Sharps Injuries among Hospital Workers in Massachusetts



Findings from the Massachusetts Sharps Injury Surveillance System, 2011

Occupational Health Surveillance Program – Massachusetts Department of Public Health

August 2014

Data Highlights and Prevention Measures

- 2,892 sharps injuries (SIs) were reported in 2011. The SI rate for workers in all MDPH licensed hospitals was 15.7 SIs per 100 licensed beds, similar to rates for 2009-10 (Figure 1). Comparable findings were noted in rates for employees (per full time employee equivalents) in acute care hospitals only (Figure 2).
- The trend in rates over time (Figures 2) suggests that the earlier observed decline in rates from 2002-2009 may be leveling off. Not all workers report their SIs to employee health, thus this plateauing could reflect a positive change, i.e., increased worker reporting. Nevertheless, these findings underscore the need for continued commitment to preventing SIs. Hospitals, in interpreting their own SI rates, need to understand reporting practices in their facilities.
- After excluding SIs due to suture needles, 53% of SIs involved (Sharps with engineered sharps injury protections) SESIPs. This is a substantially higher proportion than observed in the early years of surveillance (32% in 2002) and is good news as it likely reflects increased use of SESIPS as required. However, while use of SESIPs is critical to preventing SIs, these devices are not failsafe. These findings raise critical questions about the extent to which these injuries are associated with factors such as inexperience and lack of training in the use of these devices or flaws in the product design. Hospitals should provide training in use of SESIPS and safe work practices and involve front line workers in selecting devices as part of a comprehensive SI prevention program.
- Injuries during sharps disposal are entirely preventable. They account for 6% of reported SIs, and may be due to improper disposal, over filled or poorly placed sharps disposal containers. Prevention strategies include the appropriate placement and selection of containers that allow staff to determine when containers should be emptied before they are dangerously full. It is recommended that containers are replaced when ³/₄ full. It is also crucial to implement systems to regularly check containers to identify those that need replacement. This may be done by assigning someone to check containers at the beginning of a shift or other regular intervals, and requesting replacements where needed. Staff should be provided with a number to call when containers need to be replaced.

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 2011.

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: <u>http://www.mass.gov/eohhs/docs/dph/occupational-health/injuries/injuries-hospital-2004.pdf</u>.



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 2011.

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.

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 inju	ries among hospital workers	by hospital characteristics	, Massachusetts, 2011
		Number of sharps injuries	Rate per 100 licensed beds	95% CI
Hospital size	e			
Small	(< 100 licensed beds)	183	11.3	9.7-12.8
Mediu	m (100-300 licensed beds)	982	10.1	9.5-10.7
Large	(>300 licensed beds)	1,727	25.5	24.4-26.5
Service Type	e			
Acute	care	2,817	18.6	17.9-19.2
Chron	ic care	75	2.5	2.0-3.1
Teaching St	atus			
Teach	ing	1753	25.9	24.8-26.9
Non-te	eaching status	1139	10.0	9.5-10.6
Total		2,892	15.9	15.4-16.5





Figure 1. Number and rate of sharps injuries among all workers in acute and non-acute care hospitals, Massachusetts, 2011



Figure 2. Number and rate of sharps injuries among all workers in acute care hospitals only, Massachusetts, 2011



In acute care hospitals among both employees and non-employees from 2002 to 2011, there was a statistically significant decrease in the rate of sharp injuries from 2002 to 2011. During this period the rate of injuries decreased by 19.5% from 23.1 in 2002 to 18.6 in 2011. The rates for the past several years appear to be holding steady. A similar pattern was observed when calculating the rate of sharps injuries among employees of acute care hospitals by FTEs.



Table 2.Sharps injuries among hospital workers by worker and incident characteristics by hospital size,
Massachusetts, 2011

