



AST Standards of Practice for Surgical Attire, Surgical Scrub, Hand Hygiene and Hand Washing

Introduction

The following recommended standards of practice were researched and authored by the AST Education and Professional Standards Committee and have been approved by the AST Board of Directors. They are effective April 13, 2008.

AST developed the Recommended Standards of Practice to support healthcare facilities in the reinforcement of best practices related to wearing of surgical attire and performing the surgical scrub in the perioperative setting. The purpose of the Recommended Standards is to provide an outline that healthcare workers (HCWs) in the perioperative setting can use to develop and implement policies and procedures for the proper wearing of surgical attire and performing the surgical scrub. The Recommended Standards is presented with the understanding that it is the responsibility of the healthcare facility to develop, approve, and establish policies and procedures for surgical attire and performing the surgical scrub according to established healthcare facility protocols.

Rationale

The following are Recommended Standards of practice related to properly wearing the surgical attire and performing the surgical scrub in the perioperative setting. Dating back to the Hungarian physician Ignaz Semmelweis, who advocated and implemented strict hand washing guidelines for medical students, it has long been recognized that the skin is a primary source for harboring microorganisms that represent as being a potential cause of cross-contamination.¹¹ Bacteria residing on the hands of the surgical team can be the cause of surgical site infections (SSI).⁶ When the members of the sterile surgical team use a non-antimicrobial scrubbing agent, the bacteria rapidly multiply under surgical gloves (CDC, 2002). Even though the members of the sterile surgical team wear sterile gowns and gloves, studies have shown that bacterial growth is decreased when an antiseptic scrubbing agent is used when performing the surgical scrub, thus reducing the risk of SSI in particular if a glove sustains a puncture or tear.^{14,36} Healthcare facilities should evaluate and choose surgical scrub solutions based on their meeting US Food and Drug Administration (FDA) standards; ability to decrease to an irreducible minimum the number of bacteria on the hands and forearms immediately after performing the surgical scrub, ability to provide persistent antimicrobial activity and to provide long-term cumulative activity.⁹ Of those items used to evaluate a scrub solution, immediate and persistent activity are considered the most important when determining the efficacy of the solution.⁹ FDA standards state that solutions used for the surgical scrub should substantially reduce microbes that reside on the skin, contain a nonirritating antimicrobial preparation, possess a broad-spectrum of antimicrobial properties, be fast-acting and have persistent, cumulative activity.⁵⁷

Additionally, wearing surgical attire has been shown to aid in containing the shedding and dispersal of skin squames into the environment. The human body is a major source of bacterial contamination in the surgical environment. Surgical site infections (SSI) have been traced to bacteria from the hair, scalp and skin of surgical personnel.⁸ The purpose of the surgical attire is to protect the patient and staff by maintaining a limited microbial spread.⁵ In order to maintain a clean environment and adhere to OSHA regulations, surgical attire must be worn.⁵⁶ The healthcare facility should establish policies and procedures for evaluating the efficacy of surgical attire prior to being purchased, proper wearing of attire and compliance by the surgical personnel.

In summary, the purposes of the surgical scrub and surgical attire is to promote patient safety by helping to prevent environmental contamination; prevent the transfer of transient microorganisms and debris from the hands and forearms; decrease the number of resident microorganisms to an irreducible minimum; and inhibit rapid proliferation of microorganisms on the nails, hands and forearms. All surgery department personnel should be involved in the process of developing and implementing healthcare facility policies and procedures for surgical attire and performing the surgical scrub.

Standard of Practice I

The proper surgical attire should be worn in the semi-restricted and restricted areas of the healthcare facility surgery department.

