

AORN Guideline for Sharps Safety
Evidence Table

REFERENCE #	CITATION	EVIDENCE TYPE	SAMPLE SIZE/ POPULATION	INTERVENTION(S)	CONTROL/ COMPARISON	OUTCOME MEASURE(S)	CONCLUSION(S)	CONSENSUS SCORE
1	Bouya S, Balouchi A, Rafiemanesh H, et al. Global Prevalence and Device Related Causes of Needle Stick Injuries among Health Care Workers: A Systematic Review and Meta-Analysis. <i>Ann Glob Health</i> . 2020;86(1):35. doi:10.5334/aogh.2698.	Systematic Review w/ Meta-Analysis	87 studies	n/a	n/a	n/a	The one-year global pooled prevalence of NSIs among HCWs was 44.5% (95% CI: 35.7, 53.2). The current high prevalence of NSIs among HCWs suggests need to improve occupational health services and needle-stick education programs globally.	IIIA
2	Abdelmalik MA, Alhowaymel FM, Fadlalmola H, et al. Global prevalence of needle stick injuries among nurses: A comprehensive systematic review and meta-analysis. <i>J Clin Nurs</i> . 2023. doi:10.1111/jocn.16661.	Systematic Review w/ Meta-Analysis	153 studies from 35 countries	n/a	n/a	n/a	The overall worldwide NSI prevalence in nurses pooled from the analysis was 40.97% (95% confidence interval [CI]: 31.29–50.63%, p=.00001). The results showed a high NSI prevalence among nurses worldwide. Developing countries had a significantly higher NSI prevalence than developed countries, especially low-middle SDI countries. The study findings suggest that continuous training programs should be implemented for nurses to enhance their knowledge, performance and attitude toward NSI prevention in clinical settings.	IIIA
3	Behzadmehr R, Balouchi A, Hesaraki M, et al. Prevalence and causes of unreported needle stick injuries among health care workers: a systematic review and meta-analysis. <i>Rev Environ Health</i> . 2021;38(1):111–123. doi:10.1515/revh-2021-0148.	Systematic Review w/ Meta-Analysis	41 studies	n/a	n/a	n/a	The global prevalence of non-reporting of NSIs among healthcare workers was found to be 59.9%. Underreporting was higher in developing countries and in those with lower economic levels. National surveillance systems, along with education about NSIs and the importance of reporting can improve NSI reporting.	IIIA
4	Kennedy EJ, Hendricks KJ, Casey M. Sharps Injury Rates Reported Among US Workers: National Electronic Injury Surveillance System–Occupational Supplement 2006 to 2020. <i>J Occup Environ Med</i> . 2023;65(6):495–501. doi:10.1097/JOM.0000000000002816.	Nonexperimental	67 US hospital emergency departments from the National Electronic Injury Surveillance System/US	n/a	n/a	sharps injury rates	Health care industry workers experienced sharps injury rates up to 16 times the rate of all US workers. Younger age (<=34 years) is associated with increased sharps injury risk. Sharps injury prevention focused on younger workers and health care industry workers should be developed.	IIIA
5	Panlilio AL, Orellein JG, Srivastava PU, et al. Estimate of the annual number of percutaneous injuries among hospital-based healthcare workers in the United States, 1997–1998. <i>Infection Control & Hospital Epidemiology</i> . 2004;25(7):556–562.	Expert Opinion	n/a	n/a	n/a	n/a	Provided an estimated number of percutaneous injuries sustained annually by health care workers.	VA
6	Stop Sticks Campaign: Sharps Injuries: Bloodborne Pathogens. Centers for Disease Control and Prevention (CDC): National Occupational Research Agenda (NORA) Web site. https://www.cdc.gov/nora/councils/hcsc/stopsticks/bloodborne.html . Updated 2019.	Expert Opinion	n/a	n/a	n/a	n/a	Provides information on bloodborne pathogens and workplace sharps injuries.	VB
7	Beltrami EM, Williams IT, Shapiro CN, Chamberland ME. Risk and management of blood-borne infections in health care workers. <i>Clin Microbiol Rev</i> . 2000;13(3):385–407. doi:10.1128/CMR.13.3.385.	Literature Review	n/a	n/a	n/a	n/a	A sustained commitment to the occupational health of HCWs will ensure maximum protection for HCWs and patients and the availability of optimal medical care for all who need it.	VB
8	Gobran, Samaa T; Ancuta, Petronela; Shoukry, Naglaa H. (2021). A Tale of Two Viruses: Immunological Insights Into HCV/HIV Coinfection. <i>Front.Immunol</i> , 12. https://doi.org/10.3389/fimmu.2021.726419 .	Literature Review	n/a	n/a	n/a	n/a	The immunopathology of HCV/HIV coinfection is more deleterious than each infection separately.	VA

