Environmental Cleaning and Disinfection
IN THE OR AND OTHER INVASIVE PROCEDURE ROOMS

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Objectives
After completion of this self-study activity, the learner will be able to:
1. Describe current recommended practices for environmental cleaning in the perioperative setting.
2. Discuss the importance of environmental cleaning protocols for the surgical practice setting.
3. Identify precautionary measures that help to limit transmission of microorganisms when performing routine environmental cleaning and disinfection activities.
4. Identify the information to be covered in policies and procedures.

Test Questions
True or False
1. The perioperative nurse is responsible for verifying the surgical environment is clean and safe.
   A. True  B. False
2. Not all surgical procedures are considered potentially infectious.
   A. True  B. False

3. Alcohol is an Environmental Protection Agency (EPA)-registered disinfectant and can be used to clean large environmental surfaces.
   A. True  B. False

4. When turning over a room for the next procedure it is only necessary to clean a 3-ft to 4-ft perimeter around the surgical field when it is visibly soiled.
   A. True  B. False

5. Items that would not release blood or other potentially infectious materials (OPIM) in a liquid or semi-liquid state if compressed, or are not caked with dried blood or OPIM are considered noninfectious and should be placed in a separate container designated for regular or non-infectious waste.
   A. True  B. False

6. All surgical or invasive procedure rooms, including unused rooms, should also be cleaned once during each 24 hour period throughout the facility’s regularly scheduled work week.
   A. True  B. False

7. Ice machines that use a scoop are preferred over ice dispensers.
   A. True  B. False

8. All procedures identified as contaminated or dirty-infected (cases classified as class III or IV) require extraordinary cleaning procedures and closure of the operating rooms.
   A. True  B. False

9. *Clostridium difficile* is transmitted typically through hand contact with surfaces contaminated with feces.
   A. True  B. False

10. Disposable instruments used on Creutzfeld Jakob Disease (CJD) cases should be placed in biohazard sharps boxes and incinerated.
    A. True  B. False

Introduction
Patient safety is a huge initiative in today’s healthcare world. Reducing healthcare-associated infections (HAIs) is
a major goal of patient safety. In the perioperative arena a large focus is on decreasing the risk of surgical site infections (SSIs). One essential part of that effort is to provide a safe and clean environment where surgical or invasive procedures are performed.

Surgery and invasive procedures are performed in traditional operating rooms (OR) and ambulatory surgery centers (ASC) as well as many other settings such as, physician offices, cardiac catheterization suites, endoscopy suites, and radiology departments. Consistent and thorough cleaning and disinfection practices will minimize the patient’s and healthcare worker’s risk of exposure to potentially infectious microorganisms. (AORN Purpose)¹

Regular cleaning and disinfection decreases the amount of dust, organic debris, and microorganisms in the environment. “Following scientifically based recommendations for cleaning and disinfection practices in health care organizations helps to reduce infections associated with contaminated items. Many studies have documented that failure to comply with scientifically based recommendations has led to infection outbreaks.” (AORN Recommendation II General Statement)¹

**Environmental Cleaning and Disinfection is a Team Effort**

A critical responsibility for any healthcare provider is minimizing patient risks. Providing and maintaining a clean and safe environment takes a collaborative effort between perioperative nurses, surgical technicians, surgical patient care assistants, environmental services (EVS) personnel, and infection prevention and control (IPC) professionals. Policies, procedures and guidelines related to environmental cleaning should be created and established in partnership with the OR, EVS and IPC. (AORN Recommendation X General Statement)¹

“The safety of patients undergoing operative or other invasive procedures is the primary responsibility of the perioperative registered nurse.”² Therefore, perioperative nurses should be well versed in the facility’s policies and procedures regarding environmental cleaning in the perioperative setting.

Environmental cleaning and disinfection is a team effort, however; “The responsibility for verifying a clean surgical environment rests with the perioperative nurses.” (AORN Recommendation I.a.)¹ Before case carts, supplies, equipment and instruments are brought in, the OR/procedure room should be visually inspected for the absence of visible dust, debris, soil or body substances. (AORN Recommendation I.a.1.)¹

**Recommended Practices**

The Association of periOperative Registered Nurses (AORN) provides detailed guidance for effective and efficient environmental cleaning and disinfection in the surgical practice setting. These can be found in the Recommended Practices (RP) for Environmental Cleaning in the Perioperative Settings.¹ These recommendations are a great resource for all surgical or invasive procedure areas.

