

## **TEXAS CONTAMINATED SHARPS INJURIES: 2001**

*This report contains the aggregate contaminated sharps injury data submitted to Texas Department of Health for 2001 as required by Texas Health and Safety Code, Chapter 81, Subchapter H (HB 2085), 76<sup>th</sup> Legislature.*

### *FEDERAL BLOODBORNE PATHOGEN REGULATIONS*

Since the Human Immunodeficiency Virus (HIV) epidemic began in the 1980's, many changes have occurred in the healthcare industry. Just as prior to the advent of antibiotics, healthcare workers have again become at life and death risk at the work site. In response, the Occupational Safety and Health Administration issued the 1991 standard regulating occupational exposure to bloodborne pathogens, including HIV, hepatitis B virus (HBV), hepatitis C virus (HCV) and others. Thereafter, the more stringent federal Needlestick Safety and Prevention Act became law in November 2000. This law revised the previous Bloodborne Pathogen standard to require: the evaluation and implementation of safer needle devices; documentation of the non-managerial staff involvement in the evaluation and selection of safer devices; and the establishment and maintenance of a sharps injuries log. <sup>1</sup>

### *TEXAS BLOODBORNE PATHOGEN LAW*

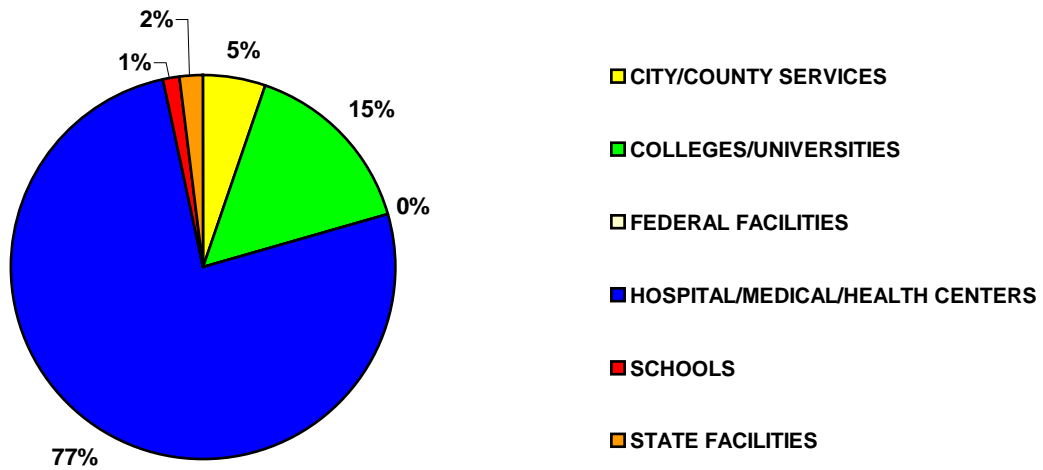
The Texas State Legislature and Governor passed House Bill 2085, which contained Bloodborne Pathogens Control regulations effective in 2001. Requirements of the Texas Bloodborne Pathogen Control regulation include: that each governmental unit will comply with minimum standards that are analogous to the standards adopted by the federal Occupational Safety and Health Administration; that governmental entities develop and implement an Exposure Control Plan; that frontline staff make up at least 50% of the team that evaluates and selects needleless systems that are to be implemented in their governmental entity as these become commercially available; that worksites maintain a confidential Sharps Injury Log; and that governmental entities submit sharps injury information to the Texas Department of Health (TDH). TDH is required to make available in aggregate form, the submitted data and maintain a registration program for needleless systems and sharps with engineered sharps protection. <sup>2</sup>

REPORTING OF CONTAMINATED SHARPS INJURIES

The sharps injury information that must be reported to TDH in a written or electronic form include: date and time of the injury; the type and brand of sharp involved in the exposure incident; a description of the incident that includes job classification of the injured person; the department or work area where the exposure occurred; the procedure that the exposed employee was performing at the time of the incident; how the incident occurred; the body part of the employee that was injured; and whether the sharp had engineered sharps injury protection and if so, did the injury occur before, during or after activation of the protective mechanism.