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9	Moving the Sharps Safety in Healthcare Agenda Forward in the United States: 2020 Consensus Statement and Call to Action. International Safety Center (ISC); 2020.	Consensus	n/a	n/a	n/a	n/a	Healthcare organizations should collect and review surveillance data and support adherence to the requirements of the OSHA bloodborne pathogen standard.	IVB
10	Jagger J, Berguer R, Phillips EK, Parker G, Gomaa AE. Increase in sharps injuries in surgical settings versus nonsurgical settings after passage of national needlestick legislation. AORN J. 2011;93(3):322–330.	Nonexperimental	7186 sharps injuries to surgical personnel	n/a	n/a	type of injury and how the injury occurred	Surgical injuries continue to increase while injuries in other area decreased.	IIIB
11	EPINet Report for Needlestick and Sharp Object Injuries. International Safety Center; 2023.	Case Report	1,642 sharps injury reports/EPINet	n/a	n/a	details of injury	Needlestick and sharp object injuries continue to persist. The majority of reported injuries occurred in the operating room (42.8%)	VB
12	Trevino H,2nd, Romero Arenas MA. Systematic Review of Blood-Borne Pathogen Exposure Rates Among Medical Students. J Surg Res. 2020;255:66–70. doi:10.1016/j.jss.2020.05.032.	Systematic Review	171 studies	n/a	n/a	n/a	Approximately 30% of medical students report a blood borne pathogen exposure, with the majority from needlestick injuries. A focus on needlestick prevention education for medical students may reduce needlestick injuries.	IIIB
13	Yun J, Umamoto K, Wang W, Vyas D. National Survey of Sharps Injuries Incidence Amongst Healthcare Workers in the United States. Int J Gen Med. 2023;16:1193–1204. doi:10.2147/IJGM.S404418.	Nonexperimental	460 healthcare workers/national cross-sectional, United States	n/a	n/a	sharps injuries incidence and reporting	Healthcare workers in surgical fields are more likely to sustain sharps injuries. Medical students are less likely to report and nurses are most likely to report. Simplified reporting and education may improve reporting and healthcare worker safety.	IIIB
14	Snaveley JE, Service BC, Miller D, Langford JR, Koval KJ. Needlestick and sharps injuries in orthopedic surgery residents and fellows. Infection Control & Hospital Epidemiology. 2019;1-5. doi:10.1017/ice.2019.262	Nonexperimental	300 orthopedic surgery residents and fellows/national cross-sectional survey, United States	n/a	n/a	Incidence of intraoperative needlestick and sharps injuries (NSSIs), factors associated with NSSIs, reporting	Orthopedic surgery residents and fellows have a high rates of NSSIs (>90%) , with many injuries going unreported.	IIIB
15	Yang AD, Quinn CM, Hewitt DB, et al. National Evaluation of Needlestick Events and Reporting among Surgical Residents. J Am Coll Surg. 2019. doi:10.1016/j.jamcollsurg.2019.09.001.	Nonexperimental	7,395 surgical residents/national survey, United States	n/a	n/a	needlestick events and reporting	Needlestick injuries occurred frequently among surgical residents and many injuries went unreported due to reporting barriers. Training and accessibility is needed to overcome injury-reporting barriers.	IIIA
16	Sethi N, Evans D, Murray A. Needlestick Occurrences and Reporting Among Residents in the Operative Setting. J Surg Educ. 2020;77(6):1542–1551. doi:S1931-7204(20)30149-5 [pii].	Nonexperimental	138 residents/single institution, Illinois	n/a	n/a	Incidence and contributing factors of needlestick injuries in residents, along with barriers to reporting.	Many residents sustain sharp-related injuries when in the operating room, with about a quarter of the injuries going unreported. Barriers of taking too much time was cited as the most common reason for not reporting.	IIIB
17	Ahadizadeh EN, Quintanilla-Dieck L, Pfeifer H, Wax MK. Needlestick Injury in Otolaryngology-Head and Neck Surgery Resident Programs. Laryngoscope. 2021;131(4):E1076–E1080. doi:10.1002/lary.29234.	Nonexperimental	314 otolaryngology residents/Otolaryngology residency programs, North America	n/a	n/a	needlestick injuries	Occupational exposure is high in healthcare and particularly high in surgical trainees. The majority of otolaryngology trainees undergo a needlestick injury in their junior years. There continues to be underreporting of these injuries by residents, who report that the process is too time-consuming. Most residents do not have an accurate understanding of their actual risk of acquiring a blood-borne disease. These findings emphasize the need for education regarding risks and development of strategies to encourage reporting of injuries.	IIIB
18	Ugonabo N, Shah P, Adotama P, Zampella JG. Needlestick and Sharps Injuries Among Resident Physicians. JAMA Surg. 2021;156(1):96–97. doi:10.1001/jamasurg.2020.4112.	Nonexperimental	5395 injury reports (2012-2019)/single academic institution, New York	n/a	n/a	needlestick and sharps injuries	The highest risk for sharps injuries was in the first 3 months of the academic year among residents. Training on sharps injury prevention should be included during onboarding education.	IIIB

