



Approved October 20, 2008
Revised June 1, 2018

Guidelines for Best Practices for Breaking Down the Sterile Field

Introduction

The following Guidelines for Best Practices were researched and authored by the AST Education and Professional Standards Committee, and are AST approved.

AST developed the Guidelines to support healthcare delivery organization's (HDO) reinforce best practices in breaking down the sterile field as related to the role and duties of the Certified Surgical Technologist (CST®), the credential conferred by the National Board of Surgical Technology and Surgical Assisting. The purpose of the Guidelines is to provide information operating room (OR) supervisors, risk management, and surgical team members can use in the development and implementation of policies and procedures for breaking down the sterile field in the operating room. The Guidelines are presented with the understanding that it is the responsibility of the HDO to develop, approve, and establish policies and procedures for the surgery department regarding breaking down the sterile field per HDO protocols.

Rationale

Surgical team members must rigorously adhere to the *principles of asepsis* and implement those principles for every surgical procedure in order to reduce the risk of the patient acquiring a surgical site infection (SSI).¹ During the perioperative phases of surgical case management, the CST must practice the principles of surgical conscience that demands following best practices when breaking down the sterile field.^{2,3} Properly performing the steps for breaking down the sterile field is just as important as when creating the sterile field to protect the surgical patient and team members from cross-contamination and preventing sharps injuries. It also involves the first step of point-of-use disinfection of instruments prior to transportation to the decontamination area of the Central Service Department. However, even though the CST may have specific duties to complete, he/she should not forget they are still a member of a surgical team whose focus remains on the patient who can experience a variety of complications during the immediate postoperative phase of care in the OR and the CST must be ready to quickly assist the team.⁴

Evidence-based Research and Key Terms

The research of articles, letters, nonrandomized trials, and randomized prospective studies is conducted using the Cochrane Database of Systematic Reviews and MEDLINE®, the U.S. National Library of Medicine® database of indexed citations and abstracts to medical and healthcare journal articles.

The key terms used for the research of the Guidelines include: bloodborne pathogens; medical hand wash; personal protective equipment; principles of asepsis; sharps safety; standard precautions; hazardous waste. Key terms used in the Guidelines are italicized and included in the glossary.

Guideline I

Until the patient has been transported out of the OR, the CST should remain sterile as well as maintain the sterility of the back table, Mayo stand and basin set.

1. The CST should ensure that all sharps, instruments, and non-disposable items are removed from the drapes prior to the sterile dressing being applied.^{1,5}
2. The CST should use a saline-soaked sponge to gently clean the skin around the wound and use a dry sponge to dry the skin. Care must be taken not to disrupt the wound or dislodge drains.
3. If the CST is double gloved and will be involved in assisting the surgeon apply the sterile dressing, the outer glove should be removed first to prevent blood and body fluids from the outer glove contacting the sterile dressing.
4. Upon placement of the sterile dressing, the drape should be removed in such a manner that it is rolled up to ensure the exterior is contained within itself.³ The drape should not be thrown from any distance into the waste container to prevent splattering blood and body fluids onto the floor, furniture, walls and/or onto other surgical team members.¹ The drape should be placed in the impervious bag indicated for contaminated *hazardous waste* by the biohazard symbol.¹
5. One focus of surgery departments has been to improve the efficiency of OR turnover time. A routine practice has been to break down the sterile back table, Mayo stand and basin set, and remove instruments and equipment from the OR to be transported to the central sterile supply department prior to the patient being transported out of the OR to decrease turnover time. However, this practice is questionable in providing quality patient care. When the patient is waking from general anesthesia complications can occur such as aspiration of gastric contents, cardiorespiratory distress, and hemorrhaging.⁶ The surgical team must be ready to treat complications in the OR such as performing an emergency tracheotomy after a tonsillectomy and adenoidectomy (T&A). Bleeding and hypovolemic shock immediately following a T&A is the most common cause of morbidity and mortality affecting an estimated 0.5% to 10% of patients. Additionally, mortality from bleeding is 2 in 10,000 tonsillectomies.⁷

After assisting the surgeon in placing the sterile dressing and removing and disposing the drapes, the CST is responsible for moving the sterile back table, Mayo stand and basin set away from the OR table and should remain sterile while other members of the surgical team complete the activities necessary to transport the patient to PACU or other recovery area.