Types of facilities that reported injuries included hospitals, medical/health centers, colleges/universities, city/county facilities, state facilities, and schools (Figure 1). Sharps injuries by Public Health Regions are shown in Table 1.

**Figure 1: Type of Facility Reporting  
(n=1789)**



**Table 1: Sharps Injuries by Public Health Region  
(n = 1789)**

| PUBLIC HEALTH REGION | NUMBER      | PERCENT        |
|----------------------|-------------|----------------|
| 1                    | 235         | 13.14%         |
| 2                    | 122         | 6.82%          |
| 3                    | 449         | 25.10%         |
| 4                    | 36          | 2.01%          |
| 5                    | 8           | 0.45%          |
| 6                    | 375         | 20.96%         |
| 7                    | 88          | 4.92%          |
| 8                    | 309         | 17.27%         |
| 9                    | 102         | 5.70%          |
| 10                   | 38          | 2.12%          |
| 11                   | 27          | 1.51%          |
| <b>TOTAL</b>         | <b>1789</b> | <b>100.00%</b> |

Table 2 further depicts the types of worksites where injuries occurred. It may be noted that seventy-eight percent (78%) of the 1,798 contaminated sharps injuries were reported as having occurred in hospitals. The tracking of injury trends within a hospital/other facility may be more meaningful than the comparison of injuries between different types of facilities with diverse patient populations, lengths of stay, and services.<sup>3</sup> Formulas for calculation of injury rates are listed in Advances in Exposure Prevention.<sup>4</sup>

**Table 2: Sharps Injuries by Facility Type  
(n = 1789)**

| TYPE OF FACILITY          | NUMBER      | PERCENT        |
|---------------------------|-------------|----------------|
| Hospital                  | 1399        | 78.20%         |
| Clinic                    | 133         | 7.43%          |
| EMS/Fire/Police           | 67          | 3.75%          |
| Correctional Facility     | 42          | 2.35%          |
| School                    | 38          | 2.12%          |
| Laboratory (Freestanding) | 32          | 1.79%          |
| Outpatient Treatment      | 26          | 1.45%          |
| Dental Facility           | 10          | 0.56%          |
| Residential Facility      | 10          | 0.56%          |
| Home Health               | 9           | 0.50%          |
| Morgue/Medical Examiner   | 5           | 0.28%          |
| Bloodbank/Center/Mobile   | 4           | 0.22%          |
| Other                     | 14          | 0.78%          |
| <b>TOTAL</b>              | <b>1789</b> | <b>100.00%</b> |

Sharps injuries reported by work area within facilities (Table 3) revealed that 455 or 25% of the injuries were sustained in the patient's room and the next greatest number (332 or 19%) occurred in the operating room. Additionally, 10% occurred in the procedure room and 9% in the emergency department.

**Table 3: Sharps Injuries by Work Area  
(n = 1789)**

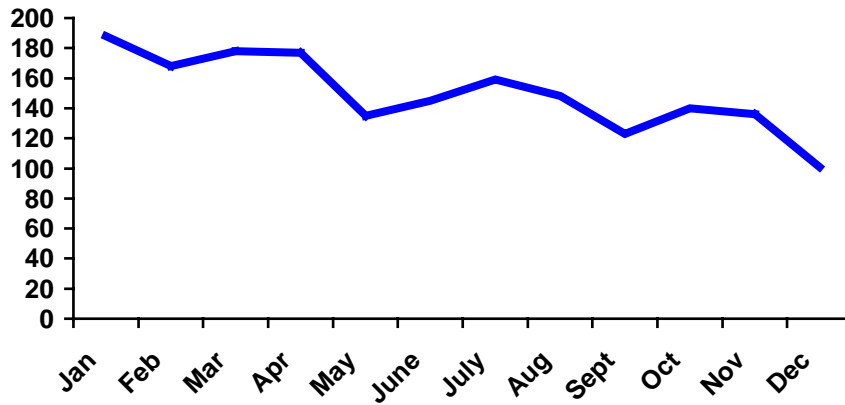
| WORK AREA                 | NUMBER      | PERCENT        |
|---------------------------|-------------|----------------|
| Patient/Resident Room     | 455         | 25.43%         |
| Operating Room            | 332         | 18.56%         |
| Procedure Room            | 184         | 10.29%         |
| Emergency Department      | 168         | 9.39%          |
| Laboratory                | 118         | 6.60%          |
| Labor & Delivery          | 89          | 4.97%          |
| Medical/Outpatient Clinic | 79          | 4.42%          |
| Critical Care             | 77          | 4.30%          |
| Rescue Setting (non-ER)   | 60          | 3.35%          |
| Floor, Not Patient Room   | 57          | 3.19%          |
| School                    | 33          | 1.84%          |
| Service/Utility Area      | 28          | 1.57%          |
| Pre-Op or PACU            | 20          | 1.12%          |
| Autopsy/Pathology         | 15          | 0.84%          |
| Dialysis Centers          | 12          | 0.67%          |
| Home                      | 12          | 0.67%          |
| Infirmery                 | 9           | 0.50%          |
| Blood Bank/Center/Mobile  | 5           | 0.28%          |
| Other                     | 36          | 2.01%          |
| <b>TOTAL</b>              | <b>1789</b> | <b>100.00%</b> |

