Sharps Injuries among Hospital Workers in Massachusetts, 2002

Findings from the Massachusetts Sharps Injury Surveillance System

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Executive Summary

Health care worker exposures to bloodborne pathogens as a result of injuries caused by needles and other sharp devices are a significant public health concern. The U.S. Centers for Disease Control and Prevention (CDC) estimate that, nationwide, between 600,000 and 800,000 percutaneous injuries from contaminated sharp devices occur each year in health care; approximately half are sustained by hospital workers.

Sharps injuries are preventable, and health care facilities are required by state and federal regulations to implement comprehensive plans to reduce these injuries. 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. Sharps injury surveillance is also a key component of a comprehensive program.

While some national data have been collected, little is known about the extent and distribution of sharps injuries among health care workers at the state level. In 2001, pursuant to the Massachusetts law – An Act Relative to Needlestick Injury Prevention (MGL Chapter 111 §53D) – the Massachusetts Department of Public Health (MDPH) promulgated regulations requiring hospitals to report sharps injury data to MDPH.

This first annual report from the Massachusetts Sharps Injury Surveillance System provides information about sharps injuries among Massachusetts hospital workers that occurred in 2002. For all hospitals combined, patterns of sharps injuries by a) occupation of the injured worker, b) department in which the injury occurred, c) procedure performed, and d) device involved are described. Sharps injury rates[1] (defined as number of sharps injuries per 100 licensed hospital beds) are presented for the state overall and for three hospital size categories (small, medium and large hospitals). The report also provides feedback to hospitals regarding data quality. Results stratified by hospital size and by teaching status are included at the end of the report.

Under-reporting of sharps injuries by employees has been well documented in the literature, and varies by occupation and by hospital. 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. Under-reporting 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 under-reporting should be an integral part of sharps injury prevention activities.

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. This report illustrates ways in which surveillance data can be used within hospitals to identify prevention priorities. Input from hospitals and health care workers regarding the surveillance activities and the content of this report is welcome. MDPH looks forward to continued collaboration in building an effective sharps injury surveillance system to improve the health and safety of health care workers in Massachusetts.

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[1] Rates based on the number of licensed beds have a number of limitations, and should be interpreted with caution. Alternative approaches to calculating rates will be explored for future reports.

Findings:

Overview

- A total of 3,413 sharps injuries among hospital health care workers in Massachusetts were reported for the surveillance period January 1 to December 31, 2002. Ninety-seven percent (3,303) of the injuries were reported by acute care hospitals.

- Eighty-eight percent of workers (2,992) who sustained injuries were hospital employees, 6% (192) were non-employee practitioners, 3% (109) were students, and 2% (78) were temporary or contract employees.

Occupation and Department

- Nurses sustained more injuries (1,393, 41%) than any other occupational group followed by physicians who sustained 32% (1,088) of all reported sharps injuries. 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).

- Technicians and support service workers were also at risk for sharps injuries. Technicians, such as surgical technicians and phlebotomists, accounted for 604 (18%) injuries. Support service workers sustained 132 (4%) injuries, 86 (3%) were sustained by housekeepers.

- Injuries occurred most frequently in operating and procedure rooms (1,286, 38%) and inpatient units (excluding intensive care units) (814, 24%).

Type of Device

- Hollow bore needles as a group accounted for 58% (1,942) of all injuries reported and proportionately more injuries among nurses (77%) than physicians (35%). Half of the injuries involving hollow bore needles occurred with hypodermic needles.

- The type of device involved in the incident varied by occupation. Hypodermic needles accounted for the greatest number of injuries (603; 44%) among nurses, whereas suture needles accounted for the greatest number of injuries (438; 40%) among physicians.

- Almost two-thirds of the injuries (2,109, 62%) involved standard devices, devices that were reported as not having engineered sharps injury prevention features. Twenty-six percent (557) of these injuries involved hypodermic needles, devices for which there are safer alternatives on the market.

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

- Devices involved in injuries were most frequently used for injections (713, 21%) and suturing (680, 20%). Proportionately more of the injuries in large hospitals were related to suturing.

- Injuries occurred during the use of devices in 45% (1,539) of the cases. After use of the device was also a dangerous time to handle a device. About half (1,665, 49%) of the injuries occurred after use of the device, including injuries sustained after use / before disposal of devices (33%, 1,130) and injuries occurring during or after disposal (16%,535).

Data Quality

- For the most part, the information provided by hospitals about reported injuries was complete. For several data elements (including department where injury occurred and brand of device) there was some confusion about the information requested. MDPH is working with hospitals to clarify these outstanding issues.

Introduction

Health care worker exposures to bloodborne pathogens as a result of injuries from needles and other sharp devices are a significant public health concern. The U.S. Centers for Disease Control and Prevention (CDC) estimate that, nationwide, there are between 600,000 and 800,000 percutaneous injuries from contaminated needles and other sharp devices (referred to as "sharps injuries" in this report) each year in the health care industry, approximately half of which are sustained by hospital-based health care workers (NIOSH, 1999). This averages out to be more than 1,000 percutaneous injuries each day in US hospitals (Panlilio, Cardo, Campbell, Srivastava, Jagger, Orelien, et al., 2000). As a measure of the likelihood of injury among hospital workers, it has been estimated that annually there are 22 sharps injuries for every 100 occupied hospital beds (Perry, Parker & Jagger, 2003).

Sharps injuries have been associated with occupational transmission of hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV), as well as other pathogens. As of 2000, 25 million individuals in the general population are infected with HBV, 4 million are infected with HCV, and 900,000 with HIV (OSHA, 1998). For many, infection status is not known. The estimated risk of a health care worker developing HCV after each percutaneous exposure to blood or body fluids from an infected patient is estimated to be between 0.4-1.8% (OSHA, 1998). For HIV, the calculated risk is 0.3% (OSHA, 1998). The risk of developing HBV after percutaneous exposure is estimated to be between 6-30% among those workers who have not received HBV vaccinations (OSHA, 1998). HBV vaccination lowers this risk and has been shown to be 80-95% effective in preventing the disease (MMWR, 1982). Since 1992, when the Occupational Health and Safety Administration (OSHA) promulgated the Bloodborne Pathogen Standard, employers have been required to offer the HBV vaccine to employees who may be exposed to blood or potentially bloody body fluids in the course of their jobs. As a result, HBV vaccination rates have increased in recent years, and rates of HBV infection have dropped significantly among health care providers (OSHA, 1998).

The U.S. Public Health Service has recommended guidelines for post-exposure management of all workers who have sustained occupational exposures to bloodborne pathogens (MMWR, 2001). These guidelines provide information for determining when post-exposure prophylaxis is appropriate. Preventive medical treatment following exposure may decrease the likelihood of seroconversion for HIV (Cardo, Culver, Ciesielski, Srivastava, Marcus, Abiteboul, et al., 1997).

While the risk of developing disease after a sharps injury is low, the economic and human costs associated with these injuries are substantial. These include the costs for baseline and follow-up testing of the exposed worker, testing the source patient if serostatus is not already known, and the costs of post-exposure prophylaxis. The costs are estimated to range from $500 to $3,000 per incident depending on the treatment provided (Jagger, Bentley & Julliet, 1998). Other direct costs include health care costs when workers develop infection and disease as a result of exposure, overtime to make up for any staffing changes that may result from the injury, and increases in workers' compensation costs. In addition to these direct costs, there are indirect costs, that are more difficult to quantify; including the emotional costs to workers and their families associated with the anxiety about the possible consequences of sharps injuries, as well as other human costs when workers become infected. Also difficult to quantify are the effects of sharps injuries on morale of workers, turnover, and perceptions of quality of care within the hospital.

Sharps injuries are preventable, and according to OSHA's Bloodborne Pathogen Standard, all health care facilities are required to have comprehensive plans in place to reduce sharps injuries and other bloodborne pathogen exposures. According to the CDC, sharps injuries can be prevented by: promoting a culture of safety in the work environment; eliminating the unnecessary

use of needles and other sharps devices; using devices with sharps injury prevention features; using safe work practices; and educating and training health care personnel (CDC, 2004). Surveillance of sharps injuries sustained by workers is also a critical component of a comprehensive prevention strategy. Information about the types of devices and procedures associated with sharps injuries, the departments in which the injuries occurred, and the occupations at risk is essential to developing effective prevention programs in health care facilities, and at the state and national levels.

Surveillance of Sharps Injuries among Health Care Workers

Currently, there are two national surveillance systems for tracking sharps injuries to health care workers: The National Surveillance System for Health Care Workers (NaSH), operated by the Centers for Disease Control and Prevention (http://www.cdc.gov/ncidod/hip/SURVEILL/nash.htm); and EpiNet which is operated by the International Health Care Worker Safety Center at the University of Virginia (www.med.virginia.edu/epinet).

NaSH is a voluntary reporting system with approximately 20 hospitals, (mostly teaching) hospitals, throughout the country. NaSH has collected data since 1995 on vaccine preventable diseases, bloodborne pathogen exposures, and tuberculosis exposures. EpiNet is, likewise, voluntary and has collected data regarding occupational bloodborne pathogen exposures since 1992; approximately 70 hospitals, in three geographic regions, report exposure data through EpiNet.

Surveillance of sharps injuries is limited by the fact that health care workers often fail to report sharps injuries to their employers. NaSH and EpiNet have estimated the under-reporting rate for sharps injuries to be 56% and 39% respectively (Perry, 2000). There are many reasons why health care 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 (Tandberg, Stewart & Doezema, 1991). In addition, they may lack information and training about appropriate reporting procedures or the reporting procedures themselves may be inadequate. Under-reporting should be taken into account in interpreting sharps injury surveillance data.

Although these two national reporting systems are in place, there is little information about sharps injuries among health care workers at the state level. State level data are important to inform state prevention activities and promote action at the local level. Statewide surveillance of sharps injuries can provide important information about trends in sharps injuries and the devices, procedures, and departments associated with sharps injuries to be addressed. It can identify health care facilities where increased intervention efforts are needed. Statewide surveillance can also identify facilities where prevention efforts have been effective, and facilitate sharing of information about successful programs and practices.

The Massachusetts Sharps Injury Surveillance System

Work-related sharps injuries potentially affect the lives of many individuals: The health care industry in Massachusetts employs over 340,000 people, more than any other industrial sector (Massachusetts DET, 2000). Forty-six percent of Massachusetts health care workers are employed in hospitals (Massachusetts DET, 2000), including over 60,000 physicians and nurses as well as thousands of others who perform other important functions in the hospital setting. Notably, the risk of sharps injury is not limited to direct care providers, but also affects support staff such as maintenance and environmental service workers. When sharps devices are improperly disposed of, many people, including patients and visitors, are placed at risk.

In 2000, Massachusetts joined a growing number of states that have enacted state laws to prevent sharps injuries among health care workers. The Massachusetts law - An Act Relative to Needlestick Injury Prevention (MGL Chapter 111 §53D) – requires all Massachusetts hospitals licensed by the Massachusetts Department of Public Health (MDPH) to:

- Utilize sharps with engineered sharps injury prevention features to the extent feasible;
- Develop written exposure control plans that include effective procedures for identifying and selecting existing sharps injury prevention technology;
- Record percutaneous exposure incidents in sharp injury logs (including information about the type and brand of device involved in the incidents);
- Use this information for continuous quality improvement in reducing sharps injuries through education and procurement of improved products; and
- Report information from sharps injury logs annually to MDPH.

The Massachusetts law also calls for the formation of an advisory committee at MDPH to address sharps injuries, and the compilation of a list of safer sharps devices to be maintained by MDPH. (See Appendix A for current Advisory Committee membership.)

Shortly after the enactment of MGL Chapter 111 §53D, Congress mandated OSHA to amend the existing Bloodborne Pathogens Standard (29 CFR 1910.1030) to include provisions explicitly requiring employers to use safer sharps devices, to record percutaneous injuries on Sharps Logs and to utilize this information for quality improvement (See Appendix B for Massachusetts General Law: An Act Relative to Needlestick Injury Prevention).

In 2001, regulations pursuant to MGL Chapter 111 §53D went into effect requiring hospitals to record sharps injuries (also referred to as "reportable exposure incidents" as defined below) on Sharps Injury Logs starting October 1, 2001 (See Appendix C for MGL Chapter 111 §53D). The MDPH regulations implementing the state law mirror federal law regarding use of safe devices and recording sharps injuries, and they add the requirement that MDPH licensed hospitals submit the data from their Sharps Injury Logs annually to the Department. The initial reporting period was defined as October 1, 2001 – December 31, 2001. The first Annual Summaries of Sharps Injuries, to include data from this period, were due at MDPH on February 1, 2002. The subsequent reporting periods include the full calendar year. January 1 through December 31, 2002 is the first complete calendar year for which data have been collected.

This report from the Massachusetts Sharps Injury Surveillance System provides a look at sharps injuries among Massachusetts hospital workers based on data from this twelve month reporting period. This picture will be augmented in the future, as more data become available. The report illustrates the type of information that can be provided by the surveillance system. It includes information regarding the devices and procedures associated with sharps injuries in Massachusetts hospitals as well as the departments in which these injuries occurred and the occupations involved. Findings are presented by hospital bed-size categories as well as for the state as a whole to allow hospitals to compare their individual experiences with that in similar sized-facilities. Several data quality issues are discussed. Data from the Sharps Injury Surveillance System are intended to assist hospitals and health care workers in targeting and evaluating their efforts to prevent sharps injuries. Feedback from hospitals and health care workers regarding the content and format of this report is welcome, and it will be taken into account in preparing future reports.

Methods

Reportable Exposure Incident: A reportable exposure incident is a bloodborne pathogen exposure incident that is the result of events that pierce the skin or mucous membranes. It is also referred to in this report as a "reportable sharps injury". Bloodborne pathogen exposure is defined more broadly as a specific eye, mouth or other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that result from the performance of an employee's duties. A sharp is defined as any object that can penetrate the skin or any part of the body and result in an exposure incident, including but not limited to needle devices, scalpels, lancets, broken glass, and broken capillary tubes.

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. These health care workers include hospital employees, employees of other agencies working in the hospital, those providing patient services without compensation such as students, and anyone providing care within the facility, regardless of the source of their compensation.

Surveillance Period: The surveillance period is defined as January 1 through December 31, 2002.

MDPH regulations require that sharps injury data be submitted by licensed hospitals to MDPH by February 1 for the previous calendar year.

Definitions:
Sharps Injury Prevention Technology: Sharps injury prevention technology is defined as devices or other technology that minimize the risk of injury to health care workers from hypodermic syringes, needles or other sharps. OSHA refers to non-needle sharps and needle devices used for withdrawing body fluids, accessing a vein or artery, or administering medications or other fluids, with built-in safety features or mechanisms that effectively reduce the risk of an exposure incident as "sharps with engineered sharps injury protections" (SESIPs). They are referred to in this report as "safety devices".

Teaching hospital: Defined by the Medicare Payment Advisory Commission as a hospital with at least 25 medical residents per 100 hospital beds.

