



Data Brief:

Sharps Injuries among Hospital Workers in Massachusetts: Findings from the Massachusetts Sharps Injury Surveillance System, 2013

Massachusetts Department of Public Health

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Data Highlights and Prevention Measures

- 2,947 sharps injuries (SIs) were reported in 2013. The SI rate for workers in all Massachusetts Department of Public Health (DPH) licensed hospitals was 15.9 SIs per 100 licensed beds, similar to rates for the three previous years (Figure 2). Comparable findings were observed in rates for employees (per full time employee equivalents) in acute care hospitals only (data not shown). These findings (Figure 2) suggest that the earlier observed decline in rates from 2002-2010 is leveling off. This plateauing could reflect a positive change, i.e., increases in worker reporting of these injuries. Nevertheless, these findings underscore the need for a continuing commitment to preventing SIs. Hospitals, in interpreting their own SI rates, need to understand the employee reporting practices in their facilities.
- SIs related to injection procedures continued to account for a substantial proportion (29%) of the total injuries. Of these, nearly 80% are related to subcutaneous injections, and 75% involve Sharps with Engineered Sharps Injury Protections (SESIPs) (Table 6). This high percentage of SESIPs likely reflects increased use of SESIPS as required. However, while use of these devices is critical to preventing SIs, they are not failsafe. Inexperience and lack of training in use of these devices, as well as flaws in product design, can contribute to injuries with these devices. Comprehensive SI prevention programs and continuous quality improvement should include training in use of SESIPS and safe work practices and seek input from front line workers in selecting devices.
- Twenty percent of SIs involved devices that were part of a pre-packaged kit (Table 7). Of these, hypodermic needles were the device most commonly involved in SIs. Notably, 22% of SIs with hypodermic needles from kits and 39% of SI with scalpels from kits involve non-SESIPs (Figure 4). Hospitals are encouraged to work with suppliers to ensure that kits with SESIPs are provided.
- The presence of a SI prevention feature is most crucial after the device is used. There were 271 SIs due to non-SESIPs that involved commonly used devices for which SEIPS are widely available. Of these, 178 (66%) occurred after use of the device (Table 9). These injuries could be thought of as “never events” in that use of SESIPs could have likely prevented the injury.

Since 2001, hospitals licensed by the Massachusetts Department of Public Health (DPH) have been required to report data on sharps injuries among workers to the Department annually (MGL/Chapter 111 s 53D). Data have been collected from all DPH licensed hospitals (approximately 99 hospitals) since 2001. This report includes data on sharps injuries that occurred during 2013.

The Massachusetts Sharps Injury Surveillance System is intended to provide information to assist Massachusetts hospitals and hospital workers in targeting and evaluating efforts to reduce the incidence of sharps injuries and the associated human and economic costs. For a more comprehensive description of the system, please see: <http://www.mass.gov/eohhs/docs/dph/occupational-health/injuries/injuries-hospital-2004.pdf>.

Key Definitions

Sharps injury (also referred to as an exposure incident): An exposure to blood or other potentially infectious materials as a result of an incident involving a contaminated sharp device that pierces the skin or mucous membranes. An injury with a clean sharp or device (before use) through contaminated gloves or other contaminated mediums is also considered a sharps injury. An injury involving a clean device without any contact with infectious materials is not considered an exposure incident.

Sharps device: 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 DPH, as well as any satellite units (e.g., ambulatory care centers) operating under a hospital license.

Surveillance Period: Calendar year 2013.

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 injuries. 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. The rates presented in this report were calculated by dividing the number of sharps injuries among all workers by the number of licensed beds. Confidence intervals (CI) are presented for each rate. We modelled trends in annual rates using both negative binomial and joinpoint regressions. Negative binomial regression was used to model the overall trends of these rates from 2002 to 2013. Joinpoint regression was used to identify any changes in the trends over the same period.

Sharps with engineered sharps injury protections (SESIPs): Needle devices and non-needle sharps used for withdrawing body fluids, accessing a vein or artery, or administering medications or other fluids, with built-in sharps injury prevention features or mechanisms that effectively reduce the risk of an exposure incident.

