

3.3 Importance of a clean environment in the operating room and decontamination of medical devices and surgical instruments

3.3.1 Environment

For many years, environmental contamination was considered to be less important than many other factors in contributing to HAI. However, recent evidence shows that a contaminated health care environment plays a significant role in the transmission of microorganisms (1,2). It is essential that the operating room (OR) is thoroughly cleaned on a daily basis. Proper mechanical ventilation is also necessary to prevent surgical wound contamination from unfiltered air drawn into the OR and to dilute and remove microorganisms shed in skin scales (3). Specific guidance on the most appropriate ventilation systems in the OR and an evidence-based recommendation on laminar flow are included in chapter 4.23 of these guidelines.

Environmental cleaning and waste management in the OR

Cleaning consists of the removal of dust, soil and contaminants on environmental surfaces and ensures a hygienic and healthy environment both for patients and staff. The environment should be thoroughly cleaned and general principles of good practice should be taken into consideration (Box 3.3.1). Cleaning requirements for various surfaces are detailed in Table 3.3.1.

At the beginning of each day, all flat surfaces should be wiped with a clean, lint-free moist cloth to remove dust and lint. Between cases, hand-touch surfaces (Figure 3.3.1) and surfaces that may have come in contact with patients' blood or body fluids, should be wiped clean first by using a detergent solution and then disinfected according to hospital policy and allowed to dry.

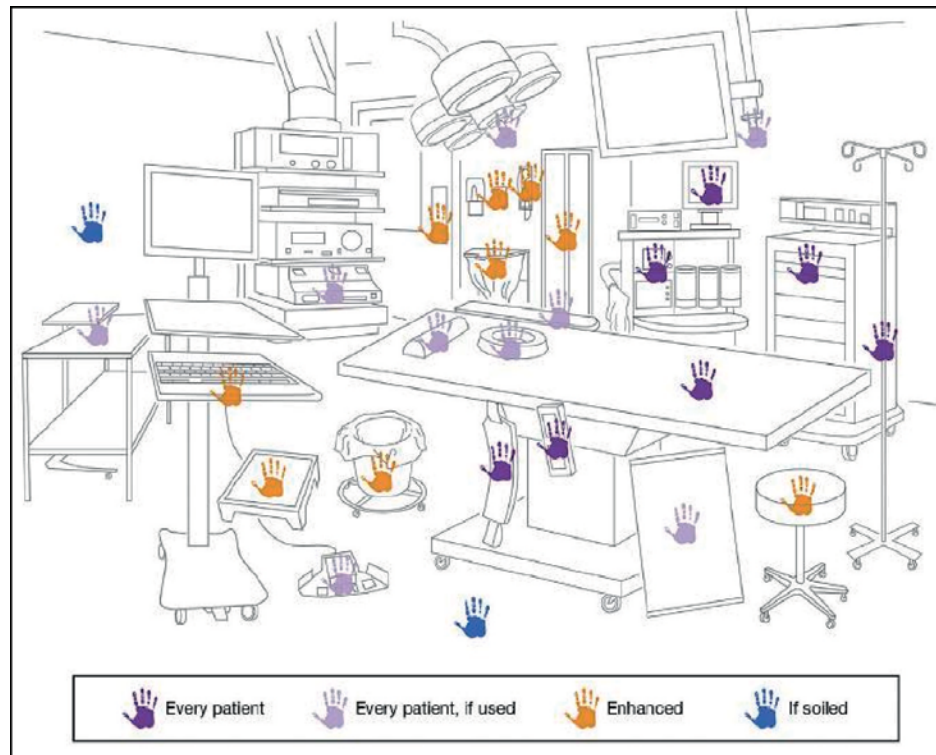
Box 3.3.1. General principles for environmental cleaning