*VARIATIONS IN INJURY REPORTING*

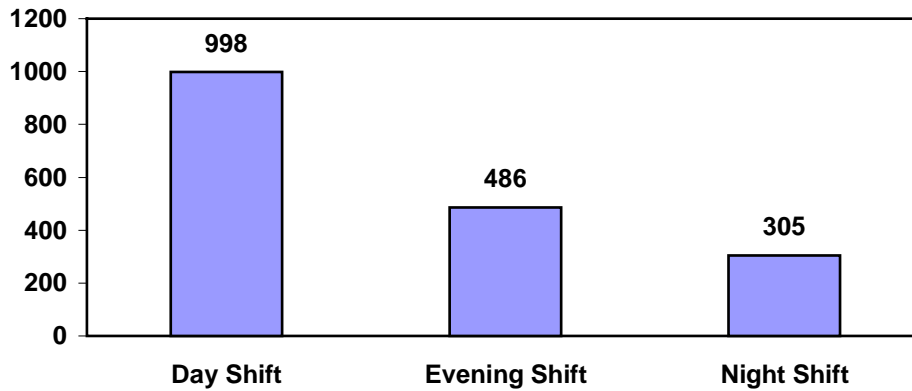
Figures 2 and 3 display when injuries occurred during 2001. Figure 2 displays injuries per month while Figure 3, lists injuries by time of injury incident. Figure 2 appears to demonstrate a decreasing trend in sharps injuries per month over time. These variations in reporting of sharps injuries could possibly be the result of a number of factors, such as: increased reporting after an education program on Bloodborne Pathogen Risks, or a drop in reporting after requiring the use of safer sharps devices<sup>3</sup>, or a change in reported injuries thought to be related to organizational climate and staffing levels<sup>5</sup>. Inconsistency in reporting and profound underreporting may be as high as seventy percent (70%) in some facilities<sup>6</sup>. Figure 3 reveals that fifty-six percent (56%) or a total of 998 sharps injuries were sustained on the day shift. The

higher number of day shift injuries might be expected to occur because of the possible higher number of risky procedures on the day shift.

**Figure 2: Sharps Injuries per Month, 2001  
(n = 1789)**



**Figure 3: Time of Injury  
(n=1789)**



Day shift: 7:00AM to 2:59PM  
Evening shift: 3:00PM to 10:59PM  
Night shift: 11:00PM to 6:59AM

*HEALTH CARE WORKERS AT BLOODBORNE PATHOGEN RISK*

More than eight million health care workers in the United States work in hospitals and other health care services <sup>7</sup>. These workers in the health care industry and related occupations are at risk of occupational exposure to bloodborne pathogens, including human immunodeficiency virus (HIV), hepatitis C (HCV), hepatitis B virus (HBV), and other infections. As of December 2001, there were 57 “documented” and 135 “possible” cases of occupational HIV transmission to U.S. health care workers as reported to the Centers for Disease Control and Prevention (CDC).

