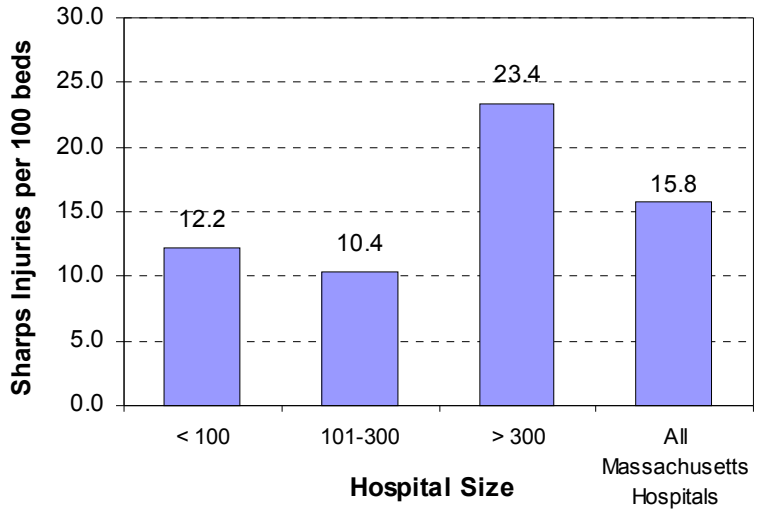
- Twelve percent (358) of the cases occurred during the act of suturing. Handling and passing equipment (240) and activating sharps injury prevention features (230) accounted for 8% of the injuries occurring after use before disposal respectively.

- Collision with sharp accounted for 15% (445) of the reported cases. MDPH continues to work with hospitals to encourage greater detail in descriptions of the incident so that these cases can be more appropriately coded.

Rates

The statewide rate of sharps injuries among hospital workers for this twelve month surveillance period was 15.8 sharps injuries per 100 licensed beds. The annual rate of sharps injuries varied by hospital size. (Figure 6). Injury rates which include all licensed hospitals underestimate the risk for acute care hospitals, because although acute care hospitals make up only 79% of all licensed hospital beds, injuries in acute care hospitals accounted for 97% of all reported injuries. The sharps injury rate among hospital workers in acute care hospitals in 2009 was 18.7 injuries per 100 licensed beds. Large acute care hospitals had the highest annual rate of 25.8 injuries per 100 licensed beds, followed by small and medium sized acute care hospitals, which had annual sharps injury rates of 15.1 and 12.7 sharps injuries per 100 licensed hospital beds, respectively.

Figure 6. Sharps Injury Rates by Hospital Size Category, Massachusetts, 2009, N=2,889



Data Source: Massachusetts Sharps Injuries Surveillance System, 2009

Given the limitations presented below of using the number of hospital beds as a denominator for assessing risks, sharps injury rates should be interpreted with caution. In comparing experience among hospitals, underreporting must be taken into consideration. The extent to which high rates of reported injuries in some hospitals reflect a true higher incidence of injuries in these hospitals or better sharps injury reporting practices compared to those with low rates is not known. Hospitals evaluating there own rates should do so within the context of their own sharps injury surveillance and prevention programs.

LIMITATIONS

There are a number of limitations to be considered in interpreting the findings presented in this report. In order for an injury to be included on the Annual Sharps Summary, hospitals rely on health care workers to report sharps injuries. As discussed previously, there are many reasons why health care workers may choose not to report sharps injuries, and underreporting by health care workers has been well documented. Also, there is evidence that the likelihood of reporting varies by occupation and completeness of reporting varies by hospital (CDC, 2008). The surveillance findings presented in this report should be considered conservative estimates of the burden of sharps injuries among hospital workers in Massachusetts.

The rates for hospitals in Massachusetts are somewhat lower than rates reported by EPINet, which are based on occupied beds (Perry et al., 2008 & 2009a-b). In Massachusetts, the number of occupied beds and the number of licensed beds are highly correlated, and this difference in denominators does not explain the difference in Massachusetts and EPINet rates. Rates using number of beds whether licensed or occupied in the denominator have several limitations. The number of licensed beds is not an accurate reflection of patients treated nor does it provide a measure of the number of inpatient or outpatient procedures performed or devices used, or workers at risk. For example, rates based on licensed beds

may overestimate the risks of sharps injuries in facilities where a large number of outpatient procedures are performed.