Data collection methods: Prior to implementing the record-keeping and annual reporting requirements, MDPH worked with members of its Sharps Injury Prevention Advisory Committee to develop effective mechanisms for collecting and reporting sharps injury data. MDPH identified data elements to be recorded on the sharps injury log, consistent with OSHA record-keeping requirements. Several additional data elements were recommended (Appendix D). To facilitate collection of standard data and reduce the need for coding narrative text at both the hospital and state levels, MDPH developed a recommended Bloodborne Pathogen Exposure Incident Recording Form that includes lists of device types, procedures, clinical practice settings, occupations, and how the injury occurred (Appendix E). Based on lists developed for NaSH, these standard lists allow data from Massachusetts to be compared with national data. Use of the Bloodborne Pathogen Exposure Incident Recording Form was voluntary. MDPH also developed a mandatory Annual Summary of Sharps Injury reporting form (referred to in this report as the Annual Summary) that included the same standard lists (Appendix F). Hospitals were given the option of submitting this form either as hard copy or electronically. In September 2001, MDPH, in collaboration with the Massachusetts Hospital Association (MHA), held a training session for hospital staff regarding the new sharps injury record-keeping and reporting requirements;

representatives from 74 of the state's 101 licensed acute and chronic hospitals attended the training session.

For most hospitals, information from Sharps Injury Logs was submitted to the Occupational Health Surveillance Program at MDPH by infection control practitioners or employee health staff. In some hospitals, reports were submitted by staff in risk management or human resources. Data from the Annual Summaries were entered at MDPH into MSExcel and coded as needed using the standard lists developed for NaSH (See Appendix G). Expert clinicians assisted in making coding decisions, and data were then imported into Stata for analysis.

Experimental Sharps Injury Rates: Sharps injury rates indicate the probability or risk of a worker sustaining a sharps injury within the surveillance period. Numbers are the counts of sharps injury cases. A large hospital may have many workers who sustain sharps injuries but the rate of injury may be low. Conversely, in a smaller hospital, relatively few workers may sustain sharps injuries but the risk may be high. Both rates and numbers of injuries must be considered when targeting and evaluating prevention efforts.

Sharps injury rates presented in this report are defined as the number of reported sharps injuries divided by the number of licensed hospital beds. Information regarding bed numbers for each hospital was obtained from the MDPH Division of Health Care Quality that licenses hospitals. Rates were calculated for all hospitals combined, as well as by hospital size. Hospitals were divided into three groups based on the number of licensed beds - small (0-100 beds), medium (101-300 beds) and large (301+ beds) for this analysis. Rates by hospital size were calculated by adding all injuries reported in each category (small, medium, and large hospitals) and dividing by the total number of licensed beds in the respective category.

Limitations

There are a number of data limitations that need to be taken into account when interpreting sharps injury rates. Optimally, sharps injury rates would be calculated using information on the total number of hours worked, sharps devices purchased or used, or procedures performed at the hospitals in the denominator. This information, however, was not available. Rates based on numbers of licensed beds are approximate measures of risk, and are included in this report to allow hospitals to compare their injury experience with that of other hospitals in same size categories. However, it should be recognized that the number of licensed beds is neither an accurate reflection of the average daily census, nor does it take into account the number of inpatient or outpatient procedures performed in a hospital or satellite facilities. These rates, for example, may overestimate the risks of sharps injuries in facilities in which large numbers of procedures are performed. For these reasons, these rates are considered experimental and should be interpreted with caution. MDPH welcomes input on the usefulness of these rates, and will explore alternative rate calculations for future reports.

There are also other 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 under-reporting by health care workers has been well documented. Thus the surveillance findings presented in this report should be considered conservative estimates of the burden of sharps injuries among hospital workers in Massachusetts.

Also, there is evidence that a) the likelihood of reporting varies by occupation and b) completeness of reporting varies by hospital (CDC, 1999). Hospitals with well established sharps injury surveillance programs and strong safety cultures may identify and report more injuries than hospitals with less well developed employee health programs. Hospitals, in evaluating their own data, should do so within the context of their own sharps injury surveillance and prevention program.

Assessment of under-reporting should be an integral part of the sharps injury prevention activities in hospitals. Caution is advised in comparing experiences among hospitals, particularly in this first annual report from the Massachusetts Sharps Injury Surveillance System. Hospitals with high numbers or rates of reported sharps injuries are not necessarily hospitals with the highest risks of sharps injury, but, rather, may have stronger internal reporting systems. This, however, should not detract from the need to address real problems in these facilities.

For the most part, the information about reported injuries provided by hospitals was complete. However, there was some missing information, and for several data elements (such as department where injury occurred and brand of device) there was some confusion about what information should be submitted. MDPH is working with hospitals to clarify these outstanding issues.

Results
Overview

All 101 hospitals licensed by MDPH submitted Annual Sharps Injury Reports for 2002. A total of 3,413 sharps injuries were sustained by Massachusetts hospital workers from January 1 through December 31, 2002; these injuries were then reported by the hospitals to MDPH. The number of sharps injuries reported by individual hospitals ranged from 0 to 431. Over half of the hospitals reported fewer than 20 injuries. The extent to which high numbers of reported injuries in some hospitals reflect a truly higher incidence of injuries in these hospitals compared to those with low numbers or better sharps injury reporting practices is not known. MDPH plans to work with hospitals over time to better understand injury patterns, and improve reporting and prevention practices.

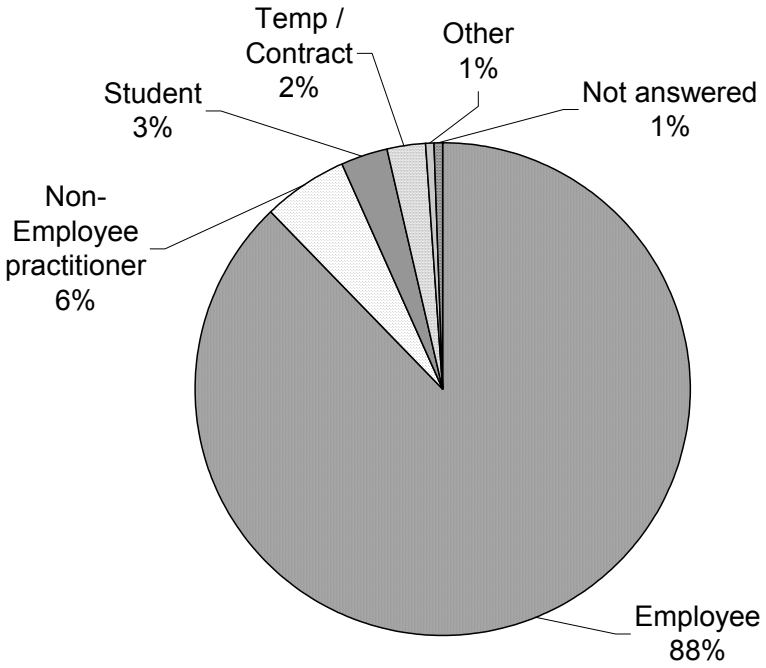
There are 84 acute care hospitals in Massachusetts. These hospitals reported 97% (3,303) of all sharps injuries. The 14 teaching hospitals in Massachusetts reported 40% (1,365) of all sharps injuries. More than half of the teaching hospitals (8, 57%) have over 300 beds.

Key findings for all hospitals combined are presented in the following sections. When the pattern of sharps injuries varied markedly by hospital size, this is noted in the text. Detailed tables, including findings by hospital size categories and teaching status, are provided in Appendices G, H and I.

Comments on data quality are offered to assist hospital staff responsible for compiling the required information for reported injuries. These comments do not address under-reporting of sharps injuries to the surveillance system, which cannot be evaluated without additional sources of information.

Work Status of Injured Worker

Figure 1. Sharps Injuries among Hospital Workers by Work Status Massachusetts, 2002, N=3,413



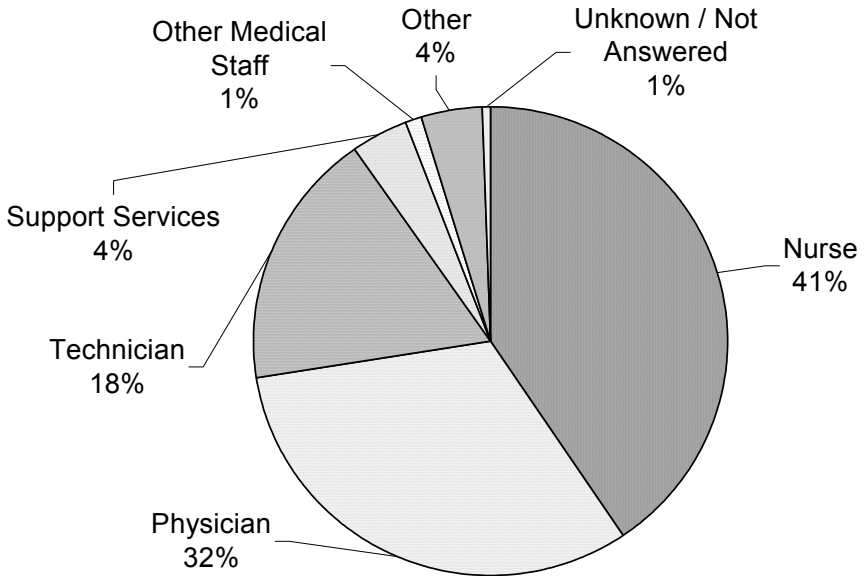
Data Source: Annual Summary of Sharps Injuries, 2002

State reporting regulations require hospitals to report sharps injuries to all workers in the hospital and satellite sites, regardless of the source of compensation for these workers. Eighty-eight percent (2,992) of all sharps injuries reported were sustained by employees, followed by non-employee practitioners, with 6% (192) of the injuries (Figure 1). Three percent (109) of those injured were students. Non-employee practitioners include, but are not limited to, physicians with admitting privileges at a particular hospital and nurse practitioners or physicians assistants from a private medical practice who are checking on patients from that practice.

Data quality: Information about work status was provided for 99% of the cases.

Occupation of Injured Worker

Figure 2. Sharps Injuries among Hospital Workers by Occupation, Massachusetts, 2002, N = 3,413



Data Source: Annual Summary of Sharps Injuries, 2002

Nursing department staff sustained more sharps injuries than any other occupational category, accounting for 41% (1,393) of the injuries (Figure 2). Of these, five were nursing students and 123 were nursing assistants. Physicians followed nurses with 32% (1,088) of the sharps injuries. Close to half of the injuries in this category (444) were sustained by interns and residents. The physician category also included 72 injuries among medical students. Technicians comprised the third leading occupational group accounting for 18% (604) of sharps injuries. This group included individuals in a wide variety of technical occupations; the most frequently reported were operating room/surgical technicians (204) and phlebotomists (143) and clinical laboratory technicians (108). Of the 132 injuries (4%) sustained by workers in support services, 86 were housekeepers.

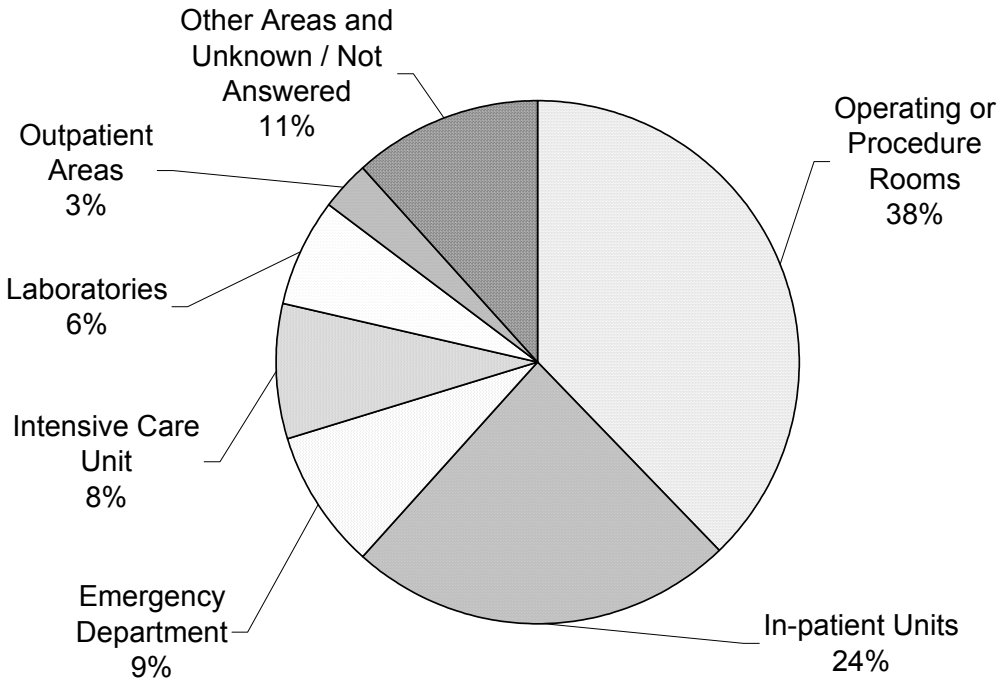
The occupational distribution of the cases varied by hospital size. Most notably, physicians comprised 41% of the injuries in the large hospitals whereas they comprised 23% and 24% in the small and medium sized hospitals respectively (See Appendix H).

Recent studies indicate that the likelihood of workers reporting sharps injuries to employee health departments in hospitals varies by occupation. However, findings are not consistent among studies. In one study, nurses were found to be more likely than physicians to report needle stick injuries (Tandberg, et al., 1991). The CDC found, however, that while nurses were more likely to report needle stick injuries than surgeons, they were less likely to report than other physicians (CDC, 1999). This variation needs to be taken into account in interpreting the findings throughout this report.

Data quality: Information about occupation was provided for 99% of the cases.

Department or Work Area where the Injury Occurred

Figure 3. Sharps Injuries among Hospital Workers by Department where Injury Occurred, Massachusetts, 2002, N=3,413



Data Source: Annual Summary of Sharps Injuries, 2002

The greatest number of sharps injuries (1,286; 38%) occurred in operating or procedure rooms (Figure 3); of these, more than two-thirds (935) occurred in operating rooms.

In-patient units accounted for the second largest number of cases with 814 (24%) of the injuries. Of these, 473 occurred on medical surgical units, 46 in Ob/Gyn units and 34 in pediatrics and 22 in psychiatry. For 136 of the injuries that occurred on in-patient units, hospitals reported hospital specific unit identifiers (such as 2 East) that could not be coded to more specific standard locations (See Table 1, page 13 for findings regarding occupation by department).

Data Quality: Some information on location where injuries occurred was provided for 99% of the cases. However, as noted above, in a number of cases, hospitals reported hospital specific unit identifiers that could not be coded to standard locations or departments. MDPH is interested in the department or clinical practice area (physical location) where the injury occurred. Hospitals are encouraged to used the standard department list provided on the Annual Summary of Sharps Injuries reporting form rather than hospital specific nomenclature.