According to the NIOSH Alert in March 1999, an estimated 600,000 to 800,000 needlestick injuries and other percutaneous injuries occur annually among health care workers <sup>8</sup> with nurses sustaining the majority of the injuries <sup>7</sup>. During 2001, Texas Registered Nurses (R.N.s) likewise, sustained the highest portion of the sharps injuries with 464 or 26% of the total (Table 4). Another 8% of the injuries occurred among Licensed Vocational Nurses (LVNs). These nursing injury statistics are comparable to the injuries reported by the International Health Care Safety Center at the University of Virginia (EPINet) <sup>9</sup>. The EPINet injury data for 1999 health care facilities showed RN/LVN combined injuries at 40% of the total of the 1,995 injuries reported from hospitals in the data base. During 2001, Texas physicians sustained the second highest number of sharps injuries with 393 (22% of total) reported (Table 4), while laboratory workers were third highest in reported injuries at 179 (10% of the total number).

**Table 4: Sharps Injuries by Job Classification  
(n = 1789)**

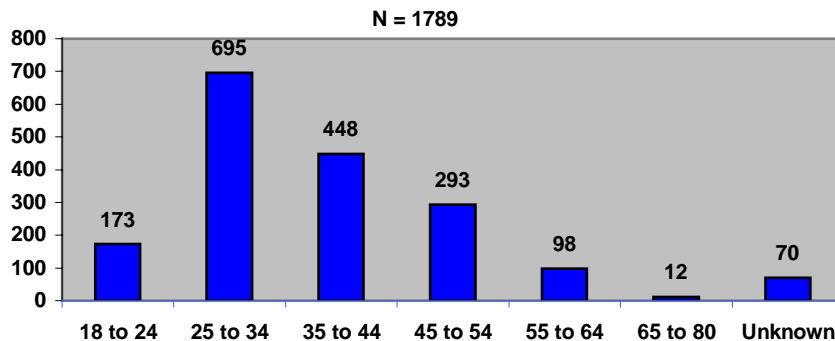
| JOB CLASSIFICATION        | NUMBER      | PERCENT        |
|---------------------------|-------------|----------------|
| RN                        | 464         | 25.94%         |
| MD/DO                     | 393         | 21.97%         |
| Laboratory                | 179         | 10.01%         |
| LVN                       | 143         | 7.99%          |
| Surgery Assistant/OR Tech | 135         | 7.55%          |
| First Responder           | 82          | 4.58%          |
| Housekeeper/Laundry       | 80          | 4.47%          |
| Student                   | 78          | 4.36%          |
| Aide                      | 51          | 2.85%          |
| Dental                    | 32          | 1.79%          |
| Other Techs               | 26          | 1.45%          |
| Respiratory Therapist     | 24          | 1.34%          |
| Radiology                 | 23          | 1.29%          |
| School Personnel          | 13          | 0.73%          |
| Physician Assistant       | 9           | 0.50%          |
| CRNA/NP                   | 8           | 0.45%          |
| Correctional              | 6           | 0.34%          |
| Forensics                 | 5           | 0.28%          |
| Physical Therapy          | 5           | 0.28%          |
| Other                     | 33          | 1.84%          |
| <b>TOTAL</b>              | <b>1789</b> | <b>100.00%</b> |

Sixty-five percent (65%) of the injured workers were female (Table 5) and the greatest number of the injured workers was between the ages of 25 to 34 (Figure 4). The hand was the most frequently injured body part with 1,673 hand injuries reported which was 94% of all injuries (Table 6).

**Table 5: Sex of Injured Worker  
(n = 1789)**

| SEX          | NUMBER      | PERCENT        |
|--------------|-------------|----------------|
| Female       | 1170        | 65.40%         |
| Male         | 607         | 33.93%         |
| Unknown      | 12          | 0.67%          |
| <b>TOTAL</b> | <b>1789</b> | <b>100.00%</b> |

**Figure 4: Age Distribution of Injured Workers**



**Table 6: Area of Body Injured  
(n = 1789)**

| INJURED BODY PART | NUMBER      | PERCENT        |
|-------------------|-------------|----------------|
| Hand              | 1673        | 93.52%         |
| Arm               | 55          | 3.07%          |
| Leg/Foot          | 47          | 2.63%          |
| Torso             | 4           | 0.22%          |
| Face/Head/Neck    | 3           | 0.17%          |
| Unknown           | 7           | 0.39%          |
| <b>TOTAL</b>      | <b>1789</b> | <b>100.00%</b> |

*HOW CONTAMINATED SHARPS INJURIES OCCURRED*

The Texas Bloodborne Pathogen law requires the reporting of how sharps injuries occurred and the use or nonuse of safety engineering controls. The reporting of how the sharps injuries occurred includes: the original intended use of the sharp, the availability of the sharps disposal container as an engineering control, the type of sharp involved, and details of the injury.

