

## TERMINAL CLEANING OF THE OPERATING ROOM



Dawn Anthopoulos, RN

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## AORN

- Recommended by AORN Practices Advisory Board
- Intended to be achievable recommendations
- Represents optimal level of practice
- Policies and procedures should reflect variations that determine the degree to which these practices can be implemented
- Collaborative approach, multidisciplinary
- Includes high touch areas and objects
- Includes all perioperative areas
- Enhanced environmental cleaning
- Clean methodology, measurement of cleanliness



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## Why Clean?

- Operating rooms have increased risk of spreading bacteria
- Same equipment is used on multiple patients
- Decrease the risk of HAIs
- Protect staff and patients
- Break the chain of infection
- High risk of infection after surgery



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### Definitions

- Clean – absence of visible soil or other potentially infectious material
- Detergent – cleansing agent used to remove dirt and soil
- Disinfection – process that kills most forms of microorganisms on inanimate surfaces
- Environmental surfaces – noncritical devices that require a low level of disinfection
- PPE – specialized clothing or equipment worn by an employee for protection against infectious materials

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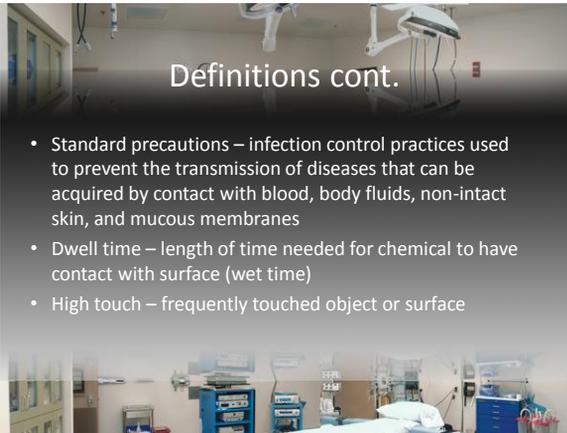
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### Definitions cont.

- Standard precautions – infection control practices used to prevent the transmission of diseases that can be acquired by contact with blood, body fluids, non-intact skin, and mucous membranes
- Dwell time – length of time needed for chemical to have contact with surface (wet time)
- High touch – frequently touched object or surface

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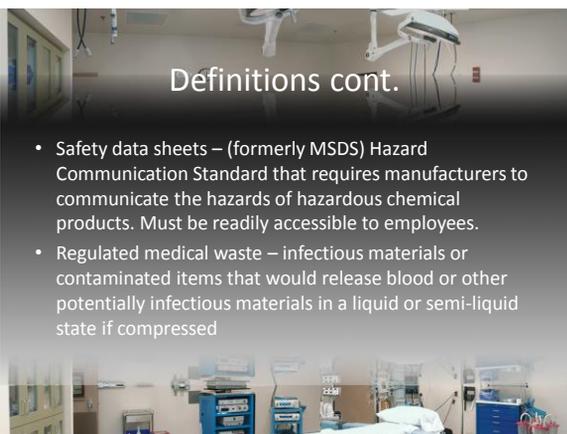
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### Definitions cont.

- Safety data sheets – (formerly MSDS) Hazard Communication Standard that requires manufacturers to communicate the hazards of hazardous chemical products. Must be readily accessible to employees.
- Regulated medical waste – infectious materials or contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed

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### Definitions cont.

- Performance improvement – continuous study and adaptation of an organization’s functions and processes to increase the probability of achieving desired outcomes and to better meet the needs of individuals and other users of services
- Benchmark – comparing performance with an external (industry) standard

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### Surgical Areas

- Defined by activities performed in that area
- Traffic should be controlled
  - Unrestricted
  - Semi-restricted
  - Restricted

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### Unrestricted

- Central point
- Monitor the entrance of personnel and patients
- Street clothes permitted
- Traffic not limited
- Based on facility policies

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Semi-Restricted

- Traffic allowed for authorized staff, personnel, and patients
- Proper OR attire
- No outside clothes
- Hair must be covered



