

## SIXTEEN

# HOUSEKEEPING

**KEY CONCEPTS** you will learn in this chapter include:

- Why housekeeping in hospitals and clinics is important
- What the general principles of cleaning are
- How to prepare disinfectant cleaning solutions
- When and how to clean low- and high-risk areas
- How to clean spills of blood or other body fluids
- How to clean housekeeping equipment

## BACKGROUND

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**“Accumulation of dust, soil, and microbial contaminants on environmental surfaces is both aesthetically displeasing and a potential source of nosocomial infections. Effective and efficient cleaning methods and schedules are, therefore, necessary to maintain a clean and healthy environment in healthcare settings.” (Chou 2002)**

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Housekeeping refers to the general cleaning of hospitals and clinics, including the floors, walls, certain types of equipment, tables and other surfaces. The purpose of general housekeeping is to:

- reduce the number of microorganisms that may come in contact with patients, visitors, staff and the community; and
- provide a clean and pleasant atmosphere for patients and staff.

Most areas in hospitals and clinics are low-risk, such as waiting rooms and administrative offices, and can be cleaned using only soap and water. In high-risk areas where heavy contamination is expected, such as toilets and latrines, or for blood or body fluid spills, a disinfectant such as 0.5% chlorine or 1% phenol should be added to the cleaning solution (SEARO 1988). Using a disinfectant in addition to soap and water is also recommended in other high-risk areas such as operating rooms, pre- and postoperative recovery areas and intensive care units (ICUs).

In addition, patient rooms, especially those items that might be touched barehanded by patients and staff, should be cleaned using a disinfectant solution to minimize the risk of infection. For example, McFarland et al (1989) found that when patients who did not have *Clostridium difficile* were

admitted to a room previously occupied by a patient with *C. difficile*, the risk for the new patient increased several fold—even though staff were correctly using precautions to prevent cross-contamination.<sup>1</sup>

If the purpose of housekeeping as stated above is to be achieved, it is important that housekeeping staff be trained to perform their assigned tasks and are supervised on a regular basis. As part of their training, it is important that housekeeping staff:

- understand the risk of exposure to contaminated items and surfaces when performing environmental cleaning procedures; and
- follow recommended policies and guidelines, including the use of appropriate personal protective equipment (PPE).

The general principles for cleaning hospitals and clinics and other healthcare facilities are summarized in **Table 16-1**.

**Table 16-1. General Principles of Cleaning**

- **Scrubbing (frictional cleaning)** is the best way to physically remove dirt, debris and microorganisms.
- **Cleaning** is required **prior** to any disinfection process because dirt, debris and other materials can decrease the effectiveness of many chemical disinfectants.
- Cleaning products should be selected on the basis of their **use, efficacy, safety and cost**.
- **Cleaning** should always progress from **the least soiled areas to the most soiled areas** and from **high to low areas**, so that the dirtiest areas and debris that fall on the floor will be cleaned up last.
- **Dry sweeping, mopping and dusting** should be avoided to prevent dust, debris and microorganisms from getting into the air and landing on clean surfaces. Airborne fungal spores are especially important as they can cause fatal infections in immunosuppressed patients (Arnow et al 1991).
- **Mixing (dilution) instructions should be followed** when using disinfectants. (Too much or too little water may reduce the effectiveness of disinfectants.)
- Cleaning methods and written cleaning schedules should be based on the **type of surface, amount and type of soil present** and the **purpose of the area**.
- **Routine cleaning** is necessary to maintain a standard of cleanliness. Schedules and procedures should be consistent and posted.

## DEFINITIONS

- **Cleaning solution.** Any combination of soap (or detergent) and water, with or without a chemical disinfectant, used to wash or wipe down environmental surfaces such as floors, chairs, bench tops, walls and ceilings.
- **Disinfectant.** Chemical that destroys or inactivates microorganisms. Disinfectants are classified as low-, intermediate- or high-level

<sup>1</sup> *C. difficile* is an excellent marker for organisms such as enterococci that persist in the environment.

depending on their ability to kill or immobilize some (low- or intermediate-level) or all (high-level) microorganisms (but not all spores). Phenols, chlorine or chlorine-containing compounds and QUATs are classes of disinfectants frequently used to clean noncritical surfaces such as floors, walls and furniture.