- A. At the minimum the CST should maintain the sterility of the Mayo stand including keeping a minimum number of sterile instruments on the stand to include knife handle with attached #10 or #15 knife blade, four Crile or Kelly hemostats, curved Mayo and Metzenbaum scissors, two Army-Navy or Richardson retractors and two needle holders until the patient has been transported out of the OR.³
- B. When the CST is involved in postoperative care of the patient in the OR, he/she should still position the sterile back table, Mayo stand and basin set away from the OR table and traffic to preserve their sterility until the patient is transported out of the OR.

Guideline II

The CST should follow *Standard Precautions* to prevent contact with blood and body fluids as well as apply the principles of economy of motion in establishing a routine for breaking down the sterile field. The CST in the first scrub role should be the person who is responsible for breaking down the sterile field and applying the principles of point-of-use decontamination since they know the location of sharps and contaminated items. (ANSI)

1. The gown should always be removed first.
 - A. The gloves should not be removed prior to removing the gown in order to prevent touching blood and body fluids on the gown, thus causing cross-contamination.⁸
 - B. As the gown is being removed it should be rolled up so that the exterior is contained within itself.³
 - C. The gown should not be thrown from any distance into the waste container to prevent splattering blood and body fluids onto the floor, furniture, walls and/or onto other surgical team members.¹ The gown should be placed in the red or yellow-colored impervious bag indicated for contaminated hazardous waste by the biohazard symbol; the World Health Organization recommends the use of yellow-colored bags.^{1,9,10}
2. The surgical gloves should be carefully removed to prevent splashing blood and body fluids.
 - A. The gloves should not be thrown or “sling-shot” from any distance into the waste container to prevent splattering blood and body fluids onto the floor, furniture, walls and/or onto other surgical team members.¹ The gloves should be placed in the impervious bag indicated for contaminated hazardous waste by the biohazard symbol.^{1,10,11}
 - B. The CST should perform a *medical hand wash* after removing the gloves.
3. The CST should wear *personal protective equipment* (PPE) when breaking down the sterile field to protect against exposure to *bloodborne pathogens*.^{1,12}
 - A. The CST should continue to wear the head cover, mask and eye protection.¹³
 - B. After removing the sterile gown and gloves, he/she should don non-sterile gloves and non-sterile protective medical gown.¹⁴
4. To contribute to an efficient room turnover the CST should implement the principles of economy of motion in establishing a logical, sequential routine for breaking down the sterile field.^{3,15}
 - A. The principles of economy of motion include:^{3,15}
 - 1) Moving about as little as possible
 - 2) Motions should be simple, productive, minimal and non-repetitive.
 - 3) Moving as smoothly and rapidly as possible without compromising safety.
 - 4) Establishing a logical, sequential and efficient pattern for breaking down the back table and Mayo stand.
 - B. Disposable sharps should be handled and discarded according to HDO policy and OSHA standards that address *sharps safety*.^{16,17}
 - 1) Knife blades and both hypodermic and suture needles should be placed in the small, rigid sharps container that the CST originally set-up on the back table when creating the sterile field. The container should be placed in the OSHA compliant larger puncture-resistant sharps container that is

positioned in a visible location in the OR that allows the CST to easily identify the biohazard symbol and how full it is.^{12,16,17}