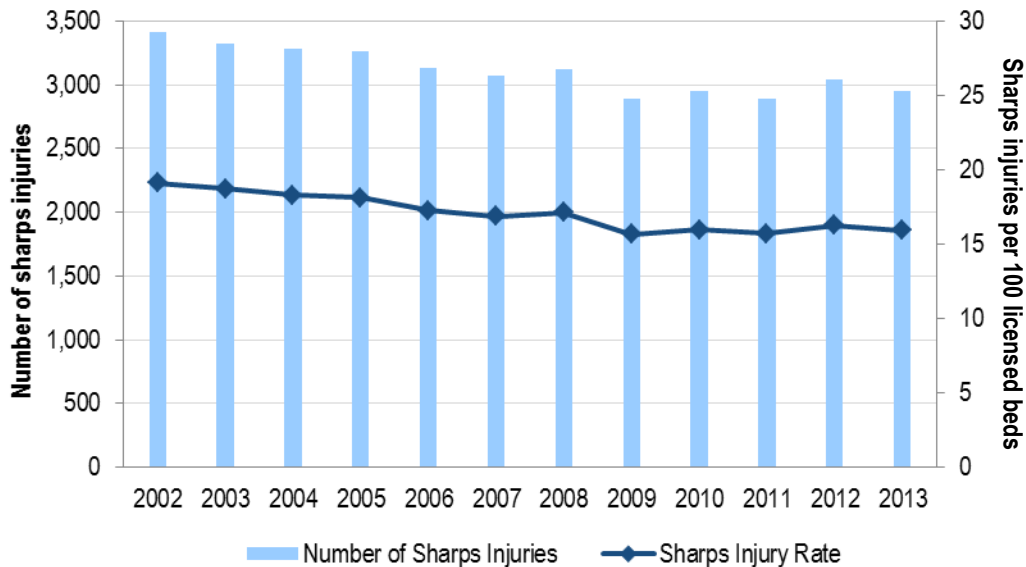
Findings

Table 1. Number and rate of sharps injuries among hospital workers by hospital characteristics, Massachusetts, 2013

	Number of Hospitals	Number of sharps injuries	Rate per 100 licensed beds	95% CI
Hospital size				
Small (< 100 licensed beds)	28	217	13.3	11.6-14.9
Medium (101-300 licensed beds)	55	1,021	10.4	9.8-11.0
Large (>300 licensed beds)	14	1,709	24.1	23.1-25.1
Service Type				
Acute care	77	2,870	18.5	17.9-19.1
Non-acute care*	20	77	2.5	2.0-3.1
Teaching Status				
Teaching	18	1,856	27.2	26.2-28.3
Non-teaching	79	1,091	8.8	8.8-9.9
Total	97	2,947	15.9	15.4-16.4

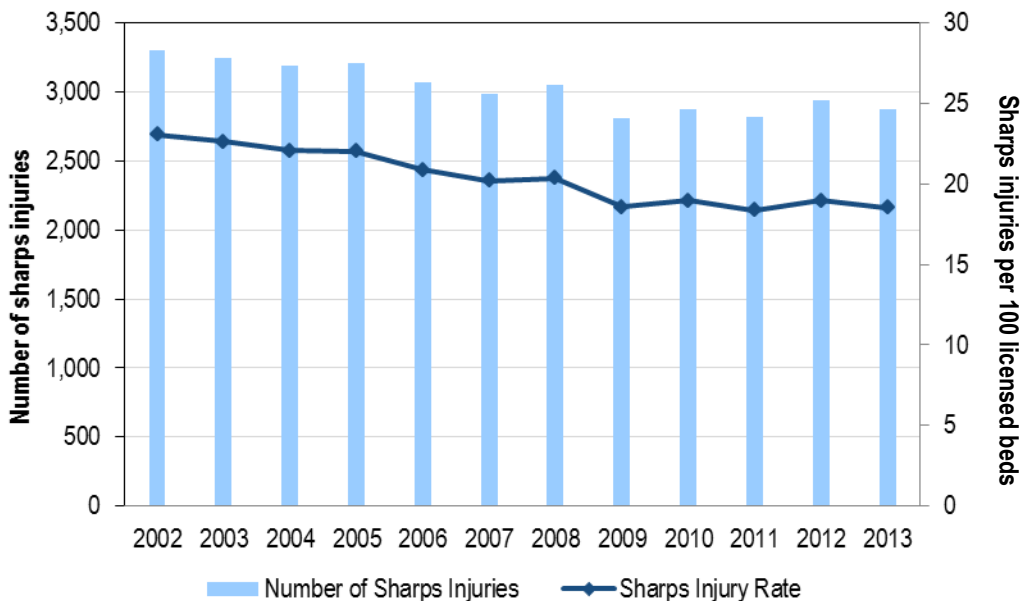
*Non-acute care hospitals include chronic care and rehabilitation facilities.