- Cleaning is an essential first step prior to any disinfection process to remove dirt, debris and other materials.
- The use of a neutral detergent solution is essential for effective cleaning. It removes dirt while improving the quality of cleaning by preventing the build-up of biofilms and thus increasing the effectiveness of chemical disinfectants.
- If disinfectants are used, they must be prepared and diluted according to the manufacturer's instructions. Too high and/or too low concentrations reduce the effectiveness of disinfectants. In addition, high concentrations of disinfectant may damage surfaces.
- Cleaning should always start from the least soiled areas (cleanest) first to the most soiled areas (dirtiest) last and from higher levels to lower levels so that debris may fall on the floor and is cleaned last (4).
- Detergent and/or disinfectant solutions must be discarded after each use.
- Avoid cleaning methods that produce mists or aerosols or disperse dust, for example dry sweeping (brooms, etc.), dry mopping, spraying or dusting.
- Routine bacteriological monitoring to assess the effectiveness of environmental cleaning is not required, but may be useful to establish the potential source of an outbreak and/or for educational purposes (5).

Table 3.3.1. Cleaning requirements for various surface types in ORs

Surface type	Definition	Cleaning requirement
High hand-touch surface	Any surface with frequent contact with hands.	Requires special attention and more frequent cleaning. <i>After</i> thorough cleaning, consider the use of appropriate disinfectants to decontaminate these surfaces.
Minimal touch surface (floors, walls, ceilings, window sills, etc.)	Minimal contact with hands. Not in close contact with the patient or his/her immediate surroundings.	Requires cleaning on a regular basis with <i>detergent only</i> or when soiling or spills occur. Also required following patient discharge from the health care setting.
Administrative and office areas	No patient contact.	Require normal domestic cleaning with <i>detergent only</i> .
Toilet area	–	Clean toilet areas at least twice daily and as needed.
Medical and other equipment	–	Require cleaning according to written protocols (for example, daily, weekly, after each patient use, etc.). This should include the use of appropriate personal protective equipment, cleaning methods conforming to the type/s of surface and cleaning schedules, etc. Schedules and procedures should be consistent and updated on a regular basis and education and training must be provided to all cleaning staff. Please refer to the manufacturer's instructions for medical equipment to ensure that the item is not damaged by the use of disinfectants.
Surface contaminated with blood and body fluids	Any areas that are visibly contaminated with blood or other potentially infectious materials.	Requires prompt cleaning and disinfection (see below).

Figure 3.3.1. Example of cleaning frequencies in preoperative and postoperative care areas



Reproduced with permission from reference 6.

All spills must be carefully cleaned up and the surface cleaned and disinfected according to hospital policy. Domestic heavy duty gloves should be always worn to undertake this task. Use a single-use plastic apron if contamination of the body is likely. Use of a gown and mask is *not* necessary. If there is a risk of spills with chemicals, the use of a face shield or goggles should be considered, depending on the type of chemical products used for disinfection. All waste from the OR should be collected and removed in closed leak-proof containers; soiled linen should be placed in plastic bags for collection. All reusable medical devices should be sent for reprocessing to the sterile services department or the decontamination unit. The operating table should be cleaned and wiped with a detergent solution, including the mattress and the surface. All surfaces that have come in contact with a patient or a patient's body fluids must be cleaned and disinfected using an appropriate disinfectant solution according to local protocols.

At the end of every day, it is necessary to perform a total cleaning procedure. All areas of the surgical suite, scrub sinks, scrub or utility areas, hallways

and equipment should be thoroughly cleaned, regardless of whether they were used or not during the last 24 hours. Soiled linen should be removed in closed leak-proof containers. All contaminated waste containers should be removed and replaced with clean containers. Sharps' containers should be closed and removed when they are three quarters full. All surfaces should be cleaned from top to bottom using a detergent, followed by a disinfectant if necessary, and then allowed to dry. To reduce the microbial contamination of environmental surfaces, such as walls, ceilings and floors, they should be thoroughly cleaned from top to bottom with a detergent and allowed to dry. The routine use of a disinfectant or fumigation of the OR is *not* necessary even after contaminated surgery.

3.3.2 Decontamination of medical devices and surgical instruments

Decontamination is a complex and highly specialized subject. This section provides a brief summary on the decontamination and reprocessing of reusable medical devices and patient care equipment.