- **Disinfectant cleaning solution.** Products that are a combination of a detergent (soap) and a chemical disinfectant. Not all detergents and disinfectants are compatible. Several combinations are available commercially or can be prepared, such as alkaline detergents with chlorine compounds, alkaline detergents with quaternary ammonium compounds (QUATs) or other nonionic surfactants, and acid detergents with iodophors.
- **Environmental controls.** Standards specifying procedures to be followed for the routine care, cleaning and disinfection of environmental surfaces, beds, bedrails, bedside equipment and other frequently touched surfaces.
- **Environmental hygiene.** Process of maintaining a clean, healthy and pleasing patient and work environment.
- **Sanitizer.** Chemical that reduces the number of bacterial contaminants to safe levels on inanimate objects based on public health requirements (i.e., a chemical that kills 99.999% of the specific test bacteria in 30 seconds under the conditions of the test).
- **Soaps and detergents (terms used interchangeably).** Cleaning products (bar, liquid, leaflet or powder) that lower surface tension, thereby helping remove dirt, debris and transient microorganisms from hands. **Plain** soaps require friction (scrubbing) to mechanically remove microorganisms; **antiseptic** (antimicrobial) soaps kill or inhibit the growth of most microorganisms.
- **Sterilants.** Chemicals used to destroy all forms of microorganisms, including endospores. Most sterilants are also high-level disinfectants when used for a shorter period of time. Sterilants are used only on inanimate objects (e.g., surgical instruments) that are used in semicritical and critical areas (e.g., surgery). Sterilants are not meant to be used for cleaning environmental surfaces.
- **Surfactant.** Agent that reduces the surface tension of water or the tension at the interface between water and another liquid; a wetting agent found in many sterilants and disinfectants.
- **Type of detergent:** Commercial cleaning product (liquid or powder) that are composed of a hydrophilic (water-seeking) component and a lipophilic (fat-seeking) component and can be divided into four types: anionic, cationic, amphoteric and nonionic detergents.

## HOW TO SELECT A CLEANING PRODUCT

Different types of cleaning products are available—liquid soaps and detergents, disinfectants, combinations (detergent and disinfectant) and sanitizers—and each type has different properties. An ideal cleaning product should accomplish the following:

- Suspension of fats (suspend fats in water)
- Saponification of fats (make fats water-soluble)
- Surfaction (decrease surface tension of water and allow greater penetration of the agent into the dirt or soil)
- Dispersion (break up of soil into small particles)
- Protein destruction (break up proteins)
- Softening the water (removal of calcium and magnesium)

When selecting a disinfectant or other cleaning product, consider the following factors:

- Intended use
- Efficacy
- Acceptability
- Safety
- Cost

In settings where resources are limited, it is important not to waste money on expensive cleaning products that are unnecessary. Where the volume of intended use is high, preparing cleaning solutions from bulk products should be considered. For smaller facilities, it may be necessary to purchase commercial products for use in cleaning high-risk areas, such as operating rooms, to ensure that cleaning meets the requirements for the area. What is important is that the decision as to what product(s) to buy or use is not left to chance.

## HOW TO PREPARE A DISINFECTANT CLEANING SOLUTION

A disinfectant cleaning solution is one that contains both a disinfectant and a detergent (soap).

### **Precautions When Using Chlorine Solutions**

Although chlorine-containing solutions (sodium hypochlorite) are excellent, inexpensive disinfectants, they should **not** be mixed with cleaning solutions containing an acid (e.g., phosphoric acid), ammonia or ammonium chloride (NH<sub>2</sub>Cl). Doing this will release chlorine gas and other by-products that can

result in temporary illness (nausea, tearing, headache or shortness of breath) to staff breathing fumes in a poorly ventilated area (CDC 1991).