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19	Bevan V, Blake P, Radwan RN, Azzopardi E. Sharps and needlestick injuries within the operating room: Risk prone procedures and prevalence meta-analysis. J Perioper Pract. 2023;33(7-8):200–210. doi:10.1177/17504589221103810.	Systematic Review w/ Meta-Analysis	16 studies (2015-2020)	n/a	n/a	n/a	The analysis revealed that 22% of sharps and needlestick injuries that occur within the operating room involved handling or receiving instruments. Adhering to strict safety protocols could prevent sharps injuries and reduce costs.	IIIB
20	29 CFR 1910.1030: Bloodborne pathogens. 7-1-21 ed. Occupational Safety and Health Administration (OSHA); 2022.	Regulatory	n/a	n/a	n/a	n/a	Provides regulatory requirements for the bloodborne pathogens standard.	n/a
21	Ballenger C. Needlestick safety and prevention act. 2000;5178(106). https://www.congress.gov/106/statute/STATUTE-114/STATUTE-114-Pg1901.pdf	Regulatory	n/a	n/a	n/a	n/a	Provides regulatory rule to update the bloodborne pathogens standard.	n/a
22	Bloodborne Pathogens: Standards. https://www.osha.gov/bloodborne-pathogens/standards	Regulatory	n/a	n/a	n/a	n/a	Provides overview of bloodborne pathogens standard and OSHA-approved state plans.	n/a
23	Hierarchy of Controls. CDC/NIOSH Web site. https://www.cdc.gov/niosh/hierarchy-of-controls/about/?CDC_AAref_Val=https://www.cdc.gov/niosh/topics/hierarchy/default.html . Updated 2024.	Expert Opinion	n/a	n/a	n/a	n/a	Provides information about controlling exposure to hazards in the workplace and protection of workers.	VA
24	Wood A. Guideline for Transmission-Based Precautions. Wood A, ed. e-Subscription ed. AORN, Inc.; 2019.	Guideline	n/a	n/a	n/a	n/a	Provides evidence-based recommendations about transmission-based precautions for perioperative teams.	IVA
25	Workbook for Designing, Implementing, and Evaluating a Sharps Injury Prevention Program. http://www.cdc.gov/sharpsafety/ ed. Centers for Disease Control and Prevention; 2008.	Expert Opinion	n/a	n/a	n/a	n/a	Provides information about designing, implementing, and evaluating a sharps injury prevention program.	VA
26	Kuhar DT, Carrico RM, Cox K, et al. Infection control in healthcare personnel: Infrastructure and routine practices for occupational infection prevention and control services. Centers for Disease Control and Prevention (CDC); 2019	Consensus	n/a	n/a	n/a	n/a	Provides consensus statement occupational infection prevention and control services on infection control for healthcare personnel.	IVB
27	Stop Sticks Campaign: Safety Culture. What Can You Do to Reduce Sharps Injuries? Centers for Disease Control and Prevention (CDC): National Occupational Research Agenda (NORA) Web site. https://www.cdc.gov/nora/councils/hcsa/stopsticks/reduceinjuries.html . Updated 2010.	Expert Opinion	n/a	n/a	n/a	n/a	Provides information about reducing sharps injuries.	VB
28	Bahat H, Hasidov-Gafni A, Youngster I, Goldman M, Levtzion-Korach O. The prevalence and underreporting of needlestick injuries among hospital workers: a cross-sectional study. Int J Qual Health Care. 2021;33(1):mzab009. doi: 10.1093/intqhc/mzab009. doi:mzab009 [pii].	Nonexperimental	844 hospital workers/single institution, Israel	n/a	n/a	needlestick and sharps injuries	Underreporting and needlestick and sharps injuries were common among all hospital workers. Injury prevention measures and methods to improve reporting should be implemented.	IIIB
29	Gurria JP, Nolan H, Polites S, et al. Don't Get Stuck: A Quality Improvement Project to Reduce Perioperative Blood-Borne Pathogen Exposure. Jt Comm J Qual Patient Saf. 2019;45(5):329–336. doi:10.1016/j.jcjq.2018.12.002.	Organizational Experience	Main Campus and Satellite Surgery Center (34 ORs total)/OH	bundled blood borne pathogen exposure (BBPE) prevention initiative: double gloving, engineered-sharps injury prevention devices, safe zone, clear communication	n/a	BBPE events and number of days between events	A bundled BBPE prevention initiative led to a decrease in BBPE events and an increase in days between events.	VB

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30	Shenoy ES, Weber DJ. Occupational Health Update: Evaluation and Management of Exposures and Postexposure Prophylaxis. <i>Infect Dis Clin North Am.</i> 2021;35(3):735–754. doi:10.1016/j.idc.2021.04.009.	Expert Opinion	n/a	n/a	n/a	n/a	Occupational health and safety professionals need to identify and manage postexposure to bloodborne pathogens.	VA
31	Stop Sticks Campaign: What to do following a sharps injury. Centers for Disease Control and Prevention (CDC): National Occupational Research Agenda (NORA) Web site. https://www.cdc.gov/nora/councils/hcsa/stopsticks/whattodo.html . Updated 2019. Accessed Dec 1, 2023.	Expert Opinion	n/a	n/a	n/a	n/a	Provides information on actions to take following a sharps injury.	VB
32	Sharps Disposal Containers in Health Care Facilities. U.S. Food & Drug Administration (FDA) Web site. https://www.fda.gov/medical-devices/safely-using-sharps-needles-and-syringes-home-work-and-travel/sharps-disposal-containers-health-care-facilities . Updated 2021.	Regulatory	n/a	n/a	n/a	n/a	Sharps disposal containers in health care facilities are regulated by the FDA as Class II devices.	n/a
33	CPL 02-02-069 Enforcement Procedures for the Occupational Exposure to Bloodborne Pathogens. 2001:85.	Regulatory	n/a	n/a	n/a	n/a	Provides enforcement procedures for the bloodborne pathogens standard	n/a
34	NIOSH alert: preventing needlestick injuries in health care settings. NIOSH publication no. 2000-108. National Institute for Occupational Safety and Health (NIOSH); 1999.	Expert Opinion	n/a	n/a	n/a	n/a	The document provides information about the risk of needlestick injury and the transmission of BBP to health care workers.	VA
35	Kyle E, Spruce L. Guideline for Medical Device and Product Evaluation. Kyle E, ed. e-Subscription ed. Association of periOperative Registered Nurses (AORN); 2024.	Guideline	n/a	n/a	n/a	n/a	This document provides guidance to perioperative team members for developing and implementing a process for evaluating US Food and Drug Administration-cleared medical devices and products for use in the perioperative setting.	IVA
36	Tosini W, Ciotti C, Goyer F, et al. Needlestick injury rates according to different types of safety-engineered devices: results of a French multicenter study. <i>Infect Control Hosp Epidemiol.</i> 2010;31(4):402–407. doi:10.1086/651301.	Nonexperimental	453 safety engineered device-related needlestick injuries	n/a	n/a	Safety engineered device efficacy	Passive safety engineered devices are the most effective for preventing needlestick injuries.	IIIB
37	Dulon M, Stranzinger J, Wendeler D, Nienhaus A. Causes of Needlestick and Sharps Injuries When Using Devices with and without Safety Features. <i>Int J Environ Res Public Health.</i> 2020;17(23):8721. doi: 10.3390/ijerph17238721. doi:10.3390/ijerph17238721.	Nonexperimental	835 needlestick reports	n/a	n/a	causes of needlestick and sharps injuries related to safety-engineered devices	Sharps injuries occur, even when using safety engineered devices. Reasons for sharps injuries are multifaceted including high workload, stress, lack of attention, and organizational problems (eg, inavailability of sharps disposal containers, lack of training). Employers need to provide access to safe sharps disposal and education.	IIIB
38	Reddy VK, Lavoie MC, Verbeek JH, Pahwa M. Devices for preventing percutaneous exposure injuries caused by needles in healthcare personnel. <i>Cochrane Database Syst Rev.</i> 2017;2017(11):no pagination. Accessed 20171212. doi:10.1002/14651858.CD009740.pub3.	Systematic Review	24 total studies	devices with safety features	devices without safety features	Percutaneous injuries	The evidence on safety devices preventing needlestick injuries is of low quality and inconsistent. More high-quality studies are needed to determine effect of using devices with safety features on preventing percutaneous injuries.	IIA
39	Fairfax, R. Safer medical devices must be selected based on employee feedback and device effectiveness, not Group Purchasing Organizations.	Expert Opinion	n/a	n/a	n/a	n/a	An interpretation letter that outlines the requirements to evaluate a wide range of devices, and that the selection can not be based on price alone.	VA