					Hosp	ital Size			
	All H	ospitals	S	Small	Med	lium	La	rge	
	97 h	ospitals	29 h	29 hospitals		53 hospitals		15 hospitals	
	Ν	%	Ν	%	Ν	%	Ν	%	
Work status of injured worker	2,892	100	183	100	982	100	1,727	100	
Employee	2,485	86	170	93	842	86	1,473	85	
Non-Employee Practitioner	292	10	8	4	92	9	192	11	
Student	78	3	1	1	30	3	47	3	
Temporary / Contract Worker	24	1	4	2	14	1	6	<1	
Other / Unknown / Not answered	13	<1	0	0	4	<1	9	<1	
Occupation	2,892	100	183	100	982	100	1,727	100	
Physician	1,152	40	53	29	238	24	861	50	
Nurse	1,017	35	76	42	417	42	524	30	
Technician	467	16	33	18	224	23	210	12	
Support Services	119	4	11	6	44	4	64	4	
Dental Staff	13	<1	0	0	5	1	8	<1	
Other Medical Staff	72	2	4	2	35	4	33	2	
Other / Unknown / Not answered	52	2	6	3	19	2	27	1	
Department where injury occurred	2,892	100	183	100	982	100	1,727	100	
Operating and Procedure Rooms	1,261	44	78	43	353	36	830	48	
Inpatient Units	551	19	41	22	263	27	247	14	
Intensive Care Units	269	9	7	4	67	7	195	11	
Emergency Department	261	9	18	10	116	12	127	7	
Outpatient areas	187	6	7	4	69	7	111	6	
Laboratories	137	5	11	6	34	3	92	5	
Other / Unknown / Not answered	226	8	21	12	80	8	125	7	
Device involved in the injury	2,892	100	183	100	982	100	1,727	100	
Hypodermic needle/syringe	857	30	59	32	339	35	459	27	
Suture needle	633	22	27	15	162	16	444	26	
Other hollow bore needle	367	13	16	9	118	12	233	13	
Scalpel blade	236	8	15	8	58	6	163	9	
Winged steel needle	217	8	13	7	111	11	93	5	
Vacuum tube collection holder/needle	79	3	11	6	36	4	32	2	
Glass	28	1	3	2	8	1	17	1	
Other / Unknown / Not answered	475	16	39	21	150	15	286	17	
Procedure for which the device was used	2,892	100	183	100	982	100	1,727	100	
Injection	699	24	49	27	283	29	367	21	
Suturing	631	22	27	15	159	16	445	26	
Blood procedures	375	13	27	15	178	18	170	10	
Making the incision	338	12	22	12	99	10	217	13	
Line procedures	319	11	18	10	114	12	187	11	
To obtain body fluid or tissue sample	97	3	9	5	24	2	64	4	
Dental procedures	10	<1	0	0	5	1	5	<1	
Other / Unknown / Not answered	423	15	31	17	120	12	272	16	

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



Table 3.	Sharps i	njuries amo	ng hospita	g hospital workers by occupation by hollow bore device, Massachusetts, 2011									
				Hollow Bore									
Occupation	Т	otal	Нурс	dermic	Butter	fly Needle	Va	cuum	Other	Hollow			
			Ne	edle	N	eedle	Т	ube	В	ore			
	Ν	%	N	%	Ν	%	Ν	%	Ν	%			
Nurse	805	100	473	59	101	13	42	5	189	23			
Physician	354	100	235	66	11	3	4	2	104	29			
Technician	239	100	85	36	82	34	29	12	43	18			
Support	40	100	17	43	3	8	1	3	19	48			
Services													
All Others/	82	100	47	57	20	24	3	4	12	15			
Not Answered													
Total	1.520	100											

Table 4.	Sharps in	njuries amo	ng hospital v	workers by oc	cupation by	solid bore dev	vice, Massachu	setts, 2011
Occupation	Т	otal	Suture	e Needle	S	calpel	C	Other/
							Un	known
	Ν	%	N	%	Ν	%	Ν	%
Physician	798	100	473	59	150	19	175	22
Technician	228	100	68	30	50	22	110	48
Nurse	212	100	77	36	22	10	113	53
Support	79	100	6	8	6	8	67	85
Services								
All Others/	55	100	9	16	8	15	38	69
Not Answered								
Total	1,372	100						



Table 5.Sharps injuries among hospitals workers by SESIP by hospital size: all devices and excluding suture
needles, Massachusetts, 2011

			Hospital Size							
	All Ho	ospitals	S	Small	Me	Medium		irge		
	97 ho	spitals	29 h	ospitals	53 ho	spitals	15 hc	5 hospitals		
Sharps Injury Protections	Ν	%	Ν	%	Ν	%	Ν	%		
All devices	2,892	100	183	100	982	100	1,727	100		
SESIP	1,198	41	80	44	525	53	593	35		
Non-SESIP	1,501	52	94	51	402	41	1,005	58		
Unknown/Not answered	193	7	9	5	55	6	129	7		
Devices excluding suture needles	2,259	100	156	100	820	100	1,283	100		
SESIP	1,189	53	80	51	517	63	592	46		
Non-SESIP	910	40	69	44	251	31	590	46		
Unknown/Not answered	160	7	7	4	52	6	101	8		