1. Surgical attire that should be worn in the semi-restricted and restricted areas of the surgery department includes the head cover, masks, scrub suit, warm-up jacket, and shoes.
 - A. The surgical team members are responsible for preventing SSI by properly donning and wearing the appropriate head cover or hood. The surgical department should follow recommended OSHA and CDC standards for personal protective equipment (PPE).
 - (1) The surgical head cover or hood should be lint-free and cover all head and facial hair. Head covers prevent the shedding of hair, squamous cells, and/or dandruff onto the scrub suit.^{8,17}
 - (2) To prevent shedding onto the scrub suit, the first item of the surgical attire to be donned should be the head cover.²
 - (3) Surgeons (skull) caps/head covers are not recommended for use. The determination is that the surgeons head cover does not completely cover the hair exposing the patient to the possibility of acquiring a SSI.⁸
 - (4) Disposable bouffant and hood head covers offer complete coverage of the head and facial hair and should be worn by all OR personnel.
 - (5) It is recommended that surgery personnel with facial hair wear a disposable hood to completely cover the facial hair.
 - (6) The surgical department should develop policies and procedures addressing the wearing of head covers by surgical personnel

entering the semi-restricted and restricted areas of the surgical suite based on OSHA, CDC and APIC standards.

- (7) The practice of allowing the use or not allowing the use of reusable cloth caps is governed by the healthcare facility policies and procedures. However, it is recommended that reusable cloth covers should not be worn.
 - (8) If worn, reusable cloth head covers should be laundered daily in the healthcare facility laundry services or third party health-care accredited laundry facility that is contracted by the healthcare facility (see *AST Recommended Standards of Practice for Laundering of Scrub Attire*, 2008).^{4,5}
 - (9) If the reusable cloth head cover becomes contaminated with blood or body fluids it should be immediately removed and laundered.¹⁰
 - (10) Disposable bouffant and hood covers should be discarded in a designated receptacle after use. If the disposable head cover becomes contaminated with blood or body fluids, it should be removed and discarded as soon as possible, and a clean head cover donned.
- B. The mask must be worn at all times in restricted areas including the sub-sterile rooms and scrub sinks.² The mask will only be effective when properly worn.
- (1) The wearing of a surgical mask and safety eyewear to protect the mucous membranes of the eyes, nose, and mouth during procedures in which the possibility of splashes or sprays of blood, body fluids and other secretions could occur is mandated by the OSHA Bloodborne Pathogens Standard.⁵⁶
 - (2) The mask should be worn to completely cover the nose and mouth.
 - (3) Masks should fit in a comfortable, but secure manner to prevent venting at the sides. Venting can allow the entry of infectious microbes that could contact the surgical team member's nose and mouth or dispersal of infectious microbes to the sterile field by the surgical team member.⁴⁷
 - (4) The pliable metal or plastic noseband should be contoured to fit over the bridge of the nose to aid in providing a close fit and prevent the mask from slipping. To prevent fogging of safety eyewear, tape can be used to cover this portion of the mask.
 - (5) Masks should be either on or completely off. They should not be allowed to hang around the neck or folded and placed in a pocket for later use.^{2,47} Used masks harbor multiple microbes that can be transferred to the scrub suit and dispersed into the healthcare facility environment.
 - (6) When a surgical team member is performing the surgical scrub the mask must be worn; it should be secured in place prior to starting the scrub. When other surgery department personnel

who are not performing the scrub are talking with a person who is performing the scrub, the non-scrub person should be wearing a mask.

- (7) If wearing a mask with strings, the mask should be handled only by the strings when discarding to prevent contamination of the hands. When removing a mask, it should be immediately discarded into the biohazard waste bag. The surgical team member should perform a hand wash after removing the mask (see Standard X).
 - (8) It is recommended that a new mask be used for each procedure or at the minimum, changed frequently and if it becomes wet and or/ contaminated by blood and body fluids.²
- C. Healthcare facility approved clean, freshly laundered surgical scrub suit designated for wear in the perioperative environment should be worn by surgical personnel who will enter the semi-restricted and restricted areas.
- (1) Surgery personnel, including CSTs, should be involved with the decision-making process regarding the purchase of surgical attire.
 - (2) Surgery personnel, including CSTs, should be involved with the development and review of healthcare facility policies and procedures regarding surgical attire.
 - a. The policies and procedures should include, but not limited to the following:
 - required attire
 - attire to be worn in semi-restricted and restricted areas
 - in-house or commercial laundering
 - placing attire in designated receptacle after use
 - (3) Surgical attire fabric should be free of lint, provide comfort and allow for “breathability” (allow the escape of body heat) while containing the shedding of skin squames.
 - a. The fabric should be tightly woven to prevent skin squames from being released through the pores of the fabric into the environment.
 - b. Studies have shown that scrub suits made of 100% cotton fabric should not be worn for the following reasons:
 - Cotton fabrics typically have large pores and are not tightly woven allowing the dispersal of skin squames into the environment.^{1,51}
 - Cotton fabrics have a high level of shedding lint.
 - Cotton fabrics are highly flammable and 100% cotton does not meet the federal standard for flammability.¹²
 - c. It is recommended that healthcare facilities purchase scrub suits that are made of 100% spunbound polypropylene in order to contribute to the decrease of the environment by the shedding of skin squames.

