

# Use of Blunt-Tip Suture Needles to Decrease Percutaneous Injuries to Surgical Personnel

## Safety and Health Information Bulletin

SHIB 03–23–2007 • DHHS (NIOSH) Publication No. 2008–101 (supersedes 2007–132)

This document was developed by the Occupational Safety and Health Administration (OSHA), Department of Labor, and the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention, Department of Health and Human Services. OSHA's mission is to assure the safety and health of America's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health. NIOSH is the federal agency responsible for conducting research and making recommendations for the prevention of workplace injuries and diseases.

This Safety and Health Information Bulletin is not a standard or regulation, and it creates no new legal obligations. The Bulletin is advisory in nature, informational in content, and is intended to assist employers in providing a safe and healthful workplace. Pursuant to the Occupational Safety and Health Act, employers must comply with hazard-specific safety and health standards promulgated by OSHA or by a state with an OSHA-approved state plan. In addition, pursuant to Section 5(a)(1), the General Duty Clause of the Act, employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. Employers can be cited for violating the General Duty Clause if there is a recognized hazard and they do not take reasonable steps to prevent or abate the hazard. However, failure to implement any recommendations in this Safety and Health Information Bulletin is not, in itself, a violation of the General Duty Clause. Citations can only be based on standards, regulations, and the General Duty Clause.

### Preface

The Occupational Safety and Health Administration's (OSHA's) Bloodborne Pathogens standard (29 CFR\* 1910.1030) protects employees against occupational exposure to bloodborne pathogens. Bloodborne pathogens are pathogenic microorganisms that may be present in human blood and cause human disease. These pathogens include, but are not limited to, hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV). Occupational exposure to bloodborne pathogens may occur when workers receive a penetrating injury to their skin (percutaneous injury). Surgical personnel are at risk of occupational exposure to bloodborne pathogens from injuries caused by sharp surgical instruments. Such personnel include surgeons, nurses, surgical technicians, anesthesiologists, and other health care personnel both inside and outside the operating suite.

### Purpose

The purpose of this Safety and Health Information Bulletin is:

1. To describe the hazard of sharp-tip suture needles as a source of percutaneous injuries to surgical personnel;

\*Code of Federal regulations. See CFR in references.

U.S. Department of Labor  
Occupational Safety and Health Administration



OSHA

Department of Health and Human Services  
Centers for Disease Control and Prevention  
National Institute for Occupational Safety and Health



NIOSH

2. To present evidence of the effectiveness of blunt-tip suture needles in decreasing percutaneous injuries to surgical personnel, particularly when used to suture muscle and fascia; and
3. To emphasize OSHA's requirement and NIOSH's recommendation to use safer medical devices—in this case, blunt-tip suture needles—where clinically appropriate.

## Background

Sharp-tip suture needles are the leading source of percutaneous injuries to surgical personnel, causing 51% to 77% of these incidents.<sup>1,2,3</sup> Sharp-tip suture needles not only injure surgical staff, but also present a risk to patients from potential exposure to injured staff's blood. Suture needle injuries can occur when surgical personnel:

- Load or reposition the needle into the needle holder;
- Pass the needle hand-to-hand between team members;
- Sew toward the surgeon or assistant while the surgeon or assistant holds back other tissue;
- Tie the tissue with the needle still attached,
- Leave the needle on the operative field,
- Place needles in an over-filled sharps container; or
- Place needles in a poorly located sharps container.<sup>4</sup>

Suture needle injuries frequently occur during suturing of muscle and fascia.<sup>2</sup> In 2005, the American College of Surgeons (ACS) issued a statement supporting universal adoption of blunt-tip suture needles for suturing fascia and encouraging further investigation of their appropriate use in other surgical applications. The ACS stated that “all published studies to date have demonstrated that the use of blunt suture needles can substantially reduce or eliminate needle-stick injuries from surgical needles.”<sup>5</sup> The Association of Perioperative Registered Nurses (AORN) endorsed this ACS statement in support of blunt-tip

suture needle use where effective and clinically appropriate.<sup>6</sup> The ACS and AORN are two of the seven member organizations of the Council on Surgical and Perioperative Safety, all of which have endorsed this statement. The other five member organizations are: the American Association of Nurse Anesthetists, the American Association of Surgical Physician Assistants, the American Society of Anesthesiologists, the American Society of PeriAnesthesia Nurses, and the Association of Surgical Technologists.

## Engineering Controls

Engineering controls are defined in OSHA's Bloodborne Pathogens standard as controls that isolate or remove the bloodborne pathogens hazard from the workplace [29 CFR 1910.1030(b)]<sup>9</sup>. The standard states “Engineering and work practice controls shall be used to eliminate or minimize employee exposure” [29 CFR 1910.1030(d)(2)(i)]. This means that if an effective and clinically appropriate safety-engineered sharp exists, an employer must evaluate and implement it. However, if using a safer device compromises either patient safety or medical integrity its use would not be required.