^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, 2011

Device



Procedure	To	otal	SE	SIP	Non-	SESIP	Unk	nown
	Ν	%	Ν	%	Ν	%	Ν	%
Injection procedures	699	24	511	43	168	11	20	10
Subcutaneous injection	565	20	422	35	126	8	17	9
Intramuscular injection	97	3	82	7	15	1	0	0
Other injections	37	1	7	1	27	2	3	2
Blood procedures	375	13	302	25	56	4	17	9
Percutaneous venous puncture	258	9	235	20	16	1	7	4
Percutaneous arterial puncture	49	2	40	3	7	0	2	1
Finger stick/Heel stick	45	2	12	1	25	2	8	4
Other blood procedures	23	1	15	1	8	1	0	0
Line procedures	319	11	223	19	81	5	15	8
To insert peripheral IV/set up heparin	127	4	109	9	12	1	6	3
To insert central line	41	1	11	1	26	2	4	2
Other line procedures	151	5	103	9	43	3	5	3
Other procedures	1,499	52	162	14	1,196	80	141	73
Total	2,892	100	1,198	100	1,501	100	193	100

Table 6. Sharps injuries among hospital workers by procedure and SESIP, Massachusetts, 2011

Table 7.Sharps injuries among hospitals workers involving devices included in prepackaged kits by hospital
size, Massachusetts, 2011

					Hosp	ital Size		
	All Ho	ospitals	S	mall	Me	dium	La	rge
	97 hospitals		29 ho	29 hospitals		spitals	15 hospitals	
	Ν	%	N	%	Ν	%	Ν	%
Device included in prepackaged kit	2,892	100	183	100	982	100	1,727	100
Yes	709	25	44	24	217	22	448	26
No	2,063	71	129	70	716	73	1,218	71
Unknown/Not answered	120	4	10	5	49	5	61	4
Total	2,892	100	183	100	982	100	1,727	100

^a Hospital 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, 2011





		-		-	Hos	oital Size		
	All Ho	ospitals	E	Small	Me	dium	La	irge
	97 hc	spitals	29 h	nospitals	53 ho	spitals	15 ho	spitals
	Ν	%	Ν	%	Ν	%	Ν	%
Before use of the item	25	1	0	0	7	1	18	1
During use of the item	1,292	45	81	44	409	42	802	46
Suturing	365	13	17	9	87	9	261	15
Manipulate needle in patient	286	10	15	8	112	11	159	9
Patient moved and jarred device	233	8	15	8	91	9	127	7
Collision with worker or sharp	126	4	11	6	37	4	78	5
Handle/pass equipment	19	1	0	0	11	1	8	<1
Access IV line	19	1	1	1	6	1	12	1
Device malfunction	17	1	1	1	6	1	10	1
Recap needle	5	<1	1	1	1	<1	3	<1
Sharps injury prevention mechanism	1	<1	0	0	0	0	1	<1
not activated								
Other / Unknown / Nonclassifiable	221	8	20	11	58	6	143	8
After use, before disposal	1,192	41	80	44	446	45	666	39
Handle/pass equipment	291	10	17	9	73	7	201	12
Activating injury protection mechanism	213	7	11	6	98	10	104	6
Improper disposal	167	6	11	6	63	6	93	5
During clean-up	165	6	11	6	67	7	87	5
Collision with worker or sharp	116	4	12	7	36	4	68	4
Sharps injury prevention mechanism not activated	89	3	10	6	52	5	27	2
Recap needle	80	3	5	3	24	2	51	3
Device malfunction	25	1	1	1	15	2	9	1
Patient moved and jarred device	6	<1	1	1	3	<1	2	<1
Access IV line	2	<1	0	0	1	<1	1	<1
Other / Unknown / Nonclassifiable	38	1	1	1	14	1	23	1
During or after disposal of item	181	6	11	6	76	8	94	5
During sharps disposal	160	5	8	4	71	7	81	5
Collision with worker or sharp	7	<1	1	1	2	<1	4	<1
Device malfunction	5	<1	1	1	1	<1	3	<1
During clean up	3	<1	0	0	0	<1	3	<1
Sharps injury prevention mechanism not activated	2		0	0	2		0	
Other / Unknown / Nonclassifiable	4	<1	1	10	0	0	3	<1
Unknown / Not answered / Nonclassifiable	202	7	11	6	44	5	147	9
Total	2,892	100	183	100	982	100	1,727	100