Injuries related to the original intended use of the sharp (Table 7) revealed that the use of a sharp to obtain a sample of blood resulted in 307 injuries (17% of total injuries). In fact, The Centers for Disease Control and Prevention (CDC) has categorized phlebotomy as one of the highest risk of the sharps usage procedures due to the hollow-bore needle and the large gauge of the phlebotomy needle.<sup>10</sup> An additional six percent of the injuries were related to an intravenous aspiration or injection. Suturing (deep and skin) resulted in 317 injuries (18% of reported injuries). Fifteen percent (15%) of the injuries were sustained when the original intended use was to give subcutaneous or intramuscular injections. There were 147 injuries listed as unknown as to the original intended use.



**Table 7: Original Intended Use of Sharp When Injury Occurred  
(n = 1789)**

| ORIGINAL INTENDED USE OF SHARP  | NUMBER      | PERCENT        |
|---------------------------------|-------------|----------------|
| Draw Venous Sample              | 307         | 17.16%         |
| Suturing, Skin                  | 195         | 10.90%         |
| Injection, SC/ID                | 163         | 9.11%          |
| Start IV or Set Up Heparin Lock | 143         | 7.99%          |
| Suturing, Deep                  | 122         | 6.82%          |
| Injection/Aspiration IV         | 104         | 5.81%          |
| Injection, IM                   | 100         | 5.59%          |
| Cutting (Surgery)               | 79          | 4.42%          |
| Surgery/Surgical Procedure      | 70          | 3.91%          |
| Finger/Heel Stick               | 68          | 3.80%          |
| Obtain Body Fluid/Tissue Sample | 63          | 3.52%          |
| Draw Arterial Sample            | 43          | 2.40%          |
| Heparin/Saline Flush            | 37          | 2.07%          |
| Contain Specimen/Pharmaceutical | 32          | 1.79%          |
| Other Cutting                   | 27          | 1.51%          |
| Dental Procedure                | 17          | 0.95%          |
| Wiring                          | 14          | 0.78%          |
| Drilling                        | 8           | 0.45%          |
| Dialysis                        | 5           | 0.28%          |
| Electrocautery                  | 5           | 0.28%          |
| Tattooing                       | 4           | 0.22%          |
| Other                           | 36          | 2.01%          |
| Unknown                         | 147         | 8.22%          |
| <b>TOTAL</b>                    | <b>1789</b> | <b>100.00%</b> |

The sharps disposal container was reported as readily available in 92% of the injury cases (Table 8). However, in Table 9, that lists how the injury occurred, fourteen percent (14%) of the injuries were listed as having occurred in the use of the sharps disposal container and twelve percent (12%) were incurred when the sharp was found in an inappropriate place. In Table 9, it may be also noted that 10% were reported as having happened when the patient moved during a procedure. The greatest number of injuries at 318 (18%) were sustained during suturing.

**Table 8: Sharps Container Available for Disposal  
(n = 1789)**

| SHARPS CONTAINER AVAILABLE | NUMBER      | PERCENT        |
|----------------------------|-------------|----------------|
| Yes                        | 1643        | 91.84%         |
| No                         | 130         | 7.27%          |
| Not Applicable             | 2           | 0.11%          |
| Unknown                    | 14          | 0.78%          |
| <b>TOTAL</b>               | <b>1789</b> | <b>100.00%</b> |