This RP was newly revised in 2007 and was then published in the 2008 edition of the AORN perioperative standards and recommended practices. Like all of the AORN RPs, this one was developed by the AORN recommended practices committee and approved by the Board of Directors. All AORN RPs are intended to be attainable recommendations for a best level of practice. (AORN Introduction)¹

**Decreasing Sources of SSI**

In anatomy and physiology 101 we learned that skin is the body’s first line of defense. Therefore, any breach of a patient’s skin could potentially result in an infection. Consequently, all surgical procedures should be considered potentially infectious.

There are many sources of pathogens that may cause SSI. Pathogenic sources, other than the patient, include personnel, equipment, instruments, supplies and the environment (including the air). (AORN General Statement)³ Many HAIs have been found to be linked to external surfaces such as environmental surfaces.³ Pathogenic organisms have the ability to survive on environmental surfaces and are easily transmitted to many other areas. (AORN Recommendation I General Statement)¹

**End of Procedure Cleaning vs. Terminal Cleaning**

All patients should have a clean and safe environment. Therefore, in addition to daily cleaning, operating rooms should be cleaned after each surgical or invasive procedure. Cleaning that is performed at the end of one surgical procedure and before the start of another procedure in that same room is referred to as end of procedure cleaning, room turnover, or between case cleaning. Cleaning that is performed at the conclusion of the surgical practice setting daily surgery schedule is referred to as terminal cleaning.

**Cleaning and Disinfection**

Ensuring the environment is clean and safe requires methods for both cleaning and disinfection. Cleaning is defined as a process using friction, detergent and water to remove organic debris; the process by which any type of soil, including organic debris is removed. It is important to note that cleaning removes but does not kill microorganisms. Disinfection is defined as a process that kills most forms of microorganisms on inanimate surfaces. Disinfection destroys pathogenic organisms (excluding bacterial spores) or their toxins or vectors by direct exposure to chemical or physical means. (AORN Glossary)¹
Disinfection of Surfaces

Environmental surfaces are considered noncritical devices which only require low level of disinfection. Environmental surfaces can serve as a means of transmission by providing a reservoir for microorganisms and can contaminate a healthcare worker’s hands. This is referred to as surface-to-hand transfer of bacteria. (AORN Recommendation I.c.)

Conducted studies show environmental cleaning and disinfection helps to reduce microbial bioburden in the environment and suspends the transmission of microorganisms. “One study has shown that vancomycin-resistant enterococci (VRE) is transmitted by contaminated surfaces. Another study showed that a persistence of pathogens can survive on fabrics and plastics.” (AORN Recommendation I.c.)

Only Environmental Protection Agency (EPA)-registered hospital detergents/disinfectants should be used for cleaning of floors, noncritical equipment and other surfaces. Material safety data sheets (MSDSs) should be available and reviewed for each chemical used in the surgical setting. Facilities should consider using products that are environmentally friendly because these products contribute to better air quality and are less toxic to patients, visitors and healthcare workers. (AORN Recommendation II.a.1.)

Cleaning solutions should be prepared daily or as needed according to the manufacturers written instructions. All chemicals must be labeled with the chemical and the solution’s concentration. Alcohol is not an EPA-registered disinfectant and does not remove soil, so it should not be used to clean large environmental surfaces. Alcohol is flammable and must only be used with caution in the OR. (AORN Recommendation II.a.5.)

Spray bottles filled with disinfectant should not be used when performing cleaning and disinfection because they can pollute the air with mist aerosols or dust. (AORN Recommendation I.b.3.)

Vinyl gloves do not offer adequate protection in environmental cleaning and disinfection procedures because the barrier protraction failure rate with vinyl gloves can be high. Therefore, gloves used for these procedures should be made of natural rubber latex, nitrile, chloroprene blends or butyl rubber. (AORN Recommendation I.b.4)

Cleaning Cloths and Mops

When reusable cloths and mops are used for cleaning, they should be decontaminated or changed after each use to prevent surface contamination during cleaning and subsequent transfer of organisms. Once used, cleaning mops or cloths should not be returned to the cleaning solution container, in other words, no “double dipping.” (AORN Recommendation I.c.1.)