Occupation by Department

Table 1. Sharps Injuries among Hospital Workers by Occupation and Department, Massachusetts, 2002, N=3,413

	Department Where Injury Occurred													
	Operating/ Procedure Room		In-patient Unit		Emergency Department		Intensive Care Unit		Laboratory		Other or Unknown		Total	
	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*
Occupation														
Nurse	356	26	568	41	143	10	155	11	17	1	148	11	1,387	100%
Physician	574	53	99	9	92	8	102	9	50	5	171	16	1,088	100%
Technician	280	45	80	14	37	6	17	3	137	23	53	9	604	100%
Support Svcs	23	25	30	21	10	7	4	--	7	5	58	40	132	100%
All others	46	24	35	18	16	8	5	3	10	5	72	37	184	100%
Not answered	7	39	2	--	2	--	2	--	0	--	5	28	18	100%
Total	1,286	36	814	29	300	8	285	8	221	7	507	14	3,413	100%

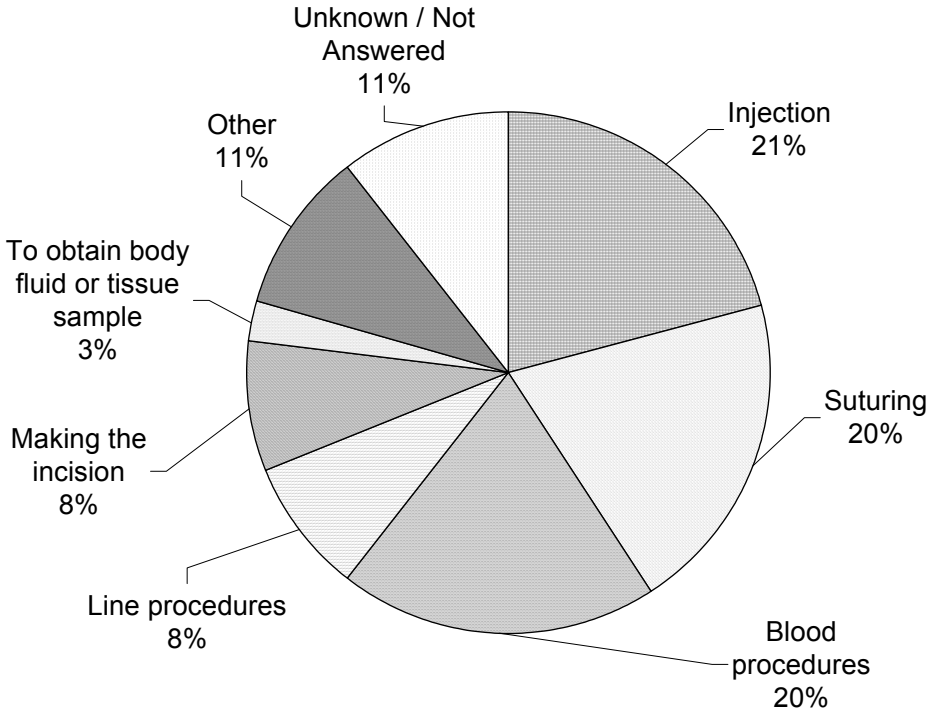
* Percentages calculated are row percents; percentages for frequencies less than 5 were not calculated
Data Source: Annual Summary of Sharps Injuries, 2002

Physicians were most frequently injured in operating and procedure rooms (574, 53%) (Table 1). In contrast, nurses were most frequently injured on in-patient units (568, 41%). Of the 132 support staff who were injured, 86 were housekeepers, of whom 28 were injured on in-patient units.

Within operating and procedure rooms, physicians sustained more injuries than any other occupation group, accounting for 45% (574 of 1,286) of the injuries, followed by nurses with 28% (356 of 1,286) of the injuries. Nurses accounted for by far the greatest number of injuries - 568 of 814 or 70% - in in-patient units. In emergency departments, similar numbers of physicians and nurses were injured. Sixty-two percent (137 of 221) of the injuries in laboratories were sustained by technicians, followed by physicians who accounted for 23% (50 of 221).

Procedure for Which Sharp was Used or Intended

Figure 4. Distribution of Sharps Injuries among Hospital Workers by Procedure or Purpose for which Device was Used, Massachusetts, 2002, N=3,413



Data Source: Annual Summary of Sharps Injuries, 2002

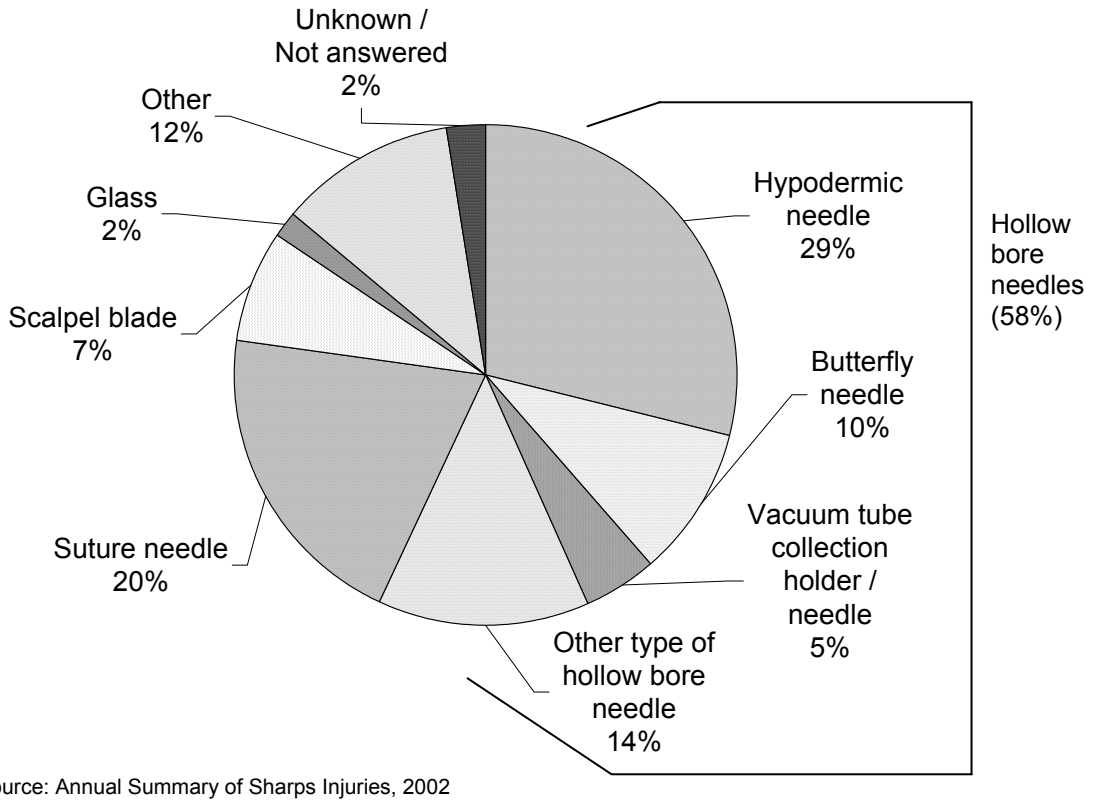
Twenty-one percent (713) of the injuries involved devices used for injections (Figure 4). Information about type of injection was provided for 584 of these injuries. Of these, 310 involved needles used for subcutaneous injections and 274 for intramuscular injections. In another 20% (680) of the injuries, workers were injured with devices used for suturing. Devices used for blood procedures accounted for 20% (672) of the injuries. The majority of blood procedures (501, 15% of the total) involved devices used for percutaneous venous punctures. Blood procedures are those procedures which involve drawing blood; line procedures involve the insertion or removal of intravenous lines.

The distribution of sharps injuries by procedure varied by hospital size, with 22% of the injuries in large hospitals associated with suturing compared to 18% and 19% in small and medium sized hospitals respectively. In turn, 16% of the injuries in small hospitals and 17% in medium sized hospitals were associated with devices used for percutaneous venous punctures, compared to 12% in large hospitals. (See Appendix H.)

Data quality: For 13% (106) of the injuries, the procedure for which the device was used or intended was reported as unknown. Most of these cases with unknown procedure (73 of 106) occurred after use of the device, either before, during or after disposal.

Device Involved in the Injury

Figure 5. Sharps Injuries among Hospital Workers by Device Involved in the Injury, Massachusetts, 2002, N=3,413



Data Source: Annual Summary of Sharps Injuries, 2002

Injuries from hollow bore needles, particularly those used in procedures accessing a vein or artery and those where residual blood is visible, are associated with increased risk of transmission of HIV when compared to other sharps devices (Cardo, et al*.,* 1997).

As a group, hollow bore needles accounted for the majority – 58% (1,942) - of the sharps injuries (Figure 5). These included 984 (29%) injuries from hypodermic needles, 338 injuries (10%) from butterfly needles, and 156 (5%) from vacuum tube needles. An additional 464 (14%) injuries were associated with "other hollow bore needle", including IV stylets (155 injuries), epidural needles (21 injuries) and biopsy needles (19 injuries).

Suture needles accounted for 20% (696) of sharps injuries. Information as to whether these were straight or curved needles was provided for only 155 of these injuries; of these, 135 involved curved needles. Consistent with findings for procedures for which devices were used, suture needles accounted for proportionately more injuries in the larger hospitals (22%), as compared to small (18%) and medium (19%) size hospitals.

Data Quality: Information about device type available was not provided for 81 of the injuries. In 62 cases device type was reported as unknown and in 19 cases the question was unanswered.

Device by Occupation

Table 2. Sharps Injuries among Hospital Workers by Device and Occupation, Massachusetts, 2002, N=3,413

	Device Type															
	Hollow Bore								Other Devices							
	Hypodermic Needle		Butterfly Needle		Vacuum Tube		Other Hollow Bore		Suture Needle		Scalpel		All Other/ Unknown		Total	
	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*
Occupation																
Nurse	603	43	159	11	65	5	241	17	118	9	50	4	151	11	1,387	100%
Physician	230	21	34	3	5	--	110	10	438	40	130	12	141	13	1,088	100%
Technician	89	15	102	17	76	13	68	11	100	17	44	7	125	21	604	100%
Support Svcs	19	14	1	--	1	--	30	23	13	10	10	8	58	44	132	100%
All others	41	22	42	23	8	4	13	7	20	11	7	4	53	29	184	100%
Not answered	2	--	0	--	1	--	2	--	7	39	1	--	5	28	18	100%
Total	984	29	338	10	156	5	464	14	696	20	242	7	533	16	3,413	100%

* Percentages calculated are row percents; percentages for frequencies less than 5 were not calculated.
Data Source: Annual Summary of Sharps Injuries, 2002

The type of device involved in the incident varied by occupation (Table 2). Hollow bore needles, as a group, accounted for 79% of injuries sustained by nurses compared to 34% of injuries sustained by physicians. Hypodermic needles accounted for more injuries (603; 43%) among nurses, whereas suture needles accounted for the greatest number of injuries (438; 40%) among physicians. The technicians with sharps injuries worked in a wide variety of technical occupations, such as operating room / surgical technicians, phlebotomists, and clinical laboratory technicians. No single device type stood out among the technicians who sustained sharps injuries.

Device by Department

Table 3. Sharps Injuries among Hospital Workers by Device and Department, Massachusetts, 2002, N=3,413

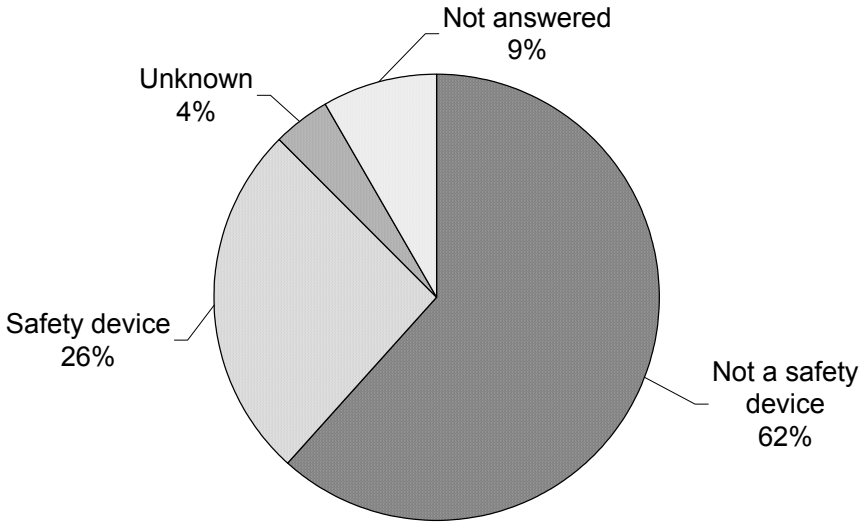
	Device Type															
	Hollow Bore Needles								Other Devices							
	Hypodermic Needle		Butterfly Needle		Vacuum Tube		Other Hollow Bore		Suture Needle		Scalpel		All Other/ Unknown		Total	
	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*
Department																
OR/Procedure Rm	231	18	30	2	13	1	160	12	519	40	135	10	198	15	1,286	100%
In-patient Units	372	46	137	17	53	7	109	13	33	4	12	1	98	12	814	100%
Emergency Dept	92	31	62	21	19	6	45	15	44	15	8	3	30	10	300	100%
Intensive Care	106	37	33	12	16	6	47	16	37	13	10	4	36	13	285	100%
Laboratories	21	10	35	16	34	15	23	10	3	--	41	19	64	29	221	100%
Outpatient Areas	44	40	9	8	3	--	16	14	3	--	3	--	33	30	111	100%
All Other/Unknown	118	39	32	8	18	13	64	34	57	32	33	26	74	45	396	100%
Total	984	29	338	10	156	5	464	14	696	20	242	7	533	16	3,413	100%

* Percentages calculated are row percents; percentages for frequencies less than 5 were not calculated.
Data Source: Annual Summary of Sharps Injuries, 2002

As expected, the type of device associated with sharps injuries varied by department. Within operating and procedure rooms, suture needles accounted for the largest number of injuries (519, 40%) followed by hypodermic needles (231, 18%). Suture needles also accounted for a substantial proportion of the injuries in emergency departments (44, 15%) and intensive care units (37, 13%). On in-patient units, hypodermic needles accounted for the greatest number of injuries (372, 46%), followed by butterfly needles (137, 17%) and “other hollow bore needles” (109, 13%). Almost half of the injuries in laboratory settings involved non-needle devices including scalpels (3, 3%) and glass (33, 30%) which is included in the “all other” category.

Safety Devices

Figure 6. Sharps Injuries among Hospital Workers by Safety Devices, Massachusetts, 2002, N = 3,413



Data Source: Annual Summary of Sharps Injuries, 2002

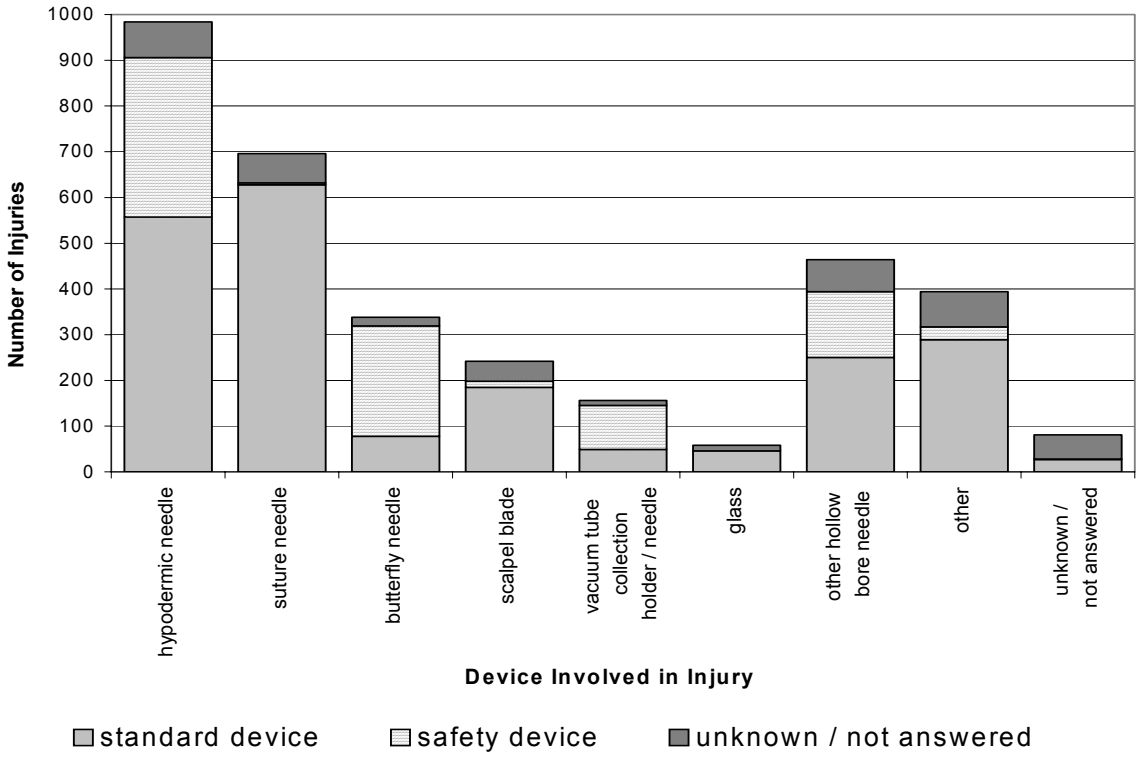
On the Annual Summary, for each injury, hospitals were encouraged to answer the question "Was it (the device) a safety device?". In almost two-thirds of the injuries (2,109, 62%), the answer to this question was "No"; the devices involved were not safety devices (Figure 6). This finding highlights the need for increased efforts to meet the federal and state requirements for use of sharps devices with sharps injury prevention features where feasible. For some sharps devices, there are a limited number of alternative devices with engineered sharps injury prevention features available on the market. Documentation of these situations, as required by OSHA, is important to promote effective work-practice controls and the development of new technologies.