For more than 90% of the records, the information about each reported injury provided by hospitals was complete. However, there was some missing information, which has been coded as "not answered". There was also some confusion in several data elements (such as department where injury occurred and brand of device) about the type of information that should be provided. MDPH has worked collaboratively with hospitals to improve data collection and to clarify any questions about information to be reported. This has resulted in more complete and comprehensive data. MDPH will continue to work with hospitals to clarify outstanding issues.

DISCUSSION

In 2009, close to 2,900 sharps injuries were reported in Massachusetts hospitals, underscoring the need for continued efforts to reduce the incidence of these injuries. An unacceptably high number of injuries continue to occur with devices lacking sharps injury prevention features, most notably hypodermic needles/syringes for which alternatives with sharps injury prevention features have been available for two decades. Hospitals are reminded that MDPH regulations require that sharps injury prevention technology must be used in the provision of care to patients, an inventory of devices lacking sharps injury prevention features must be developed and justification of the continued use of devices lacking sharps injury prevention features must be documented. Hospitals must use Annual Summary data as part of continuous quality control. This data can be used to identify devices to review, or departments where injuries are occurring. Key steps to take in developing a device inventory and converting devices to those with sharps injury prevention features are outlined below. Resources for identifying devices with sharps injury prevention features are also provided.

1. Know what is being used within the hospital.

   MDPH requires hospitals to complete an inventory of devices lacking sharps injury prevention features. This requirement was outlined in a circular letter to all hospitals in May of 2009. Developing an inventory is a substantial undertaking, and should be a team effort. Some hospitals have found it to be more efficient to ask staff in various departments to complete the inventory for the devices they use. This not only shares the responsibility, but also involves staff in the process and raises awareness of sharps injury prevention.

2. Identify those devices that can be converted to alternatives with sharps injury prevention features.

   a. Using the inventory list, distinguish those items that have alternatives available on the market from those that do not
   b. If hospitals have questions regarding the availability of alternatives with sharps injury prevention features for specific devices, OHSP can distribute these questions in monthly emails to MDPH licensed hospitals
   c. Information regarding devices with sharps injury prevention features can be found at:
      i. Sustainable Hospitals Project – Safety Needles and Sharps Devices
         http://www.sustainablehospitals.org/cgi-bin/DB_Report.cgi?px=W&rpt=Cat&id=19
      ii. International Sharps Injury Prevention Society
         http://www.isips.org/safety_products.php
      iii. International Healthcare Worker Safety Center – Safety Device List
         http://www.healthsystem.virginia.edu/internet/epinet/new/safetydevice.cfm

3. Develop a plan for converting devices.

   Due to the scope of the project – both the number and variety of devices - the device conversion process can not be completed all at one time. Annual Summary data can be used to prioritize the order of devices to convert. If your hospital does not have many reported injuries in a year, you can aggregate data over several years (3-5 years) or use the statewide data in this prioritization process.

   Things to consider when prioritizing devices to convert:
   1. frequency of use
   2. number of injuries which have occurred with this device
   3. risk of transmission of disease given procedures for which the device is used

4. Complete the waiver process.

   MDPH requires documentation justifying the continued use of devices lacking sharps injury prevention features, as outlined in the circular letter of May 2009. These waivers must be completed and reviewed by an internal committee, and approved by the hospital and shall be made available to MDPH upon request. These waivers should be reviewed annually to see if they are still applicable. As with the device inventory, some hospitals have found it more efficient to enlist the help of staff in completing the waivers for devices used in their department. Waiver forms are available upon request from MDPH-OHSP.

   Waivers must be completed for:
   i. Those devices for which alternatives exist, but it has been determined by an internal committee that the device does not promote employee or patient safety or interferes with a medical procedure.
   ii. Those devices for which no alternative exists on the market

5. Develop a plan for continued review of devices.

   On a regular, periodic basis (at least annually), the device inventory should be reviewed to see if there are new device alternatives available with sharps injury prevention features. A sharps committee or product analysis committee could conduct such reviews; it may also be useful to involve the departments where devices lacking sharps injury prevention features are used. This process should be reflected in the Exposure Control Plan. At least annually, the Exposure Control Plan shall be updated to reflect any new technology implemented to minimize risk of exposure. The Exposure Control Plan shall also document consideration of new devices and solicitation of input from non-managerial workers regarding these new devices.

Hospitals are reminded to report any issues with devices to product manufacturers, and, if appropriate, the FDA. Information on reporting device failures and serious adverse events was included in the previous report “Sharps Injuries among Hospital Workers in Massachusetts, 2008: Findings from the Massachusetts Sharps Injury Surveillance System which can be found at http://www.mass.gov/Eeohhs2/docs/dph/occupational_health/injuries_hospital_2008.pdf.