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40	Ly J, Mittal A, Windsor J. Systematic review and meta-analysis of cutting diathermy versus scalpel for skin incision. Br J Surg. 2012;99(5):613–620. doi:10.1002/bjs.8708.	Systematic Review w/ Meta-Analysis	n/a	n/a	n/a	n/a	Skin incisions made by cutting diathermy are quicker and associated with less blood loss than those made by scalpel, and there are no differences in the rate of wound complications or postoperative pain.	IA
41	Burlingame BL, Kyle E. Guideline for Electrosurgical Safety. Wood A, Kyle E, eds. e-Subscription ed. Association of periOperative Registered Nurses (AORN); 2024.	Guideline	n/a	n/a	n/a	n/a	Provides evidence-based recommendations about electrosurgical safety for perioperative teams.	IVA
42	Jones E. Guideline for Surgical Smoke Safety. Kyle E, ed. AORN; 2024	Guideline	n/a	n/a	n/a	n/a	Provides evidence-based recommendations about surgical smoke safety for perioperative teams.	IVA
43	Dumville JC, Coulthard P, Worthington HV, et al. Tissue adhesives for closure of surgical incisions. Cochrane Database Syst Rev. 2014(11):CD004287. doi:10.1002/14651858.CD004287.pub4.	Systematic Review w/ Meta-Analysis	33 total studies	n/a	n/a	n/a	Sutures are significantly better than tissue adhesives for minimizing dehiscence. In some cases tissue adhesives may be quicker to apply than sutures. Surgeons may consider the use of tissue adhesives as an alternative to other methods of surgical site closure.	IB
44	Pandey ND, Singh AK, Choudhary AK, Jina G, Thakare A, Supe NB. Comparative evaluation of efficacy of skin staples and conventional sutures in closure of extraoral surgical wounds in neck region: A double-blind clinical study. Natl J Maxillofac Surg. 2022;13(3):449-456. doi:10.4103/njms.njms_305_21	Quasi-experimental	60 patients	skin staples	conventional sutures	rate of wound closure, postop pain, pain of removing staples and/or suture, rate of removing staples and/or suture, scarring	The method of using skin staples for the closure of surgical wounds performed better than conventional suture in rate of closure and scarring.	IIB
45	Revised Statement on Sharps Safety. American College of Surgeons (ACS) Web site. https://www.facs.org/about-acs/statements/international-safety-center-releases-consensus-sharps-safety/ . Updated 2016.	Consensus	n/a	n/a	n/a	n/a	Provides consensus statement on sharps safety.	IVB
46	Hoffmann C, Buchholz L, Schnitzler P. Reduction of needlestick injuries in healthcare personnel at a university hospital using safety devices. J OCCUP MED TOXICOL. 2013;8(1):20–24. http://search.ebscohost.com/login.aspx?direct=true&db=cem&AN=104208890&site=ehost-live&scope=site . doi:10.1186/1745-6673-8-20.	Quasi-experimental	N= 13, 176 (2007-6493 full time health care personnel; 2009-6683 full time health care personnel)	Introduction of safety devices (eg, stapling devices, safety syringes, needles and IV catheters)	Number of needlestick injuries before introduction of safety devices compared to after the introduction	frequency and cause of needlestick injuries	The application of safety devices led to a reduction of needlestick injuries and significantly reduced the risk of bloodborne infections.	IIB
47	Parantainen (Saarto) A, Verbeek JH, Lavoie MC, Pahwa M. Blunt versus sharp suture needles for preventing percutaneous exposure incidents in surgical staff. Cochrane Database Syst Rev. 2011;11:CD009170. doi:10.1002/14651858.CD009170.pub2.	Systematic Review w/ Meta-Analysis	10 RCTs	blunt suture needles	sharp suture needles	needlestick injuries	There is high quality evidence that the use of blunt needles reduces the risk of exposure to blood and body fluids for surgeons and their assistants over a range of operations It is unlikely that future research will change this conclusion.	IA
48	Beswick A, Robinson E, Evans G, Codling A. An evaluation of the efficacy of safer sharps devices: Systematic review. Prepared by the Health and Safety Laboratory for the Health and Safety Executive 2012. . Vol RR914. HSE: Health and Safety Executive [Books]; 2012.	Systematic Review	n/a	n/a	n/a	n/a	The use of safer sharps devices is considered to improve safety and reduce the incidence of needlestick injuries. Appropriate education should accompany the introduction of the safer sharps devices. Health care workers should be involved in the evaluation of products before safer sharps devices are introduced.	IIIA
49	Kaur M, Mohr S, Andersen G, Kuhnigk O. Needlestick and sharps injuries at a German university hospital: epidemiology, causes and preventive potential - a descriptive analysis. Int J Occup Med Environ Health. 2022;35(4):497–507. doi:10.13075/ijomh.1896.01854	Nonexperimental	567 needlestick and sharps injury reports/single center, Germany	n/a	n/a	factors associated with preventable injuries and use of PPE	Majority of sharps injuries occurred in the operating theater. Training and education should include needlestick and sharps injury risk, appropriate use of safety-engineered devices, PPE, and safe sharps container use.	IIB

