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Infection Control Manual		
UNC HEALTH CARE	Policy Name	**Hand Hygiene and Use of Antiseptics for Skin Preparation**
	Policy Number	**IC 0024**
	Date this Version Effective	**June 2017**
	Responsible for Content	**Hospital Epidemiology**

I. Description

Describes the indications and methods for hand hygiene and skin antisepsis.

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II. Rationale

Hand hygiene and skin antisepsis are critical components of infection prevention. Hospital personnel are believed to be the mode of transmission for most preventable healthcare-associated infections and, in many outbreaks, hands of personnel have been identified as the probable means of cross-infection. Hand hygiene has been shown to eliminate or markedly reduce hand carriage of pathogenic organisms, most of which are transient flora. Thus, it is an important means of preventing patient exposure to pathogens that have already colonized or infected other patients.

III. Policy

A. Definition of Terms

1. Alcohol-based handrub. An alcohol-containing preparation designed for application to the hands for reducing the number of viable microorganisms on the hands. In the United States, such preparations usually contain 60% - 95% ethanol or isopropanol.

2. Antimicrobial soap. Soap containing an antiseptic agent.
3. Antiseptic agent. Antiseptics are antimicrobial substances that are applied to the skin to reduce the number of microbial flora. Examples include alcohols, chlorhexidine, chlorine, hexachlorophene, iodine, para-chloro-meta-xylenol, quaternary ammonium compounds, and triclosan.
4. Antiseptic handwash. Washing hands with water and soap or other detergents containing an antiseptic agent.
5. Antiseptic handrub. Applying a waterless antiseptic agent to all surfaces of the hands to reduce the number of microorganisms present.
6. Decontaminate hands. Reducing bacterial counts on hands by performing antiseptic handrub or antiseptic handwash.
7. Detergent. Detergents (surfactants) are compounds that possess a cleaning action. They are composed of a hydrophilic part and a lipophilic part and can be divided into four groups: anionic, cationic, amphoteric, and non-ionic detergents. Although products used for handwashing or antiseptic handwash in healthcare settings represent various types of detergents, they are usually referred to as soaps.
8. Hand antisepsis. Refers to either antiseptic handwash or antiseptic handrub.
9. Hand hygiene. A general term that applies to handwashing, antiseptic handwash, antiseptic handrub, or surgical hand antisepsis.
10. Handwashing. Washing hands with plain (non-antimicrobial) soap and water.
11. Persistent activity. Antimicrobial activity that persists after the agent has been rinsed off the skin or has dried. This property, which is due to binding of the antiseptic agent to the stratum corneum, is also referred to as residual activity or substantively.
12. Plain soap. Plain soap refers to products that do not contain antimicrobial agents, or contain very low concentrations of antimicrobial agents that are effective solely as preservatives. Plain bar soap is comprised of alkyl carboxylate salts, a form of anionic detergent.
13. Surgical hand antisepsis. Antiseptic handwash or antiseptic handrub performed preoperatively by surgical personnel to eliminate transient and reduce resident hand flora. Antimicrobial soap preparations often have persistent antimicrobial activity.
14. Visibly soiled hands. Hands showing visible dirt or visibly contaminated with blood or other body fluids/substances (e.g., blood, fecal material, urine).
15. Waterless antiseptic agent. An antiseptic agent that does not require use of exogenous water. After applying such an agent, the individual rubs the hands together until the agent has dried.
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B. Transmission of Pathogens on Hands

Transmission of healthcare-acquired pathogens from one patient to another via the hands of Health Care Personnel (HCP) requires four elements:

1. Organisms present on the patient's skin, or that has been shed onto inanimate objects immediately surrounding the patient, must be transferred to the hands of HCP.
2. Organisms must be capable of surviving for at least several minutes on the hands of HCP.
3. Handwashing or hand antisepsis by the worker must be inadequate or omitted altogether, or the agent used for hand hygiene inappropriate.

4. The contaminated hands of the caregiver must come in direct contact with another patient, or with an inanimate object that will come in contact with the patient.