Table 8. Sharps injuries among hospital workers by when and how the injury occurred, Massachusetts, 2011

^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, 2011

							T	ime of Inju	ſY			
Device	•	Total	Bef	ore	Durin	g use	Afte	er use,	During) or after	Unk	nown/
			us	e			Before	disposal*	Dis	oosal*	Non-cla	assifiable
	Ν	%	Ν	%	Ν	%	Ν	%	Ν	%	Ν	%
Hypodermic	205	100	3	2	67	33	106	52	16	8	13	6
Vacuum Tube	21	100	0	0	8	38	5	23	8	38	0	0
IV Stylet	18	100	0	0	13	72	4	22	0	0	1	6
Winged-Steele Needle	11	100	0	0	2	18	5	45	3	27	1	9
—												

Total 255 100

*SESIPs offer protection during the period after use. Injuries presented in this table that occurred after use (n=147) 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, 2011

	N	%		N	%
Physician	1,152	40	Support Services	119	4
Intern/Resident	496	17	Housekeeper	65	2
MD	332	12	Central supply	42	1
Fellow	98	3	Safety/security	3	<1
Medical Student	73	3	Attendant/orderly	3	<1
Physician Assistant	71	3	Maintenance	3	<1
Surgeon	43	1	Transport/Messenger	1	<1
Anesthesiologist	29	1	Laundry staff	1	<1
Radiologist	10	<1	Other support services staff	1	<1
Nurse	1,017	35	Other Medical Staff	72	2
RN or LPN	898	31	Medical assistant	66	2
Nursing assistant	53	2	Physical therapist	1	<1
Nurse practitioner	20	1	Other medical staff	5	<1
Patient care technician	19	1			
Nurse anesthetist	10	<1	Dental Staff	13	<1
Nursing student	10	<1	Dentist	7	<1
Nurse midwife	7	<1	Dental assistant/tech	5	<1
			Dental hygienist	1	<1
Technician	467	16			
OR/Surgical technician	195	7	Other	49	2
Phlebotomist	96	3	Researcher	12	<1
Clinical lab technician	61	2	EMT/paramedic	9	<1
Radiologic technician	42	2	Pharmacist	7	<1
Respiratory therapist/ Tech	26	1	Clerical/administrative	1	<1
Hemodialysis technician	3	<1	Counselor/social worker	1	<1
Morgue technician	1	<1	Dietician	1	<1
Psychiatric technician	1	<1	Other student	11	<1
Other technician	42	1	Other	7	<1
			Unknown/Not Answered	3	<1
			Total	2,892	100



Table 11. Sharps injuries among hospital workers by department (detailed), Massachusetts, 2011

	N	%		N	%
Operating and Procedure Rooms	1,261	44	Laboratory	137	5
Operating room	920	32	Histology/pathology	47	2
Labor and delivery	102	4	Morgue/autopsy room	7	<1
Radiology	96	3	Microbiology	7	<1
Cardiac catheterization laboratory	37	1	Hematology	2	<1
Hematology/oncology	36	1	Clinical chemistry	2	<1
Endoscopy/bronchoscopy/cystoscop	20	1	Blood bank	1	<1
Phlebotomy room	17	1	Other laboratory	30	1
Dialysis	14	<1	Laboratory, unspecified	41	1
Procedure room, unspecified	13	<1			
Other procedure room	6	<1	Other Areas	206	7
			Central sterile supply	43	1
Inpatient Units	551	19	Rehabilitation unit	42	1
Medical/surgical ward	469	16	Dermatology	33	1
Psychiatry ward	23	1	Long term care	21	1
Pediatrics	19	1	Exam room	13	<1
Obstetrics/gynecology	17	1	Pain clinic	11	<1
Nursery	9	<1	Anesthesia	9	<1
Patient room, ward unspecified	11	<1	Hospital grounds	5	<1
Specific ward, type unknown	3	<1	Ambulance	4	<1
			Pharmacy	4	<1
Intensive Care Units	269	9	Central trash area	4	<1
Intensive care unit	206	7	Employee health/	3	<1
Post anesthesia care unit	63	2	Infection control		
			Other Location	14	<1
Emergency Department	261	9			
			Unknown/Not Answered	20	1
Outpatient areas	187	7			
Ambulatory care clinic	91	3			
Physician's office	27	1			
Dental clinic	17	1			
Home health visit	15	1			
Community health center	7	<1			
Other outpatient areas	30	1			
			Total	2,892	100