- (4) The scrub suit should be donned in the healthcare facility designated changing room. Changing from street clothes to the scrub suit in the designated room aids in decreasing contamination of the environment.
 - a. Prior to donning the scrub suit the head cover should be donned to prevent shedding of microbes onto the scrub suit.
 - b. When donning a two-piece scrub suit (shirt and pants), the scrub shirt should be tucked into the pants to contain skin squames and prevent billowing outward in the operating room and contaminating a sterile surface.
 - c. T-shirts that are worn under the scrub shirt must be completely covered and should not extend above the scrub shirt neck or below the sleeves.
 - (5) Whenever leaving the healthcare facility, the surgical personnel should change into street clothes. Scrub suits worn outside the facility can come into contact with external microbes and contaminants and be transported into the facility environment.
 - (6) A used scrub suit should not be stored in a locker or hung in the changing room to be worn again. The disposable single-use or reusable attire should be placed in the proper container that is indicated for used attire in the changing room.
 - a. Scrub suit that has been contaminated with blood, body fluids or other potentially infectious material (OPIM) should be changed as soon as possible and freshly laundered scrub attire donned. Changing the attire aids in protecting the individual from pathogenic microbes and cross-contamination of patients.⁵⁶
 - b. Scrub suits (and other cloth surgical attire) should be laundered by the healthcare facility laundering services or by the third-party health-care accredited laundry facility that is contracted by the healthcare facility (see *AST Recommended Standards of Practice for Laundering of Scrub Attire*, 2008).
- D. Non-sterile surgical team members (anesthesia provider, circulator) should wear a healthcare facility approved, freshly laundered long-sleeved warm-up jacket in the semirestricted and restricted areas.
- (1) The jacket aids in containing the skin squames shed from the arms and axillary regions.¹
 - (2) The jacket should be fully snapped or zipped shut to prevent it from billowing outward upon movement and contaminating a sterile surface or item.
 - (3) If a CST who will be performing the surgical scrub is wearing a jacket it must be completely removed prior to performing the surgical scrub. This includes not wearing/tying the jacket around the waist.
- E. Cover apparel, such as a lab coat, cover gown or other appropriate clothing should be worn when exiting the surgery department.

- (1) The cover apparel should be long-sleeve and full-length (knee length). Upon donning it should be completely fastened when leaving the surgical department to protect the integrity of the scrub suit.⁴⁸ Covering scrub attire may eliminate the need for donning a freshly laundered scrub suit upon reentry to the surgical department and consequently decrease costs.^{16,31,35,54}
 - (2) The cover apparel must be removed prior to entering the semi-restricted or restricted areas.
 - (3) Healthcare facility policies and procedures should be followed pertaining to the wearing of cover apparel.
- F. Surgical personnel should protect themselves from contact with blood and body fluids by wearing disposable shoe covers.
- (1) The use of shoe covers has never been proven to decrease the risk or incidence of SSI, or to decrease the bacterial counts of the OR floors.²⁶ However, shoe covers do protect the footwear and feet from exposure to blood and body fluids.
 - (2) Fluid-resistant disposable shoe covers should be worn in the semi-restricted and restricted areas of the surgery department.
 - (3) Disposable shoe covers should be worn if it is anticipated that contact with blood and body fluids, splashes and spills may occur.⁸
 - (4) Knee-high impervious boot style covers should be worn if it is anticipated that there could be a large amount of irrigation fluid use and/or large amount of blood and/or body fluid loss.²
 - (5) Shoe covers must not be worn outside the surgical department to avoid tracking blood and body fluids, debris and other gross contaminants throughout the department.
 - (6) Clean shoe covers should be donned when returning to the semirestricted and restricted areas.
 - (7) Shoe covers must be changed daily.
 - (8) Shoe covers that are soiled and contaminated, torn, moist/wet, must be changed as soon as possible. When removing the contaminated shoe covers, surgical personnel should wear non-sterile gloves to protect the hands from the gross contamination.
 - (9) When discarding shoe covers, they should be discarded in a designated receptacle.
 - (10) Shoe covers should be removed before entering the changing room and must be removed when leaving the surgical department.
 - (11) Shoe covers should be kept in close proximity to the semi-restricted area.
- G. Surgical personnel should be aware of the hazards associated with workplace foot and toe injuries, and should protect himself/herself from injury by wearing the correct footwear.