Figure 1. Number and rate of sharps injuries per licensed beds among all workers in acute and non-acute care hospitals, Massachusetts, 2013



In all hospitals among both employees and non-employees from 2002 to 2013, there was a statistically significant ($p \leq 0.05$) decrease for the sharps injury rate (# of sharps injuries/# of licensed beds) over the 12 year period. The rate decreased by 16.8% from 19.1 in 2002 to 15.9 in 2013. When using joinpoint, a statistically significant ($p \leq 0.05$) leveling off was observed beginning in 2010.

Figure 2. Number and rate of sharps injuries per licensed beds among all workers in acute care hospitals only, Massachusetts, 2013



In acute care hospitals among both employees and non-employees from 2002 to 2013, there was a statistically significant ($p \leq 0.05$) decrease in the rate of sharp injuries from 2002 to 2013. During this period the rates of injuries decreased by 19.9% from 23.1 in 2002 to 18.5 in 2013. While the rates for the past five years appear to be holding steady, this leveling off was not statistically significant ($p \leq 0.05$). A similar pattern was observed when calculating the rate of sharps injuries among employees of acute care hospitals by full time equivalents (FTEs).

Table 2. Sharps injuries among hospital workers by worker and incident characteristics by hospital size, Massachusetts, 2013

	All Hospitals 97 hospitals		Hospital Size					
			Small 26 hospitals		Medium 56 hospitals		Large 15 hospitals	
	N	%	N	%	N	%	N	%
Work status of injured worker	2,947	100	217	100	1,017	100	1,713	100
Employee	2,508	85	178	82	850	84	1,480	86
Non-Employee Practitioner	322	11	25	12	110	11	187	11
Student	84	3	8	4	35	3	41	2
Temporary / Contract Worker	32	1	6	3	21	2	5	<1
Other / Unknown / Not answered	1	<1	0	0	1	<1	0	0
Occupation	2,947	100	217	100	1,017	100	1,713	100
Physician	1,150	39	85	39	265	26	800	47
Nurse	1,063	36	84	39	416	41	563	33
Technician	462	16	31	14	220	22	211	12
Support Services	127	4	9	4	47	5	71	4
Dental Staff	14	<1	0	0	6	1	8	<1
Other Medical Staff	69	2	7	3	38	4	24	1
Other / Unknown / Not answered	62	2	1	<1	25	2	36	2
Department where injury occurred	2,947	100	217	100	1,017	100	1,713	100
Operating and Procedure Rooms	1,301	44	89	41	416	41	796	46
Inpatient Units	605	21	43	20	261	26	301	18
Emergency Department	275	9	33	15	116	11	126	7
Intensive Care Units	248	8	11	5	66	6	171	10
Outpatient areas	182	6	11	5	53	5	118	7
Laboratories	128	4	9	4	27	3	92	5
Other / Unknown / Not answered	208	7	21	9	78	7	109	6
Device involved in the injury	2,947	100	217	100	1,017	100	1,713	100
Hypodermic needle/syringe	974	33	69	32	367	36	538	31
Suture needle	647	22	40	18	180	18	427	25
Other hollow bore needle	301	10	27	12	106	10	168	10
Scalpel blade	232	8	14	6	59	6	159	9
Winged steel needle	214	7	20	9	97	10	97	6
Vacuum tube collection holder/needle	86	3	6	3	51	5	29	2
Glass	24	1	0	0	3	<1	21	1
Other / Unknown / Not answered	469	16	41	18	154	15	274	16
Procedure for which the device was	2,947	100	217	100	1,017	100	1,713	100
Injection	849	29	62	29	325	32	462	27
Suturing	653	22	45	21	183	18	425	25
Making the incision	362	12	20	9	96	9	246	14
Blood procedures	341	12	29	13	155	15	157	9
Line procedures	320	11	26	12	118	12	176	10
To obtain body fluid or tissue sample	72	2	6	3	24	2	42	2
Dental procedures	22	1	0	0	5	<1	17	1
Other / Unknown / Not answered	328	11	29	13	111	10	188	11