Some facilities use mops made of microfiber materials to clean floors. These microfibers are very small densely constructed, polyester and nylon fibers. The microfibers are positively charged making them draw or attract dust which is negatively charged. Microfiber mops are more absorbent than the traditional cotton-loop mop heads. Microfiber mops can endure up to 300 washings and weigh about two pounds versus the conventional string mops that weigh about 10 pounds. Consequently microfiber mops may help decrease personnel injuries. (AORN Recommendation I.c.3)

Prevent Vermin Infestation

Pathogenic organisms can be carried by insects and rodents. To prevent pest infestation in the perioperative setting, food sources or any environment that attracts vermin should be removed and windows and doors should be kept closed. Food left out in lounges for long periods of time may cause fly infestation. In the event of an infestation, a credentialed pest control specialist should be contracted to eradicate the source of the infestation (AORN Recommendation I.d.2)

Prior to First Case

Contaminated dust particles can come from sources such as ventilation, doors, equipment or personnel activity. Dust containing such things as human skin, hair, fabric, paper fibers, pollens, mold, fungi, insect parts, and glove powder can settle on horizontal surfaces. Damp dusting will help prevent the microbial-burdened dust from being transmitted from furniture, surgical lights, booms and equipment. (AORN Recommendation I.a.1.)

The operating or procedure room should be damp dusted with a clean, lint-free cloth moistened with an EPA-registered hospital detergent/disinfectant immediately before the first case of the day. Any subsequent equipment should be wiped down before it is transported into the operating or procedure room. Plasma and monitor screens should be cleaned according to manufactures written recommendations. (AORN Recommendation I.b.)

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Between Case Cleaning

After each surgical or invasive procedure a clean and safe environment should be reestablished by cleaning with a lint-free or microfiber cloth that has been wet with a detergent/disinfectant and water. (AORN Recommendation II.a.)

In most circumstances, the surgical or invasive procedure room floor should be mopped following each case. The previous AORN RP stated for end-of-procedure cleaning, it is only necessary to clean a 3-ft to 4-ft perimeter around the surgical field when it is visibly soiled. This recommendation was deleted because there was no available science to support the statement. According to AORN’s Manager of Standards and Recommended Practices, Ramona Conner RN, MSN, CNOR, “In general, the floors should be cleaned following each procedure. However, some procedures such as cataracts may not require mopping the floor after each case. There is currently no evidence to support the requirement to mop after every case. In some instances … this may be unnecessary and impractical. The floor should, of course, be mopped whenever there is visible soil or there is a potential of contamination (visible or not) by blood or other potentially infectious materials.”

Equipment Cleaning

The surfaces of mattresses and padded positioning devices should be made of moisture-resistant material and be completely intact. Nonporous surfaces (mattress covers, tourniquet cuffs, BP cuffs, and other patient care equipment) should be cleaned and disinfected with an EPA-registered hospital disinfectant between each patient use. Any damaged or worn covering should be replaced. Coverings made of fabric should be changed and laundered after each patient use. Vehicles used for transportation of patients, including straps and attachment, should be cleaned in between patient uses. Disposable straps should be discarded after one use. All work surfaces, tables and containers such as bins, kick buckets, or pails, should be routinely cleaned and disinfected. (AORN Recommendation II.d.)

Computers and Electronic Equipment

Computers and other electronic equipment such as computer keyboards, monitor screens, and telephones may be sensitive to some disinfectants. The Manufacturers cleaning recommendations should be followed when cleaning these devices. Items that cannot be cleaned should be covered with a moisture-impervious protective covering that can be cleaned or discarded after each use. (AORN Recommendation II.g.)

Neonatal Patients

After cleaning and disinfection, all surfaces should be dry before any patient contact. This is particularly important for neonatal patients. When cleaning incubators, baby warmers or bassinets, an EPA-registered germicide should be used in the concentration indicated in the manufacturer’s guideline for nurseries and neonates. (AORN Recommendation II.i.2.)

Chemical residue may remain on these devices if it is not thoroughly dried. (AORN Recommendation II.i.)

Contaminated Items

Contaminated items should be handled safely and according to all state and federal regulations. Disposable and reusable items may be classified as either potentially infectious or noninfectious. To help promote a safe and healthy environment policies must be in place and enforced for handling contaminated items. (AORN Recommendation III General Statement)

Disposable Items

Handling disposable devices depends on whether they are considered infectious. Disposable objects such as gowns, gloves, sponges, drapes, suction tubing, liners, and canisters are considered potentially infectious if:

- they would release blood or other potentially infectious materials (OPIM) in a liquid or semi-liquid state when they are compressed, or
- are caked with dried blood, or OPIM.