- (1) Sandals, shoes made of soft materials, and open toe and open heel shoes should not be worn in the surgery department. It is recommended that the footwear have low heels.
- (2) Rubber boots and leather shoes are two recommendations for footwear that offer good protection.
- (3) The footwear should be comfortable, supportive, breathable and protective.
- (4) Surgical personnel who wear footwear that is designated for use only in the surgery department must make sure the footwear meets healthcare facility standards.
- (5) Surgical personnel are responsible for keeping the footwear clean and in good repair. Gross contaminants should be cleaned from the footwear as soon as possible and not be allowed to build-up on the surface.
- (6) If footwear is specifically designated for use in the surgery department and worn without shoe covers, the footwear must not be work outside the department.

Standard of Practice II

The surgical scrub should be performed by all members of the sterile surgical team, who will be donning a sterile gown and gloves.

1. The surgical scrub, when properly performed, has been shown to remove transient skin flora from the fingernails, hands and forearms; reduce the resident microbial population to an irreducible minimum; and slow the growth of bacteria in order to contribute to reducing the risk of a SSI.⁹
2. Surgical hand antisepsis should be accomplished using either an antimicrobial soap or an alcohol-based solution with cumulative, persistent antimicrobial activity before donning the sterile gown and gloves.⁹

Standard of Practice III

The members of the sterile surgical team should complete the pre-scrub activities in preparation to performing the surgical scrub.

1. The fingernails should be kept clean, not extend beyond the fingertips and artificial nails should not be worn.
 - A. Fingernails that are long and extend beyond the fingertips can puncture the gloves placing the patient at risk of SSI from exposure to the transient and resident skin flora.⁸ Additionally, long fingernails place the patient at risk for injury when the surgical team member is providing direct care to the patient, eg aiding the patient in moving from the stretcher to the OR bed, patient positioning, etc.
 - B. The subungual has been identified as harboring the majority of microorganisms as compared to the skin of the hands and forearms. Debris should be removed from the subungual area with the use of a sterile, plastic single-use, disposable nail cleaner that is usually provided with the scrub brush package. Reusable nail cleaners are not recommended. Orangewood sticks should not be used to clean the

fingernails due to the tendency of the wood to splinter and harbor *Pseudomonas* organisms.⁴⁵ The fingernails should be cleaned under running water at the scrub sink. After use, the disposable nail cleaner should be disposed according to healthcare facility policy. The dirty nail cleaner should not be discarded into the scrub sink in order to prevent cross contamination.