Table 3. Sharps injuries among hospital workers by occupation by hollow bore device, Massachusetts, 2013

Occupation	Total		Hollow Bore							
	N	%	Hypodermic Needle		Winged-Steel Needle		Vacuum Tube		Other Hollow Bore	
	N	%	N	%	N	%	N	%	N	%
Nurse	830	100	566	68	88	11	34	4	142	17
Physician	373	100	251	67	8	2	3	1	111	30
Technician	238	100	89	37	83	35	36	15	30	13
Support Services	49	100	28	57	8	16	2	4	11	23
All Others/Not Answered	85	100	40	47	27	32	11	13	7	8
Total	1,575	100	974	62	214	14	86	5	301	19

Table 4. Sharps injuries among hospital workers by occupation by solid bore device, Massachusetts, 2013

Occupation	Total		Suture Needle		Scalpel		Other/Unknown	
	N	%	N	%	N	%	N	%
Physician	777	100	466	60	138	18	173	22
Nurse	233	100	91	39	29	12	113	49
Technician	224	100	74	33	58	26	92	41
Support Services	78	100	5	6	4	5	69	89
All Others/Not Answered	60	100	11	18	3	5	46	77
Total	1,372	100	647	47	232	17	493	36

Table 5. Sharps injuries among hospitals workers by SESIP by hospital size: all devices and excluding suture needles, Massachusetts, 2013

	All Hospitals 97 hospitals		Hospital Size					
			Small 26 hospitals		Medium 56 hospitals		Large 15 hospitals	
Sharps Injury Protections	N	%	N	%	N	%	N	%
All devices	2,947	100	217	100	1,017	100	1,713	100
SESIP	1,341	46	102	47	544	53	695	41
Non-SESIP	1,458	49	110	45	416	41	932	54
Unknown/Not answered	148	5	5	2	57	6	86	5
Devices excluding suture needles	2,300	100	177	100	837	100	1,286	100
SESIP	1,301	57	102	58	539	64	660	51
Non-SESIP	859	37	71	40	244	29	544	42
Unknown/Not answered	140	6	4	3	54	6	82	6

^a Hospital size: small= <100 licensed beds; medium=101-300 licensed beds; large=>300 licensed beds

Figure 3. Sharps injuries among hospital workers by device and SESIP, Massachusetts, 2013