Twenty-six percent (876) of injuries were reported to have involved safety devices, underscoring the need to evaluate these devices and to train health care workers in their appropriate use. Because there is no information regarding the prevalence of safety devices in hospitals, these data alone cannot be used to assess the efficacy of safety devices. Likewise, these data do not reveal the number of injuries that were prevented by using safety devices. Recent findings from EPINet demonstrate a marked decline in the rate of sharps injuries among nurses in teaching hospitals from 1993 – 2001 (Jagger & Perry, 2003). During this period there was a substantial increase in the adoption of safety devices. As the number of safety devices increased, there was a rise in the proportion of injuries associated with them, as would be expected. However, the overall injury rate declined.

The proportion of injuries associated with safety devices was highest in small hospitals (37%), followed by medium sized hospitals (27%) and large hospitals (16%). (See Appendix H) The extent to which this can be explained by the variation in the types of devices used in different sized hospitals is not known.

Standard versus Safety Devices by Type of Device

Figure 7. Sharps Injuries among Hospital Workers by Device – Standard v Safety Device, Massachusetts, 2002, N=3413

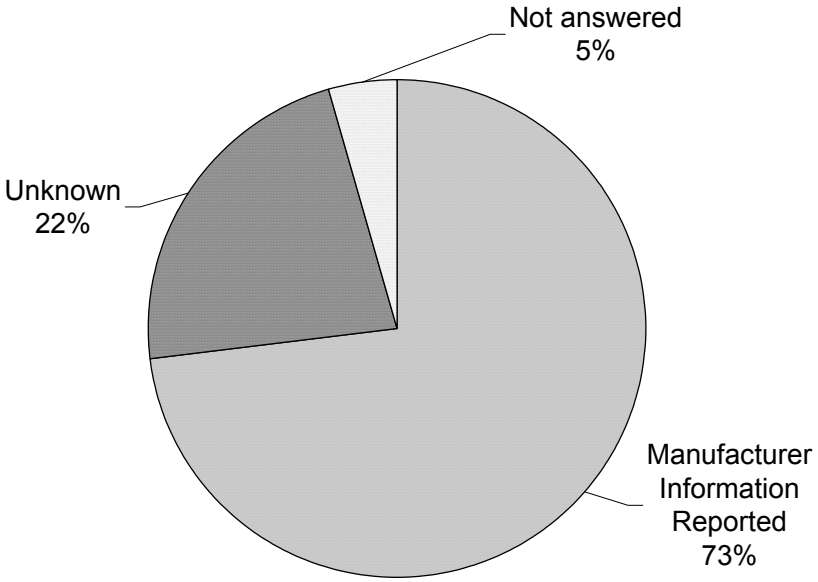


Data Source: Annual Summary of Sharps Injuries, 2002

Information as to whether or not the device involved in the injury was a safety device was provided for 2,985 of the 3,413 injuries (87%). Among injuries associated with suture needles where safety device information was provided, 628 of 634 injuries (99%) occurred with standard devices (Figure 7). Regarding injuries involving scalpel blades, 185 of 198 injuries (93%) occurred with standard devices. Among the 906 injuries from hypodermic needle for which safety device information was reported, 57% involved devices reported as standard devices (557 of 906 injuries). Among other hollow-bore needles, 63% (250 of 394 with information) of injuries involved standard devices. In contrast, 76% (241 of 319 with information) of injuries involving butterfly needles and 66% (96 of 145 with information) of injuries involving vacuum tubes occurred with devices reported as safety devices. It should be noted that safety devices are not widely available for all of the device categories shown. There are some specific devices currently on the market for which there are no alternative devices with engineered sharps injury prevention features.

Brand of Device

Figure 8. Sharps Injuries among Hospital Workers with Manufacturer of Device Information Reported, Massachusetts, 2002, N=3,413



Data Source: Annual Summary of Sharps Injuries, 2002

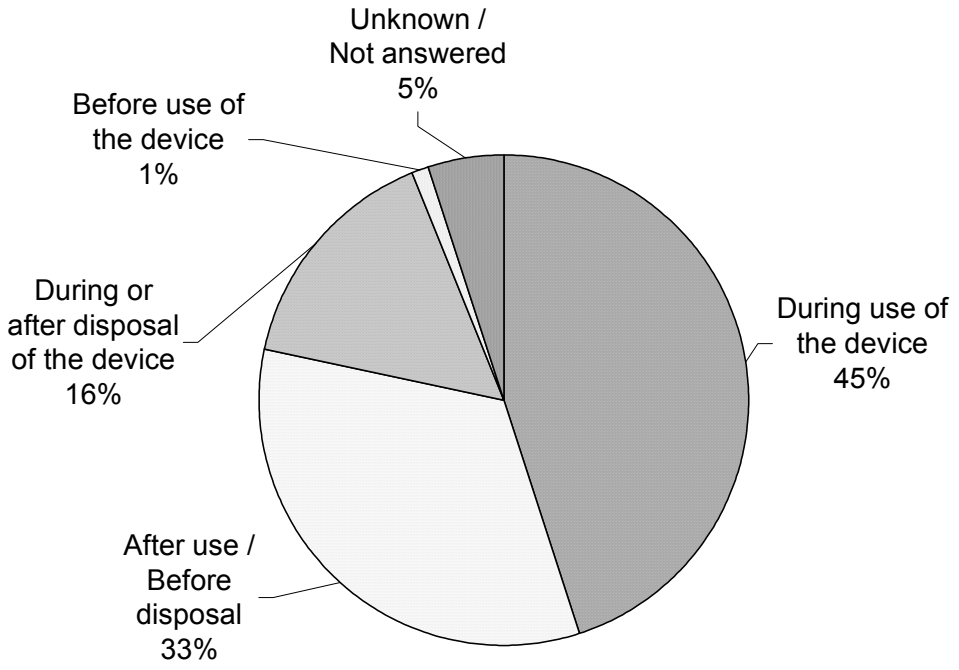
Information about the manufacturer of the device involved in the injury was provided or was able to be ascertained from the name of the product line in 73% (2,442) of the injuries (Figure 8). In 22% (750) of the injuries, the manufacturer of the product was not known, and in 5% there was no response.

Because information about the market share of different manufacturers and product lines was not available, it is not possible to use this data to make judgments about a particular manufacturer's products and the efficacy of the products with respect to safety.

Data quality: Both OSHA and MDPH regulations pertaining to sharps injuries require facilities to collect and record information about the "brand" of the devices involved in the incidents. There is some legitimate confusion about whether "brand" means the name of the manufacturer or name of the product line. Technically brand means name of the product line. This distinction was not made clear in previous instructions to hospitals. MDPH is interested in the name of the product line as well as the manufacturer, and will clarify this on forms for the future.

When the Injury Occurred: Before, During, After Use of Device

Figure 9. Sharps Injuries among Hospital Workers by When the Injury Occurred, Massachusetts, 2002, N=3413

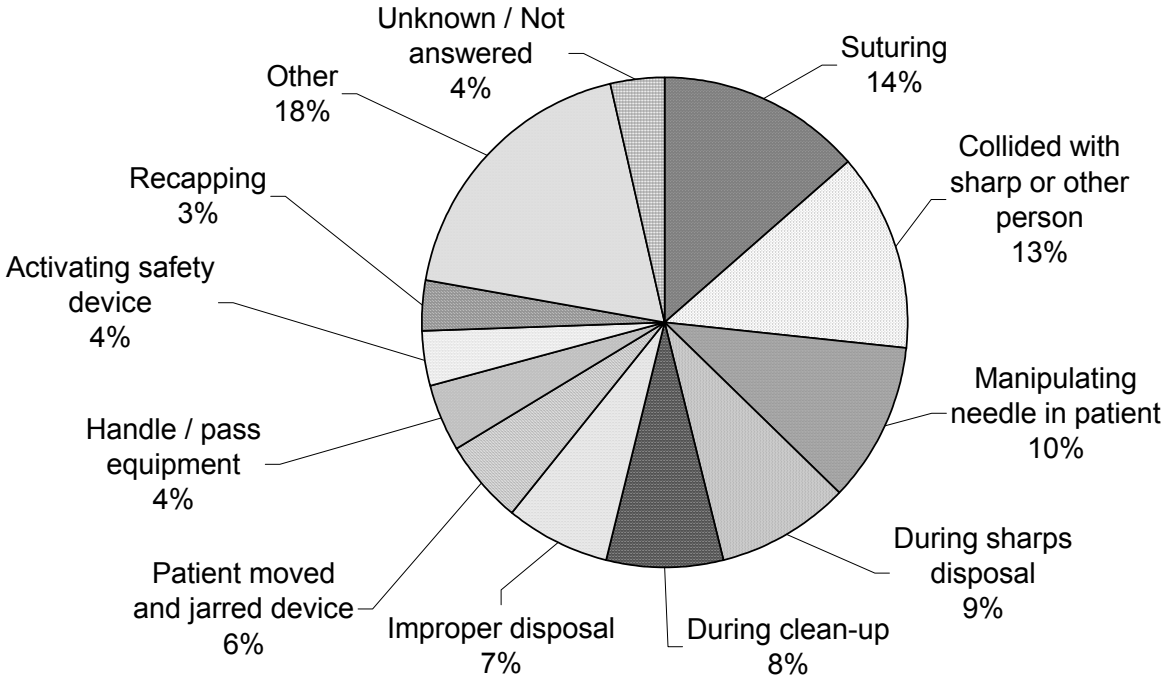


Data Source: Annual Summary of Sharps Injuries, 2002

Injuries occurred at various points in the course of handling needles or other sharp devices (Figure 9). After use was a dangerous time: about half of the injuries (1,665, 49%) occurred either after use and before disposal (1,130, 33%) or during or after disposal (535, 16%) of the device. Forty-five percent (1,539) occurred during use of the item. The 38 injuries (1%) that happened before use of the item involved sharps devices penetrating contaminated gloves.

How the Injury Occurred

Figure 10. Sharps Injuries among Hospital Workers by How the Injury Occurred, Massachusetts, 2002, N = 3,413



Data Source: Annual Summary of Sharps Injuries, 2002

The largest number of injuries (463, 14%) occurred while suturing. Another 13% of injuries (451) fell into the broadly defined category of "collided with sharp or other person" (Figure 10).

Nine percent (306) of the injuries occurred during disposal. A majority of these (203, 6%) were reported as involving sharps containers. In 4% (144) of the injuries, the health care worker was injured by the sharp being disposed of while placing it in the sharps container. In 19 cases (<1%), the health care worker was injured by a sharp already in the container.

Improper disposal of sharps accounted for 7% (239) of the injuries. These included cases in which the contaminated sharps were left on the floor, in the trash, or in beds. Others cases involved sharps found in linens or laundry, in clothing, or on tables or trays.

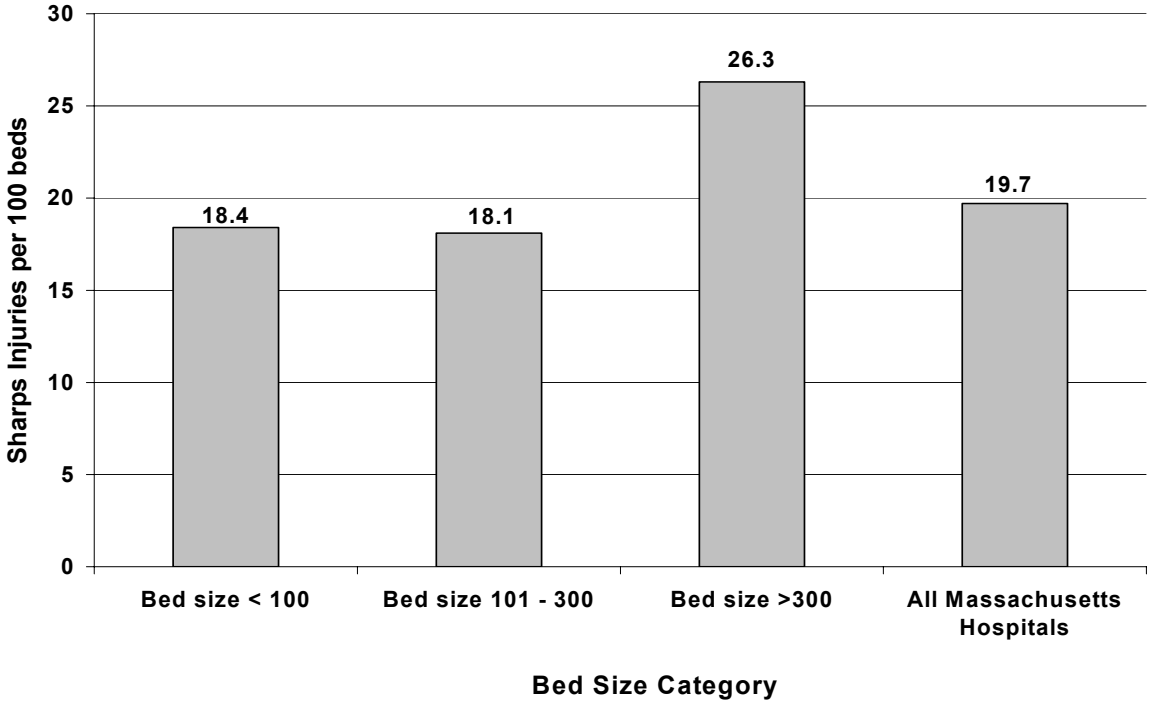
Four percent of the injuries (130) occurred during activation of safety devices. No information was collected regarding the failure rate of safety features; therefore it is not possible to use this information to assess the efficacy of the safety features on those devices.

It should be noted that the OSHA Bloodborne Pathogen standard states that contaminated needles shall not be recapped. In 3% (111) of the cases, injuries occurred while recapping devices.