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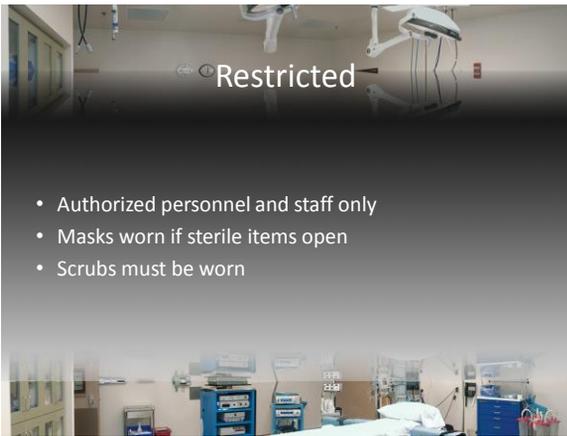
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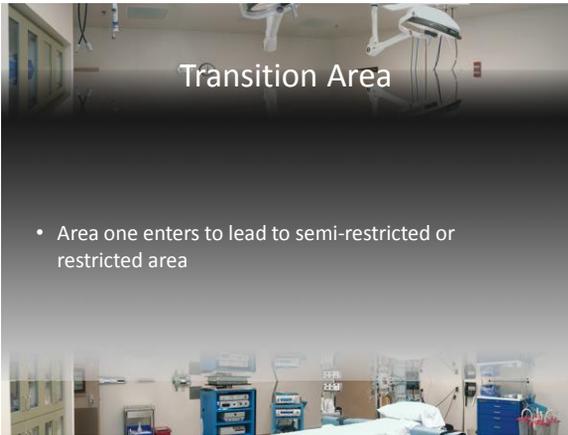
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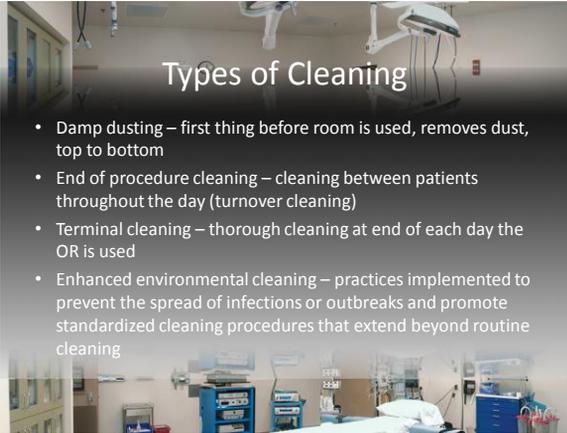
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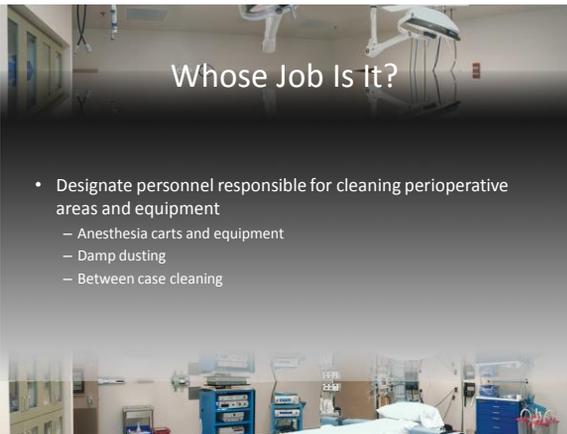
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### Technique

- Clean to dirty
- Clockwise or counterclockwise
- Top to bottom
- If no visible soil is present, wipe surface with moistened cloth or wipe with disinfectant
- If soil is visible, first clean with moistened cloth or wipe, then again to disinfect with a new cloth or wipe
- Soil and dirt can be a barrier that may stop the disinfectant from working on the surface



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## Cleaning Supplies

- Detergents
- Disinfectants
- Low lint cloths and/or single use wipes
- Single use microfiber pad mops
  - Microfibers are positively charged so they draw/attract dust which is negatively charged
  - More absorbent than cotton-loop mop heads
  - Can endure many washings
  - Weigh much less than string mops

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## Cleaning/Disinfecting Products, Tools, and Equipment

- Selection based on:
  - Manufacturer's recommendations for use on surfaces to be cleaned
  - Manufacturer's recommendations for use for cleaning materials and equipment
  - Effect on the environmental conditions in the OR (temperature, humidity)
  - Effect on the environment
  - Compatibility with detergents and disinfectants

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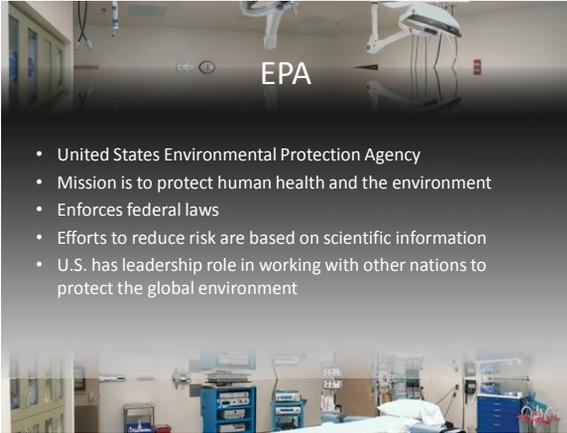
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## EPA

- United States Environmental Protection Agency
- Mission is to protect human health and the environment
- Enforces federal laws
- Efforts to reduce risk are based on scientific information
- U.S. has leadership role in working with other nations to protect the global environment

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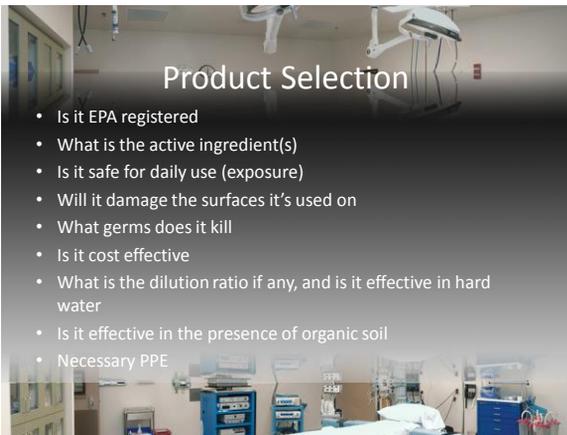
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## Product Selection

- Is it EPA registered
- What is the active ingredient(s)
- Is it safe for daily use (exposure)
- Will it damage the surfaces it's used on
- What germs does it kill
- Is it cost effective
- What is the dilution ratio if any, and is it effective in hard water
- Is it effective in the presence of organic soil
- Necessary PPE

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## One Step or Two Step

- One Step
  - Combination of detergent and disinfectant
  - Will need to wipe surface more than once with different wipes/ cloths
- Two Step
  - Two separate products for detergent and disinfectant
  - Gross soil is removed first
  - Not recommended for health care facilities

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## Chemicals

- Phenols
  - Gross protoplasmic poison
  - Disrupts cell wall
  - Inactivates essential enzyme system
- Quaternary Compounds
  - Inactivates energy producing enzymes
  - Denatures essential cell proteins
  - Disruption of cell membranes