Objects considered potentially infectious must be placed in closable, leak-proof containers or bags that are color-coded, and labeled for easy identification as biohazardous waste. (AORN Recommendation III.a.) Biohazard waste is regulated waste and is sometimes called red bag waste.

Items that would not release blood or OPIM in a liquid or semi-liquid state if compressed, or are not caked with dried blood or OPIM are considered noninfectious and should be placed in a separate container designated for regular or non-infectious waste.

Regulated Waste

The storage room or area for regulated (red bag) waste should have:

- a floor drain;
- a cleanable floor and wall surface;
- good lighting; and
- exhaust ventilation.
The red bag waste storage area should be safe from any unauthorized entry, weather, insects and animals, until it is transported for treatment or disposal. (AORN Recommendation III.b.)

Reusable Items
Reusable devices such as surgical instruments or supplies are considered infectious if they:
- would release blood or OPIM in a liquid or semi-liquid state if squeezed; or
- are caked with blood or OPIM.

Reusable items, which are contaminated with blood and/or tissue must be placed in closable, leak-proof containers and labeled as biohazard to prevent exposure of personnel to blood, tissue and body fluids as well as avoiding contamination of the environment. (AORN Recommendation III.d.) (ANSI/AAMI ST79 Section 6.2)

Liquid Waste
When disposing of liquid waste, personal protective equipment (PPE) must be worn because of the possibility of splash or spatter. Facilities should follow their state regulations regarding liquid waste disposal. Liquid waste disposal methods may include:
- adding a solidifying powder to the liquid;
- use of a medical liquid waste disposal system; or
- pouring the liquid down a sanitary sewer. (AORN Recommendation III.e.1)

Contaminated Laundry
Contaminated laundry should be handled as little as possible. Shaking or excessive handling of contaminated laundry should be avoided in an effort to decrease the chance of contamination of air, surfaces and personnel. Contaminated linen should be put in containers or bags that are leak-proof and labeled with the location where it was used. Linen should only be laundered in a designated, facility-approved and monitored laundry. If the design of the perioperative setting includes a laundry chute it should be designed to enable routine cleaning, disinfection and maintenance. Laundry chutes need to be maintained under negative air pressure. (AORN Recommendation II.e.)

Daily Terminal Cleaning
Terminal cleaning and disinfection should be performed in the surgical and invasive procedure rooms as well as scrub and utility areas on a daily basis. AORN recommends that floors be wet-vacuumed with an EPA-registered disinfectant. Other areas requiring cleaning and disinfection include, but are not limited to:
- all horizontal surfaces (e.g., cabinet tops, tops of sterilizers, solution blanket warmers);
- hallways and floors;
- substerile areas; and
- sterile storage areas. (AORN Recommendation IV.a.2. and IV.a.3.)

Equipment and supplies are moved in and out of unused rooms throughout the day, therefore all unused rooms should also be cleaned once during each 24 hour period throughout the facility’s regularly scheduled work week. (AORN Recommendation IV.a.1.) After scheduled cases are completed AORN recommends that
Cleaning Equipment
To prevent the growth of microorganisms during storage and to prevent subsequent contamination of the perioperative area, cleaning equipment should be disassembled, then cleaned and disinfected using an EPA-registered disinfectant, and dried before reuse and storage. (AORN Recommendation IV.b.1)

Liquid Hand Soap Dispensers
Refillable liquid hand soap dispensers should not be used because they can become contaminated and serve as reservoirs for microorganisms. Extended use of multi-use containers, transferring solutions to secondary containers, and refilling containers has resulted in contamination of the solution with Pseudomonas aeruginosa. (AORN Recommendation IV.c.1)

Routine Environmental Cleaning and Disinfection Housekeeping Schedule
In an effort to reduce the numbers of microorganism present, all areas and equipment in the surgical practice setting should be routinely cleaned. A cleaning schedule for areas and equipment that should be cleaned on a daily, weekly or monthly basis should be established by the facility. This housekeeping schedule should be developed by a multi-disciplinary team inclusive of OR, EVS and IPC personnel in order to establish the appropriate rate of recurrence for cleaning, disinfection and maintenance. (AORN Recommendation V.a.1)