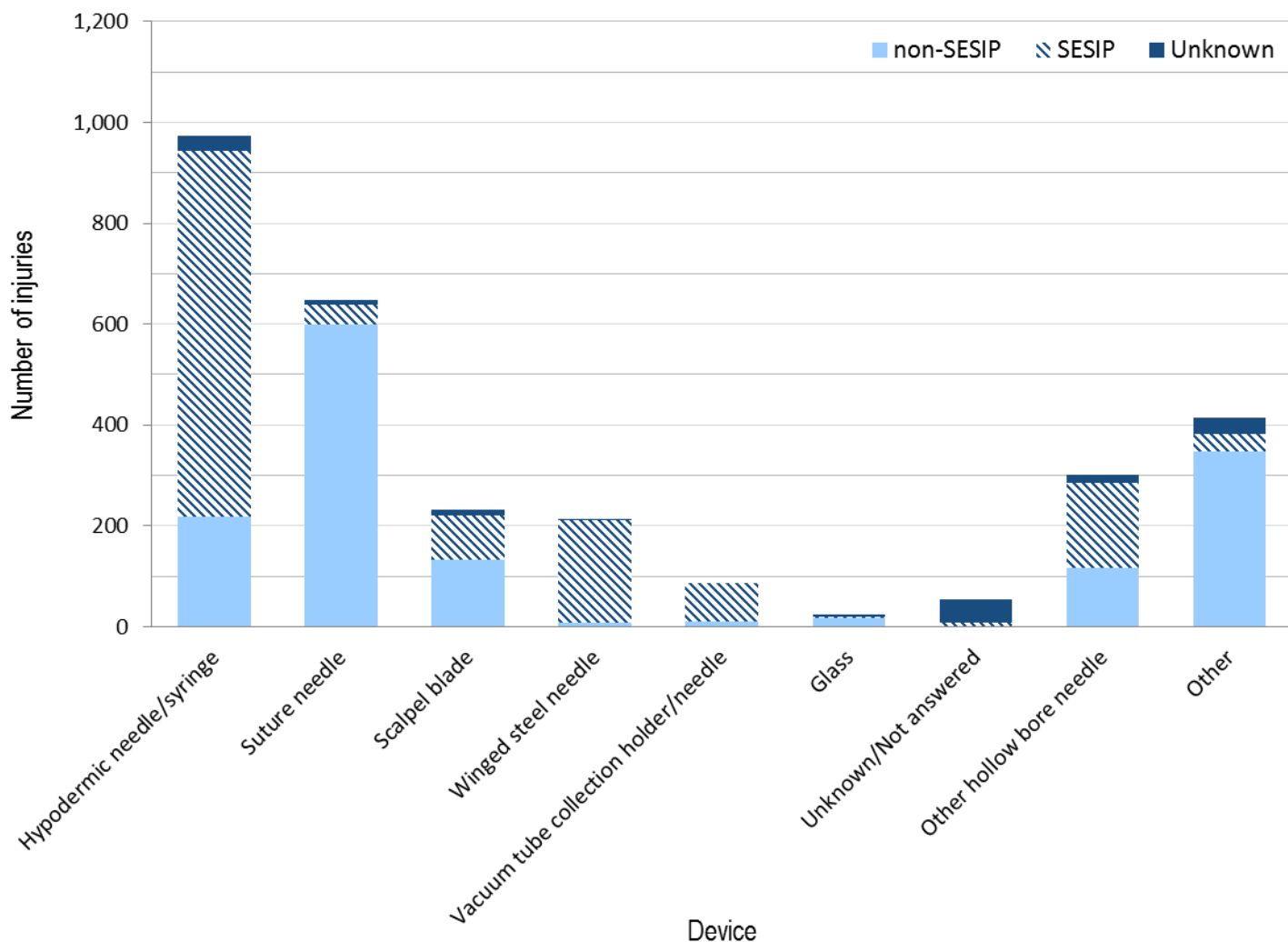


Table 6. Sharps injuries among hospital workers by procedure and SESIP, Massachusetts, 2013

Procedure	Total		SESIP		Non-SESIP		Unknown	
	N	%	N	%	N	%	N	%
Injection procedures	849	29	635	47	192	13	22	15
Subcutaneous injection	668	23	508	38	145	10	15	10
Intramuscular injection	117	4	101	8	14	1	2	1
Other injections	64	2	26	2	33	2	5	5
Blood procedures	341	12	305	23	28	2	8	5
Percutaneous venous puncture	231	8	228	17	2	<1	1	1
Finger stick/Heel stick	39	1	19	1	14	1	6	4
Percutaneous arterial puncture	26	<1	24	2	2	<1	0	0
Other blood procedures	45	2	34	3	10	1	1	1
Line procedures	320	11	216	16	97	7	7	5
To insert peripheral IV/set up heparin	119	4	113	8	4	<1	2	1
To insert central line	44	2	14	1	28	2	2	1
Other line procedures	157	5	89	7	65	4	3	2
Other procedures	1,437	49	185	14	1,141	78	111	75
Total	2,947	100	1,341	100	1,458	100	148	100

Table 7. Sharps injuries among hospitals workers involving devices included in prepackaged kits by hospital size, Massachusetts, 2013

	All Hospitals 97 hospitals		Hospital Size					
			Small 26 hospitals		Medium 56 hospitals		Large 15 hospitals	
	N	%	N	%	N	%	N	%
Device included in prepackaged kit								
Yes	591	20	45	21	270	27	276	16
No	2,245	76	167	77	693	68	1,385	81
Unknown/Not answered	111	4	5	2	54	5	52	3
Total	2,947	100	217	100	1,017	100	1,713	100

^aHospital size: small <100 licensed beds; medium 101-300 licensed beds; large >300 licensed beds

Figure 4. Sharps injuries among hospital workers involving devices from prepackaged kits by SESIP, Massachusetts, 2013