To find out if a cleaning solution contains ammonia, first check the label. If it does not say there is ammonia, you may be able to detect ammonia when opening the product by its pungent, burning smell.

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If you are exposed to chlorine gas or ammonium chloride or other unpleasant (noxious) gases with strong odors, leave the room or area immediately until the room can be completely ventilated.

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### Instructions

**STEP 1:** Prepare a 0.5% chlorine solution from liquid concentrates (see **Table 10-1** for directions) or from chlorine compounds (see **Table 10-2**). Alternative disinfectants that can be used include 1–2% phenols or 5% carbolic acid (e.g., Lysol®).

**STEP 2:** Add enough detergent to the 0.5% chlorine solution or other disinfectant to make a mild, soapy cleaning solution.

## CLEANING METHODS

In general, written schedules and procedures for cleaning in each specific area should be available and posted. Cleaning should start with the least soiled area and move to the most soiled area and from high to low surfaces. Common methods of cleaning are briefly described below:

**Note: Do not use disinfectant fogging** (e.g., fumigation with dilute formaldehyde (formalin) solutions to reduce microbial contamination of environmental surfaces such as walls, ceilings and floors (CDC 1988). It is not effective, is time-consuming (requires 24 hours) and the fumes are toxic (irritating to mucous membranes of the nose and eyes). Scrubbing with a disinfectant and cleaning is a safer, quicker and more effective way to reduce microbial contamination on these surfaces.

**Wet mopping** is the most common and preferred method to clean floors.

- **Single-bucket (basin) technique:** One bucket of cleaning solution is used. The solution must be changed when dirty. (The killing power of the cleaning product decreases with the increased load of soil and organic material present.)
- **Double-bucket technique:** Two different buckets are used, one containing a cleaning solution and the other containing rinse water. The mop is always rinsed and wrung out before it is dipped into the cleaning solution. The double-bucket technique extends the life of the cleaning solution (fewer changes are required), saving both labor and material costs.
- **Triple-bucket technique:** The third bucket is used for wringing out the mop before rinsing, which extends the life of the rinse water.

**Flooding** followed by wet vacuuming is recommended in the surgical suite, if possible. This process eliminates mopping, thus minimizing the spread of microorganisms. This method increases the contact time of disinfectants with the surface to be cleaned, but it is necessary to leave the floor wet for several

minutes. (Flooding is best done at night or at times when foot traffic is minimal.)

**Dusting** is most commonly used for cleaning walls, ceilings, doors, windows, furniture and other environmental surfaces.

- Clean cloths or mops are wetted with cleaning solution contained in a basin or bucket. The double-bucket system minimizes the contamination of the cleaning solution.
- Dry dusting should be avoided and dust cloths and mops should never be shaken to avoid the spread of microorganisms.
- Dusting should be performed in a systematic way, using a starting point as a reference to ensure that all surfaces have been reached.
- When doing high dusting (ceiling tiles and walls), check for stains that may indicate possible leaks. (Leaks should be repaired as soon as possible because moist ceiling tiles provide a reservoir for fungal growth.)

**Dry vacuuming** is only recommended for cleaning of carpets.

## USE OF PERSONAL PROTECTIVE EQUIPMENT

**Table 16-2** lists the recommended PPE for use by housekeeping staff when performing the various tasks.

TYPE OF PPE	WHEN USED				
Gloves (preferably household utility gloves)	● Handling disinfectant cleaning solutions				
Shoes that protect the feet from accidentally dropped items and blood and body fluids	● Cleaning patient care areas	● Cleaning heavily contaminated areas	● Handling soiled linen	● Handling soiled items and instruments	● Handling or disposing of waste
Plastic or rubber apron, mask and protective eyewear	● When spills or splashes are expected				

## SCHEDULE AND PROCEDURES FOR SPECIFIC AREAS

Housekeeping schedules should be planned, **written** and closely followed. Cleaning schedules should be developed according to the needs of each area.