Blunt-tip suture needles are identified by OSHA as an example of an engineering control to reduce percutaneous injuries (CPL 02-02-069, XIII D.2) (Citation Guidelines). As an alternative to sharp-tip suture needles, blunt-tip suture needles can be used to suture less-dense tissue such as muscle and fascia. Since as many as 59% of suture needle injuries occur during suturing of muscle and fascia,<sup>1</sup> the replacement of conventional sharp-tip suture needles with blunt-tip suture needles for these surgical tasks will reduce injury rates to surgical personnel. Conventional sharp-tip suture needles may be needed to suture skin, bowel, and blood vessels, although suture-less techniques for these procedures are available for use at the discretion of the surgeon. Several case studies suggest, but do not conclusively demonstrate, that blunt suture needles may also be used for suturing bowel and skin.<sup>7</sup>

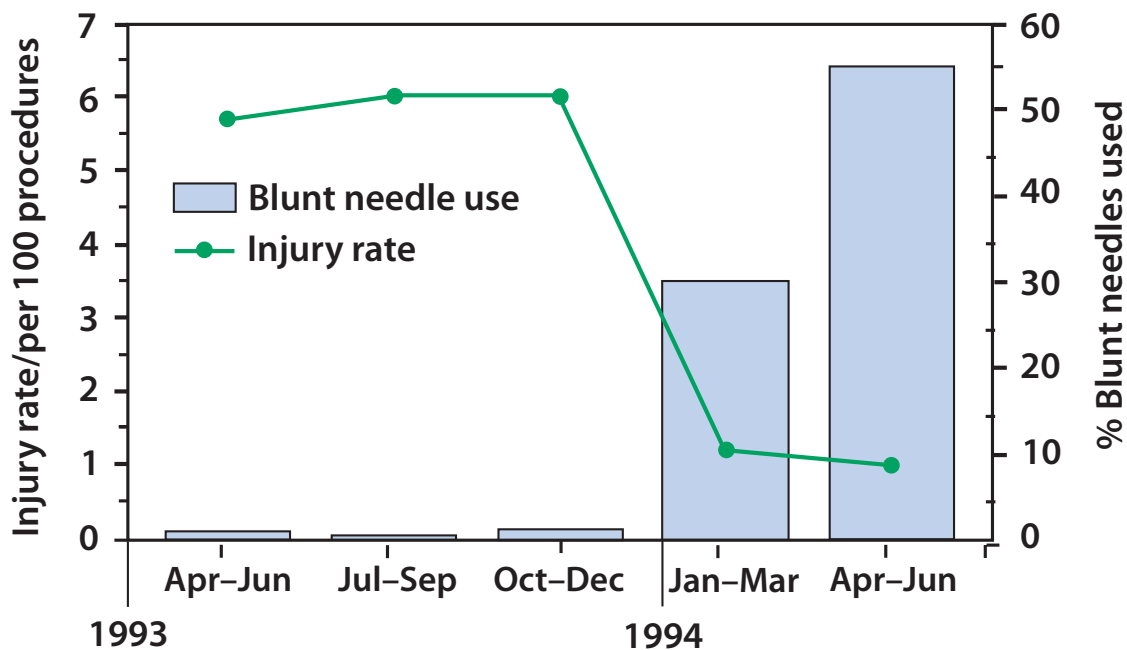
## Evidence of Effectiveness of Blunt-Tip Suture Needles

Multiple studies have reported the effectiveness of blunt-tip suture needles in decreasing percutaneous injuries. A Centers for Disease Control and Prevention (CDC) study of suture needles in gynecologic surgery found a statistically significant reduction of injury rates when blunt-tip suture needles were used (Figure 1).<sup>8</sup> In addition, use of these devices resulted in minimal clinically apparent adverse effects on patient care and were generally accepted by participating surgeons.<sup>8</sup> Other trials and reports have shown that blunt-tip suture needles are technically satisfactory when used appropriately and that their use results in substantial reduction or elimination of injuries to surgical personnel.<sup>2</sup>

## Conclusion

OSHA and NIOSH strongly encourage the use of blunt-tip suture needles, whenever feasible and appropriate, to decrease percutaneous injuries

to surgical personnel. Clinical use and scientific studies have established the effectiveness of blunt-tip suture needles in decreasing the risk of percutaneous injuries. Employers in workplaces that use suture needles have the responsibility under the Bloodborne Pathogens standard to evaluate the use of blunt-tip suture needles as well as other appropriate safer medical devices. After this evaluation, which must include input from non-managerial employees responsible for direct patient care [29 CFR 1910.1030(c)(1)(v)] -e.g., in this case surgical personnel—employers must use safer devices to replace corresponding conventional sharp-tip suture needles in their workplaces when clinically appropriate. The introduction of any device must include training of staff in its proper use and follow-up to ensure a successful transition from conventional to safer devices. Where an employer has determined that the use of available safer devices is not feasible, the clinical justification for this determination must be documented in the facility's Exposure Control Plan and the employer must implement alternative means of protecting surgical personnel from percutaneous injuries.