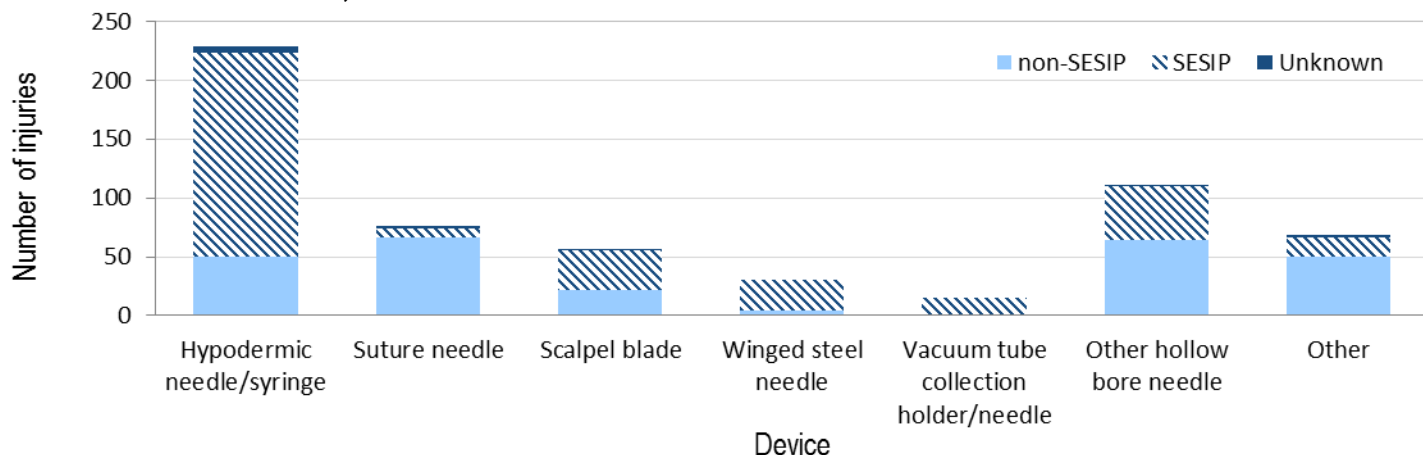


Table 8. Sharps injuries among hospital workers by when and how the injury occurred, Massachusetts, 2013

	Hospital Size							
	All Hospitals 97 hospitals		Small 26 hospitals		Medium 56 hospitals		Large 15 hospitals	
	N	%	N	%	N	%	N	%
Before use of the item	28	1	4	2	6	1	18	1
During use of the item	1,292	44	90	41	394	39	808	47
Suturing	367	12	21	10	89	9	257	15
Manipulate needle in patient	249	8	21	10	86	8	142	8
Patient moved and jarred device	195	7	20	9	80	8	95	6
Handle/pass equipment	139	5	7	3	29	3	103	6
Collision with worker or sharp	137	5	8	4	53	5	76	4
Access IV line	21	1	2	1	4	<1	15	1
Recap needle	9	<1	1	<1	2	<1	6	<1
Device malfunction	2	<1	0	0	1	<1	1	<1
Other / Unknown / Nonclassifiable	173	6	10	5	50	5	113	7
After use, before disposal	1,208	41	94	43	442	43	672	39
Activating injury protection mechanism	240	8	15	7	107	11	118	7
Handle/pass equipment	215	7	8	4	72	7	135	8
Collision with worker or sharp	189	6	20	9	58	6	111	6
During clean-up	186	6	8	4	57	6	121	7
Recap needle	80	3	6	3	27	3	47	3
Sharps injury prevention mechanism not activated	76	3	11	5	35	3	30	2
Improper disposal	54	2	3	1	17	2	34	2
Device malfunction	51	2	3	1	25	2	23	1
Patient moved and jarred device	14	<1	3	1	7	1	4	<1
Access IV line	6	<1	2	1	2	<1	2	<1
Other / Unknown / Nonclassifiable	97	3	15	7	35	3	47	3
During or after disposal of item	277	9	17	8	118	12	142	8
During sharps disposal	157	5	7	3	65	6	85	5
Improper Disposal	102	3	7	3	44	4	51	3
Device malfunction	3	<1	0	0	1	<1	2	<1
Other / Unknown / Nonclassifiable	15	1	3	1	8	1	4	<1
Unknown / Not answered / Nonclassifiable	142	5	12	6	57	6	73	4
Total	2,947	100	217	100	1,017	100	1,713	100

^a Hospital size: small <100 licensed beds; medium 101-300 licensed beds; large >300 licensed beds

Table 9. Sharps injuries involving select devices without sharps injury prevention features but for which SESIPs are widely available, by when the injury occurred, Massachusetts, 2013