Areas and equipment that should be cleaned on a weekly or monthly basis should include, but are not limited to:
- heating and air-conditioning equipment;
- pneumatic tubes and carriers;
- sterilizers and their loading carts/carriages;
- clean and soiled storage areas;
- walls and ceilings; and
- unrestricted areas (e.g., offices, waiting rooms, lounges, lavatories, and locker rooms. (AORN Recommendation V.a.1.1)

Pathogens such as Pseudomonas aeruginosa thrive in moist and humid environments and are known to cause healthcare-associated infection outbreaks. Scrub sinks (including the aerators on facets) and wash basins should be cleaned and then disinfected using an EPA-registered disinfectant on a routine schedule. All ventilation ducts, refrigerators and ice machines should be routinely cleaned and disinfected. All cleaning and disinfection activities should be documented in a log. (AORN V.b. and V.c.1)

Machines that dispense ice are preferred over ones that require the use of an ice scoop. If an ice scoop is used it should be cleaned at least weekly. (AORN Recommendation V.c.3.1)

Protective Measures
Precautionary measures aimed at limiting the transmission of microorganisms should be used when performing routine environmental cleaning and disinfection activities. In 1991, the Occupational Safety and Health Agency (OSHA) published its Bloodborne Pathogens Exposure Control Plan to help protect healthcare workers from exposure to bloodborne infections. In 2000, Congress passed the Needlestick Safety and Prevention Act in an effort to protect healthcare workers from contaminated sharps. (AORN Recommendation V General statement.1)

Following bloodborne pathogen precautions reduces healthcare workers risks of exposure to blood and OPIM. “Approximately 8,700 health care personnel are infected with hepatitis B annually, resulting in 200 deaths. Wearing PPE can reduce the risk of becoming infected with HIV/AIDS and hepatitis C as well.” (AORN Recommended Practice VI.a.1)

Whenever performing cleaning and disinfection procedures that involve contact with blood and OPIM, personnel must comply with OSHA’s bloodborne pathogen standards and follow all standard precautions. All body fluids, except sweat, are considered potentially infectious. (AORN Recommendation VI.b.1)

Appropriate PPE includes wearing gloves whenever personnel may have contact with blood or OPIM while handling or touching contaminated items or surfaces. If there is a possibility of splashes, spray, splatter or droplets of blood or OPIM, fluid-resistant face masks, eye protection and face shields must be worn. (AORN Recommendation VI.c.1) (ANSI/AAMI ST79 Section 4.5.2.7)

Needles, blades and sharp disposable instruments must be immediately discarded in a container that is closable, puncture resistant and marked with a biohazard label. (AORN Recommendation VI.h.1) (ANSI/AAMI ST79 Section 6.2)
Spills that contain blood or OPIM should be removed with an absorbent material as soon as possible. Caution must be taken when cleaning spills including the use of gloves, and may include gown, mask and eye protection. “The contaminated absorbent cleaning material used to clean a spill must be disposed of in a designate biohazardous waste receptacle.” (AORN Recommendation VI.f.2.)

Contact or Airborne Precautions

Healthcare facilities should establish procedures for environmental cleaning, disinfection and PPE use for circumstances that may require contact or airborne precautions. Pathogens may be distributed by person-to-person, directly or indirectly through:
- a contaminated environmental surface;
- airborne transmission;
- fecal-oral transmission; or
- percutaneous exposure. (AORN Recommendation VII General Statement)

Procedures identified as contaminated or dirty-infected (cases classified as class III or IV) do not require any extraordinary cleaning procedures or closure of the operating rooms with the exception of cases involving patients suspected of having Creutzfeldt-Jacob disease (CJD). (AORN Recommendation VII General statement)

Antibiotic-resistant Organism Transmission

In the past 30 plus years, the occurrence of multi-drug resistant organisms has risen steadily in healthcare facilities. Adhering to approved cleaning and disinfection procedures is a critical step toward the prevention of antibiotic-resistant organism transmission. Both Methicillin-resistant *Staphylococcus epidermidis* (MRSE) and Vancomycin-resistant *Enterococci* (VRE) have been found to survive longer than 90 days on fabrics and plastics. One study found VRE was recovered from 50 percent of inadequately cleaned surfaces after inoculation. (AORN Recommendation VII.h.)

