CLEANING, DISINFECTION AND STERILIZATION

Appropriate cleaning, disinfection and/or sterilization of patient care equipment is essential in limiting the transmission of organisms within the long-term care home. The reprocessing method needed for a specific item will depend on the intended use of the item, the risk of infection to the resident and the amount of soiling. (See Appendix Z)

Cleaning is always essential prior to disinfection or sterilization. An item that has not been cleaned cannot be disinfected or sterilized.

Effective cleaning removes large numbers of microorganisms. Soil can shield microorganisms and protect them from the action of disinfectants/sterilants or interact with the disinfectant/sterilant to neutralize the process.

The manufacturer’s directions for cleaning should be considered prior to the purchase of any piece of equipment. Products that cannot be effectively cleaned and disinfected should not be purchased.

Cleaning

Cleaning is the physical removal of foreign material (e.g. dust, soil, organic material such as blood, secretions, excretions and microorganisms). Cleaning physically removes rather than kills microorganisms. It is accomplished with water, detergents and mechanical action. Thorough and meticulous cleaning is required before any equipment/device may be decontaminated, disinfected and/or sterilized.¹


The following recommendations should be incorporated into the policies of the long-term care home.

1. An education program should be in place for staff involved in cleaning and disinfection to assist them in understanding the effective methods of cleaning and the importance of their work.

2. Staff must also be educated on the proper use of PPE during outbreaks.

3. Long-term care homes should develop policies for cleaning schedules and methods. These should include the name of the person responsible for cleaning.
4. Routine cleaning of environmental surfaces and noncritical resident care items should be performed according to a predetermined schedule and should be sufficient to keep surfaces clean and dust free. Horizontal surfaces that are frequently touched by the hands of health care providers and residents (e.g. call bells, equipment, knobs) require a minimum of daily cleaning. Resident bathrooms should be cleaned at least once a day, but the frequency should be assessed and may need to be increased. Curtains should be cleaned on a routine schedule and whenever there is visible soil. Walls should be cleaned as part of a regular schedule and spot-cleaned whenever visible soil is present.

5. Procedures for cleaning should use a process, which moves from less contaminated areas to heavily contaminated areas (i.e. washrooms) and from high areas to low areas.

6. Damp dusting and sweeping rather than dry should be done whenever possible. Any dry cleaning should be done carefully with a chemically treated dry mop or vacuum cleaner (with exhaust filter) rather than a broom. Care should be taken to avoid shaking of mops and dusting equipment to minimize the dispersal of microorganisms into the environment.

7. Ceiling tiles and walls should be inspected for signs of leakage when high dusting is being done. This may indicate a leak in plumbing or HVAC system, which requires maintenance.

8. Vacuum cleaners should be used on carpeted areas. Expelled air from the vacuum cleaners should be diffused so that it does not aerosolize dust from unclean surfaces.

9. During wet cleaning, cleaning solutions and the tools with which they are applied soon become contaminated. A routine should be adopted that does not redistribute microorganisms.

10. Tools used for cleaning and disinfecting must be cleaned and dried between uses.

11. Cleaning and disinfecting agents must be mixed and used according to manufacturers’ recommendations.

12. Household utility gloves should be worn during cleaning and disinfecting procedures.

13. Long-term care facilities should determine a schedule for cleaning and maintaining ducts, fans, and air conditioning systems.
Cleaning Procedures for Common Items

<table>
<thead>
<tr>
<th>Surface/object</th>
<th>Procedure</th>
<th>Special Considerations</th>
</tr>
</thead>
</table>
| Horizontal surfaces such as bed tables, work counters, beds, mattresses, bedrails, call bells | 1. Thorough regular cleaning  
2. Cleaning when soiled  
3. Cleaning between residents after discharge |                                                                                         |
| Walls, blinds, curtains                             | Should be cleaned regularly with a detergent and whenever visibly soiled   |                                                                                        |
| Floors                                              | 1. Thorough regular cleaning  
2. Cleaning when soiled  
3. Cleaning between residents and after discharge  
Damp mopping preferred. | Detergent is adequate in most areas.  
Blood/body fluid spills should be cleaned up with disposable cloths followed by disinfection with a low-level disinfectant. |
| Carpets/upholstery                                  | Should be vacuumed regularly and shampooed whenever soiled.                |                                                                                        |
| Toilets and commodes                                | 1. Thorough regular cleaning  
2. Cleaning when soiled  
3. Clean between residents and after discharge.  
Use a low-level disinfectant. | These may be the source of enteric pathogens such as *C. difficile*, *Shigella*. |

Disinfection

Disinfection is defined as the inactivation of disease-producing microorganisms. Disinfection does not kill high levels of bacterial spores. Medical equipment/devices and surfaces must be cleaned thoroughly before effective disinfection can take place.²

Disinfectants are used on inanimate objects. The process usually involves chemicals or heat and sometimes ultraviolet light. Levels of chemical disinfection vary with the type of product used.

Disinfection is required when the cleaning process alone does not make the product safe for its intended use. In Homes there are two main methods of disinfection available: liquid chemicals and pasteurization. Regardless of the type of disinfection process chosen, it is essential that the process is used correctly. Failure to use the process correctly may result in the transmission of infections.

- **Chemical Disinfection**
  The Health Protection Branch of Health Canada regulates chemical disinfectants. The label on the disinfectant must clearly state: the product name, active ingredients, intended use, the area and site of use and specific directions for use. Classes of disinfectants, their use and advantages/disadvantages are summarized in Table 1(Section 7-7).