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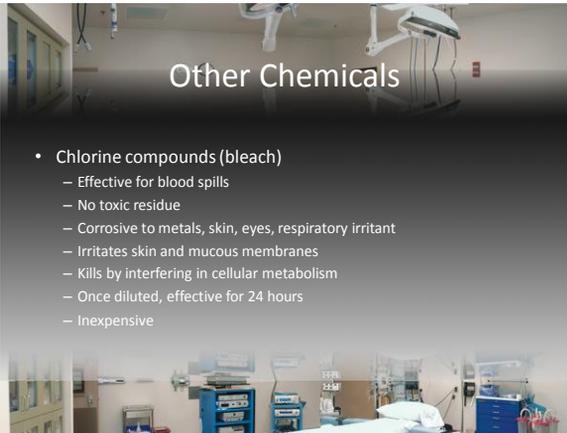
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## Other Chemicals

- Chlorine compounds (bleach)
  - Effective for blood spills
  - No toxic residue
  - Corrosive to metals, skin, eyes, respiratory irritant
  - Irritates skin and mucous membranes
  - Kills by interfering in cellular metabolism
  - Once diluted, effective for 24 hours
  - Inexpensive

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## Alcohol

- Not an EPA registered disinfectant
- Not a detergent
- Is an antiseptic

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### Spray Bottles

- Not recommended
- May pollute air with mist aerosols or dust

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### Gloves

- Vinyl gloves are not adequate protection
  - Barrier protraction failure rate can be high
- Gloves should be made of natural rubber latex, nitrile, chloroprene blends, or butyl rubber

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### Floors

- Always considered contaminated
- Clean from edge of room toward the center
- Damp or wet mop heads/pads
- Items that contact the floor for any amount of time should be considered contaminated
- Noncritical items that come in contact with the floor should be disinfected per manufacturers' instructions prior to patient use

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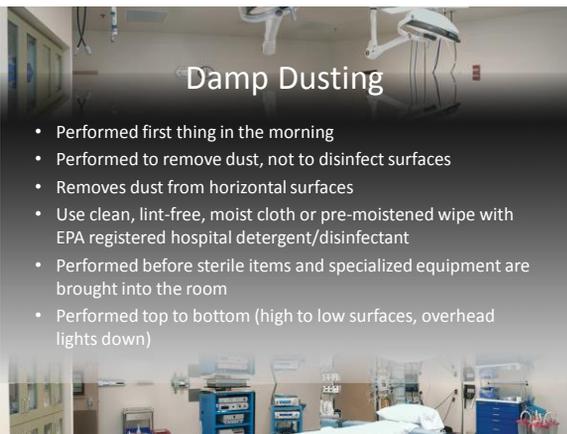
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### Damp Dusting

- Performed first thing in the morning
- Performed to remove dust, not to disinfect surfaces
- Removes dust from horizontal surfaces
- Use clean, lint-free, moist cloth or pre-moistened wipe with EPA registered hospital detergent/disinfectant
- Performed before sterile items and specialized equipment are brought into the room
- Performed top to bottom (high to low surfaces, overhead lights down)

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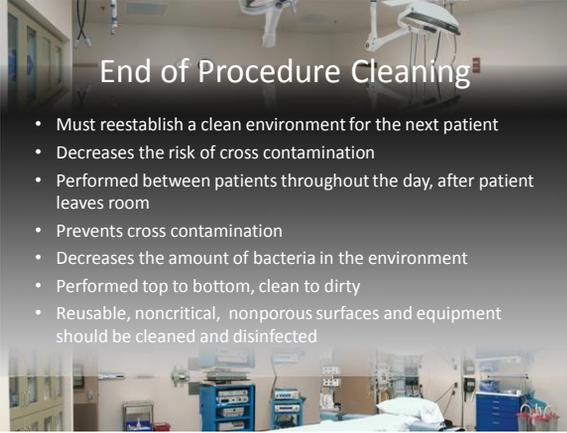
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### End of Procedure Cleaning

- Must reestablish a clean environment for the next patient
- Decreases the risk of cross contamination
- Performed between patients throughout the day, after patient leaves room
- Prevents cross contamination
- Decreases the amount of bacteria in the environment
- Performed top to bottom, clean to dirty
- Reusable, noncritical, nonporous surfaces and equipment should be cleaned and disinfected

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### End of Procedure Cleaning cont.

- High touch objects should be cleaned and disinfected
- Used items should be cleaned and disinfected
- After finished, remove all cleaning equipment, place disposables in trash, remove trash and linen

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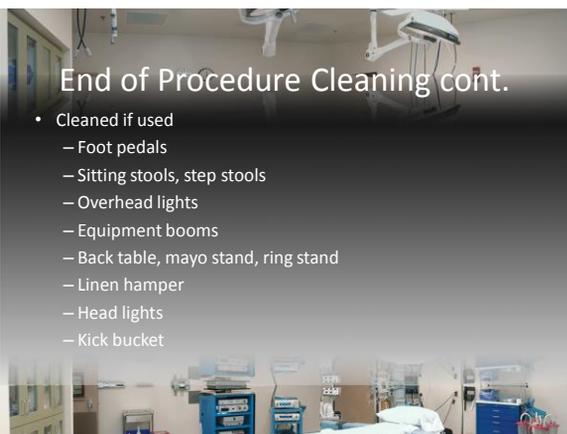
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### End of Procedure Cleaning cont.

- Cleaned if used
  - Foot pedals
  - Sitting stools, step stools
  - Overhead lights
  - Equipment booms
  - Back table, mayo stand, ring stand
  - Linen hamper
  - Head lights
  - Kick bucket

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### End of Procedure Cleaning cont.