Device	Total		Time of Injury									
			Before use		During use		After use, Before Disposal*		During or after Disposal*		Unknown/ Non-classifiable	
			N	%	N	%	N	%	N	%	N	%
Hypodermic	216	100	1	<11	61	28	119	55	30	14	5	2
IV Stylet	41	100	0	0	21	51	15	37	4	10	1	2
Vacuum Tube	10	100	0	0	4	40	5	50	1	10	0	0
Winged-Steele	4	100	0	0	0	0	4	100	0	0	0	0
Total	271	100										

*SESIPs offer protection during the period after use. Injuries presented in this table that occurred after use (n=178) can be considered “never events” – events that could have been prevented with the use of SESIPs.

Table 10. Sharps injuries among hospital workers by occupation (detailed), Massachusetts, 2013

	N	%		N	%
Physician	1,150	39	Support Services	127	4
Intern/Resident	424	14	Housekeeper	70	2
MD	322	11	Central supply	43	1
Fellow	134	5	Maintenance	5	<1
Physician Assistant	97	3	Attendant/orderly	3	<1
Surgeon	69	2	Safety/security	1	<1
Medical Student	66	2	Other ancillary staff	5	<1
Anesthesiologist	30	1	Other Medical Staff	69	2
Radiologist	8	<1	Medical assistant	60	2
Nurse	1,063	36	Other medical staff	9	<1
RN or LPN	921	31	Dental Staff	14	<1
Nursing practitioner	38	1	Dental assistant/tech	8	<1
Nurse assistant	34	1	Dentist	3	<1
Patient care technician	31	1	Dental hygienist	2	<1
Nurse anesthetist	15	1	Dental student	1	<1
Nurse midwife	13	<1	Other	60	2
Nursing student	11	<1	Researcher	22	1
Technician	462	16	EMT/paramedic	3	<1
OR/Surgical technician	202	7	Counselor/social worker	2	<1
Phlebotomist	95	3	Clerical/administrative	1	<1
Radiologic technician	46	2	Other student	25	1
Clinical lab technician	44	1	Other	7	<1
Respiratory therapist/ Tech	19	1	Unknown/Not Answered	2	<1
Hemodialysis technician	4	<1	Total	2,947	100
Psychiatric technician	1	<1			
Other technician	51	2			

Table 11. Sharps injuries among hospital workers by department (detailed), Massachusetts, 2013

	N	%		N	%
Operating and Procedure Rooms	1,301	44	Laboratory	128	4
Operating room	965	33	Histology/pathology	38	1
Labor and delivery	87	3	Clinical chemistry	10	<1
Radiology	84	3	Microbiology	4	<1
Cardiac catheterization laboratory	54	2	Blood bank	6	<1
Hematology/oncology	36	1	Morgue/autopsy room	8	<1
Phlebotomy room	24	1	Hematology	1	<1
Dialysis	22	1	Other laboratory	38	1
Endoscopy/bronchoscopy/cystoscop	13	<1	Laboratory, unspecified	23	1
Other procedure room	4	<1			
Procedure room, unspecified	12	<1	Other Areas	204	7
			Central sterile supply	51	2
Inpatient Units	605	21	Dermatology	34	1
Medical/surgical ward	528	18	Long term care	25	1
Psychiatry ward	25	1	Rehabilitation unit	24	1
Obstetrics/gynecology	23	1	Exam room	18	1
Pediatrics	12	<1	Central trash area	8	<1
Nursery	1	<1	Pain clinic	6	<1
Patient room, ward unspecified	16	1	Anesthesia	5	<1
			Detox unit	5	<1
Emergency Department	275	9	Hospital grounds	3	<1
			Pharmacy	2	<1
Intensive Care Units	248	8	Laundry room	2	<1
Intensive care unit	222	8	Ambulance	2	<1
Post anesthesia care unit	26	1	Employee health/ Infection control	1	<1
			Other Location	18	1
Outpatient areas	182	6			
Ambulatory care clinic	86	3	Unknown/Not Answered	4	<1
Dental clinic	20	1			
Physician's office	17	1			
Home health visit	12	<1			
Community health center	4	<1	Total	2,947	100
Other outpatient areas	43	1			

Table 12. Sharps injuries among hospital workers by device (detailed), Massachusetts, 2013