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50	Grimmond T, Good L. EXPO-S.T.O.P. 2016 and 2017 blood exposure surveys: An alarming rise. <i>Am J Infect Control.</i> 2019;47(12):1465–1470. doi:10.1016/j.ajic.2019.07.004.	Nonexperimental	170 hospitals (2016) and 224 hospitals (2017)/United States	n/a	n/a	sharps injuries and mucocutaneous exposures	Sharps injury rates have continued to rise and signals a need for sharps injury reductions strategies including leadership support, safety-engineered devices, and education. Additional research is needed to understand mechanism of injury and safety-engineered device effectiveness.	IIIB
51	Ream PSF, Tipple AFV, Salgado TA, et al. Hospital housekeepers: Victims of ineffective hospital waste management. <i>Archiv Environ Occup Health.</i> 2016;71(5):273–280. doi:10.1080/19338244.2015.1089827.	Nonexperimental	938 hospital housekeepers reporting 996 injuries	n/a	n/a	Frequency and profile of exposure incidents, role of sharps waste	Most incidents among hospital housekeepers were percutaneous with hypodermic needles and involved blood from an unknown source. Improper sharps disposal by the patient care staff was a contributing factor in the majority of injuries.	IIIC
52	Tsuchiya A, Wada K, Morikane K, et al. Characteristics of needlestick and sharps injuries of the hands in the operating room among orthopedic surgeons in Japan. <i>Ind Health.</i> 2023;61(2):151–157. doi:10.2486/indhealth.2021-0194.	Nonexperimental	666 needlestick and sharps injuries in orthopedic surgeons/Japan sharps injury registry	n/a	n/a	causes of needlestick and sharps injuries, location of sharps injuries	Suture needles were involved in the majority of injuries in the orthopedic surgeons. Regardless of years of experience, all orthopedic surgeons should take safety measures to prevent sharps injury.	IIIB
53	Degirolo KM, Courtemanche DJ, Hill WD, Kennedy A, Skarsgard ED. Use of safety scalpels and other safety practices to reduce sharps injury in the operating room: What is the evidence? <i>Can J Surg.</i> 2013;56(4):263–269.	Systematic Review	n/a	n/a	n/a	n/a	There is insufficient evidence to support the regulated use of safety scalpels. Injury-reduction strategies should emphasize proven methods including double-gloving, blunt suture needles and use of hands-free sharps transfer.	IIIA
54	Evaluation Background: Safety Scalpels. Emergency Care Research Institute (ECRI) Web site. https://www.ecri.org/components/HDJournal/Pages/Evaluation-Background-Safety-Scalpels.aspx . Updated 2021.	Expert Opinion	n/a	n/a	n/a	n/a	Provides expert opinion on safety scalpel evaluation	VB
55	Azar-Cavanagh M, Burdt P, Green-McKenzie J. Effect of the introduction of an engineered sharps injury prevention device on the percutaneous injury rate in healthcare workers. <i>Infect Control Hosp Epidemiol.</i> 2007;28(2):165-170. doi: 10.1086/511699.	Quasi-experimental	11,161 health care workers pre-intervention; 12,851 health care workers post-intervention	Safer needle devices (eg, IV catheter, insulin needles) & training on the device use	Percutaneous injuries before and after the intervention	Percutaneous injuries	Use of safety engineered devices lead to a reduction in percutaneous injuries in health care workers decreasing the risk of exposure to bloodborne pathogens.	IIA
56	Evaluation Background: Safety Syringes and Needles. Emergency Care Research Institute (ECRI) Web site. https://www.ecri.org/components/HDJournal/Pages/Evaluation-Background-Safety-Syringes-and-Needles.aspx . Updated 2022.	Expert Opinion	n/a	n/a	n/a	n/a	Provides expert opinion on safety syringe and needle evaluation	VB
57	FDA, NIOSH and OSHA Joint Safety Communication: Blunt-Tip Surgical Suture Needles Reduce Needlestick Injuries and the Risk of Subsequent Bloodborne Pathogen Transmission to Surgical Personnel. 2012.	Expert Opinion	n/a	n/a	n/a	n/a	The FDA, OSHA, and NIOSH strongly encourage health care providers in surgical settings to use blunt-tip suture needles to suture muscle and fascia when clinically appropriate to reduce the risk of needlestick injury and BBP transmission to surgical personnel.	VA
58	Stringer B, Infante-Rivard C, Hanley JA. Effectiveness of the hands-free technique in reducing operating theatre injuries. <i>Occupational & Environmental Medicine.</i> 2002;59(10):703–707.	Nonexperimental	3765 surgeries	n/a	n/a	relative rate of percutaneous injuries	The use of the hands-free technique was effective in surgeries with blood loss over 100ml.	IIIB
59	Stringer B, Haines T, Goldsmith CH, et al. Hands-Free Technique in the Operating Room: Reduction in Body Fluid Exposure and the Value of a Training Video. <i>Public Health Rep.</i> 2009;124(4_suppl1):169–179.	Quasi-experimental	10596 surgeries	Training video on the hands-free technique	Surgeries before the training video compared to surgeries after the video using the hands-free technique	Number of sharps injuries, contaminations, and glove tears	The use of the hands-free technique and the hands-free video were both effective in reducing injuries, contaminations, and glove tears.	IIIB