- What must be cleaned every time?
  - Iv poles/pump
  - Anesthesia cart, machine, and monitors
  - BP cuff, tourniquet cuff
  - OR bed, arm boards, straps, control
  - Positioning devices (rolls, pillows, etc.)
  - Back table, mayo stand, ring stand
  - Linen and trash receptacles
  - Suction equipment
  - Phone
  - Door handles/push plates



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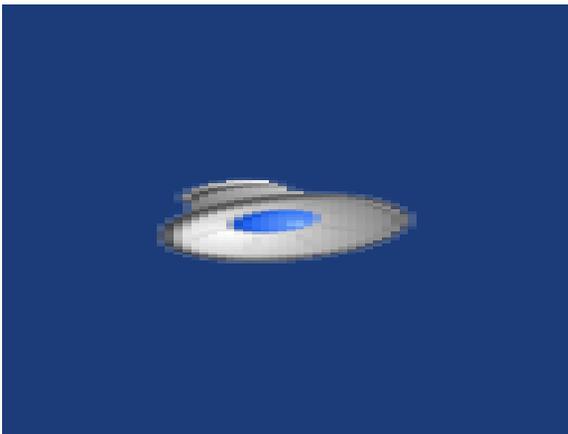
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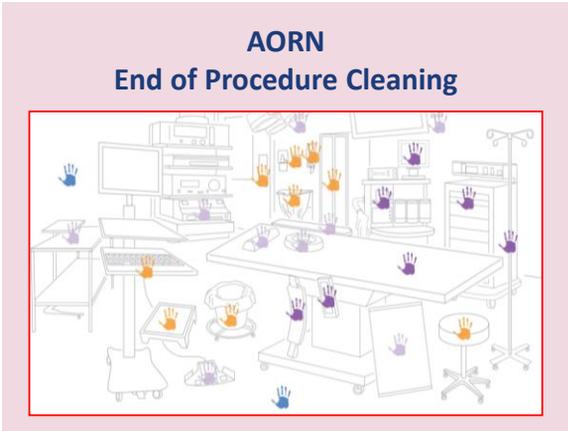
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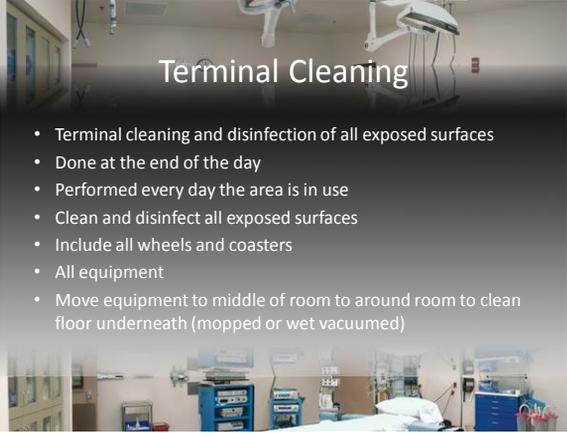
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### Terminal Cleaning

- Terminal cleaning and disinfection of all exposed surfaces
- Done at the end of the day
- Performed every day the area is in use
- Clean and disinfect all exposed surfaces
- Include all wheels and coasters
- All equipment
- Move equipment to middle of room to around room to clean floor underneath (mopped or wet vacuumed)



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Terminal Cleaning cont.

- Overhead procedure lights
- Tables and mayo stands
- Mobile and fixed equipment
- Storage cabinets, supply carts, and furniture
- Light switches
- Door handles and push plates
- Telephones and mobile communication devices
- Computer accessories (keyboard, mouse)
- Chairs, sitting stools, and step stools



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Terminal Cleaning cont.

- Anesthesia machines, carts, and equipment
- IV poles and pumps
- Linen and trash receptacles
- Patient monitors
- OR beds
- Reusable safety belts/straps
- OR bed attachments (arm boards, stirrups, head rests)
- Positioning devices
- Patient transfer devices



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### Must Be Cleaned Every Time

- Transfer devices
- Overhead lights
- Suction and medical gas regulators
- Radiology equipment
- Electrosurgical units
- Microscopes
- Lasers
- Floor and walls if soiled or potentially soiled by splash, splatter, or spray

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### Enhanced Cleaning

- Performed when patients with drug resistant organisms have received care
- C. diff, prion diseases, construction, and environmental contamination
- Room access should be restricted if patient suspected or diagnosed with an airborne transmissible disease (Tb) or droplet transmissible disease (influenza) until adequate time has passed for air exchanges per hour to clean 99% of airborne particles from the air

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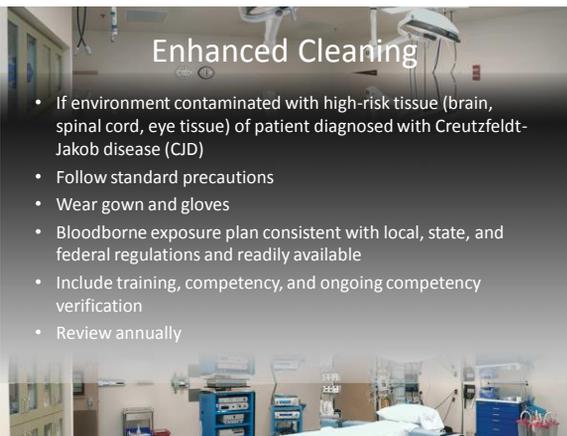
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### Enhanced Cleaning

- If environment contaminated with high-risk tissue (brain, spinal cord, eye tissue) of patient diagnosed with Creutzfeldt-Jakob disease (CJD)
- Follow standard precautions
- Wear gown and gloves
- Bloodborne exposure plan consistent with local, state, and federal regulations and readily available
- Include training, competency, and ongoing competency verification
- Review annually

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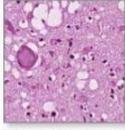
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## Prions

Brain shrinkage and deterioration occurs rapidly



Brain section showing spongiform pathology characteristic of Creutzfeldt-Jakob

Creutzfeldt-Jakob disease (CJD) is caused by prions in human brains. It starts with memory loss and dementia, leading to loss of muscle control and death.