- C. The principles of “point-of-use (POU) decontamination” of instruments should be applied by the CST; POU decontamination is the beginning of the cleaning process of instruments.^{5,12} POU decontamination is important because it assists in lengthening the life of instruments by preventing blood and saline from corroding the finish on instruments.^{5,12} Additionally, blood and body fluids that are allowed to dry on instruments are difficult to remove versus when they are kept moist.^{5,12} The CST should try to handle the contaminated instruments as little as possible while breaking down the sterile field.¹²
- 1) Saline must not be used when cleaning instruments since the chloride ions in the solution can corrode and pit the stainless-steel finish on the instruments.^{8,12}
 - 2) During the surgical procedure the CST should try to keep instruments as free of gross soil as possible by wiping with a sterile-water moistened sponge.^{8,12} Additionally, instruments with a lumen should be flushed with sterile water to remove blood and body fluids before which can clog the lumen upon drying making it that much more difficult to remove during the decontamination process.¹²
 - 3) The following are the steps that should be completed when breaking down the sterile field.
 - a) The surgery department should have a process in place for identifying instruments that need repair and removing from service to be sent out for repair, such as a pre-printed tag.¹²
 - b) The CST may need to contact the instrument manufacturer to request information regarding recommended cleansing solutions and should follow the manufacturers IFUs for cleaning the instruments.⁵ The manufacturer should provide information for POU decontamination and preparation of the instruments.⁵
 - c) Instruments from the Mayo stand(s) should be wiped off with a sterile-water soaked sponge to remove gross soil and placed in a basin of water that contains an enzyme detergent or sprayed with the enzyme detergent prior to placing in the basin of water.^{5,12} The instruments should not be exposed to the enzyme solution for an extended period of time as this may damage the finish.⁵ Heavy instruments should be placed on the bottom of the basin and lighter, smaller instruments on top to prevent damage to the instruments.¹²
 - d) Sharp instruments, such as Gelpi retractors, reamers, and trocars, should be placed in a separate basin.¹² The CST should use a bristle brush to clean sharp instruments such as trocars and orthopedic reamers.
 - e) Delicate instruments should be placed back into their container to prevent damage.¹²
 - f) Instruments with a lumen should be flushed with sterile water.⁸ Another example is manufacturers of flexible fiberoptic endoscopes often recommend that water should be suctioned through the

- endoscope's suction channel at the end of the procedure to remove debris.⁵
- g) Ratcheted instruments should be left open and placed on a stringer.^{5,8}
 - h) Instruments with multiple parts should be disassembled according to the manufacturer's written IFU and kept together when transporting to the decontamination room; failure to keep the items together can cause delays and increase the risk of pieces being misplaced or thrown away.^{5,12}
 - i) The basin(s) with instruments should be placed in a bag marked with the biohazard label to prevent the soaking solution from splashing within the case cart when it is transferred to the decontamination room of the Central Service Department.¹² This allows all HCP who subsequently handle the items in the decontamination room know that they are contaminated.¹²
- 4) Instruments on the back table that were not used during the procedure should be placed in their respective container or instrument tray to prevent the instruments from being damaged.¹²
 - a) Ratcheted instruments should be opened and placed on the stringer.
 - b) Instruments with multiple parts should be disassembled.
 - c) Heavy instruments should be placed on the bottom of the tray; delicate instruments placed on top.¹²
 - d) The instrument tray should be placed in the case cart for transfer to the decontamination room of the Central Service Department.⁵
 - 5) Disposable items should be separated by waste categories and disposed of according to local, state and federal regulations.¹² All disposable items should be placed in the impervious red or yellow waste bag identified by the biohazard symbol.^{1,10}
 - 6) Suction canisters and tubing should be discarded according to HDO policy and procedures as well as local, state and federal regulations.⁹
 - 7) PPE is removed and discarded in the impervious red or yellow waste bag identified by the biohazard symbol.¹⁰
 - 8) The biohazard and linen bags are removed from the OR and placed in the HDO designated area for removal by environmental personnel.⁹
 - 9) The CST should perform a medical hand wash.
 - 10) Contaminated items should be contained during transport from the OR to the decontamination room of the Central Service Department.¹² Many HDOs use a case cart to transfer the contaminated items to the decontamination room of the Central Service Department.
 - 11) The preoperative case management routine is repeated in preparation for the next procedure including repositioning the OR furniture.