| <b>Table 9: How Injury Occurred</b>       | NUMBER      | PERCENT       |
|---|-------------|---------------|
| Suturing                                  | 318         | 17.8%         |
| Use Of Sharps Container                   | 245         | 13.7%         |
| Found In An Inappropriate Place           | 206         | 11.5%         |
| Other                                     | 197         | 11.0%         |
| Patient Moved During Procedure            | 182         | 10.2%         |
| While Disassembling                       | 147         | 8.2%          |
| While Carrying/Handling Sharp             | 80          | 4.5%          |
| While Recapping                           | 70          | 3.9%          |
| Laboratory Procedure/Process              | 58          | 3.2%          |
| Procedure/Environment                     | 52          | 2.9%          |
| Interaction With Another Employee/Patient | 37          | 2.1%          |
| Unknown                                   | 35          | 2.0%          |
| During Use Of Device                      | 30          | 1.7%          |
| Cleaning Instruments/Equipment            | 29          | 1.6%          |
| Surgery                                   | 27          | 1.5%          |
| Passing Instruments                       | 23          | 1.3%          |
| Use Of Iv/Central Line                    | 22          | 1.2%          |
| Activating Safety Shield                  | 15          | 0.8%          |
| Device Malfunctioned                      | 14          | 0.8%          |
| <b>TOTALS</b>                             | <b>1787</b> | <b>100.0%</b> |

Missing: 2

\*\*Please Note! The above table is a correction of previously published data.

Scrutiny of injuries by the type of sharp in use at time of the injury revealed a variety of devices: syringes, needles, scalpels, lancets, trocars, surgical instruments, wires, and vacuum tube devices (Table 10). “Suture needles” were listed most frequently at eighteen percent (18%) of the injuries. The next highest number of devices was “other syringe with needle” at 211 (12%) followed by “needle factory-attached to syringe” at 11% of the injuries.

**Table 10: Injuries by Type of Sharp  
(n = 1789)**

| TYPE OF SHARP                            | NUMBER      | PERCENT        |
|--|-------------|----------------|
| Suture needle                            | 320         | 17.89%         |
| Other syringe with needle                | 211         | 11.79%         |
| Needle factory-attached to syringe       | 201         | 11.24%         |
| Winged steel needle                      | 156         | 8.72%          |
| Other surgical instrument/nonglass sharp | 137         | 7.66%          |
| Other nonsuture needle                   | 113         | 6.32%          |
| IV catheter, loose                       | 100         | 5.59%          |
| Scalpel                                  | 97          | 5.42%          |
| Insulin syringe with needle              | 83          | 4.64%          |
| Vacuum tube collection                   | 83          | 4.64%          |
| Lancet                                   | 62          | 3.47%          |
| Tuberculin syringe with needle           | 34          | 1.90%          |
| Syringe, other                           | 28          | 1.57%          |
| Blood gas syringe                        | 26          | 1.45%          |
| Needle connected to IV line              | 22          | 1.23%          |
| Prefilled cartridge syringe              | 20          | 1.12%          |
| Blood tube                               | 13          | 0.73%          |
| Wire                                     | 13          | 0.73%          |
| Trocar                                   | 10          | 0.56%          |
| Other glass                              | 9           | 0.50%          |
| Ampule                                   | 2           | 0.11%          |
| Staples                                  | 2           | 0.11%          |
| Other                                    | 7           | 0.39%          |
| Unknown                                  | 40          | 2.24%          |
| <b>TOTAL</b>                             | <b>1789</b> | <b>100.00%</b> |

#### *WORKSITE SAFETY CONTROLS*

The presence of the following interventions were evaluated at the time of the injury: glove use, hepatitis B vaccine series, bloodborne pathogen education in the last twelve months, and whether the device used had safety engineered sharps protection.

Eighty-four percent (84%) of the injured workers were wearing gloves at the time of their injury (Table 11). Eighty-seven percent (87%) of injured workers had completed the hepatitis B vaccine series at the time of injury (Table 12).