Experimental Sharps Injury Rates by Number of Licensed Hospital Beds

The statewide rate of sharps injuries among hospital workers for this twelve month surveillance period was 23.3 sharps injuries per 100 licensed hospital beds. The annual rate of sharps injuries varied by hospital size (Figure 11). Large hospitals had the highest annual rate of 26.3 sharps injuries per 100 licensed hospital beds, followed by medium and small sized hospitals, which each had annual sharps injury rates of approximately 18 per 100 licensed hospital beds. As discussed on page 7, given the limitations of hospital bed size as a denominator for assessing risks, these rates should be interpreted with caution. In comparing experience among hospitals, under-reporting must be taken into account. 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. Comparison of rates among facilities is of limited usefulness (CDC, 2004; Perry, et. al., 2003). Hospitals evaluating their own rates should do so within the context of their own sharps injury surveillance and prevention programs.

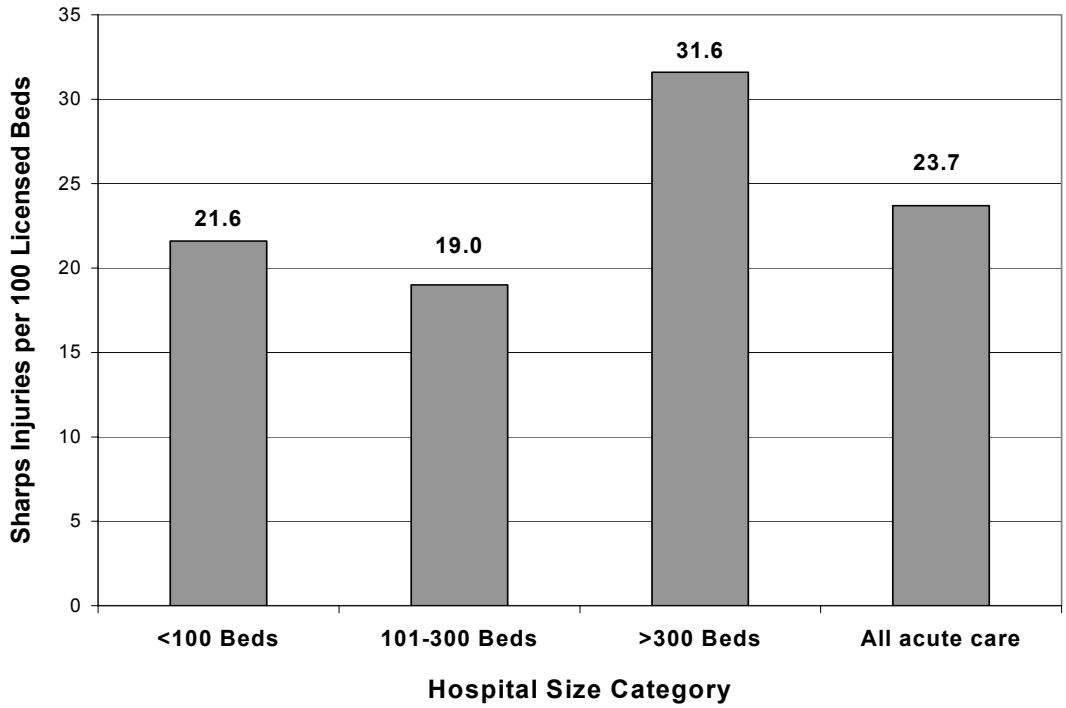
Figure 11. Annualized Experimental Sharps Injury Rates by Bed Size Categories, Massachusetts, 2002, All licensed hospitals



Data Source: Annual Summary of Sharps Injuries, 2002

Injuries reported by acute care hospitals accounted for 97% of all injuries reported. However, acute care hospitals account for only 75% of all licensed hospital beds. Therefore, sharps injury rates which include all licensed hospitals underestimate the risk for acute care hospitals. Sharps injury rates for acute care hospitals are presented below in order to more accurately reflect the injury rates in those settings.

Figure 12. Annualized Experimental Sharps Injury Rates by Bed Size Categories, Massachusetts, 2002, Licensed Acute Care hospitals



Data source: Annual Summary of Sharps Injuries, 2002

Discussion

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 2000-2010 (DHHS, 2000). Preventing sharps injuries requires the combined efforts of government agencies, employers, and equipment manufacturers, as well as health care workers themselves. The Massachusetts Sharps Injury Surveillance System is intended to provide information to both guide and evaluate these efforts in Massachusetts.

Over 3,400 sharps injuries were reported by Massachusetts hospitals in 2002, underscoring the need for continued efforts to reduce the incidence of these injuries. Given previously documented underreporting of sharps injuries to employee health by health care workers, this figure likely underestimates the full extent of the problem. The findings in this first annual report from the Massachusetts surveillance system set an important baseline for future time trend comparisons. While overall patterns are similar to NaSH and EpiNET, findings highlight a number of specific issues to be addressed in Massachusetts:

- More than 20% of the injuries occurred after use of devices – either during clean up or disposal or as a result of improper disposal. Elimination of these preventable injuries will have a large impact on the incidence of sharps injuries in hospitals. (These injuries are entirely preventable.) Examples of prevention strategies include the purchase and appropriate placement of sharps containers that allow staff to determine when containers should be emptied before they are dangerously full. It is also crucial to implement systems to regularly check containers to identify those that need to be replaced. Increased training and supervision to avoid improper disposal is needed in addition to appropriate sharps containers, and is essential to protect not only health care providers but support service workers and patients.

- Close to a third of the injuries were associated with hypodermic needles, and of these, more than 60% involved devices without sharps injury prevention features. There are a wide variety of hypodermic needles with engineered sharps injury prevention features on the market. Other injuries occurred with devices for which safety devices are available. Hospitals should evaluate their device inventory and aggressively identify, evaluate and implement use of alternative devices with engineered sharps injury prevention features.

- It may be more difficult to institute change in some areas than others: the operating room setting, for example, poses unique challenges. Some devices, such as suture needles, have fewer options for engineering controls; to date, safer options for suture needles have been blunt needles, which are not appropriate for all situations. In this instance, exploring alterative methods of closing wounds may be more appropriate than finding alternative devices. The use of neutral zones to minimize hand-to-hand transfer of sharps is an effective work practice control to reduce sharps injuries.

The Massachusetts Sharps Injury Surveillance System has been a collaborative effort between the MDPH, hospitals, professional associations and community advocates. The success of the program in collecting data is a result of this collaboration. MDPH will continue to work with these groups to conduct surveillance, review exposure control activities in hospitals, and facilitate the exchange of information among hospitals about successful prevention strategies.

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APPENDIX A

Massachusetts Department of Public Health
Sharps Injury Prevention Advisory Committee

Members

Philip Adamo M.D., MPH	Board of Directors, New England College of Occupational and Environmental Medicine
Bob Alconada	Manager, State Government Affairs Massachusetts Dental Society
Evelyn Bain, M Ed, RN, COHN-S	Associate Director/Coordinator - Health and Safety Program Massachusetts Nurses Association
Karen Daley, RN, MPH	Consumer
Anuj Goel, JD, MPH	Director, Regulatory Compliance Massachusetts Hospital Association
Margaret Quinn, Sc.D., CIH	Associate Professor, Department of Work Environment, University of Massachusetts Lowell
James Ryan, M.D., MPH	Committee on, Occupational & Environmental Medicine Massachusetts Medical Society

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Gail Palmeri, RN	Program Manager, Hospitals Division of Health Care Quality, MDPH

APPENDIX B

NOTE: This is an unofficial copy.

Chapter 252 of the Acts of 2000

AN ACT RELATIVE TO NEEDLESTICK INJURY PREVENTION.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

SECTION 1. Chapter 111 of the General Laws is hereby amended by inserting after section 53C the following section:

Section 53D. (a) Any acute or non-acute hospital licensed under this chapter shall ensure the provision of services to individuals through the use of hollow-bore needle devices or other technology that minimize the risk of injury to health care workers from hypodermic syringes or needles, in accordance with rules and regulations promulgated pursuant to subsection (b).

(b) The department shall promulgate rules and regulations requiring the use, at all acute and non-acute hospitals, of only such devices which minimize the risk of injury to health care workers from needlestick and sharps, so-called. Such rules and regulations promulgated by the department shall include the following requirements:

(1) Written exposure control plans shall be developed by each acute and non-acute hospital that include an effective procedure for identifying and selecting existing sharps prevention technology, so-called, of the types specified by the department.

(2) Sharps injury prevention technology shall be included as engineering or work practice controls, except in cases where the employer or other appropriate party can demonstrate circumstances in which the technology does not promote employee or patient safety or interferes with a medical procedure. Those circumstances shall be specified by the employer and shall include, but not be limited to, circumstances where the technology is medically contraindicated or not more effective than alternative measures used by the employer to prevent exposure incidents. In all cases the department shall make the final determination as to whether an employer or other appropriate party has demonstrated in a satisfactory manner circumstances which warrant an exemption from the inclusion of sharps injury prevention technology.

(3) Information concerning exposure incidents shall be recorded in a sharps injury log to be kept within such acute and non-acute hospitals and reported annually to the department, including but not limited to, the type and brand of device involved in the incident. Such logs shall be used as the basis for continuing quality improvement in reducing sharps injuries through the provision of education and the procurement of improved products. Such logs shall be kept confidential and shall be used only for the intended purposes of this section.

(4) Written exposure control plans shall be updated when necessary to reflect progress in sharps prevention technology as determined by the department.

(c) The department shall promulgate all rules and regulations pursuant to this section in consultation with an advisory committee composed of, but not limited to: the department's director of infectious disease, a consumer to be selected by the commissioner, a technical expert to be selected by the commissioner, and a representative from the Massachusetts Nurses Association,

the Massachusetts Association of Occupational and Environmental Medicine, the Massachusetts Medical Society and the Massachusetts Hospital Association.

The department, in consultation with the advisory committee, shall compile and maintain a list of needleless systems, needles and sharps, so-called, with engineered injury protections meeting the purposes of this section. The list shall be available to assist employers in complying with rules and regulations promulgated in accordance with this section.

SECTION 2. The department of public health shall promulgate the rules and regulations required by section 53D of chapter 111 of the General Laws no later than November 1, 2000.

Approved August 17, 2000.

APPENDIX C

NOTE: This is an unofficial copy.

105 CMR 130.000 Hospital Licensure Regulations
105 CMR 130.000 is amended by adding the following new sections:

130.1001: Definitions

As used in 105 CMR 130.1001 through 130.1008 the following definitions shall apply:

"Advisory committee," means a committee composed of, but not limited to the Department's director of infectious disease; a consumer to be selected by the commissioner; a technical expert to be selected by the commissioner; and a representative from the Massachusetts Nurses Association, the New England Association of Occupational and Environmental Medicine, the Massachusetts Medical Society and the Massachusetts Hospital Association.

"Commissioner" means the Commissioner of the Massachusetts Department of Public Health.

"Department" means the Massachusetts Department of Public Health.

"Engineering and work practice controls" mean controls such as, but not limited to, sharps disposal containers, needleless systems, and sharps with engineered injury protections, that isolate or remove the bloodborne pathogens hazard from the workplace.

"Exposure Control Plan" means a plan that includes an effective procedure for identifying and selecting existing sharps injury prevention technology.

"Exposure Incident" means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that result from the performance of an employee's duties.

"Health care worker" means all workers employed by the hospital, working within the hospital but employed by other agencies, those providing patient care services without pay such as students, or providers who are delivering care but receiving compensation from sources other than the hospital.

"Hospital" means any hospital licensed by the Department pursuant to M.G.L. c.111, § 51.

"Reportable Exposure incident" means an exposure incident a result of events that pierce the skin or mucus membranes.

"Sharp" means any object that can penetrate the skin or any part of the body, and result in an exposure incident, including, but not limited to, needle devices, scalpels, lancets, broken glass, broken capillary tubes and exposed ends of dental wires.

"Sharps injury log" means a log to be kept within acute and non-acute hospitals that records information concerning exposure incidents, including but not limited to, the type and brand of device involved in the incident.

"Sharps injury prevention technology" means devices or other technology that minimizes the risk of injury to health care workers from hypodermic syringes, needles or other sharps.
130.1002: Minimizing Risk of Injury

APPENDIX C

Every hospital shall:

(A) Ensure the provision of services to individuals through the use of safe needle devices or other technology that minimizes the risk of injury to health care workers from hypodermic syringes, needles, and sharps; and

(B) Except as provided in 105 CMR 130.1005; use only such devices designed to reduce risk of percutaneous exposure to bloodborne pathogens.

130.1003: Written Exposure Control Plans

Hospitals shall develop written exposure control plans that include an effective procedure for identifying and selecting existing sharps injury prevention technology consistent with the federal regulations concerning occupational exposure to bloodborne pathogens, 29 CFR 1910.1030 *et seq.* the Occupational Safety & Health Administration's (OSHA) Occupational Exposure to Bloodborne Pathogens standards. Written exposure control plans shall be updated when necessary to reflect progress in sharps injury prevention technology as determined by the Department.

130.1004: Engineering and Work Practice Controls

Hospitals shall include sharps injury prevention technology as engineering and work practice controls to isolate or remove the bloodborne pathogens hazard from the workplace consistent with the federal regulations concerning occupational exposure to bloodborne pathogens, 29 CFR 1910.1030 et seq.

130.1005: Exemption from the Inclusion of Sharps Injury Prevention Technology

(A) Sharps injury prevention technology may be excluded as engineering and work practice controls in cases where the hospital or other appropriate party can demonstrate circumstances in which the technology does not promote employee or patient safety or interferes with a medical procedure.

(B) Where sharps injury prevention technology is not utilized, the hospital shall specify those circumstances, which shall include but not be limited to, situations where the technology is medically contraindicated or not more effective than alternative measures used by the hospital to prevent exposure incidents.

(C) In all cases the Department shall make the final determination as to whether a hospital or other appropriate party has demonstrated in a satisfactory manner those circumstances which warrant an exemption from the inclusion of sharps injury prevention technology.

130.1006: Sharps Injury Log

(A) Information concerning exposure incidents shall be recorded in a sharps injury log that includes, but is not limited to, the type and brand of device involved in the incident, the department or work area where the exposure incident occurred, and an explanation of how the incident occurred.

(B) Sharps injury logs shall be kept within the hospital and shall be used as the basis for continuing quality improvement in reducing sharps injuries through the provision of education and the procurement of improved products; and,

(C) Sharps injury logs shall be kept confidential.

130.1007: Reporting

Every licensed acute and non-acute care hospital shall report annually to the Department information from its sharps injury logs and such other information as the Department may require concerning exposure incidents. The Department shall supply each reporting hospital with guidelines indicating the specific data elements to be submitted.

130.1008: Advisory Committee

The Department shall convene an advisory committee composed of, but not limited to the Department's director of infectious disease; a consumer to be selected by the commissioner; a technical expert to be selected by the commissioner; and a representative from the Massachusetts Nurses Association, the New England Association of Occupational and Environmental Medicine, the Massachusetts Medical Society and the Massachusetts Hospital Association.

130.1009: List of Needleless Systems

The Department, in consultation with the advisory committee, shall compile, maintain and periodically update a list of needleless systems, with engineered injury protection~~s~~ meeting the purposes set forth in M.G.L. c. 111, § 53D. The list shall be available as a resource to assist hospitals in complying with these regulations.

APPENDIX D

MDPH Data Elements to be Recorded for each Exposure Incident

Those items in bold are required to be recorded by both OSHA and MDPH. The additional items are strongly recommended by MDPH to be recorded. The checks in the left-hand column identify the subset of data elements that should be reported annually to MDPH for each exposure incident. See also Annual Summary of Sharps Injuries.