C. Indications for Handwashing and Hand Antisepsis

1. When hands are visibly dirty or contaminated with proteinaceous material or are visibly soiled with blood or other body fluids, wash hands with either a non-antimicrobial soap and water or an antimicrobial soap and water.
2. If hands are not visibly soiled, use an alcohol-based hand rub for routinely decontaminating hands in all other clinical situations described in items 3-9. Alternatively, wash hands with an antimicrobial soap and water in all clinical situations described in items 3-10.
3. Decontaminate hands before having direct contact with patients, even if gloves are worn.
4. Decontaminate hands before donning sterile gloves or inserting devices.
5. Perform hand hygiene after contact with a patient's intact skin (as in taking a pulse of blood pressure or lifting a patient)
6. Decontaminate hands after contact with body fluids or excretions, mucous membranes, non-intact skin, or wound dressings, as long as hands are not visibly soiled.
7. Decontaminate hands if moving from a contaminated body site to a clean body site during patient care.
8. Decontaminate hands after contact with inanimate objects (including medical equipment) within the patient's environment.
9. Decontaminate hands after removing gloves.
10. Before eating and after using a restroom, wash hands with a non-antimicrobial soap and water or with an antimicrobial soap and water.
11. HCP should use an antimicrobial soap and water when providing care for patients on enteric precautions for a suspected or known case of infectious gastroenteritis (e.g.,*Clostridium difficile* or norovirus). See Appendix 1 of Infection Control Policy 0031: Isolation Precautions for a complete list of infectious gastrointestinal diseases requiring enteric isolation.
12. Wash hands with non-antimicrobial soap and water or with antimicrobial soap and water if exposure to *Bacillus anthracis* is suspected or proven. The physical action of washing and rinsing hands under such circumstances is recommended because alcohols and other antiseptic agents have poor activity against *Bacillus anthracis* spores.
13. Antimicrobial-impregnated wipes (i.e., towelettes) have not been found to be as effective as alcohol-based hand rubs or washing hands with an antimicrobial soap and water for reducing bacterial counts on the hands of HCWs. Wipes should not be used by HCWs in clinical areas; however, they may be used in limited situations (e.g., cleaning small children's hands before going to the playroom, for patient use before or after eating).

D. Preparations Used for Hand Hygiene

Chlorhexidine, odophors and alcohols are the active antimicrobial ingredients recommended for hand hygiene. The hand hygiene products that are most commonly used within UNCHC are chlorhexidine gluconate and alcohol-based waterless hands rub. (For additional information regarding effectiveness of antiseptic agents, refer to Table 1, "Characteristics of Antiseptic [Antimicrobial] Agents.")

1. Alcohol: 70% isopropyl or ethyl alcohol disinfects the skin rapidly. It is effective against bacteria, mycobacteria, fungi and viruses. Unfortunately it is flammable, evaporates quickly, and dries the skin.

2. Iodophors: (e.g., Betadine). These are water soluble complexes of iodine with organic compounds, which are effective against all gram-positive bacteria, gram-negative bacteria, and viruses. The iodophors are not long lasting and, if used frequently, may cause considerable drying of the skin.
3. Chlorhexidine gluconate (e.g., CHG). This antiseptic is 2% chlorhexidine gluconate (CHG) with 4% isopropyl alcohol in a sudsing base. CHG is an effective antiseptic for reducing transient and resident microbial hand flora and has a sustained antimicrobial effect. It is also approved for surgical hand antisepsis. It does not appear to have adverse actions on the skin as do some of the other handwashing agents.
4. Alcohol-based antiseptics: Most contain 50-80% isopropanol, ethanol n-propanol or a combination of these two products. The antimicrobial activity of alcohols is due to their ability to denature proteins. Alcohols have excellent in vitro germicidal activity against gram-positive and gram-negative vegetative bacteria.
5. Other agents: Other antiseptic agents for hand hygiene include quaternary ammonium compounds, para- chlorometa-xylenol (PCMX), iodine compounds, phenol derivatives, iodophors, and Triclosan. Hospital Epidemiology must first approve use of these agents. Studies have shown these agents to be less active in reducing some types of microbes from the hands and some agents may be too irritating for hand hygiene.