While use of devices with sharps injury prevention features has been demonstrated to reduce sharps injuries, it is just one component of a comprehensive sharps injury prevention program. Training on the use of these devices is critical for all employees. In addition, there needs to be an increased understanding of the relative efficacy of the various mechanisms of sharps injury prevention features. In 2010, the mechanism of the sharps injury prevention feature was added to the Annual Summary of Sharps Injuries. Information on the mechanisms of the sharps injury prevention feature will be available in future reports.

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APPENDIX A
Sharps Injuries among Hospital Workers in Massachusetts, 2009

STATE TOTAL	**2,889**	**100%**
WORK STATUS OF INJURED WORKER	**N**	**%**
Employee	2,495	86
Non-employee practitioner	253	9
Student	108	4
Temporary / Contract worker	23	1
Other	9	<1
Not answered	1	<1
OCCUPATION OF INJURED WORKER	**N**	**%**
Nurse	**1,073**	**37%**
RN or LPN	943	33
Nursing assistant	48	2
Patient care technician	33	1
Nurse practitioner	17	1
Nurse midwife	9	<1
Nursing student	8	<1
Nurse anesthetist	8	<1
Home health aide	7	<1
Physician	**1,065**	**37%**
Intern / Resident	469	16
MD	299	10
Fellow	80	3
Medical student	71	2
Physician assistant	60	2
Surgeon	60	2
Anesthesiologist	18	1
Radiologist	8	<1
Technician	**517**	**18%**
OR / Surgical technician	196	7
Phlebotomist	98	3
Clinical lab technician	59	2
Radiologic technician	37	1
Respiratory therapist / Tech	19	1
Hemodialysis Technician	1	<1
Other technician	107	4
Support Services	**122**	**4%**
Housekeeper	80	3
Central supply	33	1
Attendant / Orderly	3	<1
Maintenance	3	<1
Safety / Security	2	<1
Transport / Messenger / Porter	1	<1
Other Medical Staff	**49**	**2%**
Medical assistant	47	2
Physical Therapist	1	<1
Other medical staff	1	<1

APPENDIX A
Sharps Injuries among Hospital Workers in Massachusetts, 2009

OCCUPATION OF INJURED WORKER	N	%
Dental Staff	**14**	**<1%**
Dentist	5	<1
Dental Assistant / Tech	4	<1
Dental student	2	<1
Dental hygienist	2	<1
Other dental worker	1	<1
Other	**46**	**2%**
Counselor / social worker	3	<1
Clerical / Administrative	3	<1
Researcher	2	<1
EMT / Paramedic	2	<1
Pharmacist	1	<1
Other student	23	1
Other	12	<1
Unknown / Not Answered	**2**	**<1%**
Nonclassifiable	**1**	**<1%**

DEPARTMENT WHERE INCIDENT OCCURRED	N	%
Operating and Procedure Rooms	**1,272**	**44%**
Operating room	963	33
Radiology	93	3
Labor and delivery	73	3
Cardiac catheterization laboratory	53	2
Phlebotomy room	33	1
Hematology / Oncology	15	1
Endoscopy / Bronchoscopy / Cytoscopy	14	<1
Dialysis	10	<1
Other procedure room	8	<1
Procedure room, unspecified	11	<1
Inpatient Units	**642**	**22%**
Medical / Surgical ward	545	19
Psychiatry ward	27	1
Pediatrics	23	1
Obstetrics / Gynecology	21	1
Nursery	6	<1
Specific ward, type unknown	4	<1
Patient room, ward unspecified	16	1
Emergency Department	**263**	**9%**
Intensive Care Units	**211**	**7%**
Intensive care unit	190	7
Post anesthesia care unit	21	1
Outpatient Areas	**184**	**6%**
Ambulatory care clinic	78	3
Dental clinic	25	1
Home health visit	20	1

APPENDIX A
Sharps Injuries among Hospital Workers in Massachusetts, 2009

DEPARTMENT WHERE INCIDENT OCCURRED	N	%
Community health center	11	<1
Other outpatient areas	50	2
Laboratory	**110**	**4%**
Histology / Pathology	37	1
Blood bank	6	<1
Morgue / Autopsy room	5	<1
Clinical chemistry	3	<1
Microbiology	3	<1
Other laboratory	16	1
Laboratory, unspecified	40	1
Other Areas	**200**	**7%**
Central sterile supply	37	1
Dermatology	37	1
Rehabilitation unit	36	1
Anesthesia	21	1
Long term care	13	<1
Hospital grounds	11	<1
Exam room	9	<1
Pain clinic	7	<1
Employee health / Infection control	2	<1
Pharmacy	2	<1
Central trash area	1	<1
Other location	24	1
Nonclassifiable	**7**	**<1%**