Guideline III

The surgery department should review the policies and procedures (P&P) regarding breaking down the sterile field on an annual basis.

1. The surgery department should include members of the surgical team and administration when reviewing the P&Ps, including CSTs, surgeons, RNs, risk management, and infection control officer.
 - A. The surgery department should document when the P&Ps were reviewed, revision completed (if necessary), and who participated in the review process.
2. CSTs should be familiar with the P&Ps for breaking down the sterile field. The orientation of new employees should include reviewing the P&Ps.

Guideline IV

CSTs should complete continuing education to remain current in their knowledge of breaking down the sterile field.¹⁸

1. The continuing education should be based upon the concepts of adult learning, referred to as andragogy. Adults learn best when the information is relevant to their work experience; the information is practical, rather than academic; and the learner is actively involved in the learning process.¹⁹
2. It is recommended surgery departments use various methods of instruction to facilitate the learning process of CSTs.
 - A. If the education is primarily lecture, methods to engage learners include presentation of case studies for discussion, and audience discussion providing suggestions for reinforcing breaking down the sterile field.
 - B. Other proven educational methods include interactive training videos, and computerized training modules and teleconferences.
 - C. The continuing education should be delivered over short periods of time such as in modules, and not in a one-time lengthy educational session.
3. Continuing education programs should be periodically evaluated for effectiveness including receiving feedback from surgery department personnel.
4. The surgery department should maintain education records for a minimum of three years that include dates of education; names and job titles of employees that completed the continuing education; synopsis of each continuing education session provided; names, credentials, and experience of instructors.

Competency Statements

Competency Statements	Measurable Criteria
<ol style="list-style-type: none"> 1. CSTs have the knowledge and skills for implementing the principles of asepsis. 2. CSTs are qualified to perform post-procedure patient care utilizing their knowledge of the principles of asepsis and PPE. 3. CSTs have the knowledge and skills to implement the principles of economy of motion to contribute to the efficiency of performing post-procedure break down of the sterile field and preparing the OR for the next procedure. 	<ol style="list-style-type: none"> 1. Educational standards as established by the <i>Core Curriculum for Surgical Technology</i>.²⁰ 2. The didactic subject of breaking down the sterile field is included in a CAAHEP accredited surgical technology program. 3. Students demonstrate knowledge of breaking down the sterile field in the lab/mock OR and during clinical rotation. 4. CSTs complete continuing education to remain current in their knowledge of Standard Precautions, bloodborne pathogens, use of PPE, and care of the patient.¹⁸

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Glossary

Bloodborne pathogens: Pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).¹

Medical hand wash: A specific type of hand wash performed by HCP that includes the principles of holding the hands lower than the elbows so water flows downward from the wrist to the fingertips; using friction and circular motions to wash the palms and back of hand, and interlacing the fingers and thumbs to address the spaces in-between the digits; rinsing by holding the hands lower than the elbows; drying the hands with a clean towel or paper towel; and using a clean paper towel to turn off the water to prevent the hand from acquiring microorganisms from the faucet handles.

Personal protective equipment: Specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.¹³

Principles of asepsis: Principles applied through the use of sterile techniques to prevent pathogenic microbial contamination of the sterile field and prevent the patient from acquiring a surgical site infection.³

Sharps safety: Principles applied by HCP to prevent sharps injuries to patient and themselves, including the use of safety-engineered hypodermic needles and scalpel blades; proper removal of hypodermic needles from syringes; proper removal of scalpel blades from the knife handle; and proper use of sharps containers.

Standard Precautions: A set of precautions designed to prevent transmission of HIV, Hepatitis B virus (HBV) and other bloodborne pathogens when providing first aid or health care. Under standard precautions, blood and certain body fluids of all patients are considered potentially infectious for HIV, HBV and other bloodborne pathogens.¹⁶

Hazardous waste: Also called medical hazardous waste (MDW); disposable waste such as draping material, gloves, gowns, masks and shoe covers that are contaminated by blood and body fluids and should be disposed of according to local, state and federal regulations.