To be reported to MDPH annually	Data elements
√	Employer
√	**Unique Incident Number**
√	Employment status of exposed health care worker (temp, agency employee, pool nurse, contractor, employee)
√	**Date of incident**
	Time of incident
	Time work shift began
√	**Occupation**
√	**Department or work area in which the exposure incident occurred**
√	**Device or item that was involved in the injury**
√	**Brand and model of device**
√	Was the device a safety device?
√	**Purpose or procedure for which the sharp was intended or used**
√	**How the incident occurred**
	Health care worker's recommendations to prevent similar injuries

APPENDIX E

This form meets the requirements of recording sharps injuries under M.G.L. 105 CMR 130.1001 *et seq.*
Please complete this form with the exposed health care worker. ***REQUIRED DATA ELEMENTS FOR RECORDING**

Massachusetts Department of Public Health
Bloodborne Pathogen Exposure Incident Recording Form

EMPLOYER:*	**UNIQUE EXPOSURE INCIDENT NUMBER:***
EXPOSED WORKER'S NAME: **(or unique ID number)**	**OSHA RECORDABLE:** □ YES □ NO □ UNKOWN
STATUS of EXPOSED WORKER: □ EMPLOYEE □ VOLUNTEER □ STUDENT □ NON EMPLOYEE PRACTITIONER □ TEMP / CONTRACT □ OTHER _____	**TIME WORK SHIFT BEGAN:*** am : pm

DATE OF INCIDENT:* / /	**TIME of INCIDENT:*** : am pm	**DATE REPORTED:** / /	**TIME REPORTED:** : am pm

TYPE OF EXPOSURE:*	**TYPE OF FLUID:**	**FOR PERCUTANEOUS INJURIES:**	
		DEPTH OF INJURY:	**BLOOD VISIBLE ON DEVICE BEFORE EXPOSURE?**
□ Percutaneous	□ Blood / blood products	□ Superficial	□ Yes
□ Mucous membrane	□ Visibly bloody body fluid	□ Moderate	□ No
□ Skin	□ Non-visibly bloody body fluid	□ Deep	□ Unknown
□ Was skin intact?: YES NO UNKNOWN	□ Visibly bloody solution (iv fluid, etc.)	□ Unknown	
□ Bite	□ Non-visibly bloody solution		
	□ Other _____ (specify)		
	□ Unknown		

BODY PART INJURED:	**PERSONAL PROTECTIVE EQUIPMENT WORN BY WORKER AT TIME OF EXPOSURE:**
□ Arm □ Mouth / nose	□ Gloves (single pair) □ Eye protection □ Mask
□ Hand □ Leg	□ Gloves (double pair) □ Face shield □ Other_____ (specify)
□ Finger □ Other _____ (specify)	□ Gloves (triple pair) □ Gown/Garment □ None of the above

OCCUPATION:*

□ Attendant / orderly	□ Fellow	□ Medical student	□ Physical therapist
□ Attending physician	□ Fireperson / First responder	□ Nurse Anesthetist	□ Public health worker
□ Central supply	□ Food service	□ Nursing Assistant	□ Psychiatric technician
□ Clerical / administrative	□ Hemodialysis technician	□ Nurse Midwife	□ Radiologic technician
□ Clinical lab technician	□ Housekeeper	□ Nurse Practitioner	□ Registered Nurse
□ Counselor / social worker	□ Intern / resident	□ Nursing student	□ Researcher
□ Dentist	□ Laundry staff	□ OR / surgical technician	□ Respiratory Therapist / Tech
□ Dental assistant / tech	□ Law enforcement officer	□ Patient care technician	□ Safety / security
□ Dental hygienist	□ Licensed Practical Nurse	□ Pharmacist	□ Transport / messenger
□ Dental student	□ Maintenance	□ Phlebotomist	□ Volunteer
□ Dietician	□ Morgue technician	□ Physician assistant	□ Other _____ (specify)
□ EMT / paramedic			

DEPARTMENT OR WORK AREA WHERE EXPOSURE INCIDENT OCCURRED:* ***Select all that apply***
Identify specific location (room number, floor etc): _____

□ Ambulance	□ Endoscopy / bronchoscopy /cytoscopy	□ Intensive care unit	□ Obstetrics / gynecology ward
□ Blood bank		□ Jail unit	□ Operating room
□ Central sterile supply	□ Exam room	□ Labor and delivery	□ Pediatrics
□ Central trash area	□ Hematology	□ Laundry room	□ Procedure room
□ Clinical chemistry	□ Histology / pathology	□ Medical / surgical ward	□ Psychiatry ward
□ Dialysis	□ Home health visit (home)	□ Microbiology	□ Radiology department room
□ Dental Clinic	□ Hospital grounds	□ Morgue / autopsy room	□ Other location _____ (specify)
□ Emergency Department		□ Nursery	

IS THIS THE DEPARTMENT TO WHICH THE WORKER IS REGULARLY ASSIGNED? □ YES □ NO □ N/A

IF NO, TO WHICH DEPARTMENT IS THE WORKER REGULARLY ASSIGNED?

APPENDIX E

WHAT DEVICE OR ITEM WAS INVOLVED IN THE INJURY?*

Hollow bore needle

- □ Biopsy needle
- □ IV stylet
- □ Hollow-bore needle, type unknown
- □ Huber needle
- □ Hypodermic needle attached to a disposable syringe
- □ Hypodermic needle attached to IV tubing
- □ Prefilled cartridge syringe
- □ Spinal or epidural needle
- □ Unattached hypodermic needle
- □ Winged steel needle
- □ Winged steel needle attached to a vacuum tube collection holder
- □ Winged steel needle attached to IV tubing
- □ Vacuum tube collection holder / needle
- □ Other type of hollow bore needle _____(Specify)

Other sharp object

- □ Bone chip / chipped tooth
- □ Bone cutter
- □ Bovie electrocuatery device
- □ Bur
- □ Explorer
- □ Histology cutting blade
- □ Lancet
- □ Laser
- □ Pin
- □ Razor
- □ Retractor
- □ Scaler / curette
- □ Scalpel blade
- □ Scissors
- □ Sharp object, type unknown
- □ Tenaculum
- □ Trocar
- □ Wire
- □ Other type of sharp object _____ (specify)

Suture needle

- □ Curved suture needle
- □ Straight suture needle

Glass

- □ Capillary tube
- □ Medication ampule / vial / IV bottle
- □ Pipette
- □ Slide
- □ Specimen / test / vacuum tube
- □ Other glass item _____ (specify)

Additional dental / surgical devices

- □ Hypodermic needle attached to non-disposable syringe
- □ Elevator
- □ Extraction forceps
- □ Root canal file
- □ Rod (orthopaedic)
- □ Other device or item _____ (specify)

BRAND / MODEL OF DEVICE:*

WAS IT A SAFETY DEVICE? □ **Yes** □ **No** □ **Unknown**

IF YES, WHEN DID THE INJURY OCCUR?

- □ Before activation of safety feature
- □ During activation of safety feature
- □ Safety feature improperly activated
- □ Safety feature failed; after activation
- □ Safety feature not activated
- □ Passive safety feature, activation not required
- □ Other _____ (specify)
- □ Unknown

IF YES, WAS THE WORKER TRAINED IN THE PROPER USE OF THIS SAFETY DEVICE? □ Yes □ No

Describe training:

PURPOSE OR PROCEDURE FOR WHICH SHARP WAS USED OR INTENDED:*

Line procedures:

- □ To insert a peripheral IV line or set up a heparin lock
- □ To insert a central IV line
- □ To insert and arterial line
- □ To connect IV line (intermittent IV / piggy back / IV infusion / other IV line connection)
- □ To flush heparin / saline
- □ Other injection into IV injection site or IV port _____ (specify)
- □ Other line procedure _____ (specify)

Blood procedures:

- □ Percutaneous venous puncture (e.g. phlebotomy)
- □ Percutaneous arterial puncture
- □ Central of peripheral IV line or port
- □ Arterial line
- □ Dialysis / AV fistula site
- □ Umbilical vessel
- □ Fingerstick / heel stick
- □ Other blood sampling _____ (specify)

Other procedures:

- □ Cutting (e.g. surgery / autopsy)
- □ During disposal
- □ Epidural / spinal anesthesia
- □ Intramuscular (IM) injection
- □ Subcutaneous / intradermal injection / skin test placement
- □ Suturing
- □ Transferring blood / body fluid to another container
- □ To obtain a body fluid or tissue sample (CFS / amniotic / biopsy)
- □ To obtain laboratory specimens
- □ Other procedure (not a line procedure or blood sampling procedure) _____ (specify)
- □ Unknown

***Dental procedure*:**

- □ During disposal
- □ Hygiene (prophy, root plane, curettage)

Oral surgery

- □ Simple Extraction
- □ Surgical Extraction
- □ Fracture Reduction
- □ Other_____(specify)
- □ Unknown

Orthodontic procedure

- □ Periodontal surgery
- □ Restorative(amalgam, composite, crown)
- □ Root canal
- □ Other _____**(specify)**
- □ Unknown

Where did the injury occur?

- □ Inside the patient's mouth
- □ Outside the patient's mouth
- □ Unknown

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HOW DID THE INJURY OCCUR?* *Choose up to two*

- ☐ Before use of the item

During use of the item

- ☐ Collided with co-worker or other person
- ☐ Collided with sharp
- ☐ Incising
- ☐ Manipulating suture needle in holder
- ☐ Palpating / Exploring
- ☐ Passing or receiving equipment
- ☐ Passing or transferring equipment
- ☐ Patient moved and jarred device
- ☐ Sharp object dropped
- ☐ Suturing
- ☐ Tying sutures
- ☐ While inserting needle in line
- ☐ While inserting needle in patient
- ☐ While manipulating needle in line
- ☐ While manipulating needle in patient
- ☐ While withdrawing needle from line
- ☐ While withdrawing needle from patient
- ☐ Other _____ (specify)
- ☐ Unknown

After use, before disposal

- ☐ Activating safety device
- ☐ Cap fell off after recapping
- ☐ Collided with co-worker or other person
- ☐ Collided with sharp after procedure
- ☐ Disassembling device or equipment
- ☐ Decontamination / processing of used equipment
- ☐ During clean-up
- ☐ Handling equipment on a tray or stand
- ☐ In transit to disposal
- ☐ Opening / breaking glass containers
- ☐ Processing specimens
- ☐ Passing or transferring equipment
- ☐ Recapping (missed or pierced cap)
- ☐ Sharp object dropped after procedure
- ☐ Struck by detached I.V. line needle
- ☐ Transferring blood / bodily fluids into specimen container
- ☐ Other _____ (specify)
- ☐ Unknown

During or after disposal of item

- ☐ Collided with co-worker or other person
- ☐ Collided with sharp during / after disposal
- ☐ In trash
- ☐ In linen / laundry
- ☐ In pocket / clothing
- ☐ Left on table / tray
- ☐ Left in bed / mattress
- ☐ On floor
- ☐ Over-filled sharps container
- ☐ Punctured sharps container
- ☐ Protruding from opened container
- ☐ Sharp object dropped during / after disposal
- ☐ Struck by detached I.V. line needle during / after disposal
- ☐ While manipulating container
- ☐ While placing sharp in container, injured by sharp being disposed
- ☐ While placing sharp in container, injured by sharp already in container
- ☐ Other_____ (specify)
- ☐ Unknown

NARRATIVE DESCRIPTION OF THE INCIDENT:

WHAT SUGGESTIONS DOES THE WORKER HAVE FOR PREVENTING SIMILAR INJURIES IN THE FUTURE?

Prepared by: Title: Date:

APPENDIX E

INSTRUCTIONS FOR MDPH BLOODBORNE PATHOGEN EXPOSURE INCIDENT RECORDING FORM

The Bloodborne Pathogen Exposure Incident Recording Form shall be completed with the exposed health care worker at the time that post-exposure care is given following a percutaneous injury resulting in an exposure to blood and potentially infectious bodily fluids.

Health care workers are defined as: all workers employed in the hospital, working within the hospital but employed by other agencies, those providing patient care services without pay such as students, or providers who are delivering care but receiving compensation from sources other than the hospital.

This form shall be kept in a place that protects the confidentiality of the exposed health care worker. If this information is to be shared with committees within the hospital, all measures that protect the privacy of the exposed health care worker shall be taken.

The **name of the employer** shall be recorded. If incident occurred in a satellite site, note site here.

A **unique exposure incident number** shall be assigned to each incident. This number along with the ID number should be used when referring to this incident on subsequent reports. There should be only one location where the connection is made between the ID number, incident number and the health care worker's name. This information shall be kept confidential.

The **exposed health care worker's name** or **unique ID number** shall be recorded. An **ID number**, unique to the exposed health care worker should be assigned. A social security number or employee ID number should not be used. If this form is shared with other departments, then the health care worker's name should not be used, in order to maintain confidentiality.

Indicate if this is an **OSHA recordable** incident.

The **employment status** shall be given. If the health care worker is a paid employee of the organization, then indicate that the health care worker is an employee. If the health care worker is from an outside agency, (e.g., staffing agency) then indicate that the health care worker is a temp or a contract employee. An attending physician employed by a group practice would be classified as a non-employee practitioner.

Indicate the time that the health care worker began the **work shift** in which the incident occurred.

Indicate the **date and time of the incident**, and the **date and time that the incident was reported**.

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Indicate the **type of exposure**.

Percutaneous – punctured or broke the skin
Mucous membrane – contact with mouth, eyes or other mucous membranes
Skin – contact with unprotected skin
Bite – bite where the skin was broken

Identify the **type of fluid** involved in the exposure. If the fluid type is not listed, describe in OTHER.

Describe the **depth of the injury**.

Superficial – injuries such as a scratch
Moderate – those injuries that are more serious than scratches, but not so serious that they would be considered to be deep (e.g., superficial laceration or tissue avulsion)
Deep – injuries that touched bone or muscle contracted

Indicate whether there was **blood visible on the device** before the incident occurred.

Indicate the **body part injured**. If it is not listed, describe in OTHER.

Indicate the type of **personal protective equipment** worn by the exposed health care worker at the time of exposure. If the type of protection is not listed, describe in OTHER.

Indicate the usual **occupation** of the exposed health care worker. If the occupation is not listed, provide the occupation in OTHER.

Indicate the **department or work area where the incident occurred**. This may be different from the department in which the health care worker is regularly assigned. If the department is not listed, indicate the department in OTHER. In the space provided, indicate the specific location of the incident, such as the room number, or the floor in which the incident occurred.

Indicate whether the department in which the exposure occurred is the department to which the health care worker is regularly assigned. If the answer is no, please indicate the department to which the employee is regularly assigned.

Indicate which **device or item was involved in the injury**. If the device is not listed, indicate the type of device in the space for OTHER in the category of devices provided.

Identify the **brand and or model of the device**. It may be helpful to have the samples or pictures of the types of devices available, with the sharp covered, so that the injured employee can identify the device.

Indicate whether the **device was a safety device**. If yes, indicate **when the injury occurred**, relative to the activation of the safety feature.

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If the device was a safety device, indicate whether the health care worker was **trained in the use of the device**. Describe the training provided (e.g., printed instructions, on the job, in-service demonstration, hands on in-service).

Identify the **purpose or procedure for which the sharp was used or intended**. If the purpose is not listed, indicate the purpose in OTHER within the category of uses provided.

Choose up to two items describing **how the injury occurred**.

Provide a narrative description of the incident, identifying the events that led up to the incident, as well as if anyone else was involved. Describe the nature of the injury and the body part injured, along with any other information about the incident.