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## Drug Resistant Organisms

Requires enhanced cleaning

- Methicillin-resistant *Staphylococcus aureus* [MRSA]
- Vancomycin-intermediate *Enterococcus* species
- Vancomycin-intermediate *Staphylococcus aureus*
- Vancomycin-resistant *Enterococcus* spp [VRE]
- Vancomycin-resistant *Staphylococcus aureus*
- Carbapenem-resistant *Enterobacteriaceae*
- Extended spectrum beta-lactamase-producing organisms
- *Klebsiella pneumoniae* carbapenemase-producing organisms
- Multidrug-resistant *Acinetobacter* species



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### Enhanced Cleaning cont.

- Enhanced high touch objects
- Cabinets, furniture, carts
- Door handles, push plates, light switches
- Phones, cell phones
- Step stools, sitting standing stools
- Computer keyboard
- Trash and linen receptacles

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### High-Risk Tissue Contamination of Surfaces

- Cleaning and disinfection
- 2-Step process
  - Remove the gross tissue from the surface
  - Clean area with detergent solution
  - Apply disinfectant solution for contact time of 30 minutes – 1 hour
  - Use absorbent materials to soak up the solution
  - Discard cleaning material in appropriate waste container
  - Rinse treated surface with water

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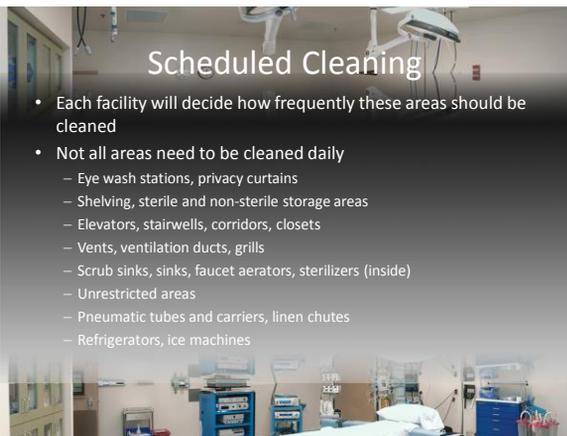
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### Scheduled Cleaning

- Each facility will decide how frequently these areas should be cleaned
- Not all areas need to be cleaned daily
  - Eye wash stations, privacy curtains
  - Shelving, sterile and non-sterile storage areas
  - Elevators, stairwells, corridors, closets
  - Vents, ventilation ducts, grills
  - Scrub sinks, sinks, faucet aerators, sterilizers (inside)
  - Unrestricted areas
  - Pneumatic tubes and carriers, linen chutes
  - Refrigerators, ice machines

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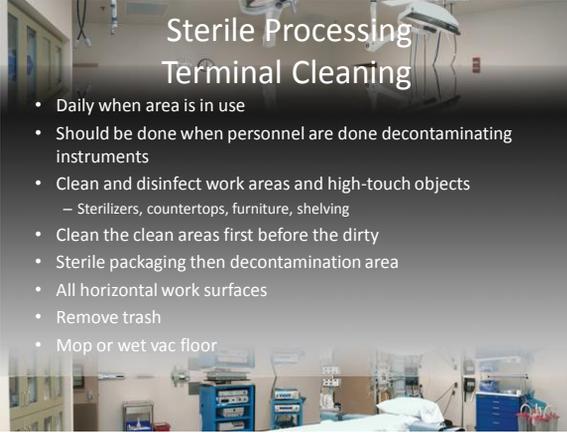
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## Sterile Processing Terminal Cleaning

- Daily when area is in use
- Should be done when personnel are done decontaminating instruments
- Clean and disinfect work areas and high-touch objects
  - Sterilizers, countertops, furniture, shelving
- Clean the clean areas first before the dirty
- Sterile packaging then decontamination area
- All horizontal work surfaces
- Remove trash
- Mop or wet vac floor



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## Quality Improvement

- Incorporate infection control into quality improvement process
- Want to meet or exceed expectations via performance improvement
- Establish benchmarks (nationally recognized external standards)
- Formulate plans for corrective actions when standards are not met
- Evaluate safety of personnel and patients

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## Multidisciplinary Approach

- Perioperative staff
- Environmental services
- Infection preventionists
- Sterile processing
- Input from staff
- In-services
- Training
- Input on product selection, supplies, and equipment
- Communicate with sales representatives

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## Data Collection

- Systematic audits
- Direct observation
- Checklists
- Documentation to maintain facility policies and maintain regulatory requirements
- Feedback will show patterns, improvement, worsening
- Are goals/benchmarks met?
- Give feedback to staff
- Communicate results to Governing Board

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## Report and Investigate

- HAIs
- SSIs
- Adverse events

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## Monitoring Compliance

- Compliance with standards and facility policies
- Manufacturer instructions
- Cleaning procedures
- Report and investigate adverse events
- Measure by:
  - Real time audits (visual inspection and observation)
  - ATP monitoring
  - Fluorescent marking gel and light
  - Documentation (checklists and logs)