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60	Linzer PB, Clarke SP. An Integrative Review of the Hands-Free Technique in the OR. <i>AORN J.</i> 2017;106(3):211–218. doi:10.1016/j.aorn.2017.07.004.	Systematic Review	n/a	n/a	n/a	n/a	Hands free technique is a safe and inexpensive, evidence-based technique that has not been achieved in most ORs.	IIIA
61	Information Statement: Preventing the Transmission of Bloodborne Pathogens. American Academy of Orthopaedic Surgeons; 2012.	Expert Opinion	n/a	n/a	n/a	n/a	The statement provides an overview of strategies to reduce the risk of transmitting BBPs in orthopedic settings.	VA
62	AST Guidelines for Best Practices for Sharps Safety and Use of the Neutral Zone. Association of Surgical Technologists; 2017.	Guideline	n/a	n/a	n/a	n/a	The guideline provides guidance for the safe handling of sharps in the OR, including implementation of a hands free technique to prevent sharps injuries and reduce blood borne pathogen exposure of health care workers and patients.	IVB
63	Dagi TF, Berguer R, Moore S, Reines HD. Preventable errors in the operating room—part 2: retained foreign objects, sharps injuries, and wrong site surgery. <i>Curr Probl Surg.</i> 2007;44(6):352–381. doi:10.1067/j.cpsurg.2007.04.002.	Expert Opinion	n/a	n/a	n/a	n/a	Strategies and work practices to reduce sharps injuries in the OR.	VA
64	Kane P, Marley R, Daney B, Gabra JN, Thompson TR. Safety and Communication in the Operating Room: A Safety Questionnaire After the Implementation of a Blood-Borne Pathogen Exposure Checkpoint in the Surgical Safety Checklist Preprocedure Time-Out. <i>Jt Comm J Qual Patient Saf.</i> 2019;45(10):662–668. http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=ohst&NEWS=N&AN=31451354 . doi:10.1016/j.jcjq.2019.07.004.	Nonexperimental	90 operating room staff members (physician, surgical tech, surgical assistant, nursing)	n/a	n/a	BBPE events, 'safety perception'	Operating room staff members reported a positive safety perception and decreased BBPE after BBPE education and an enhanced timeout with a BBPE checkpoint.	IIIC
65	Spruce L, Fearon M. Guideline for Team Communication. Kyle E, ed. e-Subscription ed. Association of periOperative Registered Nurses (AORN); 2024.	Guideline	n/a	n/a	n/a	n/a	Provides evidence-based recommendations about team communication in the perioperative environment.	IVA
66	Folin A, Nyberg B, Nordstrom G. Reducing blood exposures during orthopedic surgical procedures. <i>AORN J.</i> 2000;71(3):573–576.	Quasi-experimental	740 orthopedic procedures with 2126 staff members	Neutral zone and No-touch technique	injuries before and after introduction of the neutral zone and no-touch technique	Number of injuries and contaminations	Changing surgical working methods decreased the number of incidents.	IIC
67	Rizk C, Monroe H, Orengo I, Rosen T. Needlestick and sharps injuries in dermatologic surgery: A review of preventative techniques and post-exposure protocols. <i>J Clin Aesthetic Dermatol.</i> 2016;9(10):41–49.	Literature Review	n/a	n/a	n/a	n/a	The elimination of needlestick injuries (NSI) begins with the documentation of how and why NSIs are occurring	VA
68	Zhang Z, Gao X, Ruan X, Zheng B. Effectiveness of double-gloving method on prevention of surgical glove perforations and blood contamination: A systematic review and meta-analysis. <i>J Adv Nurs.</i> 2021;77(9):3630–3643. https://doi.org/10.1111/jan.14824 . doi:10.1111/jan.14824.	Systematic Review w/ Meta-Analysis	7 RCTs	double gloving	single gloving	surgical glove perforations, blood contamination	Double gloving could effectively reduce the rate of glove perforation compared with single gloving.	IA
69	Williams GJ, Nicolaou M, Athanasiou T, Coleman D. Suture needle handling in the operating theatre; what is the safest method? A survey of surgical nursing opinion. <i>Injury Prevention.</i> 2016;22(2):135–139. doi:10.1136/injuryprev-2015-041607.	Qualitative	107 scrub nurses	n/a	n/a	Preferred method of suture needle handling	Protected needle transfer seems safer than the unprotected method. Needle-handling guidelines and appropriate training are required to help prevent the occurrence of NSIs in the OR.	IIIC