Ask the injured health care worker to suggest ways to prevent this type of injury from occurring in the future. Suggestions may range from increased training, to changing the devices that are utilized within the facility.

The name and title of the individual filling out the recording form as well as the date it is completed shall be recorded.

Annual Summary of Sharps Injuries

Massachusetts Department of Public Health
Occupational Health Surveillance Program

Hospital:
License Number:
Hospital Contact:
Phone number:
Year:

Use of the attached lists is encouraged when completing this form.
***Required data elements for reporting to MDPH.**

* Date of Exposure Incident	* Unique Exposure Incident Number	Employment status of exposed health care worker. (e.g.,Employee, temp/contract, student,	* Occupation	* Department or work area where the exposure incident occurred	* Device or item that was involved in the injury	Was it a safety device? Y / N / Unknown	* Brand / model of device	* Purpose or procedure for which the sharp was used or intended	* How did the injury occur?

APPENDIX F

INSTRUCTIONS for
MDPH ANNUAL SUMMARY OF SHARPS INJURIES

This form shall be either typed or computer generated. This form shall cover sharps injuries occurring in the previous calendar year and shall be sent to MDPH-OHSP by ***February 1****.*

Provide the **name and license number** of the **hospital** facility.

Provide the **calendar year** of the data.

Provide a **contact name** and **phone number** for the person who is responsible for the data at the hospital.

A **unique exposure incident number** shall be assigned to each exposure event.

Indicate the usual **occupation** of the exposed health care worker. Use of the list of occupations provided on the attached list is encouraged.

Identify the **department or work area** where the incident occurred. Use of the list of departments provided on the attached list is encouraged.

Identify the **device or item** involved in the exposure incident. Use of the list of devices provided on the attached list is encouraged.

Indicate whether the device involved was a **safety device**.

Identify the **brand and model** of the device involved in the exposure incident.

Identify the **purpose or procedure for which the sharp was used or intended**, that is what the device was being utilized for at the time of the exposure incident. Use of the list of procedures provided on the attached list is encouraged.

Indicate **how** the exposure incident occurred. Use of the list of possible causes provided on the attached list is encouraged.

Insert **page numbers** and total number of pages.

Sharps Injury Suveillance Project
Occupational Health Surveillance Program
Massachusetts Department of Public Health
250 Washington Street, 6th floor
Boston, MA 02108

For information on reporting, contact:
Occupational Health Surveillance Program
at Sharps.Injury@state.ma.us or 617-624-5625

APPENDIX F

OCCUPATION				
Attendant / orderly	Dietician	Licensed Practical Nurse	Patient care technician	Respiratory Therapist / tech
Attending physician	EMT / paramedic	Maintenance	Pharmacist	Safety / security
Central supply	Fellow	Morgue technician	Phlebotomist	Transport / messenger
Clerical / administrative	Fireperson / First responder	Medical student	Physician assistant	Volunteer
Clinical lab technician	Food service	Nurse Anesthetist	Physical therapist	Other ancillary staff **(specify)**
Counselor / social worker	Hemodialysis technician	Nursing Assistant	Public health worker	Other dental worker **(specify)**
Dentist	Housekeeper	Nurse Midwife	Psychiatric technician	Other medical staff **(specify)**
Dental assistant / tech	Intern / resident	Nurse Practitioner	Radiologic technician	Other student **(specify)**
Dental hygienist	Laundry staff	Nursing student	Registered Nurse	Other **(specify)**
Dental student	Law enforcement officer	OR / surgical technician	Researcher	Other technician **(specify)**

DEPARTMENT OR WORK AREA WHERE EXPOSURE INCIDENT OCCURRED				
Ambulance	Emergency Department	Home health visit (home)	Medical / surgical ward	Pediatrics
Blood bank	Endoscopy / bronchoscopy /cytoscopy	Hospital grounds	Microbiology	Procedure room
Central sterile supply		Intensive care unit	Morgue / autopsy room	Psychiatry ward
Central trash area	Exam room	Jail unit	Nursery	Radiology department room
Clinical chemistry	Hematology	Labor and delivery	Obstetrics / gynecology ward	Other laboratory **(specify)**
Dialysis	Histology / pathology	Laundry room	Operating room	Other outpatient area **(specify)**
Dental Clinic				Other location **(specify)**

WHAT DEVICE OR ITEM WAS INVOLVED IN THE INJURY?				
Hollow bore needle	Winged steel needle attached to a vacuum tube collection holder	Bur	Tenaculum	***Suture Needle***
Biopsy needle		Explorer	Trocar	Curved suture needle
IV stylet		Histology cutting blade	Wire	Straight suture needle
Hollow-bore needle, type unknown	Winged steel needle attached to IV tubing	Lancet	Other type of sharp object **(specify)**	
Huber needle		Laser		***Additional dental / surgical devices***
Hypodermic needle attached to a disposable syringe	Vacuum tube collection holder / needle	Pin		Hypodermic needle attached to non-disposable syringe
Hypodermic needle attached to IV tubing		Razor	***Glass***	Elevator
Prefilled cartridge syringe	Bone chip / chipped tooth	Retractor	Capillary tube	Extraction forceps
Spinal or epidural needle	Bone cutter	Scaler / curette	Medication ampule / vial / IV bottle	Root canal file
Unattached Hypodermic needle	Bovie electrocuatery device	Scalpel blade	Pipette	Rod (orthopaedic)
Winged steel needle		Scissors	Slide	Other device or item **(specify)**
		Sharp object, type unknown	Specimen / test / vacuum tube	
			Other glass item **(specify)**	

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PURPOSE OR PROCEDURE FOR WHICH SHARP WAS USED OR INTENDED:

Line procedures:
To insert a peripheral IV line or set up a heparin lock
To insert a central IV line
To insert and arterial line
To connect IV line (intermittent IV / piggy back / IV infusion / other IV line connection)
To flush heparin / saline
Other injection into IV injection site or IV port **(specify)**
Other line procedure **(specify)**

Blood procedures:
Percutaneous venous puncture (e.g. phlebotomy)
Percutaneous arterial puncture
Central of peripheral IV line or port
Arterial line
Dialysis / AV fistula site
Umbilical vessel
Finger stick / heel stick
Other blood sampling **(specify)**

Other procedures:
Cutting (e.g. surgery / autopsy)
During deposal
Epidural / spinal anesthesia
Intramuscular (IM) injection
Subcutaneous / intradermal injection / skin test placement
Suturing
Transferring blood / body fluid to another container
To obtain a body fluid or tissue sample (CFS / amniotic / biopsy)
To obtain laboratory specimens
Other procedure (not a line or blood sampling procedure) **(specify)**
Unknown

Dental procedure:
During disposal
Hygiene (prophy, root plane, curettage)
Oral surgery
- Simple Extraction
- Surgical Extraction
- Fracture Reduction
- Other **(specify)**
- Unknown

Periodontal surgery
Restorative (amalgam, composite, crown)
Root canal
Other **(specify)**
Unknown

Where did the injury occur??
Inside the patient's mouth
Outside the patient's mouth
Unknown

HOW DID THE INJURY OCCUR? Choose up to two.

Before use of the item

During use of the item
Collided with co-worker or other person
Collided with sharp
Incising
Manipulating suture needle in holder
Palpating / Exploring
Passing or receiving equipment
Transferring equipment
Patient moved and jarred device
Sharp object dropped
Suturing
Tying sutures
While inserting needle in line
While inserting needle in patient
While manipulating needle in line
While manipulating needle in patient
While withdrawing needle from line
While withdrawing needle from patient
Other **(specify)**
Unknown

After use, before disposal
Activating safety device
Cap fell off after recapping
Collided with co-worker or other person
Collided with sharp after procedure
Disassembling device or equipment
Decontamination / processing of used equipment
During clean-up
Handling equipment on a tray or stand
In transit to disposal
Opening / breaking glass containers
Processing specimens
Passing or transferring equipment
Recapping (missed or pierced cap)
Sharp object dropped after procedure
Struck by detached I.V. line needle
Transferring blood / bodily fluids into specimen container
Other **(specify)**
Unknown

During or after disposal of item
Collided with co-worker or other person
Collided with sharp during / after disposal
In trash
In linen / laundry
In pocket / clothing
Left on table / tray
Left in bed / mattress
On floor
Over-filled sharps container
Punctured sharps container
Protruding from opened container
Sharp object dropped during / after disposal
Struck by detached I.V. line needle during / after disposal
While manipulating container
While placing sharp in container, injured by sharp being disposed
While placing sharp in container, injured by sharp already in container
Other **(specify)**
Unknown

APPENDIX G

TABLE G-1

WORK STATUS OF INJURED WORKER	N	%
Employee	2,992	88%
Non-Employee Practitioner	192	6
Student	109	3
Temp/Contract	78	2
Volunteer	7	<1
Other	14	<1
Unknown/Not answered	21	<1
STATE TOTAL	**3,413**	**100%**

* Percentages for frequencies less than 5 were not calculated.

APPENDIX G

TABLE G-2

OCCUPATION	N	%
Nurse	**1,393**	**41%**
RN or LPN	1,230	36
Nursing Assistant	123	4
Nurse Practitioner	12	<1
Nurse Anesthetist	13	<1
Nursing Student	5	<1
Nurse Midwife	4	--
Physician	**1,088**	**32%**
Intern/Resident	444	13
MD	406	12
Medical Student	72	2
Fellow	69	2
Surgeon	40	1
Anesthesiologist	27	<1
Physician Assistant	30	<1
Technician	**604**	**18%**
OR/Surgical Technician	204	6
Phlebotomist	143	4
Clinical Lab Technician	108	3
Other Technician	79	2
Radiologic Technician	36	1
Respiratory Therapist/Tec	32	<1
Hemodialysis Technician	2	--
Support Services	**132**	**4%**
Housekeeper	86	3
Central Supply	29	<1
Attendant/Orderly	12	<1
Maintenance	2	--
Safety/Security	2	--
Laundry Staff	1	--
Other Medical Staff	**41**	**1%**
Medical Assistant	34	<1
Physical Therapist	2	--
Other Medical Staff, unspecified	5	<1
Other	**143**	**4%**
Clerical/Administrative	7	<1
Researcher	6	<1
Dentist	6	<1
Dental Assistant	5	<1
EMT	5	<1
Counselor/Social Worker	2	--
Pharmacist	2	--
Dental Hygienist	1	--
Dietician	1	--
Other	86	3
Other Student	19	<1
Unknown/Not answered	**18**	**<1**
STATE TOTAL	**3,413**	**100%**

* Percentages for frequencies less than 5 were not calculated.

TABLE G-3

DEPARTMENT WHERE INCIDENT OCCURRED	N	%
Operating and procedure rooms	**1,286**	**38%**
Operating room	935	27
Labor and delivery	141	4
Radiology	102	3
Cardiac cathetorization laboratory	36	1
Dialysis	15	<1
Endoscopy/Bronchoscopy/Cytoscopy	15	<1
Phlebotomy room	9	<1
Procedure room, not specified	33	<1
Inpatient units	**814**	**24%**
Medical/Surgical ward	473	14
OB/GYN ward	46	1
Pediatrics	34	<1
Psychiatry ward	22	<1
Nursery	18	<1
Specific ward, type unknown**	136	4
Patient room, ward unspecified	85	2
Emergency Department	**300**	**9%**
Intensive Care Units	**285**	**8%**
Intensive care unit	266	8
Post anesthesia care unit	19	<1
Laboratories	**221**	**6%**
Histology/Surgical pathology	51	1
Clinical chemistry	21	<1
Hematology	21	<1
Morgue/Autopsy room	8	<1
Blood bank	7	<1
Microbiology	4	--
Other laboratory	109	3
Outpatient areas	**111**	**3%**
Dental Clinic	25	<1
Home health visit	16	<1
Ambulatory care clinic	3	--
Other outpatient areas	67	2
Other areas	**382**	**11%**
Anesthesia	38	1
Central Sterile Supply	28	<1
Dermatology	19	<1
Hospital grounds	7	<1
Pharmacy	3	--
Central trash area	1	--
Laundry room	1	--
Other location	285	8
Unknown/Not answered	**14**	**<1**
STATE TOTAL	**3,413**	**100%**

* Percentages for frequencies less than 5 were not calculated.

TABLE G-4

PROCEDURE FOR WHICH DEVICE WAS USED	N	%
Injection	**713**	**21%**
Subcutaneous injection	310	9
IM Injection	274	8
Injection, unspecified	129	4
Suturing	**680**	**20%**
Suturing	668	20
Suture removal	12	<1
Blood procedures	**672**	**20%**
Percutaneous venous puncture	501	15
Percutaneous arterial puncture	71	2
Finger stick / heel stick	49	1
Central or peripheral IV line or port	23	<1
To draw blood from umbilical vessel	12	<1
Dialysis/AV fistula site	8	<1
Arterial line	4	--
Other blood sampling	4	--
Line procedure	**285**	**8%**
To insert a peripheral IV line or set up a heparin lock	130	4
To insert a central IV line	47	1
To flush heparin/saline	31	<1
To insert an arterial line	15	<1
To connect IV line	7	<1
Other injection into IV injection site	42	1
Other line procedure	13	<1
Making the incision	**274**	**8%**
To obtain body fluid or tissue sample	**88**	**3%**
Dental procedure	**11**	**<1**
Hygiene	4	--
Oral surgery	1	--
Other dental	6	<1
Other	**388**	**11%**
Finger stick/heel stick	49	1
To obtain lab specimens	46	1
Epidural/spinal anesthesia	20	<1
Transferring blood/body fluid to another container	13	<1
Umbilical vessel	12	<1
During disposal	7	<1
Other procedure	154	5
Other	87	3
Unknown/Not answered	**363**	**11%**
STATE TOTAL	**3,413**	**100%**

* Percentages for frequencies less than 5 were not calculated.

TABLE G-5

DEVICE INVOLVED IN THE INJURY	N	%
Hypodermic needle	**984**	**29%**
Hypodermic needle attached to a disposable syringe	827	24
Unattached hypodermic needle	79	2
Prefilled cartridge syringe	53	2
Hypodermic needle attached to IV tubing or syringe	18	<1
Hypodermic needle attached to non-disposable syringe	7	<1
Suture needle	**696**	**20%**
Curved	135	4
Straight	20	<1
Unspecified	541	16
Butterfly needle	**338**	**10%**
Winged steel needle	260	8
Winged steel needle attached to vacuum tube holder	73	2
Winged steel needle attached to IV tubing	5	<1
Scalpel blade	**242**	**7%**
Vacuum tube collection holder/needle	**156**	**5%**
Vacuum tube collection holder/needle	122	4
Phlebotomy needle (other than butterfly)	34	<1
Glass	**58**	**2%**
Specimen/test/vacuum tube	25	<1
Other glass item	16	<1
Pipette	7	<1
Slide	5	<1
Capillary tube	3	--
Medication ampule/vial/IV bottle	2	--
Other hollow bore needle	**464**	**14%**
IV stylet	155	5
Spinal or epidural needle	21	<1
Biopsy needle	19	<1
Huber	10	<1
Other type of hollow bore needle	101	3
Hollow-bore needle, type unknown	158	5
Other	**394**	**12%**
Lancet	63	2
Wire	57	2
Scissors	31	<1
Pin	23	<1
Retractor	20	<1

TABLE G-5 (continued)

DEVICE INVOLVED IN THE INJURY (continued)	N	%
Razor	18	<1
Bovie electrocautery device	17	<1
Trocar	11	<1
Extraction forceps	11	<1
Bone chip/chipped tooth	8	<1
Bone cutter	5	<1
Elevator	2	--
Rod	2	--
Scaler/curette	2	--
Tenaculum	2	--
Explorer	1	--
Other dental device or item	4	--
Other sharp object or device	117	3
Unknown/Not answered	**81**	**2%**
STATE TOTAL	**3,413**	**100%**

* Percentages for frequencies less than 5 were not calculated.