- C. Nail polish, if worn, should be freshly applied and free of chips. Studies have not established a correlation between the wearing of freshly applied nail polish and an increase in microbial growth.⁸ However, nails with chipped polish or polish that has been worn for more than four days harbor a greater number of bacteria as compared to unpolished nails.²⁰ Surgical personnel should follow healthcare facility policy related to wearing nail polish.
 - D. Artificial nails and other types of artificial nail coverings, such as silk overlays should not be worn by any member of the surgical team, no matter what team role they are fulfilling.⁹ Cultures of surgical team members who wear artificial nails demonstrate increased bacterial and fungal counts as compared to personnel who do not wear artificial nails.^{8,22,39} Additionally, hand carriage of Gram-negative organisms has been shown to be greater among wearers of artificial nails than among non-wearers.⁸
 - E. Cuticles should be kept clean and intact; the cuticles should not be trimmed or cut.
2. The intact skin layer is the first line of defense for preventing the entry of microbes into the body. When the skin is damaged by burns, lesions, abrasions, and cuts, it creates an opening for the invasion of microbes, placing the patient and surgical team member at risk for acquiring an infection.⁴⁶ (2003). Additionally, the sterile team member could transfer pathogens, if bodily fluids in the form of exudate from burns, lesions, abrasions, and cuts, come into contact with the patient.
- A. The skin of the hands and forearms should be intact with no burns, lesions, abrasions, and cuts present. The surgical team member should inspect the hands and forearms prior to performing the surgical scrub to confirm the skin is intact.
 - B. If there is a break in the integrity of the skin, the surgical team member should determine if the extent of the damage to the skin prevents performing the surgical scrub and participating as a member of the sterile team.
3. All jewelry including rings, bracelets, and watches should be removed prior to performing the surgical scrub.⁹
- A. Jewelry is not sterile and can harbor microorganisms. Studies have reported a significant increase in the bioload on the hands of personnel who wear rings after performing a hand wash as compared to personnel who perform a hand wash not wearing rings.^{49,55} Studies have also demonstrated that the skin underneath rings is more heavily colonized as compared to areas of the skin on the fingers where rings were not worn.^{25,}

^{27,37} Lastly, studies show that the the bioload and concentration of microorganisms increase exponentially correlated to the number of rings worn.²⁷

- B. Jewelry is removed in order to allow the surgical scrub solution to make contact with the entire skin and sides (planes) of the fingers, hands, and forearms.

Standard of Practice IV

Scrub solution dispensing containers should be a closed container that is maintained in working condition.

1. Scrub solution dispensing containers should not be an open container and have a lid.
2. The use of single-use containers is recommended, and they should be discarded when empty according to healthcare facility policy.
3. If reusable containers are used, it is recommended that the container be evaluated prior to purchase for ease in cleaning, including the tubing and dispensing spout, ability to maintain its function for long periods of time, and ability of tubing and dispensing spout to remain free from obstruction.²⁹ If reusable containers are used, it is recommended that healthcare facilities purchase reusable containers that can be sterilized between uses.
4. Prior to reuse, the decontamination process should be completed to include the outside and inside of the reusable container, sterilized if possible and dried. The container should be dry in order not to “water-down” the scrub solution and reduce its microbial effectiveness.
5. The container should never be refilled or what is referred to as “topping off.” Refilling or topping off without first decontaminating the container can cause contamination of the scrub solution and container, thus contributing to the risk of cross contamination.

Standard of Practice V

The healthcare facility should provide an FDA-approved scrub solution that has immediate, cumulative and persistent antimicrobial action for use by the surgical personnel.

1. The surgical personnel and infection control officer should be involved in the process of evaluating and selecting scrub solutions. In the US antiseptic scrub solutions are regulated by the FDA’s Division of Over-the-Counter Drug Products.⁹ The evaluation should involve the review of the manufacturer’s information to confirm that the scrub solution was tested according to FDA requirements and to review the results of the testing to confirm efficacy.⁵⁷
 - A. The involvement of the surgical personnel in the decision-making process has been shown to contribute to compliance with hand washing and scrub procedures.^{8,9} The surgical personnel are able to evaluate the properties of the scrub solution, including effects on the skin and contribute to the final decision about the scrub solutions that are the most effective antimicrobial solutions and least harmful to the skin. The cost of the surgical scrub

solution product should not be a factor that influences the decision making process.⁸

- B. When evaluating a scrub solution, the following FDA standards should be taken into consideration. The scrub solution should:
- substantially reduce transient microorganisms
 - possess a broad-spectrum of antimicrobial properties
 - be fast-acting
 - have persistent, cumulative activity
 - be a nonirritating antimicrobial preparation

Standard of Practice VI

Alcohol-based solutions are an effective scrubbing agent (CDC, 2000). The selection of an alcohol-based solution should be based upon the solution being FDA-approved that provides persistent, cumulative activity and is approved by the healthcare facility.