	N	%		N	%
Hypodermic needles/syringe (hollow bore)	974	33	Glass	24	1
Hypodermic needle attached to a disposable syringe	842	29	Slide	7	<1
Unattached hypodermic needle	59	2	Specimen / Test / Vacuum tube	5	<1
Prefilled cartridge syringe	48	2	Medication ampule / Vial / IV bottle	4	<1
Hypodermic Needle Attached to a non-disposable syringe	13	<1	Pipette	3	<1
Hypodermic needle attached to IV tubing	6	<1	Capillary tube	2	<1
Hypodermic needle, unspecified	6	<1	Other glass item	3	<1
Suture Needle	647	22	Dental Device of item	10	<1
Curved suture needle	536	18	Dental explorer	5	<1
Straight suture needle	27	1	Dental bur	4	<1
Suture needle, unspecified	84	3	Other dental device or item	1	<1
Other Hollow Bore Needles	301	10	Other	404	14
IV Stylet	163	6	Wire	54	2
Huber Needle	43	1	Lancet	44	1
Spinal or epidural needle	30	1	Retractor	38	1
Other type of hollow bore needle	29	1	Scissors	37	1
Biopsy Needle	20	1	Electrode	27	1
Hollow bore needle, unspecified	16	1	Bone cutter	25	1
Scalpel Blade	232	8	Cutting blade other than scalpel	24	1
Butterfly Needle	214	7	Pin	20	1
Winged Steel needle attached to a vacuum tube collection holder	128	4	Forceps	19	1
Winged Steele Needle	71	2	Bovie electrocautery device	13	1
Winged Steele Needle attached to IV tubing	15	1	Drill bit	10	<1
Vacuum Tube Collection Holder/Needle	86	3	Trocar	8	<1
Vacuum tube collection holder/needle	56	2	Staple	7	<1
Phlebotomy needle (other than winged steel needle)	30	1	Tenaculum	6	<1
			Bone chip/chipped tooth	5	<1
			Other needle	4	<1
			Other Type of Sharp Object	51	2
			Needle/unspecified	12	<1
			Unknown/Not Answered	55	2
			Total	2,947	100

Table 13. Sharps injuries among hospital workers by procedure (detailed), Massachusetts, 2013

	N	%		N	%
Injection	849	29	Line Procedures	320	11
Subcutaneous injection	668	23	To insert a peripheral IV line or set up a heparin lock	119	4
Intramuscular injection	117	4	To insert a central IV line	44	1
Epidural/spiral anesthesia	22	1	Draw blood from central or peripheral IV line or port	28	1
Other injection	13	<1	Other injection into IV site/port	39	1
Injection, unspecified	29	1	To insert an arterial line	23	1
Suturing	653	22	Draw Blood from Arterial line	12	<1
Suturing	647	22	To flush heparin/saline	12	<1
Suture removal	6	<1	To connect IV line	9	<1
Blood Procedures	341	12	Other line procedure	27	1
Percutaneous venous puncture	231	8	Line procedure, unspecified	7	<1
Finger stick/heel stick	39	1	To Obtain Body Fluid or Tissue Sample	72	2
Percutaneous arterial puncture	26	1	Dental Procedures	22	1
Draw blood from umbilical vessel	13	<1	Oral surgery	10	<1
Dialysis/AV Fistula site	12	<1	Dental drilling	4	<1
Blood Procedure, unspecified	6	<1	Restorative	2	<1
Making the incision	362	12	Other dental	6	<1
Making the incision	258	9	Other	220	7
Cauterization	6	<1	To obtain lab specimens	37	1
Other surgical procedure	61	2	Transferring blood/body fluid to another container	20	1
Surgical procedure, unspecified	37	1	Drilling	16	1
			Shaving	10	<1
			During Disposal	2	<1
			Other procedure	135	5
			Unknown/Not answered	108	4
			Total	2,947	100

For all tables presented, percentages may not total 100% due to rounding.

Resources

CDC Sharps Safety for Healthcare Settings: Workbook and Teaching Tools	www.cdc.gov/sharpsafety
NIOSH Preventing Needlesticks and Sharps Injuries	www.cdc.gov/niosh/topics/bbp/sharps.html
OSHA Bloodborne Pathogens and Needlestick Prevention	www.osha.gov/SLTC/bloodbornepathogens