PROCEDURE FOR WHICH DEVICE WAS USED	N	%
Injection	**690**	**24%**
Subcutaneous injection	510	18
Intramuscular injection	120	4
Epidural / Spinal anesthesia	17	1
Other injection	12	<1
Injection, unspecified	31	1
Suturing	**655**	**23%**
Suturing	648	22
Suture removal	7	<1
Blood Procedures	**413**	**14%**
Percutaneous venous puncture	306	11
Percutaneous arterial puncture	48	2
Finger stick / Heel stick	34	1
Dialysis / AV fistula site	8	<1
Draw blood from umbilical vessel	4	<1
Blood procedure, unspecified	11	<1
Other blood procedure	2	<1
Line Procedures	**319**	**11%**
To insert a peripheral IV line or set up a heparin lock	113	4
Other injection into IV site / port	49	2
To insert a central IV line	40	1

APPENDIX A
Sharps Injuries among Hospital Workers in Massachusetts, 2009

PROCEDURE FOR WHICH DEVICE WAS USED	N	%
Draw blood from central or peripheral IV line or port	23	1
To insert an arterial line	20	1
To flush heparin / saline	16	1
Draw blood from arterial line	7	<1
To connect IV line	5	<1
Other line procedure	26	1
Line procedure, unspecified	20	1
Making the incision	**306**	**11%**
Making the incision	218	8
Other surgical procedure	54	2
Surgical procedure, unspecified	34	1
To Obtain Body Fluid or Tissue sample	**69**	**2%**
Dental Procedures	**24**	**1%**
Oral surgery	10	<1
Dental drilling	3	<1
Restorative	3	<1
Dental procedure, unspecified	3	<1
Other dental	5	<1
Other	**273**	**9%**
To obtain lab specimens	26	1
Transferring blood / body fluid to another container	19	1
Drilling	16	1
During disposal	14	<1
Shaving	5	<1
Other procedure	167	6
Procedure, unspecified	26	1
Unknown / Not answered	**138**	**5%**
Nonclassifiable	**2**	**<1%**

DEVICE INVOLVED IN THE INJURY	N	%
Hypodermic needles / syringe (hollow bore)	**884**	**31%**
Hypodermic needle attached to a disposable syringe	732	25
Prefilled cartridge syringe	50	2
Unattached hypodermic needle	45	2
Hypodermic needle attached to a non-disposable syringe	29	1
Hypodermic needle attached to IV tubing	7	<1
Hypodermic needle, unspecified	21	1
Suture Needle	**653**	**23%**
Curved suture needle	386	13
Straight suture needle	32	1
Suture needle, unspecified	235	8
Other Hollow Bore Needle	**275**	**10%**
IV stylet	153	5
Huber needle	42	1
Spinal or epidural needle	8	<1

APPENDIX A
Sharps Injuries among Hospital Workers in Massachusetts, 2009

DEVICE INVOLVED IN THE INJURY	N	%
Biopsy needle	18	1
Other type of hollow bore needle	22	1
Hollow bore needle, unspecified	32	2
Winged Steel Needle (hollow bore)	**240**	**8%**
Winged steel needle	105	4
Winged steel needle attached to a vacuum tube collection holder	123	4
Winged steel needle attached to IV tubing	12	<1
Scalpel Blade	**231**	**8%**
Vacuum Tube Collection Holder / Needle (hollow bore)	**112**	**4%**
Vacuum tube collection holder / needle	78	3
Phlebotomy needle (other than winged steel needle)	34	1
Glass	**18**	**1%**
Medication ampule / Vial / IV bottle	5	<1
Pipette	5	<1
Specimen / Test / Vacuum tube	2	<1
Slide	1	<1
Other glass item	5	<1
Dental Device or Item	**11**	**<1%**
Dental bur	8	<1
Dental pick	1	<1
Scaler / curette	1	<1
Other dental device or item	1	<1
Other	**408**	**14%**
Wire	50	2
Lancet	38	1
Retractor	36	1
Scissors	32	1
Electrode	26	1
Razor	19	1
Bovie electrocautery device	18	1
Pin	16	1
Forceps	16	1
Staple	16	1
Trocar	11	<1
Drill bit	10	<1
Bone cutter	8	<1
Histology cutting blade	4	<1
Bone chip / chipped tooth	4	<1
Tenaculum	3	<1
Rod	1	<1
Other needle	18	1
Needle, unspecified	27	1
Other type of sharp object	55	2
Unknown / Not answered	**57**	**2%**