1. The antimicrobial action of alcohols is the denaturing of proteins. Alcohol solutions that contain 60%-95% alcohol are the most effective. Solutions higher in alcohol concentration are less effective since the denaturing of proteins does not easily occur in the absence of water.⁸
2. Alcohols have a broad-spectrum of antimicrobial properties, including the ability to destroy Gram-positive and Gram-negative bacteria, as well as multidrug-resistant pathogens, including MRSA and VRE, *Mycobacterium tuberculosis* and fungi.^{9,30,50}
3. Alcohols have rapid activity when applied to the skin, but alone do not have a persistent, cumulative activity; however, when combined with another scrub solution persistent, cumulative activity results.⁸ Therefore, if a healthcare facility adopts the use of alcohol, it is recommended that the agent be a combination of alcohol and another scrubbing agent (alcohol-based solution).
 - A. Alcohol-based solutions have a greater antimicrobial activity as compared to other scrub solutions. Studies have shown that alcohol-based solutions immediately lower the microbial count on the skin postscrub more effectively than other scrub solutions.⁸
 - B. Alcohol-based solutions that contain 0.5% to 1% chlorhexidine gluconate have been found to have a persistent antimicrobial activity that is equal to, or greater than, that of chlorhexidine gluconate alone. The next most effective scrubbing agents are chlorhexidine gluconate, iodophors, and triclosan. Studies of parachlorometaxyleneol (PCMX) have produced contradictory results and therefore, further studies are required in order to determine the efficacy of the agent with other scrubbing agents.⁵³
4. When using an alcohol-based solution, the healthcare facility procedure for performing the surgical scrub should follow the manufacturer's instructions since the instructions can vary according to the solution that is being used.
5. The alcohol-based solution should not be used when the hands and/or forearms are visibly dirty or contaminated with proteinaceous materials since that decreases the antimicrobial action of the alcohol.³² The hands and forearms should be prewashed with a non-antimicrobial soap unless it is suspected that hands are

- contaminated with *Bacillus anthracis* and in that instance anti-microbial soap must be used.⁹ The hands and forearms should be thoroughly dried before using the alcohol-based solution.
6. Alcohols are a flammable liquid and therefore, must be properly stored according to National Fire Protection Association recommendations, as well as local and state regulations.
 - A. Alcohol containers should be stored in a dry, cool area that is approved by the healthcare facility for the storage of flammables and removed from sources of flames, heating vents, and high temperatures.
 - B. Alcohol is the gold standard for hand washing and surgical scrub in Europe where it has been used extensively for years.⁸ Reports concerning the use of alcohol-based solutions indicate a very low incidence of fires.⁵⁸
 - C. Careful planning should occur related to the placement of the scrub solution dispensing containers. Because alcohols are highly volatile, the solution dispensing containers should be located away from light switches (source of sparks) and sources of heat, but still situated in a manner that is convenient for use by the surgical team members.
 - D. The solution dispensing containers must be designed to prevent evaporation due to the volatility of alcohols.⁸
 - E. The surgical team member must allow the hands and forearms to be thoroughly dry before donning the sterile gown and gloves.^{24,41}

Standard of Practice VII

Surgical team members should perform a standardized surgical scrub procedure based upon manufacturer's written instructions that are specific to the scrub solution to be used and according to healthcare facility policy and procedures.