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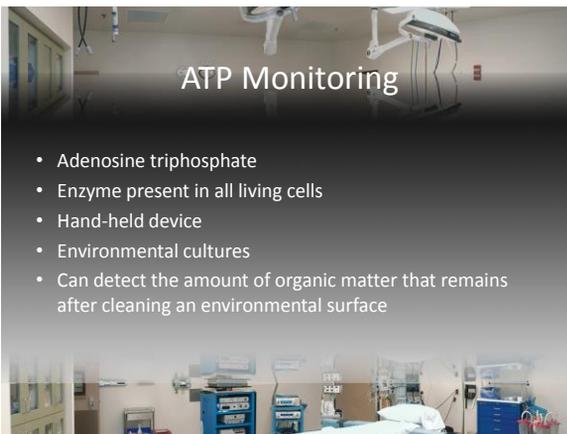
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## ATP Monitoring

- Adenosine triphosphate
- Enzyme present in all living cells
- Hand-held device
- Environmental cultures
- Can detect the amount of organic matter that remains after cleaning an environmental surface

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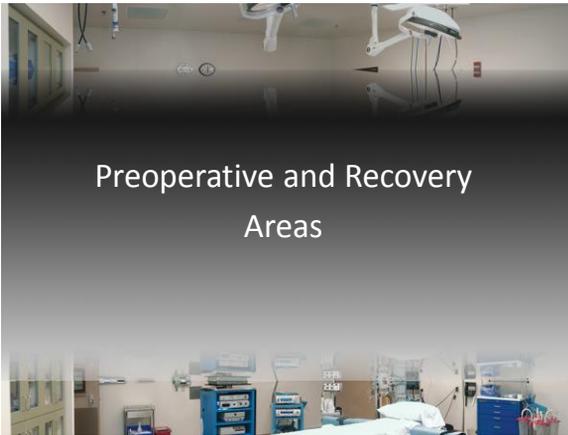
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### Preoperative and Recovery Areas

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### Between Patient Cleaning

- Items used during patient care should be cleaned and disinfected after every patient use
  - Patient monitors
  - Patient beds
  - Patient tables
  - TV remote
  - Call lights
  - Floors and walls if soiled or potentially soiled by splash, splatter, or spray

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Cleaned If Used during Patient Care

- Suction regulators
- Medical gas regulators
- Imaging viewers
- Radiology equipment
- Warming equipment

A photograph showing various pieces of medical equipment, including monitors and carts, in a clinical setting.

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### Terminal Cleaning

- Daily when area is used
  - Disinfect all surfaces
  - High-touch areas
    - Patient monitors, computer accessories, keyboards
    - Patient beds and tables, chairs
    - Mobile and fixed equipment
    - Storage cabinets, supply cars, and furniture
    - Telephones and mobile communication devices
    - Wheels and coasters
    - Trash and linen receptacles
    - Mop or wet vac floor

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### High-Touch Objects

- Call bells
- Phones
- Patient monitors
- Recliners/beds
- Patient tables
- Equipment (Sequential compression devices, warmers)

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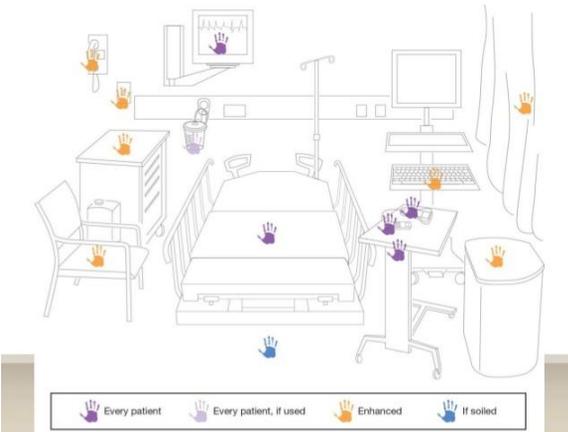
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### Enhanced Cleaning

- High-touch objects
- Storage cabinets, supply carts, furniture
- Light switches
- Door handles or push plates
- Telephones and mobile devices
- Computer keyboard
- Chairs
- Trash and linen receptacles
- Privacy curtains

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### Construction, Renovation, Repair, Demolition, and Disaster Remediation

- Assess construction barriers to determine their effectiveness
- Terminal cleaning should be done before equipment and supplies are placed in the area when work is completed
- If flood occurred, terminal clean after water is removed
- If surfaces cannot be dried within 72 hours, they should be replaced
- If condensation occurs on surfaces in semi-restricted and restricted areas, terminal cleaning should be done

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### Construction, Renovation, Repair, Demolition, and Disaster Remediation cont.

- If air contamination occurs, and source of contamination is identified and contained
  - Terminal clean affected areas
  - Ventilation ducts
  - Air vents
  - Air grilles
  - Change air filters



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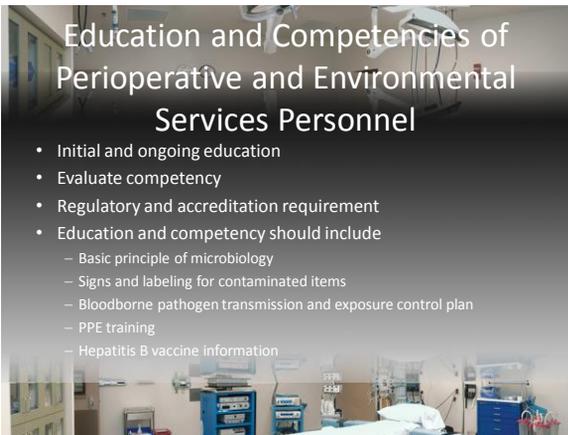
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### Education and Competencies of Perioperative and Environmental Services Personnel

- Initial and ongoing education
- Evaluate competency
- Regulatory and accreditation requirement
- Education and competency should include
  - Basic principle of microbiology
  - Signs and labeling for contaminated items
  - Bloodborne pathogen transmission and exposure control plan
  - PPE training
  - Hepatitis B vaccine information



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### Education and Competencies of Perioperative and Environmental Services Personnel