**Figure 1.** Rate of injury associated with the use of curved suture needles during gynecologic surgical procedures and percentage of suture needles used that were blunt, by quarter—three hospitals, New York City hospitals, April 1993–June 1994

## Additional Tools and Information

Additional information and resources on bloodborne pathogens and percutaneous injury prevention, including the complete text of OSHA's Bloodborne Pathogens standard and the Needlestick Safety and Prevention Act, are available on OSHA's Safety and Health Topics Page at <http://www.osha.gov/SLTC/bloodbornepathogens/index.html> and on NIOSH's Safety and Health Topic Page: Bloodborne Infectious Diseases HIV/AIDS, Hepatitis B Virus, and Hepatitis C Virus at <http://www.cdc.gov/niosh/topics/bbp>.

OSHA's web site [www.osha.gov](http://www.osha.gov) contains extensive resources on workplace safety and health as well as contact information for asking OSHA a question or filing a workplace safety and health complaint. NIOSH's web site [www.cdc.gov/niosh](http://www.cdc.gov/niosh) also contains extensive resources on workplace health and safety and contact information, including access to CDC's *Workbook for Designing, Implementing, and Evaluating a Sharps Injury Prevention Program* which may be found at <http://www.cdc.gov/sharpsafety>. The Workbook contains detailed information on how to select and evaluate sharps devices with engineered sharps injury prevention features as well as a sample device evaluation form.

## References

1. Jagger J, Bentley M, Tereskerz P. A study of patterns and prevention of blood exposure in OR personnel. *AORN J*. 1998; 67(5):979–81, 983–4, 986–7.
2. Berguer R, Heller PJ. Preventing sharps injuries in the operating room. *J Am Coll Surg*. 2004; 199(3):462–7.
3. Makary MA, Al-Attar A, Holzmüller CG, Sexton JB, Syin D, Gilson MM, Sulkowski MS, Pronovost PJ. Needlestick injuries among surgeons in training. *N Engl J Med*. 2007 Jun 28; 356(26):2693–9.
4. Davis MS. *Advanced Precautions for Today's OR: The Operating Room Professional's Handbook for the Prevention of Sharps Injuries and Bloodborne Exposures*, 1<sup>st</sup> ed. Atlanta; Sweinbinder; 1999.
5. American College of Surgeons (ACS). Statement on blunt suture needles. *Bull Am Coll Surg*. 2005 Nov; 90(11):24. Available from [http://www.facs.org/fellows\\_info/statements/st-52.html](http://www.facs.org/fellows_info/statements/st-52.html)
6. Association of Perioperative Registered Nurses (AORN). *AORN Guidance Statement: Sharps Injury Prevention in the Perioperative Setting*. In: 2005 Standards, Recommended Practices, and Guidelines. 2005; 199–204. Available from [www.aorn.org/about/positions/pdf/SECTI-2esharpsafety.pdf](http://www.aorn.org/about/positions/pdf/SECTI-2esharpsafety.pdf)
7. Dauleh MI, Irving AD, Townell NH. Needle prick injury to the surgeon—do we need sharp needles? *J R Coll Surg Edinb*. 1994; 39(5):310–1.
8. Centers for Disease Control and Prevention (CDC). Evaluation of blunt suture needles in preventing percutaneous injuries among health-care workers during gynecologic surgical procedures—New York City, March 1993–June 1994. *MMWR Morb Mortal Wkly Rep*. 1997; 46(2):25–9. Available from <http://www.cdc.gov/mmwr/preview/mmwrhtml/00045660.htm>
9. CFR (Code of Federal regulations). Title 29 Part 1910, OSHA. Washington, DC: U.S. Government Printing Office, Office of the Federal Register.

To receive more information about occupational safety and health topics, contact NIOSH at

Telephone: **1-800-CDC-INFO** (1-800-232-4636)

TTY: 1-888-232-6348

E-mail: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)

or visit the NIOSH Web site at [www.cdc.gov/niosh](http://www.cdc.gov/niosh).

For a monthly update on news at NIOSH, subscribe to NIOSH *eNews* by visiting [www.cdc.gov/niosh/eNews](http://www.cdc.gov/niosh/eNews).

Mention of any company or product does not constitute endorsement by NIOSH. In addition, citations to Web sites external to NIOSH do not constitute NIOSH endorsement of the sponsoring organizations or their programs or products. Furthermore, NIOSH is not responsible for the content of these Web sites.

---

**This document is in the public domain and may be freely copied or reprinted.**

---

SAFER • HEALTHIER • PEOPLE™