1. Research and studies have not established what is the ideal procedure and duration of a surgical scrub. The Association of Professionals in Infection Control (APIC) recommendations include that the ideal duration of a surgical scrub has not been established and, in part, because it may be related to the type of scrub solution that is being used. Additionally, APIC indicates that no research clearly establishes if subsequent scrubs can be shorter as far as time.²⁸ The following research is presented in order to aid healthcare facilities establish what they consider is an optimal policy and procedure.
 - A. The American College of Surgeons recommends the duration of at least two minutes for the surgical scrub.⁵²
 - B. Several European and Australian studies indicate that three to four minute scrubs are just as effective as a five-minute scrub.²⁰
 - C. Several studies have shown that a five-minute scrub is as effective as a 10-minute scrub in reducing the microbial count.^{15,19,42}
 - D. Other studies have also shown that a two- to-three-minute scrub reduces the microbial count to an acceptable level.^{23,43}
 - E. Lastly, additional studies have indicated that a two-stage surgical scrub, using an antiseptic agent, followed by the use of an alcohol-containing preparation is as effective as a five-minute scrub with only an antiseptic agent.^{13,44}

- F. The advantages of a shorter scrub time include less damage to the skin and water conservation.⁸
2. The anatomical timed method or counted stroke method of performing the surgical scrub is acceptable. The surgical team member should follow healthcare facility policy.
3. The surgical team member should follow the general principles of completing a surgical scrub.
 - A. Prewash the hands and forearms with non-antimicrobial soap.
 - B. The subungual area should be cleaned with the use of a disposable nail cleaner under running water. The nail cleaner should not be discarded into the scrub sink and disposed of according to healthcare facility policy to prevent cross-contamination of the scrub sink.
 - C. The scrub should begin at the finger tips and end 2" above the elbows without returning to a clean area. The fingers, hands and forearms should be visualized as having four sides (planes) that must be thoroughly scrubbed, including the web space between each digit.
 - D. One hand and forearm should be scrubbed, the scrub brush switched hands, and the other hand and forearm scrubbed.
 - E. Hold hands higher than the elbows so that water runs from the finger tips toward the elbows. Additionally, keep the hands and arms away from the scrub attire, while keeping the elbows in a flexed position to avoid water from wetting the scrub suit and causing strike-through.
 - F. If possible, when the water is not in use, it should be turned off to conserve.
 - G. The scrub brush should not be discarded into the scrub sink and disposed of according to healthcare facility policy to prevent cross-contamination of the scrub sink.
 - H. The surgical team member, after entering the OR, should thoroughly dry hands and arms using aseptic technique prior to donning the sterile gown to prevent strike-through contamination. If an alcohol-based solution is used, it is necessary that the hands and arms be completely dry.

Standard of Practice VIII

Performing the surgical scrub without a brush or sponge is acceptable.

1. The practice of using a brush can damage the skin resulting in increased shedding of microorganisms from the hands and arms. Scrubbing with a brush also contributes to an increase in the shedding of skin cells.⁴⁰
2. Several studies confirm that the use of a brush or sponge is not necessary as well as demonstrating lower bacterial counts when a brushless surgical scrub is performed, as compared to the use of a brush, in particular when an alcohol-based solution is used that consists of 1% chlorhexidine gluconate and 61% to 70% alcohol.^{24,34,41}

Standard of Practice IX

On a daily basis healthcare workers should practice hand hygiene in the work place and at home.

1. Hand hygiene is simple, inexpensive and focuses on the practical care of the hands by the individual.
 - A. Hand hygiene focuses on general care of the hands including the following:
 - (1) Preventing abrasions, cuts and open lesions that break the integrity of the skin
 - (2) Proper care of the fingernails and cuticles (see Standard II)
 - (3) Preventing over drying of the skin leading to discomfort and breaks in the skin
2. Lotions aid in preventing the drying of the skin and maintaining the overall health of the skin.
 - A. Surgical team members should be involved in the selection process of lotion(s) that are provided by the healthcare facility.
 - B. The lotion should be approved by the healthcare facility infection control officer.
 - C. Verification and documentation must be completed verifying the lotion used in the healthcare facility does not disrupt the effectiveness of the antiseptic scrubbing agent and sterile gloves.
 - (1) Many of the over-the-counter hand lotions have been found to counteract the antimicrobial cumulative proper of chlorhexidine gluconate.⁹
 - (2) Petroleum-containing hand lotions have been found to break down latex gloves causing an increase in their permeability.
 - (3) The hand lotion product selection process should involve reviewing the manufacturer's information in order to verify the product can be used without compromising the effectiveness of sterile gloves or antiseptic scrubbing agent.