- Eye wash location and use
- SDS location and info
- Handling hazardous chemicals
- Waste disposal
- Selection of cleaning chemicals, materials, and equipment based on intended use
- Manufacturers' instructions for use



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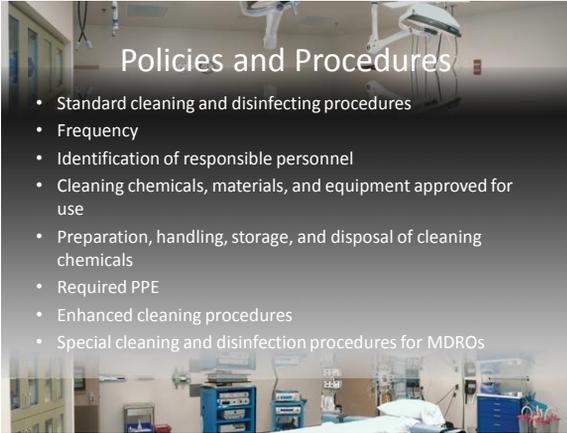
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### Policies and Procedures

- Standard cleaning and disinfecting procedures
- Frequency
- Identification of responsible personnel
- Cleaning chemicals, materials, and equipment approved for use
- Preparation, handling, storage, and disposal of cleaning chemicals
- Required PPE
- Enhanced cleaning procedures
- Special cleaning and disinfection procedures for MDROs



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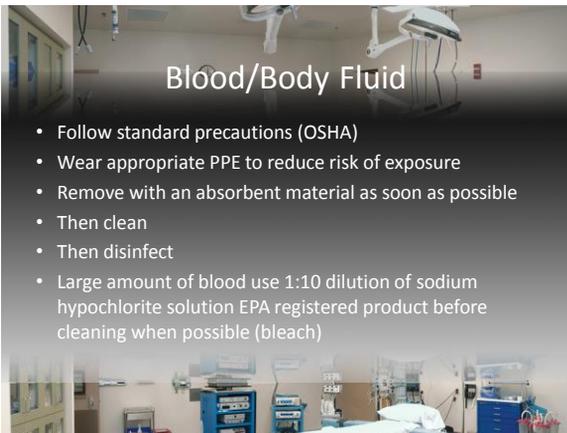
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### Blood/Body Fluid

- Follow standard precautions (OSHA)
- Wear appropriate PPE to reduce risk of exposure
- Remove with an absorbent material as soon as possible
- Then clean
- Then disinfect
- Large amount of blood use 1:10 dilution of sodium hypochlorite solution EPA registered product before cleaning when possible (bleach)



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10%  
1:10



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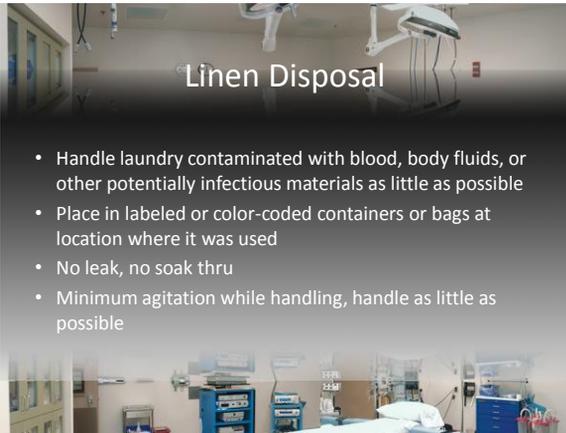
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### Linen Disposal

- Handle laundry contaminated with blood, body fluids, or other potentially infectious materials as little as possible
- Place in labeled or color-coded containers or bags at location where it was used
- No leak, no soak thru
- Minimum agitation while handling, handle as little as possible



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### Contaminated Sharps Disposal

- Discard immediately
- Closable
- Puncture resistant
- Leak proof
- Label or color coded
- Do not overfill



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### Contaminated Liquid Waste Disposal

- Dispose according to standard and federal regulations
- Appropriate PPE due to possible splash



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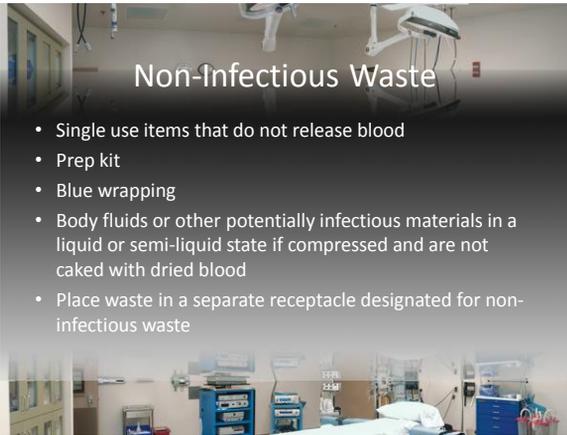
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### Non-Infectious Waste

- Single use items that do not release blood
- Prep kit
- Blue wrapping
- Body fluids or other potentially infectious materials in a liquid or semi-liquid state if compressed and are not caked with dried blood
- Place waste in a separate receptacle designated for non-infectious waste



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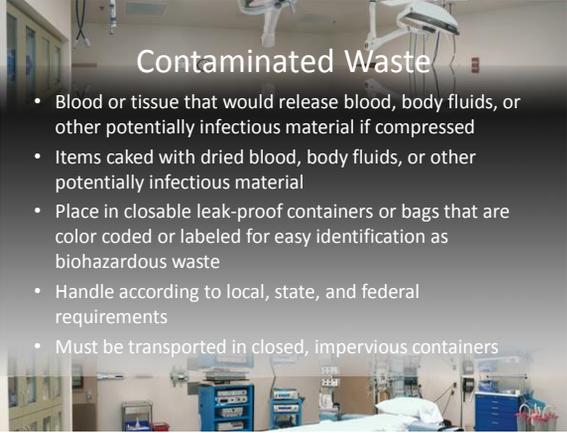
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### Contaminated Waste