AORN Guideline for Sharps Safety
Evidence Table

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70	Siegel JD, MD, Rhinehart, Emily, RN, MPH, CIC, Jackson M, PhD, Chiarello, Linda, RN, MS. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Health Care Settings. Am J Infect Control. 2007;35(10):S65–S164. https://www.clinicalkey.es/playcontent/1-s2.0-S0196655307007407 . doi:10.1016/j.ajic.2007.10.007.	Guideline	n/a	n/a	n/a	n/a	This document is intended for use by infection control staff, health care epidemiologists, health care administrators, nurses, other health care providers, and persons responsible for developing, implementing, and evaluating infection control programs for health care settings across the continuum of care.	IVA
71	Statement on Recommendations for Safe Injection Practices. American Society of Anesthesiologists (ASA) Web site. https://www.asahq.org/standards-and-practice-parameters/statement-on-recommendations-for-safe-injection-practices . Updated 2022.	Consensus	n/a	n/a	n/a	n/a	Provides recommendations for anesthesia providers on safe injection practices to protect patients and healthcare professionals.	IVB
72	Dolan, Susan A Arias, Kathleen Meehan Felizardo, Gwen Barnes, Sue Kraska, Susan Patrick, Marcia Bumsted, Amelia. APIC position paper: Safe injection, infusion, and medication vial practices in health care. Am J Infect Control. 2016;44(7):750–757. https://www.apic.org/Resource_/TinyMceFileManager/Position_Statements/2016APICSIPPositionPaper.pdf . doi:10.1016/j.ajic.2016.02.033.	Position Statement	n/a	n/a	n/a	n/a	Programs for safe injection education and competency verification for health care providers who prepare, handle, and administer injectable and parenteral medications should be implemented in all health care settings.	IVB
73	Safe Injection Guidelines for Needle and Syringe Use. American Association of Nurse Anesthesiology (AANA); 2022.	Guideline	n/a	n/a	n/a	n/a	Provides recommendations for anesthesia providers on safe injection practices to protect patients and healthcare professionals.	IVB
74	DiTullio BL. Suture Needle Injuries During Wound Closure: Examining Sources of Distraction in the OR. AORN J. 2021;113(6):586–594. doi:10.1002/aorn.13400.	Expert Opinion	n/a	n/a	n/a	n/a	Human factors plays a role in sharps safety to minimize injury, especially during wound closure. Surgical team members should minimize distractions and interruptions during wound closure to improve situational awareness.	VB
75	Grimmond T, Naisoro W. Sharps injury reduction: a six-year, three-phase study comparing use of a small patient-room sharps disposal container with a larger engineered container. J infect prev. 2014;15(5):170–174.	Nonexperimental	350-bed hospital	n/a	n/a	Number of sharps injuries sustained while depositing sharps into or during the handling of the sharps container.	The study validates the necessity of the international recommendations that sharps be placed immediately after use into a well-engineered, safe sharps container placed close to the point of sharps generation.	IIIA
76	Stop Sticks Campaign: Sharps Disposal. Centers for Disease Control and Prevention (CDC): National Occupational Research Agenda (NORA) Web site. https://www.cdc.gov/nora/councils/hcsa/stopsticks/sharpsdisposal.html . Updated 2019.	Expert Opinion	n/a	n/a	n/a	n/a	Provides information on sharps disposal.	VB
77	Selecting, evaluating, and using sharps disposal containers. NIOSH publication no. 97-111. NIOSH; 1998.	Expert Opinion	n/a	n/a	n/a	n/a	Provides a comprehensive framework for selecting, evaluating, and using sharps disposal containers.	VA
78	Grimmond T, Bylund S, Anglea C, et al. Sharps injury reduction using a sharps container with enhanced engineering: A 28 hospital nonrandomized intervention and cohort study. Am J Infect Control. 2010;38(10):799–805. doi:10.1016/j.ajic.2010.06.010.	Quasi-experimental	28 hospitals/St. Louis, MO	Use of a sharps container with enhanced engineering features	no intervention	Number of sharps injuries	Enhanced engineering designs can significantly reduce container-associated sharps injuries.	IIB

AORN Guideline for Sharps Safety
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79	AORN Position Statement on Environmental Responsibility. AORN, Inc.; 2020.	Position Statement	n/a	n/a	n/a	n/a	Provides AORN position about environmental responsibility for perioperative professionals.	VA
80	McPherson B, Sharip M, Grimmond T. The impact on life cycle carbon footprint of converting from disposable to reusable sharps containers in a large US hospital geographically distant from manufacturing and processing facilities. PeerJ. (7:e6204). doi:http://doi.org/10.7717/peerj.6204.	Quasi-experimental	1100-bed, 5-hospital system/California	reusable sharps containers	disposable sharps containers	carbon footprint	Large transport distances between polymer manufacturer, container manufacturer, user and processing facilities, can significantly impact the carbon footprint of sharps containment systems. However, even with large transport distances, a large university health system significantly reduced the carbon footprint of their sharps waste stream by converting from DSC to RSC.	IIIB
81	Cahn J. Guideline for Prevention of Unintentionally Retained Surgical Items. Kyle E, ed. Association of periOperative Registered Nurses (AORN); 2024.	Guideline	n/a	n/a	n/a	n/a	The guideline provides guidance to perioperative registered nurses (RNs) in preventing retained surgical items (RSIs) in patients undergoing surgical and other invasive procedures.	IVA
82	Kyle E, Wood A. Guideline for Care and Cleaning of Surgical Instruments. Kyle E, ed. Association of periOperative Registered Nurses (AORN); 2024.	Guideline	n/a	n/a	n/a	n/a	This document provides guidance for cleaning surgical instruments, including point-of-use cleaning, selecting cleaning chemicals, and determining water quality. Guidance is also provided for decontaminating, transporting, inspecting, and care of surgical instruments.	IVA
83	Mischke C, Verbeek JH, Saarto A, Lavoie M, Pahwa M, Ijaz S. Gloves, extra gloves or special types of gloves for preventing percutaneous exposure injuries in healthcare personnel. Cochrane Database of Systematic Reviews. 2014;3(3).	Systematic Review	34 RCTs	double gloving	single gloving	Percutaneous injuries	Surgeons and surgical staff can reduce their risk of contracting a serious viral infection by wearing two pairs of gloves instead of one pair of gloves.	IA
84	Tanner J, Parkinson H. Double gloving to reduce surgical cross-infection (Review). Cochrane Database Syst Rev. 2009;3:CD003087. doi:10.1002/14651858.CD003087.pub2.	Systematic Review	31 RCTs	double gloving	single gloving	glove perforation	The addition of a second pair of surgical gloves reduces perforations to the innermost gloves. Perforation indicator systems detect more innermost glove perforations.	IA
85	Osodin TE, Akadiri OA, Akinmoladun VI, Fasola AO, Olaitan AA. Surgical Glove Perforation and Percutaneous Injury during Intermaxillary Fixation with 0.5 Mm Stainless Steel Wire. West Afr J Med. 2022;39(8):823-828.	RCT	564 surgical gloves used during intermaxillary fixation/two centers, Nigeria	double gloving	single gloving	glove perforation and percutaneous injury rates	Although glove perforation was more likely with double gloving, percutaneous injury occurred more frequently with single gloving. Double gloving should be practiced and gloves should be changed for long procedures.	IB
86	Cahn JA. Guideline for Sterile Technique. Kyle E, ed. e-Subscription ed. Association of periOperative Registered Nurses (AORN); 2024.	Guideline	n/a	n/a	n/a	n/a	This document provides guidance on the principles and processes of sterile technique. Sterile technique involves the use of specific actions and activities to maintain sterility and prevent contamination of the sterile field and sterile items during operative and other invasive procedures.	IVA
87	Stop Sticks Campaign: Completing the Injury Report. Centers for Disease Control and Prevention (CDC): National Occupational Research Agenda (NORA) Web site. https://www.cdc.gov/nora/councils/hcsa/stopsticks/injuryreport.html. Updated 2019.	Expert Opinion	n/a	n/a	n/a	n/a	Provides information about completing an injury report after a sharps injury.	VB
88	Smith JL, Banerjee R, Linkin DR, Schwab EP, Saberi P, Lanzi M. 'Stat' workflow modifications to expedite care after needlestick injuries. Occup Med (Oxf). 2021;71(1):20-24. doi:10.1093/occmed/kqaa209.	Nonexperimental	251 reported needlestick injuries/single VA institution, PA	n/a	n/a	source patient HIV order-result interval times and PEP dispensing frequencies	A 'stat' workflow that prioritizes source-patient HIV testing after a needlestick injury decreased the order-result interval times and decreased HIV PEP dispensing rates.	IIIB