Table 12. Sharps injuries among hospital workers by device (detailed), Massachusetts, 2011

	Ν	%		Ν	%
Hypodermic needles/syringe (hollow bore)	857	30	Glass	28	1
Hypodermic needle attached to a	727	25	Medication ampule / Vial / IV bottle	7	<1
disposable syringe			Pipette	6	<1
Hypodermic Needle Attached to a	45	2	Specimen / Test / Vacuum tube	5	<1
non-disposable syringe			Slide	2	<1
Prefilled cartridge syringe	37	1	Capillary tube	1	<1
Unattached hypodermic needle	34	1	Other glass item	7	<1
Hypodermic needle attached to IV	9	<1			
tubing			Dental Device of item	25	1
Hypodermic needle, unspecified	5	<1	Dental bur	5	<1
			Scaler/curette	4	<1
Suture Needle	633	22	Dental explorer	2	<1
Curved suture needle	469	16	Dental pick	1	<1
Suture needle, unspecified	137	5	Other dental device or item	13	<1
Straight suture needle	27	1			
			Other	424	15
Other Hollow Bore Needles	367	13	Wire	47	2
IV Stylet	141	5	Lancet	46	2
Huber Needle	46	2	Retractor	42	1
Biopsy Needle	24	1	Scissors	27	1
Spinal or epidural needle	14	<1	Bovie electrocautery device	27	1
Hollow bore needle, unspecified	83	3	Cutting blade other than scalpel	26	1
Other type of hollow bore needle	59	2	Forceps	26	1
			Other needle	18	1
Scalpel Blade	236	8	Pin	18	1
			Drill bit	12	<1
Butterfly Needle	217	8	Electrode	12	<1
Winged Steel needle attached to a	130	4	Needle/unspecified	11	<1
vacuum tube collection holder	70	•	Irocar	10	<1
Winged Steele Needle	/8	3	Bone chip/chipped tooth	8	<1
Winged Steele Needle attached to IV	9	<1	Staple	6	<1
tubing			lenaculum	6	<1
			Bone cutter	5	<1
Vacuum Tube Collection Holder/Needle	79	3	Elevator	2	<1
Vacuum tube collection holder/needle	61	2	Rod	1	<1
Phlebotomy needle (other than winged steel needle)	18	1	Other Type of Sharp Object	74	3
,			Unknown/Not Answered	26	1
			Total	2,892	100



Table 13. Sharps injuries among hospital workers by procedure (detailed), Massachusetts, 2011

		Ν	%		Ν	%
Injection		699	24	Line Procedures	319	11
	Subcutaneous injection	565	20	To insert a peripheral IV line or	127	4
	Intramuscular injection	97	3	set up a heparin lock		
	Epidural/spiral anesthesia	13	<1	To insert a central IV line	41	1
	Injection, unspecified	17	1	Other injection into IV site/port	29	1
	Other injection	7	<1	Draw blood from central or	26	1
				peripheral IV line or port		
Suturing		631	22	To insert an arterial line	17	1
	Suturing	586	20	To connect IV line	15	1
	Suture removal	45	2	Draw blood from arterial line	11	<1
				To flush heparin/saline	10	<1
Blood	Procedures	375	13	Other line procedure	39	1
	Percutaneous venous puncture	258	9	Line procedure, unspecified	4	<1
	Percutaneous arterial puncture	49	2			
	Finger stick/heel stick	45	2	To Obtain Body Fluid or Tissue	97	3
	Draw blood from umbilical vessel	10	<1	Sample		
	Dialysis/AV Fistula site	10	<1			
	Blood Procedure, unspecified	1	<1	Dental Procedures	10	<1
	Other blood procedure	2	<1	Oral surgery	4	<1
				Restorative	2	<1
Making the incision		338	12	Dental drilling	1	<1
	Making the incision	248	9	Hygiene	1	<1
	Cauterization	11	<1	Other dental procedure	1	<1
	Surgical procedure, unspecified	60	2	Dental procedure, unspecified	1	<1
	Other surgical procedure	19	1			
				Other	278	10
				Transferring blood/body fluid to another container	30	1
				To obtain lab specimens	23	1
				Drilling	19	1
				Shaving	13	<1
				Procedure, unspecified	15	1
				Other procedure	178	6
				Unknown/Not answered	145	5
				Total	2,892	100

Resources CDC Sharps Safety for Healthcare Settings: Workbook and Teaching Tools www.cdc.gov/sharpssafety 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