APPENDIX A
Sharps Injuries among Hospital Workers in Massachusetts, 2009

SHARPS INJURY PREVENTION FEATURES	N	%
No	1,498	52
Yes	1,100	38
Unknown / Not answered	291	10

WHEN THE INJURY OCCURRED	N	%
During use of the item	1,350	47
After use and before disposal	991	34
During or after disposal of the item	354	12
Before use of the item **	18	1
Unknown / Not answered	37	1
Nonclassifiable	139	5

HOW THE INJURY OCCURRED	N	%
Collision with Worker or Sharp	**445**	**15%**
Collided with sharp	180	6
Collided with sharp after procedure	180	6
Collided with coworker or other person	85	3
Suturing	**358**	**12%**
Suturing	290	10
Manipulating suture needle in holder	48	2
Tying suture	20	1
During Clean-up	**142**	**5%**
During clean-up	109	4
Decontamination / Processing of used equipment	26	1
Disassembling device or equipment during clean-up	7	<1
Handle / Pass Equipment	**282**	**10%**
Receiving / Passing / Transferring equipment	130	4
Handling equipment on tray or stand	77	3
Disassembling device or equipment	67	2
Opening / breaking glass containers	8	<1
Patient Moved and Jarred Device	**260**	**9%**
Activating Safety Device	**230**	**8%**
Activating safety device	191	7
Incomplete activation	39	1
Improper Disposal	**207**	**7%**
Left on table / tray	75	3
In trash	50	2
Left in bed / mattress	20	1
On floor	20	1
In pocket / clothing	6	<1
In linen / laundry	2	<1
Other improper disposal	34	1
During Sharps Disposal	**179**	**6%**

APPENDIX A

Sharps Injuries among Hospital Workers in Massachusetts, 2009

HOW THE INJURY OCCURRED	N	%
In transit to disposal	38	1
Collided with sharp during / after disposal	34	1
While placing sharp in container, injured by sharp being disposed	31	1
While placing sharp in container, injured by sharp (unclear if sharp in container or being disposed)	28	1
While placing sharp in container, injured by sharp already in container	15	1
Overfilled sharps container	11	<1
Protruding from opened container	9	1
While manipulating container	5	<1
Struck by detached IV line needle during / after disposal	4	<1
Punctured sharps container	3	<1
Sharp object dropped during / after disposal	1	<1
During sharps disposal, unspecified		<1
Manipulate Needle in Patient	**265**	**9%**
While withdrawing needle from patient	146	5
While manipulating needle in patient	69	2
While inserting needle in patient	50	2
Recap Needle	**87**	**3%**
Recapping	69	2
Cap fell off after recapping	10	<1
Removing cap after recapping	8	<1
Access IV Line	**31**	**1%**
While withdrawing needle from line	13	<1
While inserting needle in line	9	<1
While manipulating needle in line	7	<1
Struck by detached IV line needle	2	<1
Failure to Activate Safety Device	**83**	**3%**
Device Malfunction	**69**	**2%**
Before Use of the Item	**13**	**<1%**
Other	**208**	**7%**
Incising	58	2
Sharp object dropped	55	2
Processing specimens	20	1
Sharp object dropped after procedure	13	<1
Transferring blood / bodily fluids into specimen container	12	<1
Palpating / Exploring	4	<1
Other	46	2
Unknown / Not answered	**28**	**1%**
Nonclassifiable	**2**	**<1%**
STATE TOTAL	**2,889**	**100%**

** Sharps injury is considered an exposure incident if the worker is injured with a clean sharp or device (before use) through contaminated gloves or other contaminated mediums.