**Note:** Environmental surfaces are rarely associated with disease

- **Walls, windows, ceilings and doors, including door handles:** Spot clean when visibly dirty with a damp cloth, detergent and water. In general, routine damp dusting is adequate for these areas (disinfection is unnecessary). These surfaces are rarely heavily contaminated with

microorganisms, as long as the surfaces remain dry and intact (Russell, Hugo and Ayliffe 1982).

- **Chairs, lamps, tables, tabletops, beds, handrails, grab bars, lights, tops of doors and counters:** Wipe daily and whenever visibly soiled with a damp cloth, containing disinfectant cleaning solution. A disinfectant should be used when contamination is present, such as for blood or other body fluid spills as described below.
- **Noncritical equipment** (e.g., stethoscopes and blood pressure cuffs): Wipe daily and whenever visibly soiled with a damp cloth, detergent and water. If the equipment is visibly soiled with blood or other body fluids or the patient is under contact precautions, it should be cleaned and disinfected before it is reused.
- **Floors:** Clean floors frequently (daily and as needed) with a wet mop, detergent and water. A disinfectant should be used when contamination is present, such as for blood or other body fluid spills as described below.
- **Sinks:** Scrub frequently (daily or more often as needed) with a separate mop, cloth or brush and a **disinfectant cleaning solution**. Rinse with water.
- **Toilets and latrines:** Scrub frequently (daily and more often as needed) with a separate mop, cloth or brush and a **disinfectant cleaning solution**.
- **Patient rooms:** Clean daily and after patient discharge, using the processes described above. The same cleaning process applies to rooms of patients who are under isolation precautions. Any cleaning equipment used in the rooms of patients under isolation precautions should be cleaned and disinfected before used in another room.
- **Procedure rooms:** Wipe horizontal surfaces, equipment and furniture used for the procedures with a **disinfectant cleaning solution** after each procedure and whenever visibly soiled. Clean blood or other body fluid spills as described below.
- **Examination rooms:** Wipe horizontal surfaces with a **disinfectant cleaning solution** after each procedure and whenever visibly soiled. Linen or paper on the examination table should be changed after each patient. Clean blood or other body fluid spills as described below.
- **Laboratory:** Wipe countertops with a **disinfectant cleaning solution** after each shift and whenever visibly soiled. Clean blood or other body fluid spills as described below.
- **Curtains:** Change and clean curtains according to the routine schedule and when visibly soiled.
- **Carpets:** Vacuum carpets daily in patient rooms, or weekly in offices or conference rooms.
- **Soiled linen:** Collect soiled linen daily (or more often as needed) in closed, leakproof containers.

- **Waste:** Collect waste from all areas at least daily (or more frequently as needed). **Avoid overflowing.**
- **Waste containers:** Clean contaminated waste containers after emptying each time. Clean noncontaminated waste containers when visibly soiled and at least once a week. Use a **disinfectant cleaning solution** and scrub to remove soil and organic material.

## SCHEDULE AND PROCEDURES FOR THE OPERATING ROOM

**Note:** Do not dry mop or sweep the operating room. (This causes dust, debris and microorganisms to become airborne and contaminate clean surfaces.)

### Total Cleaning

**Remember:** All areas of the surgical suite, scrub sinks, scrub or utility areas, hallways and equipment should be totally cleaned, regardless of whether they were used during the 24-hour surgery period.

**Note:** If walls and ceilings are deteriorating or damp, cover with clean plastic sheets during procedures.

**Note:** The double- or triple-bucket method is recommended for the cleaning of the operating room and other areas of the surgical suite.