Appropriate cleaning and disinfection methods should be enforced following care of patients infected or colonized with:
- Methicillin-resistant *Staphylococcus aureus*;
- Vancomycin-resistant *Enterococci*;
- any multi-drug-resistant pathogen, including Vancomycin-intermediate enterococcus;
- Vancomycin-resistant *Staphylococcus aureus*;
- extended spectrum β-lactamases;
- multi-drug-resistant gram-negative bacteria; and
- resistant *Streptococcus pneumonia*. (AORN Recommendation VII.h.)

When cleaning rooms used for patients colonized or infected with drug resistant pathogens, contact precautions should be used and isolation gowns and gloves should be worn.

**Clostridium difficile**

*Clostridium difficile* is transmitted through a fecal-oral exposure. *C. difficile* has been cultured in rooms occupied by infected patients for up to 40 days after the patient has left the room. The transmission is typically through hand contact with surfaces contaminated with feces. The spore form, *C. difficile* can survive up to five months in the environment and can be transmitted from person-to-person via touching surfaces or objects that have been contaminated with feces and then placing contaminated fingers or objects into the mouth. (AORN Recommendation VII.c.)

Whenever patients are diagnosed or suspected of being infected with *Clostridium difficile*, the room should be cleaned with an EPA-registered hypochlorite (bleach)-based disinfectant. Isolation gowns and gloves should be worn and again, fluid-resistant face mask and eye protection must be worn if splash or splatter is anticipated. (AORN Recommendation VII.c.) (CDC Disinfection of Healthcare Equipment, Inactivation of *Clostridium difficile*, p.22)

**Airborne Disease**

When cleaning and disinfecting the room of a patient who has an airborne disease (i.e., rubella [measles], varicella [chickenpox] or, tuberculosis [TB]) workers must use a properly fit-tested N95 mask or powered air purifying respirator until a complete air exchange has been achieved. Access to these rooms should be restricted until the air exchange has been completed. For a 15-air-exchanges-per-hour cycle, this means a 28 minute wait time. (AORN Recommendation VII.d.) The AORN RP on Environmental Cleaning provides a table helpful in establishing the time necessary for airborne contaminant removal related to air changes per hour.

The EPA-registered germicide disinfectant used for cleaning rooms contaminated with airborne diseases should be labeled for tuberculocidal activity. (AORN Recommendation VII.d.3.)
Creutzfeldt-Jakob disease

CJD is caused by proteinaceous infectious agents or prions which do not contain DNA or RNA. The probability of CJD transmission is directly related to the concentration of prions. All reported cases are a result of exposure to infectious brain, pituitary or eye tissue. (AORN Recommendation XVII)\(^1\) (ANSI/AAMI ST79 Annex C.1)\(^9\) Special cleaning procedures should be used on environmental surfaces after a surgical procedure which included high risk tissue such as brain, spinal cord, or eye tissue on a patient diagnosed or is suspected of having CJD. (AORN Recommendation VII.e.)\(^1\) (ANSI/AAMI ST79 Annex C.2)\(^9\)

Prions present unique infection prevention and control challenges because they are resistant to traditional chemical and physical decontamination techniques. Chemicals used in a hospital laundry are not effective in deactivation of prions. (AORN Recommendations VII.e.2.)\(^1\) Thus, disposable linens should be used for these cases. Work surfaces should be covered with a disposable, impervious material that can be removed and incinerated after the procedure. (AORN Recommendation VII.e.1.)\(^1\)

Environmental surfaces that are contaminated with high-risk tissues should be cleaned and then decontaminated with a solution of sodium hydroxide (1 Normal or 1 Molar solutions) or, sodium hypochlorite (1 part chlorine bleach to 5 parts diluent). The solutions require a contact time of 30 to 60 minutes to be effective. Commercial solutions of sodium hydroxide are readily available. Hypochlorite solutions need to be prepared daily with the use of a hood. (AORN Recommendation VII.e.3.)\(^1\) In most facilities, the hypochlorite solution is usually mixed by the pharmacy.