E. Availability and Management of Hand Hygiene Products

1. Liquid soap dispensers are monitored by Environmental Services and should be replaced when empty. Dispensers must not be “topped off” since this can lead to bacterial contamination of the soap.
2. Alcohol-based waterless hand rubs must be available in all patient care areas. They should be located at the entrance to the patient’s room, at the bedside, or in other convenient locations. For areas where hand rubs may not be readily available, the healthcare provider should carry pocket-sized containers.
3. Alcohol-based waterless hand rubs should also be made available in the public waiting areas to promote hand hygiene among patients and visitors.

F. Hand Hygiene Technique

1. When decontaminating hands with a waterless antiseptic agent such as alcohol-based hand rub, apply product to palm of one hand and rub hands together, covering all surfaces of hands and fingers, until hands are dry. Follow the manufacturer’s recommendations on the volume of product to use. If an adequate volume of an alcohol-based hand rub is used, it should take 15 to 25 seconds for hands to dry.
2. When washing hands with a non-antimicrobial or antimicrobial soap, wet hands first with warm water, apply 3 to 5 ml of detergent to hands, and rub hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers to include the nail beds and between the fingers. Rinse hands with warm water and dry thoroughly with a disposable towel. Use towel to turn off the faucet.

G. Other Aspects of Hand Care and Protection

1. HCP with a cast or splint below the wrist that is non-removable are not allowed to provide direct patient care as they cannot perform hand hygiene. HCP with a removable splint can only provide direct patient care if the splint is not worn during the entire period of providing patient care.
2. Gloves: Single-use, disposable latex or nitrile gloves must be worn when coming into contact with blood or other potentially infectious materials (OPIM).

a. Gloves are not intended to replace good hand hygiene.

b. Hand hygiene with soap and water or with an alcohol-based antiseptic hand rub should therefore be used after glove removal.

c. Remove gloves after caring for patient.

d. Do not wear the same pair of gloves for the care of more than one patient. Do not wash gloves between patients.

e. Change gloves and decontaminate hands during patient care when moving from a contaminated site to a clean site.

3. Fingernails/Artificial Nails/Nail Polish

a. Long nails are known to promote growth of Gram negative bacteria and yeast. It is recommended that nails be kept less than ¼ inch long.

b. Artificial nail application is prohibited for all HCP who have direct contact with patients.

- Artificial nails include but are not limited to artificial tips or attachments, gel or shellac nails, silicone nails, silk wraps, acrylic nails, nail jewelry, and any other nail application.
- Clinical studies have implicated artificial nails as a source of healthcare-associated infection in high-risk areas, such as operating rooms and intensive care units.

c. Nail polish, if used, must be intact. Grossly chipped/lifting nail polish is a potential infection risk.

4. Jewelry:

a. There is little data to determine the effect of jewelry (e.g., rings, bracelets) on the effectiveness of hand hygiene.

b. Rings can make donning gloves more difficult and may cause gloves to tear more readily.

c. Certain high risk areas (e.g., NCCC) may prohibit wrist jewelry and rings.

H. Surgical Hand Antisepsis

1. Surgical hand antisepsis, using either an alcohol-based hand rub or an antimicrobial soap, will be performed before donning sterile gloves when performing surgical procedures.
2. All rings, watches, and bracelets must be removed prior to performing surgical hand antisepsis.
3. Refer to Appendix 5 of the Infection Control Policy IC 0059: Perioperative Services for detailed guidelines for surgical hand antisepsis.

I. Dermatitis

1. Personnel with cracked skin or dermatitis pose an infectious risk and are required to be evaluated by the Occupational Health Service as to work status and methods to relieve the condition.
2. To prevent and manage irritant contact dermatitis (ICD):

a. Encourage use of alcohol-based antiseptics for routine hand hygiene. These are well tolerated and associated with less ICD than soap and water handwashing. This does not apply to a situation that requires soap and water hand hygiene (e.g., patients with *Clostridium difficile* infections.

b. Wash hands with warm or cold water. There is no evidence that warm water is superior to cold water. Hot water should be avoided because it can irritate the skin, leading to dermatitis and bacterial colonization.

c. Use of cotton gloves liners when extended use of gloves is anticipated may help individuals with ICD to maintain healthy skin.

i. When used, cotton glove liners should be replaced at the beginning of each shift with a clean pair. If they become contaminated with blood or OPIM or become generally soiled in appearance, they should be removed promptly and replaced.