References

1. OSHA. 29CFR 1910.1030 Bloodborne pathogens. 2001. https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051. Accessed April 30, 2018.
2. Chambers KL. Patient safety equals: aseptic technique, surgical conscience and time out. 2013. http://www.ast.org/publications/journal_archives/. Accessed April 30, 2018.
3. Frey K. (Ed.). *Surgical technology for the surgical technologist: a positive care approach*. 5th ed. Boston, MA: Cengage Learning; 2018.
4. Hoyt DB, Ko CY, Jones RS, Cherry R, Schneidman D, Khalid Mehresh. (Eds.). *Optimal resources for surgical quality and safety*. Chicago, IL: American College of Surgeons; 2017.
5. *Central service technical manual*. 7th ed. Chicago, IL: International Association of Healthcare Central Service Materiel Management; 2007.
6. Tidy C. Common postoperative complications. 2016. <https://patient.info/doctor/common-postoperative-complications-pro#nav-7>. Accessed April 30, 2018.
7. Oron Y, Marom T, Russo E, Ezri T, Roth Y. Don't overlook the complication of tonsillectomy. *The Journal of Family Practice*. 2010; 59(10): E4-E8.
8. Gruendemann BJ, Mangum SS. *Infection prevention in surgical settings*. Philadelphia, PA: WB Saunders Company; 2001.
9. Infection Control Today. Solid and liquid medical waste: where does it go? 2008. <http://www.infectioncontroltoday.com/guidelines/solid-and-liquid-medical-waste-where-does-it-go>. Accessed April 30, 2018.
10. Chartier, Y, Emmanuel J, Peiper U, Prüss A, Rushbrook P, Stringer R, Townend W, Wilburn S, Zghondi R. Safe management of wastes from health-care activities. 2014. http://www.searo.who.int/srilanka/documents/safe_management_of_wastes_from_health_care_activities.pdf?ua=1. Accessed April 30, 2018.
11. Davis MS. *Advanced precautions for today's O.R.* 2nd ed. Atlanta, GA: Sweinbinder Publications.
12. *ANSI/AAMI ST79:2017 comprehensive guide to steam sterilization and sterility assurance in health care facilities*. Arlington, VA: AAMI; 2017.

13. OSHA. Personal protective equipment. 2004.
<https://www.osha.gov/Publications/osha3151.pdf>. Accessed May 2, 2018.
14. ANSI/AAMI PB70:2018 *liquid barrier performance and classification of protective apparel and drapes intended for use in health care facilities*. Arlington, VA: AAMI; 2018.
15. Phillips N. *Berry & Kohn's operating room technique*. 13th ed. St. Louis, MO: Elsevier; 2017.
16. Centers for Disease Control and Prevention. Stop sticks campaign. 2010.
<https://www.cdc.gov/niosh/stopsticks/sharpsdisposal.html>. Accessed April 30, 2018.
17. OSHA Fact Sheet. Protecting yourself when handling contaminated sharps. 2011.
https://www.osha.gov/OshDoc/data_Bloodbornefacts/bbfact02.pdf. Accessed May 2, 2018.
18. Association of Surgical Technologists. AST continuing education policies for the CST and CSFA. 2005. Revised February 2018.
<http://www.ast.org/Resource/ASTWebDocuments/CEPoliciesCSTCSFA/>. Accessed May 2, 2018.
19. Pappas C. The adult learning theory-andragogy-of Malcolm Knowles. May 2013.
<https://www.elearningindustry.com/the-adult-learning-theory-andragogy-of-malcolm-knowles>. Accessed May 2, 2018.
20. Association of Surgical Technologists. Core curriculum for surgical technology. 2011.
http://www.ast.org/uploadedFiles/Main_Site/Content/Educators/Core%20Curriculum%20v2.pdf. Accessed April 25, 2018.