Standard of Practice X

Hand washing should be performed before and after each patient contact, when contact has been made with a source of contamination and after removal of non-sterile or sterile gloves.

1. Hand washing is the simplest and least expensive method for the prevention of cross contamination. The surgical scrub is not a substitute for hand washing and it is just as important for surgical personnel to wash the hands between patient contacts in the surgery department as compared to the nonsurgical departments.²⁰ The following is a list of instances when it is recommended that hand washing should be performed. This list is based on CDC and APIC recommendations.
 - A. Between patient contacts including contacts with patients in the operating room.⁷
 - B. Before and after assisting the surgeon with invasive procedures that includes placing the sterile-gloved hands onto or within a surgical and/or traumatic wound.⁷
 - C. After the removal of non-sterile or sterile gloves.³³

- (1) Gloves should not be considered a substitute for hand washing. A high risk of contamination can occur when a healthcare worker removes non-sterile gloves and reaches into a glove box without performing a hand wash.³⁸ The potential exists for contaminating the opening to the box as well as the gloves inside the box.
- D. After handling and/or touching a fomite such as when emptying a Foley catheter bag.⁷
 - E. After contact with blood and body fluids, e.g. cleaning up small area of blood on floor of OR, handling soiled linen and waste.²⁸
 - F. In-between performing patient care on different body regions of the same patient to prevent cross contamination, e.g. insert urethral catheter and then perform dressing change on leg.²⁸
2. Surgical personnel should use a topical antimicrobial agent that removes transient and resident microorganisms when performing the hand wash.⁹
 3. The hand wash should be performed for a minimum of 20 seconds applying friction and washing all surfaces of the hands and fingers as well as under the nails.⁹ All jewelry should be removed such as rings and watches prior to performing the hand wash. If the faucet is not knee or foot operated it should be turned off using a paper towel.²⁰
 4. Options for drying the hands include the use of cloth paper or paper towels and air dryers. All methods have been proven to further reduce the microbial count.²⁰
 5. Other products that are acceptable in lieu of performing a traditional hand wash at the sink include hygienic hand rub products, hand wipes impregnated with alcohol, and foams that consist of an alcohol and antimicrobial agent mixture.
 6. The container of antimicrobial agent used for hand washing should be situated close to the sink in order to encourage hand washing. Studies have shown that if the agent is not located adjacent to the sink or if an alternative product is not located in a convenient location, healthcare workers will tend to neglect performing the hand wash on a routine basis.

Competency Statements

Competency Statements	Measurable Criteria
1. The CST has knowledge of infection control practices in order to prevent SSI.	1. Educational standards as established by the <i>Core Curriculum for Surgical Technology</i> . ^{1,2}

<p>2. The CST has the knowledge and skills pertaining to properly wearing surgical attire as well as how to perform the surgical scrub in an aseptic manner that promotes prevention of SSI.</p> <p>3. The CST is qualified to participate in the decision making processes as related to evaluating surgical attire and scrub solutions for use in the healthcare facility.</p> <p>4. The CST is qualified to participate in the development and review of the healthcare facility policy and procedures for required surgical attire and performing the surgical scrub.</p>	<p>2. The subjects of infection control practices to prevent SSI, aseptic technique, donning surgical attire and performance of the surgical scrub are included in the didactic studies as a student.</p> <p>3. Students demonstrate knowledge of infection control practices, aseptic technique, donning surgical attire and performance of the surgical scrub in the lab/mock OR setting and during clinical rotation.</p> <p>4. As practitioners, CSTs implement infection control practices, aseptic technique, proper donning of surgical attire and perform the surgical scrub.</p> <p>5. As practitioners, CSTs participate in the decision making processes for evaluating surgical attire and surgical scrub solutions for use in the healthcare facility. Additionally, they participate in the development and review of healthcare facility policy and procedures for required surgical attire and performing the surgical scrub.</p> <p>6. CSTs complete continuing education to remain current in their knowledge of infection control practices, aseptic technique, surgical attire and surgical scrub.</p>
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