J. Skin Care/Lotions

1. HCP should use hand lotion in order to minimize the occurrence of irritant contact dermatitis associated with hand antisepsis and hand hygiene.

2. HCP using a personally purchased product should use products which appear on the approved hand lotion list. This list is found on the Infection Control website under "Frequently Requested Information."

3. Hand lotions/creams must be compatible with both the antimicrobial agent and use of nitrile gloves.

a. Some lotions and creams interfere with the effectiveness of the antimicrobial handwashing agents.

4. Compatible lotion may be ordered from Central Distribution (Lawson #050939) and should be available for use in clinical areas.

a. The Maintenance Department will install the hand lotion dispenser when requested.

K. Healthcare Worker Behavior and Compliance

Efforts to improve hand hygiene practice will be multifaceted and will include continuing education and feedback to staff on behavior or infection surveillance data.

L. Disaster Planning

In the event of interruption of water supply, alternative agents such as detergent containing towelettes and alcohol-based hand rubs will be available. In situations where soiling occurs, baby wipes (Lawson # 050638) should be used to cleanse the hands; alcohol-based hand rubs should then be used to achieve hand antisepsis.

M. Skin Antisepsis: Preparation of Patient's Skin for Nonsurgical and Surgical Procedures

1. Indications for Antisepsis in Clinical Practice (are as follows):

a. Before invasive procedures

b. Preparation of the patient's operative site and whole body disinfection (preoperative bath or shower with CHG product)

i. The antiseptic preoperative bath must be documented in the medical record for inpatients and outpatients.

c. Daily CHG baths should be performed in ICUs with the exception of Newborn Critical Care Center (NCCC).

i. Patients should be over the age of 3 months for daily CHG baths.

ii. The appropriate concentration for the antiseptic bath is 1 bottle (120 ml) of 4% CHG to one-half of a green bath basin or 3 liters of water. (Do not use the CHG hand soap because it is a different concentration. The 4% 120 ml CHG bottles can be ordered from Central Distribution.)

2. Antiseptic Agents

a. Preparing Patient's Skin for Medical Procedures

i. Intravenous Device

Chlorhexidine gluconate with alcohol (e.g., ChloraPrep™) is the preferred antiseptic agent to use for skin preparation prior to insertion of intravenous devices and should be applied by using repeated back-and-forth strokes.

ii. Minor Procedures (IM, Subcutaneous Injections, or heel sticks)

Alcohol is adequate for preparing skin for these types of procedures.

iii. Minor or Major Surgical Procedures

Chlorhexidine gluconate with alcohol (e.g., ChloraPrep™) is recommended for preparing a patient's skin prior to minor or major surgical procedures. Follow the manufacturer's directions for use and warnings. (Refer to Table 2 for detailed recommendations for preparing hands and cleaning skin before nonsurgical and surgical procedures.)

b. Antiseptic Agents for Neonates and Infants

i. Always allow the prep to dry completely.

ii. All skin prep must be thoroughly removed with sterile water or sterile saline after procedures to prevent burns and absorption of the prep; pay special attention to removing the prep solution that may have pooled beneath the baby during the procedure.

iii. Antiseptic agents for all babies >1000 g

Chlorhexidine gluconate with alcohol (ChloraPrep™) is to be used for the following procedures:

- Starting an IV
- Performing a venous/arterial puncture
- Umbilical line placement
- PICC placement or dressing change
- Lumbar punctures
- Circumcisions

Betadine is to be used for the following procedure:

- Urinary catheter insertion

iv. For recommendations for skin antisepsis for babies <1000 g, refer to the NCCC Protocols in Nursing Policy 0180: Skin Integrity.

c. Alcohols, iodophors and chlorhexidine gluconate can be used to prepare the operative or invasive site. These agents have an excellent spectrum of activity against bacteria.

d. Plain soap, triclosan, PCMX, and aqueous quaternary ammonium compounds are not recommended as single agents for operative site preparation unless a patient's skin is sensitive to all acceptable antimicrobial products.

e. When preparation of the patient's skin requires cleaning with an antiseptic agent, a fast acting one is desirable.

f. "Defatting" agents such as acetone are not recommended.

N. Implementation

Implementation of this policy is the responsibility of Hospital Epidemiology, Service Line Directors, Nursing Service, Phlebotomy, and the Medical Staff.