APPENDIX A

Sharps Injuries among Hospital Workers in Massachusetts, 2009

Sharps Injuries among Hospital Workers by Device and Presence of Sharps Injury Prevention Features

Device	No Sharps Injury Prevention Features		Sharps Injury Prevention Features		Unknown		Total	
	N	%	N	%	N	%	N	%
Hypodermic Needle / syringe	270	31	568	64	46	5	884	100%
Suture Needle	592	91	15	2	46	7	653	100%
Winged Steel Needle	24	10	208	87	8	3	240	100%
Scalpel Blade	152	66	47	20	32	14	231	100%
Vacuum tube collection holder / needle	18	16	85	76	9	18	112	100%
Other Hollow bore needle	102	37	145	53	28	10	275	100%
Other	340	69	32	6	122	25	494	100%
Total	1,498	52	1,100	38	291	10	2,889	100%

Sharps Injuries among Hospital workers by Procedure and Presence of Sharps Injury Prevention Features

Procedure	No Sharps Injury Prevention Features		Sharps Injury Prevention Features		Unknown		Total	
	N	%	N	%	N	%	N	%
Injection Procedures								
Subcutaneous Injection	148	29	344	67	18	4	510	100%
Intramuscular Injection	30	25	82	68	8	7	120	100%
Other Injections	33	55	22	37	5	8	60	100%
Blood Procedures								
Percutaneous venous puncture	31	10	262	86	13	4	306	100%
Finger stick / Heel stick	19	56	12	35	3	9	34	100%
Percutaneous arterial puncture	9	19	32	67	7	15	48	100%
Other blood procedures	4	16	19	76	2	8	25	100%
Line Procedures								
To insert peripheral IV or set up heparin lock	23	20	90	80	0	0	113	100%
To insert central line	26	65	8	20	6	15	40	100%
Other line procedures	73	44	85	51	8	5	166	100%
Other procedures	1,102	75	144	10	221	15	1,467	100%
Total	1,498	52	1,100	38	291	10	2,889	100%

APPENDIX B

Sharps Injuries among Hospital Workers by Number of Licensed Hospital Beds, Massachusetts, 2009

	Hospital size^							
	<100 beds		101-300 Beds		> 300 beds		All Hospitals	
	30 hospitals		53 hospitals		15 hospitals		98 hospitals	
	N	%	N	%	N	%	N	%
STATE TOTAL	**204**	**100 %**	**965**	**100 %**	**1,720**	**100 %**	**2,889**	**100 %**
WORK STATUS OF INJURED WORKER								
Employee	177	87	821	85	1,497	87	2,495	86 %
Non-Employee Practitioner	21	10	92	10	140	8	253	9
Student	4	2	35	4	69	4	108	4
Temporary / Contract Worker	2	1	14	1	7	<1	23	1
Other	0	0	3	<1	6	<1	9	<1
Unknown / Not answered / Nonclassifiable	0	0	0	0	1	<1	1	<1
OCCUPATION								
Nurse	98	48	433	45	542	32	1,073	37 %
Physician	54	26	199	21	812	47	1,065	37
Technician	39	19	229	24	249	14	517	18
Support Services	4	2	55	6	63	4	122	4
Other Medical Staff	4	2	24	2	21	1	49	2
Dental Staff	0	0	3	<1	11	1	14	<1
Other	5	2	20	2	21	1	46	2
Unknown / Not answered / Nonclassifiable	0	0	2	<1	1	<1	3	<1
DEPARTMENT WHERE INJURY OCCURRED								
Operating and Procedure Rooms	93	46	410	42	769	45	1,272	44 %
Inpatient Units	51	25	244	25	347	20	642	22
Emergency Department	26	13	104	11	133	8	263	9
Intensive Care Units	6	3	53	5	152	9	211	7
Outpatient areas	12	6	49	5	123	7	184	6
Laboratories	4	2	33	3	73	4	110	4
Other areas	12	6	70	7	118	7	200	7
Unknown / Not answered / Nonclassifiable	0	0	2	<1	5	<1	7	<1
PROCEDURE FOR WHICH DEVICE WAS USED								
Injection	48	24	269	28	373	22	690	24 %
Suturing	40	20	181	19	434	25	655	23
Blood Procedures	30	15	170	18	213	12	413	14
Line Procedures	32	16	105	11	182	11	319	11
Making the Incision	16	8	78	8	212	12	306	11
To Obtain Body Fluid or Tissue Sample	7	3	22	2	40	2	69	2
Dental Procedures	1	<1	2	<1	21	1	24	1
Other	23	11	75	8	175	10	273	9
Unknown / Not answered / Nonclassifiable	7	3	63	7	70	4	140	5

^ Information on the number of licensed beds is obtained from the MDPH Division of Health Care Quality.