Disposable gowns, gloves, masks and eyewear should be worn during these cleaning procedures. All cleaning supplies used in these cases should be incinerated, and the cleaning liquids should be solidified and then incinerated. (AORN Recommendation VII.e.5.)\(^1\) Disposable instruments used on CJD cases should be placed in biohazard sharps boxes and incinerated. (AORN Recommendation VII.e.6.)\(^1\)

Construction

During any construction, renovation, repair or demolition, processes should be in place addressing appropriate containment, cleaning, disinfection and surveillance procedures. Pathogens may be released into the environment during construction. One example is *Aspergillus* which is a fungi that can be released and dispersed as a result of damage to a water pipe in a ceiling or wall. Air sampling may be used to establish whether fungi are present in the area. (AORN Recommendation VIII.d.2.)\(^1\)

In an effort to protect patients and personnel from dust and debris, protective barriers should be established and maintained during the construction process. In order to ensure dust and debris are adequately contained, particle counts should be done close to the barriers at all seams, joints, and entry/exits into the construction area. (AORN Recommendation VIII.c.)\(^1\) Dust and debris within and near construction zones should be routinely cleaned. At the completion of construction, terminal cleaning and disinfection should be performed, before placing equipment and supplies in the area. (AORN Recommendation VIII.e.)\(^1\)

Proficiency

OSHA mandates employers supply education and training programs for employees regarding recognition, avoidance, and prevention of unsafe and unhealthy working conditions.

Healthcare workers responsible for environmental cleaning should initially be given education, training, and proficiency validation on proper environmental cleaning and disinfection methods, cleaning and disinfection agent selection, and safety precautions. (AORN Recommendation IX.a.)\(^1\) The training program and material should be in vocabulary level, literacy and language of the staff member(s). (AORN Recommendation IX.c.)\(^1\)

Policies and Procedures

Written policies and procedures addressing environmental cleaning and disinfection should be reviewed annually, and readily available in surgical or invasive procedure practice settings. Policies and Procedures are necessary to establish authority, responsibility and accountability. These documents provide guidelines and support in the development of patient safety quality assurance, and improvement activities. (AORN Recommendation General Statement)\(^1\)

Policies and Procedures for environmental cleaning and disinfection should include, but not be limited to:

- identification of responsible personnel;
- competency validation;
- standard cleaning and disinfection procedures;
- frequency of cleaning;
- chemicals approved for use;
- labeling of secondary containers;
- required PPE; and
- cleaning and disinfection procedures for special cases (i.e., transmissible diseases). (AORN Recommendation X.a.)\(^1\)

Quality Management Program

Facilities should have an environmental cleaning and disinfection quality management and improvement program in place in order to evaluate products, processes and results. At a minimum the committee involved with the quality management program should include OR, IPC and EVS personnel.

Quality indicators should include, but not be limited to:

- compliance with regulatory standards;
- review of products and manufacturer direction for use;
- procedures;
monitoring cleaning and disinfection practices; and
- reporting and investigation of adverse events (i.e., outbreaks, product issues, corrective actions, and evaluation). (AORN Recommendation XI.b.)

**Summary**
Both cleaning and disinfection are necessary to minimize the exposure risk for healthcare personnel and patients to potentially infectious microorganisms. Environmental cleaning includes end-of-procedure cleaning, otherwise known as between case or room turnover cleaning; terminal cleaning, which is cleaning that is performed at the end of the scheduled day; and routine scheduled housekeeping activities that should be scheduled and documented weekly or monthly. Routine audits should be performed to ensure compliance with policies and procedures, appropriate products and training requirements. Careful application of recommended practices will help ensure a safe environment for surgical patients, thus decreasing the possibility of SSIs.