IV. References

The Society for Healthcare Epidemiology of America. Strategies to Prevent Healthcare-Associated Infections through Hand Hygiene. August 2014.

Centers for Disease Control and Prevention. Guideline for Hand Hygiene in Health Care Settings. Atlanta, GA, October 2002.

Larson, Elaine. APIC Guidelines for Handwashing and Hand Antisepsis in Health Care Settings. American Journal of Infection Control. August 1995.

APIC Infection Control and Applied Epidemiology Principles and Practice. Mosby. 1996.

V. Reviewed/Approved by

Hospital Infection Control Committee

VI. Original Policy Date and Revision

Revised on Jan 2005, Mar 2007, Feb 2010, Feb 2013, Feb 2016, June 2017_{rev}

Table 1: Characteristics of Antisepsis (Antimicrobial Agents)

Group	Gram-positive bacteria	Gram-negative bacteria	Mycobacteria	Fungi	Viruses	Speed of action	Comments
Alcohols	+++	+++	+++	+++	(enveloped) +++	fast	optimum concentration 60-90%; no persistent activity
Chlorhexidine (2% and 4% aqueous)	+++	+++	+	+	+++	intermediate	persistent activity; rare allergic reactions
Iodine compounds	+++	+++	+++	++	+++	intermediate	causes skin burns; usually too irritating for hand hygiene
Iodophors	+++	+++	+	++	++	intermediate	less irritating than iodine; acceptance varies
Phenol derivatives	+++	+	+	+	+	intermediate	activity neutralized by non-ionic surfactants
Triclosan	+++	++	+	-	+++	intermediate	acceptability on hands varies
Quaternary ammonium compounds	+	++	-	-	+	slow	used only in combination with alcohols; ecologic concerns

Activity: +++ (excellent); ++ (good, but does not include the entire bacterial spectrum); + (fair) ; - (no activity or not sufficient)

(Note: Hexachlorophene is not included because it is no longer an accepted ingredient of hand disinfection.)

Table 2: Recommendations for Hand Hygiene and Cleaning Patients' Skin before Nonsurgical Procedures*

Procedure	Example	Hand Hygiene[b]	Gloves	Preparation of Patient's Skin
Nonsurgical Instruments used in the procedure will come in contact with intact mucous membranes	Bronchoscopy; gastrointestinal endoscopy; tracheal suction	Antimicrobial Soap and Water or Alcohol-Based Hand Rub	Clean required	In general, none is required.
	Cystoscopy; urinary tract catheterization	Antimicrobial Soap and Water or Alcohol-Based Hand Rub	Sterile required	Antiseptics should be used to prepare the urethral meatus. Povidone iodine is recommended. Chlorhexidine gluconate (2% to 4%) if patient is allergic to povidone iodine.
Insertion of a peripheral intravenous catheter	Intravenous therapy	Antimicrobial Soap and Water or Alcohol-Based Hand Rub	Clean required	Chlorhexidine gluconate with alcohol is the preferred agent. Alcohols, iodophors and chlorhexidine gluconate can be used to prepare the site. Apply antiseptic liberally. Allow to dry. Do not re-contaminate site (e.g., palpate the vein after skin antisepsis).
Insertion of an arterial catheter[a]	Arterial pressure monitoring	Antimicrobial Soap and Water or Alcohol-Based Hand Rub	Sterile required	Chlorhexidine gluconate with alcohol is the preferred agent. Follow the manufacturer's directions for using the agent (e.g., use back-and-forth strokes). Alcohols and iodophors can be used to prepare the operative (invasive) site. Apply antiseptic liberally. Perform prep using friction and moving in concentric circles, from the center outward. All skin preparations must be allowed to dry, do not re-contaminate site (e.g. touching site after prep.)