APPENDIX B

Sharps Injuries among Hospital Workers by Number of Licensed Hospital Beds, Massachusetts, 2009

	Hospital size^							
	<100 beds		101-300 Beds		> 300 beds		All Hospitals	
	30 hospitals		53 hospitals		15 hospitals		98 hospitals	
	N	%	N	%	N	%	N	%
STATE TOTAL	**204**	**100 %**	**965**	**100 %**	**1,720**	**100 %**	**2,889**	**100 %**
DEVICE INVOLVED IN THE INJURY								
Hypodermic needles / syringe	60	29	346	36	478	28	884	31 %
Suture Needle	35	17	178	18	440	26	653	23
Winged Steel Needle	20	10	102	11	118	7	240	8
Scalpel Blade	13	6	67	7	151	9	231	8
Vacuum Tube Collection Holder / Needle	10	5	44	5	58	3	112	4
Glass	1	<1	4	<1	13	1	18	1
Dental Device or Item	1	<1	2	<1	8	<1	11	<1
Other Hollow Bore Needle	26	13	90	9	159	9	275	10
Other	33	17	108	11	267	16	408	14
Unknown / Not answered / Nonclassifiable	5	2	24	2	28	2	57	2
SHARPS INJURY PREVENTION FEATURE								
No	99	49	424	44	975	57	1,498	52 %
Yes	99	49	468	49	533	31	1,100	38
Unknown / Not answered	6	3	73	8	212	12	291	10
WHEN THE INJURY OCCURRED								
During Use of the Item	91	45	399	41	860	50	1,350	47 %
After Use / Before Disposal	74	36	374	39	543	32	991	34
During or After Disposal of the Item	27	13	135	14	192	11	354	12
Before Use of the Item	0	0	2	<1	16	1	18	1
Unknown / Not answered / Nonclassifiable	12	6	55	6	109	6	176	6
HOW THE INJURY OCCURRED								
Collision with Worker or Sharp	26	13	126	13	293	17	445	15 %
Suturing	18	9	86	9	254	15	358	12
Handle / Pass Equipment	16	8	84	9	182	11	282	10
Activate Safety Device	18	9	106	11	106	6	230	8
Manipulate Needle in Patient	16	8	91	9	158	9	265	9
Patient Moved / Jarred Device	32	16	102	11	126	7	260	9
Improper Disposal	12	6	92	10	103	6	207	7
During Sharps Disposal	18	9	59	6	102	6	179	6
During Clean-up	10	5	59	6	73	4	142	5
Failure to Activate Safety Device	8	4	42	4	33	2	83	3
Recap Needle	9	4	25	3	53	3	87	3
Device Malfunctioned	7	3	24	2	38	2	69	2
Access IV Line	2	1	9	1	20	1	31	1
Before Use of Item	0	0	2	<1	11	1	13	<1
Other	11	5	52	5	145	8	208	7
Unknown / Not answered / Nonclassifiable	1	<1	6	1	23	1	30	1

^ Information on the number of licensed beds is obtained from the MDPH Division of Health Care Quality.

APPENDIX C

Sharps Injuries among Hospital Workers by Hospital Teaching Status, Massachusetts, 2009

	Teaching Status^					
	Teaching		Non-teaching		All Hospitals	
	22 hospitals		76 hospitals		98 hospitals	
	N	%	N	%	N	%
STATE TOTAL	**1,886**	**100%**	**1,003**	**100%**	**2,889**	**100 %**
WORK STATUS OF INJURED WORKER						
Employee	1,649	87	846	84	2,495	86 %
Non-Employee Practitioner	133	7	120	12	253	9
Student	85	5	23	2	108	4
Temp / Contract	10	1	13	1	23	1
Other	8	<1	1	<1	9	<1
Unknown / Not answered / Nonclassifiable	1	<1	0	0	1	<1
OCCUPATION						
Nurse	589	31	484	48	1,073	37 %
Physician	878	47	187	19	1,065	37
Technician	272	14	245	24	517	18
Support Services	78	4	44	4	122	4
Other Medical Staff	30	2	19	2	49	2
Dental Staff	12	1	2	<1	14	<1
Other	27	1	19	2	46	2
Unknown / Not answered / Nonclassifiable	0	0	3	<1	3	<1
DEPARTMENT WHERE INJURY OCCURRED						
Operating and Procedure Rooms	891	47	381	38	1,272	44%
Inpatient Units	372	20	270	27	642	22
Emergency Department	143	8	120	12	263	9
Intensive Care Units	152	8	59	6	211	7
Outpatient areas	127	7	57	6	184	6
Laboratories	76	4	34	3	110	4
Other areas	120	6	80	8	200	7
Unknown / Not answered / Nonclassifiable	5	<1	2	<1	7	<1
PROCEDURE FOR WHICH DEVICE WAS USED						
Injection	395	21	295	29	690	24%
Suturing	475	25	180	18	655	23
Blood Procedures	220	12	193	19	413	14
Line Procedures	199	11	120	12	319	11
Making the Incision	236	13	70	7	306	11
To Obtain Body Fluid or Tissue Sample	47	2	22	2	69	2
Dental Procedures	21	1	3	<1	24	1
Other	201	11	72	7	273	9
Unknown / Not answered / Nonclassifiable	92	5	48	5	140	5

^ Information on hospitals' teaching status is obtained from the Massachusetts Division of Health Care Finance and Policy.