- At the beginning of each day, all flat (horizontal) surfaces (table, chairs, etc.) should be wiped with a clean, lint-free moist cloth to remove dust and lint that may have collected overnight.
- Total cleaning is **not necessary** between each case for surgical procedures.
- Total cleaning or terminal cleaning (mopping floors and scrubbing all surfaces from top to bottom) of the operating room should be done at the **end** of each day.

**STEP 1:** Move covered decontamination buckets to the central supply or processing room. A clean bucket containing a fresh 0.5% chlorine solution, or other locally available and approved disinfectant, should be provided at the beginning of each day and after each case.

**STEP 2:** Remove covered contaminated waste container and replace it with a clean container. Arrange for burning (incineration) or burial as soon as possible.

**STEP 3:** Close and remove sharps containers when three quarters full.

**STEP 4:** Remove soiled linen in closed leakproof containers.

**STEP 5:** Soak a cloth in disinfectant cleaning solution and wipe down all surfaces, including counters, tabletops, sinks, lights, etc. Wash from top to bottom, so that any debris that falls on the floor will be cleaned up last.

- **Walls and ceilings.** Wipe with a damp cloth, detergent and water as needed for visible soil.
- **Chairs, lamps, sinks, tabletops and counters.** Wipe with a damp cloth and disinfectant cleaning solution.
- **Operating room lamp.** Wipe with a damp cloth and disinfectant cleaning solution.
- **Operating room table.** Wipe with a 0.5% chlorine solution (or other approved disinfectant) to decontaminate. Then clean top, sides, base, legs and any accessories (e.g., leg stirrups) with a damp cloth and disinfectant cleaning solution.
- **Floors.** Clean with a wet mop using a disinfectant cleaning solution.



- **Vents** (heating or air conditioning). Wipe with a damp cloth, soap and water.

**Note:** Cleaning the filters in air conditioners regularly will help them run more efficiently and decrease the growth of molds.

Between each case, do the following:

- **Spills.** Clean spills with a 0.5% chlorine solution or other locally available and approved disinfectant (see below).
- **Operating room bed.** Wipe all surfaces and mattress pads with a **disinfectant cleaning solution.**
- **Instrument tables (trolley and Mayo stand) and other flat surfaces.** Wipe all flat surfaces that have come in immediate contact with a patient or body fluids with a disinfectant cleaning solution.
- **Center of operating room surrounding the operating room bed.** Mop with a disinfectant cleaning solution (if visibly soiled).
- **Waste.** Collect and remove all waste from the operating room in closed leakproof containers.
- **Sharps containers.** Close and remove containers from the operating room when they are three quarters full.
- **Containers with a 0.5% chlorine solution for decontamination.** Remove covered containers with instruments from the operating room and replace them with clean containers with a fresh 0.5% chlorine solution.
- **Soiled linen.** Remove soiled linen in leakproof, covered waste containers.

**Remember:** Because all patients are considered potentially susceptible and infectious, Standard Precautions are used; no additional measures are necessary if a client is known to have an infection.

## HOW TO CLEAN SPILLS OF BLOOD AND OTHER BODY FLUIDS

Clean spills of blood, body fluids and other potentially infectious fluids **immediately:**

- For **small spills.** While wearing utility or examination gloves, remove visible material using a cloth soaked in a 0.5% chlorine solution, then wipe clean with a disinfectant cleaning solution.
- For **large spills.** While wearing gloves, flood the area with a 0.5% chlorine solution, mop up the solution and then clean as usual with detergent and water.

## HOW TO CLEAN SOILED AND CONTAMINATED CLEANING EQUIPMENT

**STEP 1:** Decontaminate cleaning equipment that has been contaminated with blood or body fluids by soaking it for 10 minutes in a 0.5% chlorine solution or other locally available and approved disinfectants.

**STEP 2:** Wash cleaning buckets, cloths, brushes and mops with detergent and water daily, or sooner if visibly dirty.

**STEP 3:** Rinse in clean water.

**STEP 4:** Dry completely before reuse. (Wet cloths and mop heads are heavily contaminated with microorganisms.)

## REFERENCES

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