Percutaneous insertion of a central catheter or wire[a]	Hyperalimentation; central venous and capillary wedge pressure monitoring angiography; cardiac pacemaker insertion	Antimicrobial Soap and Water or Alcohol-Based Hand Rub	Sterile required	Chlorhexidine gluconate with alcohol is the preferred agent†. Follow the manufacturer's directions for using the agent ChloraPrep™ (e.g., use back-and-forth strokes). Alcohols and iodophors can be used to prepare the operative (invasive) site. Apply antiseptic liberally. Perform prep using friction and moving in concentric circles, from the center outward. All skin preparations must be allowed to dry; do not recontaminate site (e.g. touching site after prep).
Insertion (and prompt removal) of a sterile needle in deep tissues or body fluids, usually to obtain specimens or instill therapeutic agent	Spinal tap (lumbar puncture); thoracentesis; abdominal paracentesis[c]	Antimicrobial Soap and Water or Alcohol-Based Hand Rub	Sterile required	Chlorhexidine gluconate with alcohol is the preferred agent. Follow the manufacturer's directions for using the agent (e.g., use back-and-forth strokes). Alcohol and iodophors can be used to prepare the operative (invasive site. Apply antiseptic liberally. Perform prep using friction outward. All skin preparations must be allowed to dry; do not recontaminate site (e.g., touching site after prep).

*Hands should also be washed after all procedures when microbial contamination of the operator is likely to occur, especially those involving contact with blood, OPIM, and/or mucous membranes, whether or not gloves are worn.

[a]Refer to Infection Control Policy 0032: The Prevention of Intravascular Catheter-Related Infections for draping procedure.

[b]Approved antimicrobial soap at UNC Hospitals is chlorhexidine gluconate.

[c]Refer to Infection Control Policy 0030: Guidelines for Adult and Pediatric Inpatient Care for draping procedure

†Many IV kits contain swabs impregnated with CHG and alcohol. Each product must be applied following manufacturer's recommendations and allowed to dry thoroughly. If applied in a cursory manner or with insufficient contact time, they lose effectiveness.

Table 3: Recommendations for Hand Hygiene and Cleaning Patients' Skin before Surgical Procedures*[a]

Procedure	Example	Hand Hygiene[b]	Gloves	Preparation of Patient's Skin
Insertion of a sterile tube or device through tissue into a normally sterile tissue or fluid	Chest tube insertion; culdoscopy, laparoscopy, peritoneal catheter insertion	Antimicrobial soap and water or alcohol-based hand rub	Sterile required	Antiseptics should be used; if hair removal is considered necessary, hair should be clipped not shaved. Chlorhexidine gluconate with alcohol is the preferred agent. Follow the manufacturer's directions for using the agent (e.g., use back-and-forth strokes). Alcohols and iodophors can be used to prepare the operative (invasive) site. Apply antiseptic liberally. Perform prep using friction and moving in concentric circles, from the center outward. All skin preparations must be allowed to dry, do not recontaminate site (e.g. touching site after prep.)
Minor skin surgery	Skin biopsy; suturing of small cuts; lancing boils; mole removal	Antimicrobial soap and water or alcohol-based hand rub	Sterile required	Antiseptics should be used; if hair removal is considered necessary, hair should be clipped not shaved. Chlorhexidine gluconate with alcohol is the preferred agent. Follow the manufacturer's directions for using the agent (e.g., use back-and-forth strokes). Alcohols and iodophors can be used to prepare the operative (invasive) site. Apply antiseptic liberally. Perform prep using friction and moving in concentric circles, from the center outward. All skin preparations must be allowed to dry; do not re-contaminate site (e.g. touching site after prep).
Other procedures (major and minor surgery) that enter tissue below the skin	Hysterectomy; cholecystectomy; herniorrhaphy	Antimicrobial soap and water or alcohol-based hand rub	Sterile required	Antiseptics should be used; if hair removal is considered necessary, hair should be clipped not shaved. Chlorhexidine gluconate with alcohol is the preferred agent. Follow the manufacturer's directions for using the agent (e.g., use back-and-forth strokes). Alcohols and

				iodophors can be used to prepare the operative (invasive) site. Apply antiseptic liberally. Perform prep using friction and moving in concentric circles, from the center outward. All skin preparations must be allowed to dry; do not re-contaminate site (e.g. touching site after prep).

*Hands should also be washed after all procedures when microbial contamination of the operator is likely to occur, especially those involving contact with blood, OPIM, and/or mucous membranes, whether or not gloves are worn.

[a]Refer to Appendix 7 of Infection Control Policy 0059: Guidelines for Perioperative Services for information on draping .

[b]Approved antimicrobial soap at UNC Hospitals is chlorhexidine gluconate.