**Definitions**
All definitions are from the Glossary in the AORN 2010 Recommended Practices for Environmental Cleaning in the Perioperative Setting. END-OF-PROCEDURE CLEANING: “Cleaning that is performed at the end of one surgical procedure and before the start of another procedure in that same room.” END-OF-PROCEDURE CLEANING IS SOMETIMES REFERRED TO AS BETWEEN CASE CLEANING OR ROOM TURNOVER CLEANING.
- **Cleaning:** “A process using friction, detergent, and water to remove organic debris; the process by which any type of soil, including organic debris, is removed. Cleaning removes rather than kills microorganisms.”
- **Disinfection:** “A process that kills most forms of microorganisms on inanimate surfaces. Disinfection destroys pathogenic organisms (excluding bacterial spores) or their toxins or vectors by direct exposure to chemical or physical means.”
- **Environmentally friendly products:** “Products that contribute to better air quality and are less toxic to patients, visitors, and health care personnel.”
- **EPA-registered agent:** “A microorganism-killing agent registered with the Environmental Protection Agency (EPA). The EPA classifies germicides as sporicides, general disinfectants, hospital disinfectants, detergents, sanitizers and others.”
- **Molar solutions:** “Denotes a concentration of 1 gram molecular weight (1 mol) of solute per liter of solution, the common unit of concentration in chemistry.”
- **Normal solutions:** “Denotes a solution containing 1 equivalent of replaceable hydrogen ions or hydroxyl per liter (e.g., 1 mol/L HCL is 1N) or a solution containing 1 gram of substance or its equivalent in hydrogen ions. Normality is a ratio which relates to the amount of solute to the total volume of solution.”
- **Organic debris:** “Blood, tissue, and body fluids.”
- **Regulated medical waste:** “Liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi liquid state if compressed; items that are caked with dried blood or potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps, and pathological and microbiological wastes containing blood other potentially infectious materials.”
- **Terminal cleaning:** “Cleaning that is performed at the completion of surgical practice settings’ daily surgery schedules. Terminal cleaning is performed in surgical rooms and scrub/utility areas and includes, but is not limited to, surgical lights, and external tracks; fixed and ceiling-mounted equipment; all furniture, including wheels and casters; equipment; handles of cabinets and push plated; ventilation faceplates; horizontal surfaces (e.g., tops of counters, sterilizers, fixed shelving); the entire floor; kick buckets; scrub sinks.”
- **Used items:** “Items that are open for a surgical procedure that may or may not have come in contact with a patient’s blood, tissue, or body fluids.”

**References**
Rose Seavey RN, BS, MBA, CNOR, CRST, CSPDT is the president/CEO of Seavey Healthcare Consulting Inc., and formerly the director of the sterile processing department at the Children’s Hospital of Denver. She is a consultant for 3M as well as other healthcare companies. Ms. Seavey was elected to the Association of periOperative Registered Nurses (AORN) Board of Directors for 2008-2010. She was honored with AORN’s award for Outstanding Achievement in Clinical Nurse Education in 2001. Ms. Seavey served as the president of the American Society of Healthcare Central Service Professionals (ASHCSP) in 2003 and is the 2002 recipient of ASHCSP National Educator of the Year award.

Ms. Seavey is a member of several AAMI working group committees that are developing recommended practices and is currently a co-chair for the ANSI/AAMI working group for hospital steam sterilizers performance standards. In addition she has lectured and authored many articles on various topics relating to perioperative services and sterile processing, locally, nationally and internationally.

Sterile Process and Distribution CEU Information

CEU Applicant Name __________________________

Address ______________________________________

City________________ State____ Zip Code__________

The CBSPD (Certification Board for Sterile Processing and Distribution) has pre-approved this inservice for 1 contact hour for a period of five (5) years from the date of publication. Successful completion of the lesson and post test must be documented by facility management and those records maintained by the individuals until recertification is required. DO NOT SEND LESSON OR TEST TO CBSPD.

For additional information regarding Certification contact: CBSPD, 148 Main St., Lebanon, NJ, 08833 or call 908-236-0530 or 800-555-9765 or visit the Web site at www.sterileprocessing.org.

IAHCSMM has awarded 1 Contact Point for completion of this continuing education lesson toward IAHCSMM recertification.

Nursing CE Application Form

This inservice is approved by the California Board of Registered Nurses, CEP 5770 for one (1) contact hour. This form is valid up to five (5) years from the date of publication.

1. Make a photocopy of this form.
2. Print your name, address and daytime phone number and position/title.
3. Add the last 4 digits of your social security number or your nursing license number.
4. Date the application and sign.
5. Answer the true/false CE questions. KEEP A COPY FOR YOUR RECORDS.
6. Submit this form and the answer sheet to:
   3M Sterilization Assurance, Attn HC4160
   RR Donnelly Fulfillment Services
   585 Hale Ave N, Oakdale, MN 55128-9935
7. For questions, contact craig@firstaccessmedia.com.
8. Participants who score at least 70% will receive a certificate of completion within 30 days of healthVIE.com’s receipt of the application.

Application

Please print or type.

Name__________________________

Mailing Address_______________________________________________________

City________________ State________ Zip Code_____________________________

Daytime phone (     )____________________

Position/Title________________________

Social Security or Nursing License Number _________________________________

Date application submitted __________________________

Signature _______________ Offer expires February 2015

On a scale of 1-5, 5 being Excellent and 1 being Poor, please rate this program for the following:

1) Overall content _______________________
2) Met written objectives __________________
3) Usability of content ___________________

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