- Blood or tissue that would release blood, body fluids, or other potentially infectious material if compressed
- Items caked with dried blood, body fluids, or other potentially infectious material
- Place in closable leak-proof containers or bags that are color coded or labeled for easy identification as biohazardous waste
- Handle according to local, state, and federal requirements
- Must be transported in closed, impervious containers



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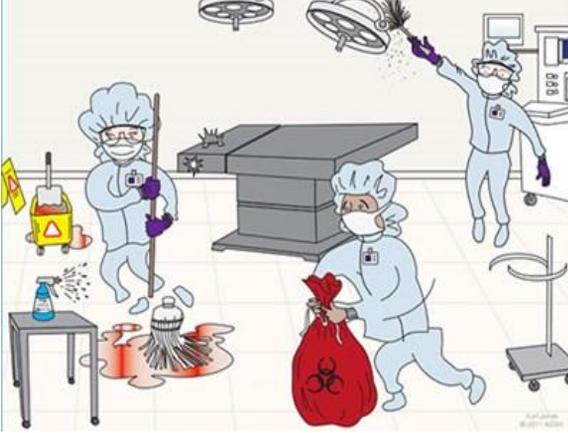
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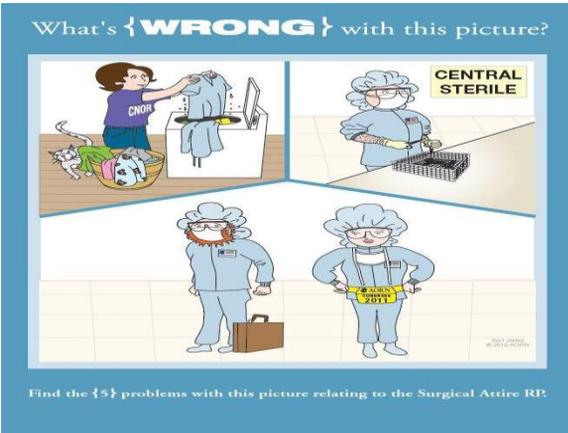
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**Resources**

Association for the Healthcare Environment of the American Hospital Association. *Practice Guidance for Healthcare Environmental Cleaning*. 2nd ed. Chicago, IL: American Hospital Association; 2012.

Guidelines for environmental infection control in health-care facilities. Centers for Disease Control and Prevention. [http://www.cdc.gov/hicpac/pdf/guidelines/eic\\_in\\_hcf\\_03.pdf](http://www.cdc.gov/hicpac/pdf/guidelines/eic_in_hcf_03.pdf)

Rutala WA, Weber DJ, Society for Healthcare Epidemiology of America. Guideline for disinfection and sterilization of prion-contaminated medical instruments. *Infect Control Hosp Epidemiol*. 2010;31(2):107-117. [IVA]

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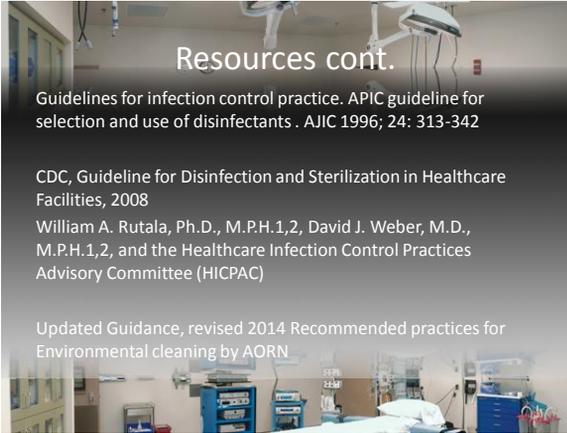
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**Resources cont.**

Guidelines for infection control practice. APIC guideline for selection and use of disinfectants . AJIC 1996; 24: 313-342

CDC, Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008

William A. Rutala, Ph.D., M.P.H.1,2, David J. Weber, M.D., M.P.H.1,2, and the Healthcare Infection Control Practices Advisory Committee (HICPAC)

Updated Guidance, revised 2014 Recommended practices for Environmental cleaning by AORN

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**Résources cont.**

Recommended practices for environmental cleaning.  
In: *Perioperative Standards and Recommended Practices*. Denver, CO: AORN, Inc.; 2014:255-276.

Recommended practices for a safe environment of care part 2 In: *Perioperative Standards and Recommended Practices*. Denver, CO: AORN, Inc.; 2014:in press.

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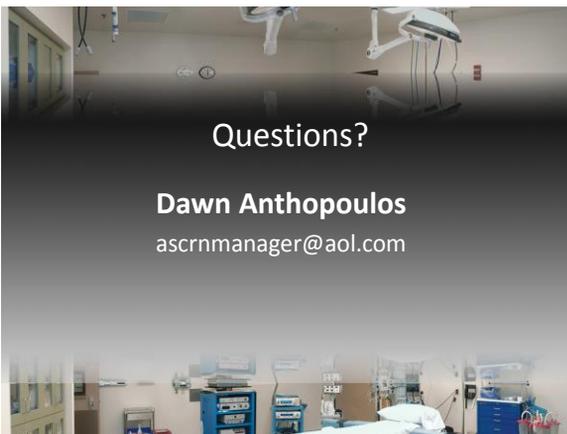
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**Questions?**

**Dawn Anthopoulos**  
ascrnmanager@aol.com

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