APPENDIX C

Sharps Injuries among Hospital Workers by Hospital Teaching Status, Massachusetts, 2009

	Teaching Status^					
	Teaching		Non-teaching		All Hospitals	
	22 hospitals		76 hospitals		98 hospitals	
	N	%	N	%	N	%
STATE TOTAL		**100%**		**100%**		**100%**
DEVICE INVOLVED IN THE INJURY						
Hypodermic needles / syringe	516	27	368	37	884	31%
Suture Needle	482	26	171	17	653	23
Winged Steel Needle	131	7	109	11	240	8
Scalpel Blade	166	9	65	6	231	8
Vacuum Tube Collection Holder / Needle	56	3	56	6	112	4
Glass	14	1	4	<1	18	1
Dental Device or Item	9	<1	2	<1	11	<1
Other Hollow Bore Needle	175	9	100	10	275	10
Other	300	16	108	11	408	14
Unknown / Not answered / Nonclassifiable	37	2	20	2	57	2
SHARPS INJURY PREVENTION FEATURE						
No	1,056	56	442	44	1,498	52%
Yes	585	31	515	51	1,100	38
Unknown / Not answered	245	13	46	5	291	10
WHEN THE INJURY OCCURRED						
During Use of the Item	937	50	413	41	1,350	47%
After Use / Before Disposal	591	31	400	40	991	34
During or After Disposal of the Item	211	11	143	14	354	12
Before Use of the Item	16	1	2	<1	18	1
Unknown / Not answered / Nonclassifiable	131	7	45	4	176	6
HOW THE INJURY OCCURRED						
Collision with Worker or Sharp	320	17	125	12	445	15%
Suturing	272	14	86	9	358	12
Activate Safety Device	112	6	118	12	282	10
Handle / Pass Equipment	215	11	67	7	230	8
Manipulate Needle in Patient	161	9	104	10	265	9
Patient Moved / Jarred Device	146	8	114	11	260	9
Improper Disposal	120	6	87	9	207	7
During Sharps Disposal	112	6	67	7	179	6
During Clean-up	81	4	61	6	142	5
Failure to Activate Safety Device	32	2	51	5	83	3
Recap Needle	58	3	29	3	87	3
Device Malfunctioned	44	2	25	2	69	2
Before Use of Item	11	1	2	<1	31	1
Access IV Line	20	1	11	1	13	<1
Other	157	8	51	5	208	7
Unknown / Not answered / Nonclassifiable	25	1	5	<1	30	1

^ Information on hospitals' teaching status is obtained from the Massachusetts Division of Health Care Finance and Policy.

APPENDIX D
Resources
Sharps Injury Surveillance and Prevention

MDPH Occupational Health Surveillance Program
http://www.mass.gov/dph/ohsp
Sharps Injury Surveillance and Prevention Project - e-mail: Sharps.Injury@state.ma.us

OSHA Subject Page for Needle Sticks
Includes Bloodborne Pathogens Standard and compliance directive
http://www.osha.gov/SLTC/bloodbornepathogens/index.html

CDC-MMWR September 30, 2005 / Vol. 54 / RR-9
Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HIV and Recommendations for Post Exposure Prophylaxis
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5409a1.htm

CDC-MMWR June 29, 2001 / Vol. 50 / RR-11
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http://www.cdc.gov/mmwr/PDF/rr/rr5011.pdf

CDC Division of Healthcare Quality Promotion
Workbook for Designing, Implementing, and Evaluating a Sharps Injury Prevention Program
http://www.cdc.gov/sharpssafety/

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http://www.cdc.gov/ncidod/hip/Blood/blood.htm

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http://www.cdc.gov/ncidod/hip/SURVEILL/nash.HTM

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http://www.cdc.gov/niosh/2000-108.html

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Preventing Needlestick and Sharps Injuries
http://www.jcaho.org/edu_pub/sealert/sea22.html

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http://sustainablehospitals.org