**Table 11: Glove Use at Time of Injury  
(n = 1789)**

| WEARING GLOVES | NUMBER      | PERCENT        |
|----------------|-------------|----------------|
| Yes            | 1502        | 83.96%         |
| No             | 276         | 15.43%         |
| Unknown        | 11          | 0.61%          |
| <b>TOTAL</b>   | <b>1789</b> | <b>100.00%</b> |

**Table 12: Hepatitis B Vaccine Series Completion Among Injured Workers  
(n = 1789)**

| HEP B VACCINE | NUMBER      | PERCENT        |
|---------------|-------------|----------------|
| Yes           | 1565        | 87.48%         |
| No            | 213         | 11.91%         |
| Unknown       | 11          | 0.61%          |
| <b>TOTAL</b>  | <b>1789</b> | <b>100.00%</b> |

Table 13 demonstrates that eighty-six percent (86%) of the injured workers had had the required education during the 12 months prior to their injury.

**Table 13: Exposure Control Plan Training During Past Twelve Months  
(n = 1789)**

| RECEIVED TRAINING | NUMBER      | PERCENT        |
|-------------------|-------------|----------------|
| Yes               | 1532        | 85.63%         |
| No                | 233         | 13.02%         |
| Unknown           | 24          | 1.34%          |
| <b>TOTAL</b>      | <b>1789</b> | <b>100.00%</b> |

#### *SAFETY ENGINEERED SHARPS PROTECTION*

Table 14 shows the results of the query concerning whether the device involved in the injury did or did not have safety engineered sharps protection. It may be noted that 74% of the Texas injuries occurred with devices that did not have safety engineered sharps protection. CDC estimates that 62 to 88 percent of sharps injuries can potentially be prevented by the use of safer medical devices.<sup>8</sup> Efficacy of safety engineered sharps protection may be reviewed in the November 1999 NIOSH Alert.<sup>7</sup>

**Table 14: Did the Device Have Engineered Sharps Injury Protection  
(n = 1789)**

| ENGINEERED SHARPS INJURY PROTECTION | NUMBER      | PERCENT        |
|-------------------------------------|-------------|----------------|
| No                                  | 1323        | 73.95%         |
| Yes                                 | 264         | 14.76%         |
| Unknown                             | 202         | 11.29%         |
| <b>TOTAL</b>                        | <b>1789</b> | <b>100.00%</b> |

*SAFETY ENGINEERED SHARPS AND EDUCATION*

A Houston hospital study of preimplementation and postimplementation of engineered sharps and education revealed that, with education only, rates of injuries were declining; however, with the combination of education and hospital-wide use of safety engineered syringes and needless-intravenous devices, a “significant” reduction in needle-related injuries was observed. A confounder, as stated in the study, was the continued availability of traditional needled devices.<sup>11</sup>

*SAFE WORK ENVIRONMENT*

Although many factors may be listed as essential to a safe work environment, 3 are associated with compliance to bloodborne pathogen exposure regulations:

1. senior management commitment and support for a safe work site;
2. absence of barriers to safe work practices;
3. cleanliness and orderliness at the worksite.<sup>12</sup>

*COST AND BENEFITS OF SAFETY ENGINEERED SHARPS*

Implementation of safety engineered sharps can be expected to reduce or eliminate the risk of contaminated sharps injuries and thus benefit both the health care worker and the employer. The new devices however may result in an increased budgetary expense. The possible increased costs of safer devices may be weighed against the benefits of reduced anxiety among staff and the reduced or eliminated employer cost of injured worker evaluation and treatment. The U.S. cost of evaluating and treating injured workers is around \$500 million per year.<sup>13</sup>

### *CONCLUSIONS:*

1. Texas governmental entities providing health care in Public Health Regions with large urban populations reported the largest numbers of sharps injuries.
2. Texas hospitals and clinics reported more injuries than other types of facilities.
3. The patient or resident's room, operating room, procedure room and emergency room were work areas highest in sharps injuries
4. Registered nurses, physicians and laboratory staff sustained the greater number of sharps injuries.
5. Blood sample collection, giving an injection, and suturing were worksite activities that resulted in the highest number of sharps injuries.
6. Thorough worksite investigation and reporting of injury incidents could assist worksite tracking and injury prevention as well as contributing to state-wide review and reporting to promote injury prevention.
7. The need for the screening, testing, and implementation of safety engineered sharps is demonstrated by the fact that 74% of the injuries were incurred through the use of traditional devices without safety engineering.

### References/Resources:

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