- **Pasteurization**
  Pasteurization is a process of hot water disinfection accomplished through the use of automated pasteurizers or washer disinfectors. Pasteurization provides high-level disinfection for semi-critical items such as respiratory therapy equipment.

  Equipment is exposed to water above 75°C for 30 minutes. The items must be totally immersed in water throughout the pasteurization cycle. The pasteurization cycle should be monitored to ensure that the correct temperature is being maintained for the required time frame.

**When choosing a disinfectant:**

1. Read the label for a description of the product.
2. Look for ingredients, such as the following, in a disinfectant:
   a. Chlorine
   b. Quaternary ammonium
   c. Iodine
   d. Accelerated hydrogen peroxide
3. Determine types of surfaces the product is designed to disinfect.
4. Remember when buying a product for kitchen use; the product must be safe for cooking surfaces.
5. Determine how to use the product. Ascertain whether it requires pre-mixing or is used directly from the container.
6. Check for cautionary statements and warnings on the labels
# Major Classes of Chemical Disinfectants for Use in Homes

<table>
<thead>
<tr>
<th>Disinfectant</th>
<th>Uses</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
</table>
| **Alcohols**  | Intermediate level disinfectant. Disinfect thermometers, external surfaces of some equipment (e.g. stethoscopes) Equipment used for home care. | Fast acting  
No residue  
Non staining | Volatile  
Evaporation may diminish concentration. Inactivated by organic material. May harden rubber or cause deterioration of glues. |
| **Chlorines** | Intermediate level disinfectant. Disinfect hydrotherapy tanks, dialysis equipment, CPR training mannequins, environmental surfaces. Effective disinfectant following blood spills after blood has been removed. Equipment used for home health care. | Low cost  
Fast acting  
Readily available in non-hospital setting | Corrosive to metals. Inactivated by organic material. Irritant to skin and mucous membranes. Unstable when diluted to usable state (1:9 parts water). Use in well-ventilated areas Shelf life shortens when diluted. |
| **Glutaraldehydes** | 2% formulations – high level disinfection for heat sensitive equipment. Most commonly used for endoscopes, respiratory | Noncorrosive to metal  
Active in presence of organic material  
Compatible with lensed instruments. Sterilization may be accomplished | Extremely irritating to skin and mucous membranes. Shelf life shortens when diluted. High cost. Monitor concentration in reusable solutions. Fixative. |
<p>| Drug                  | Use                                                                 | Characteristics                                                                 | Caution                                                                 |
|----------------------|----------------------------------------------------------------------|=================================================================================|-------------------------------------------------------------------------|
| Hydrogen Peroxide    | 3% - low level disinfectant. Equipment used for home health care. Cleans floors, walls and furnishings. 6% - high level disinfectant. Effective for high level disinfection of flexible endoscopes. Foot care equipment. Disinfection of soft contact lenses. | Strong oxidant Fast acting Breaks down into water and oxygen | Can be corrosive to aluminum, copper, brass or zinc.                   |
| Iodophors            | Intermediate level disinfectant for some equipment (hydrotherapy tanks, thermometers). Low level disinfectant for hard surfaces and equipment that does not touch mucous membranes (e.g. IV poles, wheelchairs, beds, call bells). | Rapid action Relatively free of toxicity and irritancy | Antiseptic iodophors are NOT suitable for use as hard surface disinfectant. Corrosive to metal unless combined with inhibitors. Disinfectant may burn tissue Inactivated by organic materials. May stain fabrics and synthetic materials |
| Peracetic Acid       | High level disinfectant or sterilant for heat sensitive equipment. | Innocuous decomposition (water, oxygen, acetic acid, hydrogen peroxide). Rapid action at low temperature. | Can be corrosive. Unstable when diluted. |</p>
<table>
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<tbody>
<tr>
<td>Phenolics</td>
<td>Low/intermediate level disinfectants. Clean floors, walls and furnishings. Clean hard surfaces and equipment that does not touch mucous membranes (e.g. IV poles, wheelchairs, beds, call bells).</td>
<td>Leaves residual film on environmental surfaces. Commercially available with added detergents to provide one-step cleaning and disinfecting.</td>
<td>Do not use in nurseries. Not recommended for use on food contact surfaces. May be absorbed through skin or by rubber. Some synthetic flooring may become sticky with repetitive use.</td>
</tr>
<tr>
<td>Quaternary ammonium compounds</td>
<td>Low level disinfectant. Clean floors, walls and furnishings. Clean blood spills.</td>
<td>Generally non-irritating to hands. Usually have detergent properties.</td>
<td>DO NOT use to disinfect instruments. Non-corrosive. Limited use as disinfectant because of narrow microbicidal spectrum.</td>
</tr>
</tbody>
</table>

**Sterilization**

Sterilization is the level of reprocessing required when processing critical medical equipment/devices. Sterilization results in the destruction of all forms of microbial life including bacteria, viruses, spores and fungi. Equipment/devices must be cleaned thoroughly before effective sterilization can take place.\(^3\)


Methods of sterilization include steam, dry heat and chemicals. Sterilization must be used for all critical devices that contact the bloodstream, non-intact mucous membranes or normally sterile body sites. The sterilization process must be **validated and documented** to ensure that the parameters have been met. This monitoring process includes:

- Mechanical – time and temperature graphs, charts or printouts
- Chemical – time/temperature and/or humidity sensitive tape, strips or pellets
- Biological – spore-laden strips or vials

Each home must have policies identifying what processes are to be followed and the action to be taken if there is a failure in the process.

Additional Resources:


Centers for Disease Control and Prevention Guidelines for Environmental Infection Control in Health-Care Facilities, 2003
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5210a1.htm