AORN Guideline for Sharps Safety
Evidence Table

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89	Green B, Griffiths EC. Psychiatric consequences of needlestick injury. <i>Occupational Medicine (Oxford)</i> . 2013;63(3):183–188. http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=ovftn&AN=00001774-201305000-00007 . doi:10.1093/occmed/kqt006.	Nonexperimental	17 needlestick injury (NSI) cases and 125 control cases of psychiatric trauma without a NSI	n/a	n/a	Beck depression Inventory score	Enduring psychiatric illness can result from a needlestick injury with a severity similar to other traumatic events.	IIIB
90	Kuhar DT, Henderson DK, Struble KA, et al. Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HIV and Recommendations for Postexposure Prophylaxis. 2018. https://stacks.cdc.gov/view/cdc/20711 .	Guideline	n/a	n/a	n/a	n/a	Provides guidance for occupational infection prevention and control practices.	IVB
91	29 CFR 1904: Recording and Reporting Occupational Injuries and Illnesses. 7-1-23 Edition ed. Occupational Safety and Health Administration (OSHA); 2023.	Regulatory	n/a	n/a	n/a	n/a	Regulatory standard regarding recording and reporting of occupational injuries and illnesses.	n/a
92	Cheetham S, Ngo HT, Liira J, Liira H. Education and training for preventing sharps injuries and splash exposures in healthcare workers. <i>Cochrane Database Syst Rev</i> . 2021;4:CD012060. doi:10.1002/14651858.CD012060.pub2.	Systematic Review	6 studies	Education and training	n/a	rate of sharps injuries	Education and training interventions for HCWs may lead to small reductions in the rate of sharps injuries. Education may create short-term improvements in knowledge and behaviors related to sharps injuries.	IIIC
93	Tarigan LH, Cifuentes M, Quinn M, Kriebel D. Prevention of needle-stick injuries in healthcare facilities: a meta-analysis. <i>Infect Control Hosp Epidemiol</i> . 2015;36(7):823–829. http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=med8&AN=25765502 . doi:10.1017/ice.2015.50.	Systematic Review w/ Meta-Analysis	17 studies	n/a	n/a	n/a	Training combined with safety engineered devices can substantially reduce the risk of a needlestick injury.	IIA
94	Xiong PMSN, Zhang J, Wang X, Wu TLBSS, Hall BJ. Effects of a mixed media education intervention program on increasing knowledge, attitude, and compliance with standard precautions among nursing students: A randomized controlled trial. <i>AJIC: American Journal of Infection Control</i> . 2017;45(4):389–395. http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=yrovfts&AN=00000545-201704000-00011 . doi:10.1016/j.ajic.2016.11.006.	RCT	84 nursing students	Mixed media education sessions consisting of lectures, videos, role-playing, and feedback.	Control group learning material through self-directed readings, and pre- and post-assessments	Performance on the Knowledge with Standard Precautions Questionnaire, Attitude with Standard Precautions Scale, and Compliance with Standard Precautions Scale	A mixed media education intervention is effective in improving knowledge, attitude, and compliance with standard precautions.	IB
95	Hassan ZM. Improving knowledge and compliance with infection control Standard Precautions among undergraduate nursing students in Jordan. <i>AJIC: American Journal of Infection Control</i> . 2018;46(3):297–302. doi:10.1016/j.ajic.2017.09.010.	Quasi-experimental	256 undergraduate nursing students	Online education modules in infection control and standard precautions.	Pre-test/post-test design	Knowledge and compliance with standard precautions practices	Online instruction offers a consistent and effective method to include standard precautions in the nursing curriculum	IIIB
96	Top 10 Health Technology Hazards for 2023: Expert Insights from ECRI's Device Evaluation Program. ECRI Institute; 2023. https://www.ecri.org/components/HDJournal/Documents/ECRI_2023_Top_10_Hazards_Full_Report.pdf .	Expert Opinion	n/a	n/a	n/a	n/a	Provides information about health technology hazards.	VB
97	21 CFR 803: Medical Device Reporting. 4–1–23 Edition ed. U.S. Government Publishing Office (GPO); 2023.	Regulatory	n/a	n/a	n/a	n/a	Regulatory standard regarding medical device reporting.	n/a

AORN Guideline for Sharps Safety
Evidence Table

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98	MAUDE: Manufacturer and User Facility Device Experience. https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfMAUDE/search.CFM . Updated 2024.	Regulatory	n/a	n/a	n/a	n/a	FDA database for reporting manufacturer and user facility device experience.	n/a
99	Medical Device Reporting (MDR): How to Report Medical Device Problems. https://www.fda.gov/medical-devices/medical-device-safety/medical-device-reporting-mdr-how-report-medical-device-problems . Updated 2023.	Regulatory	n/a	n/a	n/a	n/a	Provides regulatory guidance on reporting medical device problems to the FDA.	n/a