TABLE G-6

SAFETY DEVICE	N	%
No	2,109	62%
Yes	876	26
Unknown/Not answered	428	13
STATE TOTAL	**3,413**	**100%**

TABLE G-7

WHEN THE INJURY OCCURRED	N	%
During Use of the Item	1,539	45%
After Use / Before Disposal	1,130	33
During or After Disposal of the Item	535	16
Before Use of the Item	38	1
Unknown/Not answered	171	5
STATE TOTAL	**3,413**	**100%**

* Percentages for frequencies less than 5 were not calculated.

TABLE G-8

HOW THE INJURY OCCURRED	N	%
Suturing	**463**	**14%**
Suturing	420	12
Manipulating suture needle in holder	35	1
Tying suture	8	<1
Collision with worker or sharp	**451**	**13%**
Collided with sharp after procedure	241	7
Collided with coworker or other person	114	3
Collided with sharp	96	3
Manipulate needle in patient	**352**	**10%**
While withdrawing needle from patient	245	7
While manipulating needle in patient	69	2
While inserting needle in patient	38	1
During sharps disposal	**306**	**9%**
While placing sharp in container, injured by sharp being disposed	144	4
Collided with sharp during/after disposal	72	2
While placing sharp in container, injured by sharp already in container	19	<1
In transit to disposal	16	<1
Protruding from opened container	13	<1
While manipulating container	12	<1
Over-filled sharps container	12	<1
Struck by detached IV line needle during/after disposal	11	<1
Sharp object dropped during/after disposal	4	--
Punctured sharps container	3	--
During clean-up	**264**	**8%**
During clean-up	151	4
Disassembling device or equipment	113	3
Improper disposal	**239**	**7%**
In trash	93	3
Left on table/tray	68	2
Left in bed/mattress	25	<1
On floor	21	<1
In linen/laundry	13	<1
Improper disposal	10	<1
In pocket/clothing	9	<1
Patient moved and jarred device	**190**	**6%**
Handle/pass equipment	**149**	**4%**
Passing or receiving equipment	70	2
Handling equipment on tray or stand	42	1
Opening/breaking glass containers	24	<1
Passing or transferring equipment	9	<1
Transferring equipment	4	--

TABLE G-8 (continued)

APPENDIX G

HOW THE INJURY OCCURRED (continued)	N	%
Activating safety device	**130**	**4%**
Recap needle	**111**	**3%**
Recapping	102	3
Cap fell off after recapping	9	<1
Access IV line	**63**	**2%**
While withdrawing needle from line	27	<1
While inserting needle in line	24	<1
While manipulating needle in line	12	<1
Failure to activate safety device	**42**	**1%**
Before use of item	**38**	**1%**
Device malfunction	**23**	**<1%**
Other	**465**	**14%**
Incising	120	4
Sharp object dropped	42	1
Processing specimens	37	1
Transferring blood/bodily fluids into specimen container	26	<1
Sharp object dropped after procedure	25	<1
Decontamination/processing equipment	16	<1
Palpating/exploring	2	--
Other	197	6
Unknown/Not answered	**127**	**4%**
STATE TOTAL	**3,413**	**100%**

* Percentages for frequencies less than 5 were not calculated
** Hospital specific nomenclature provided, without specifying department

APPENDIX H

Sharps Injuries among Hospital Workers by Number of Licensed Hospital Beds, Massachusetts, 2002

	Number of Licensed Hospital Beds							
	0-100 Beds		101-300 Beds		300+ Beds		All Hospitals	
	33 hospitals		55 hospitals		13 hospitals		101 hospitals	
	N	%*	N	%*	N	%*	N	%*
STATE TOTAL	**271**	**100%**	**1,560**	**100%**	**1,582**	**100%**	**3,413**	**100%**
WORK STATUS OF INJURED WORKER								
Employee	229	85 %	1,326	85 %	1,437	91 %	2,992	88 %
Non-Employee Practitioner	22	8	121	8	49	3	192	6
Student	6	2	59	4	44	3	109	3
Temp/Contract	12	4	42	3	24	2	78	2
Volunteer	1	--	1	--	5	<1	7	<1
Other	0	--	11	<1	3	--	14	<1
Unknown/Not answered	1	--	0	--	20	1	21	<1
STATE TOTAL	**271**	**100%**	**1,560**	**100%**	**1,582**	**100%**	**3,413**	**100%**
OCCUPATION								
Nurse	130	48 %	686	44 %	571	36 %	1,387	41 %
Physician	61	23	380	24	647	41	1,088	32
Technician	57	21	349	22	198	13	604	18
Support Services	15	6	67	4	50	3	132	4
Other Medical Staff	1	--	25	2	15	<1	41	1
Other	6	2	45	3	92	6	143	4
Unknown/Not answered	1	--	8	<1	9	<1	18	<1
STATE TOTAL	**271**	**100%**	**1,560**	**100%**	**1,582**	**100%**	**3,413**	**100%**
DEPARTMENT WHERE INJURY OCCURRED								
Operating and procedure rooms	90	33%	635	41%	561	35%	1,286	38%
Inpatient units	82	30	378	24	354	22	814	24
Emergency Department	31	11	158	10	111	7	300	9
Intensive Care Units	12	4	102	7	171	11	285	8
Laboratories	21	8	104	7	96	6	221	7
Outpatient areas	12	4	49	3	50	3	111	3
Other areas	22	8	130	8	230	14	382	11
Unknown/Not answered	1	--	4	--	9	<1	14	<1
STATE TOTAL	**271**	**100%**	**1,560**	**100%**	**1,582**	**100%**	**3,413**	**100%**
PROCEDURE FOR WHICH DEVICE WAS USED								
Injection	59	22 %	323	21 %	331	21 %	713	21%
Suturing	54	20	305	20	321	20	680	20
Blood procedures	54	20	318	20	239	15	611	18
Making the incision	24	9	132	8	118	7	274	8
Line procedures	32	12	129	8	124	8	285	8
To obtain body fluid or tissue sample	8	3	47	3	33	2	88	3
Dental procedures	1	--	9	<1	1	--	11	<1
Other	25	9	158	10	205	13	388	11
Unknown/Not answered	14	14	139	9	210	13	363	11
STATE TOTAL	**271**	**100%**	**1,560**	**100%**	**1,582**	**100%**	**3,413**	**100%**

* Percentages for frequencies less than 5 were not calculated.

APPENDIX H

Sharps Injuries among Hospital Workers by Number of Licensed Hospital Beds, Massachusetts, 2002

	Number of Licensed Hospital Beds							
	0-100 Beds		101-300 Beds		300+ Beds		All Hospitals	
	33 hospitals		55 hospitals		13 hospitals		101 hospitals	
	N	%*	N	%*	N	%*	N	%*
DEVICE INVOLVED IN THE INJURY								
Hypodermic needle	65	24%	430	28%	489	31%	984	29%
Suture needle	48	18	298	19	350	22	696	20
Butterfly needle	18	7	169	11	151	10	338	10
Scalpel blade	18	7	99	6	125	8	242	7
Vacuum tube collection holder/needle	14	5	97	6	45	3	156	5
Glass	4	--	25	2	29	2	58	2
Other hollow bore needle	60	22	225	14	179	11	464	14
Other	40	15	177	11	177	11	394	12
Unknown/Not answered	4	--	40	3	37	2	81	2
STATE TOTAL	**271**	**100%**	**1,560**	**100%**	**1,582**	**100%**	**3,413**	**100%**
SAFETY DEVICE								
No	139	51%	949	61%	1,021	65%	2,109	62%
Yes	111	41	470	30	295	19	876	26
Unknown/Not answered	21	10	141	9	266	17	428	13
STATE TOTAL	**271**	**100%**	**1,560**	**100%**	**1,582**	**100%**	**3,413**	**100%**
WHEN THE INJURY OCCURRED								
During Use of the Item	103	38%	713	46%	723	46%	1,539	45%
After Use / Before Disposal	116	43	502	32	512	32	1,130	33
During or after disposal of the item	44	16	292	19	199	13	535	16
Before use of the item	4	--	14	<1	20	1	38	1
Unknown/Not answered	4	--	39	3	128	8	171	5
STATE TOTAL	**271**	**100%**	**1,560**	**100%**	**1,582**	**100%**	**3,413**	**100%**
HOW THE INJURY OCCURRED								
Collision with worker or sharp	35	13%	203	13%	213	13%	451	13%
Suturing	30	11	189	12	244	15	463	14
During sharps disposal	30	11	170	11	106	7	306	9
Manipulate needle in patient	18	7	162	10	172	11	352	10
During clean-up	35	13	126	8	103	7	264	8
Improper disposal	16	6	124	8	99	6	239	7
Patient moved / jarred device	18	7	120	8	52	3	190	6
Handle / pass equipment	10	4	87	6	52	3	149	4
Activate safety device	18	7	59	4	53	3	130	4
Recap needle	12	4	47	3	52	3	111	3
Access IV line	5	2	19	1	39	2	63	2
Failure to activate safety device	11	4	29	2	2	--	42	1
Before use of item	4	--	14	<1	20	1	38	1
Device malfunctioned	2	--	19	1	2	--	23	<1
Other	24	9	165	11	276	18	465	14
Unknown/Not answered	3	--	27	2	97	6	127	4
STATE TOTAL	**271**	**100%**	**1,560**	**100%**	**1,582**	**100%**	**3,413**	**100%**

* Percentages for frequencies less than 5 were not calculated

APPENDIX I

Sharps Injuries among Hospital Workers by Teaching Status, Massachusetts, 2002

	Teaching Status					
	Teaching		**Non-teaching**		**All Hospitals**	
	14 hospitals		87 hospitals		101 hospitals	
	N	**%***	**N**	**%***	**N**	**%***
STATE TOTAL	**1,895**	**100%**	**1,518**	**100%**	**3,413**	**100%**
WORK STATUS OF INJURED WORKER						
Employee	1,694	89%	1,298	86%	2,992	88 %
Non-Employee Practitioner	76	4	116	8	192	6
Student	75	4	34	2	109	3
Temp/Contract	28	1	50	3	78	2
Volunteer	5	<1	2	--	7	<1
Other	0	--	14	<1	14	<1
Unknown/Not answered	17	1	4	--	21	<1
STATE TOTAL	**1,895**	**100%**	**1,518**	**100%**	**3,413**	**100%**
OCCUPATION						
Nurse	656	35%	731	48%	1,387	41 %
Physician	835	44	253	17	1,088	32
Technician	232	12	372	25	604	18
Support Services	50	3	82	5	132	4
Other Medical Staff	17	1	24	2	41	1
Other	98	5	45	3	143	4
Unknown/Not answered	7	<1	11	<1	18	<1
STATE TOTAL	**1,895**	**100%**	**1,518**	**100%**	**3,413**	**100%**
DEPARTMENT WHERE INJURY OCCURRED						
Operating and procedure rooms	758	40%	528	35%	1,286	38%
Inpatient units	382	20	432	29	814	24
Emergency Department	127	7	173	11	300	9
Intensive Care Units	203	11	82	5	285	8
Laboratories	110	6	111	7	221	7
Outpatient areas	58	3	53	3	111	3
Other areas	250	13	132	9	382	11
Unknown/Not answered	7	<1	7	<1	14	<1
STATE TOTAL	**1,895**	**100%**	**1,518**	**100%**	**3,413**	**100%**
PROCEDURE FOR WHICH DEVICE WAS USED						
Injection	370	20	343	23%	713	21%
Suturing	439	23	241	16	680	20
Blood procedures	321	17	351	23	611	18
Line procedures	142	7	143	9	285	8
Making the incision	156	8	118	8	274	8
To obtain body fluid or tissue sample	41	2	47	3	88	3
Dental procedures	3	<1	8	<1	11	<1
Other	215	11	112	7	388	11
Unknown/Not answered	208	11	155	10	363	10
STATE TOTAL	**1,895**	**100%**	**1,518**	**100%**	**3,413**	**100%**

* Percentages for frequencies less than 5 were not calculated.

APPENDIX I

Sharps Injuries among Hospital Workers by Teaching Status, Massachusetts, 2002

	Teaching Status					
	Teaching		**Non-teaching**		**All Hospitals**	
	14 hospitals		87 hospitals		101 hospitals	
	N	**%***	**N**	**%***	**N**	**%***
	1,895	**100%**	**1,518**	**100%**	**3,413**	**100%**
DEVICE INVOLVED IN THE INJURY						
Hypodermic needle	530	28%	454	30%	984	29%
Suture needle	463	24	233	15	696	20
Butterfly needle	191	10	147	10	338	10
Scalpel blade	152	8	90	6	242	7
Vacuum tube collection holder/needle	50	3	106	7	156	5
Glass	35	2	23	2	58	2
Other hollow bore needle	213	11	251	17	464	14
Other	221	12	173	11	394	11
Unknown/Not answered	40	2	41	3	81	2
STATE TOTAL	**1,895**	**100%**	**1,518**	**100%**	**3,413**	**100%**
SAFETY DEVICE						
No	1326	70	783	52%	2,109	62%
Yes	356	19	520	34	876	26
Unknown/Not answered	213	11	215	14	428	13
STATE TOTAL	**1,895**	**100%**	**1,518**	**100%**	**3,413**	**100%**
WHEN THE INJURY OCCURRED						
During Use of the Item	910	48	629	41%	1,539	45%
After Use / Before Disposal	592	31	538	35	1,130	33
During or after disposal of the item	234	12	301	20	535	16
Before use of the item	24	1	14	<1	38	1
Unknown/Not answered	135	7	36	2	171	5
STATE TOTAL	**1,895**	**100%**	**1,518**	**100%**	**3,413**	**100%**
HOW THE INJURY OCCURRED						
Suturing	326	17	137	9	463	14
Collision with worker or sharp	239	13	212	14	451	13%
Manipulate needle in patient	204	11	148	10	352	10
During sharps disposal	138	7	168	11	306	9
During clean-up	145	8	119	8	264	8
Improper disposal	103	5	136	9	239	7
Patient moved / jarred device	64	3	126	8	190	6
Handle / pass equipment	77	4	72	5	149	5
Activate safety device	50	3	80	5	130	4
Recap needle	61	3	50	3	111	3
Access IV line	41	2	22	1	63	2
Failure to activate safety device	3	--	39	3	42	1
Before use of item	24	1	14	<1	38	1
Device malfunctioned	3	--	20	1	23	<1
Other	314	17	151	10	465	14
Unknown / Not answered	105	5	24	2	127	4
STATE TOTAL	**1,895**	**100%**	**1,518**	**100%**	**3,413**	**100%**

* Percentages for frequencies less than 5 were not calculated

APPENDIX J

Resources
Sharps Injury Surveillance and Prevention

MDPH Occupational Health Surveillance Program
http://www.state.ma.us/dph/bhsre/ohsp/ohsp.htm
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 June 29, 2001 / Vol. 50 / RR-11
Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV and HIV and Recommendations for Post Exposure Prophylaxis
http://www.cdc.gov/mmwr/PDF/rr/rr5011.pdf

CDC Division of Healthcare Quality Promotion, Issues in Healthcare
Information related to bloodborne pathogens
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