



VERSION 1

Best Practices for Environmental Cleaning in Healthcare Facilities: in Resource-Limited Settings



**Centers for Disease
Control and Prevention**
National Center for Emerging and
Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

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This document provides guidance on best practices for environmental cleaning procedures and programs in healthcare facilities in resource-limited settings. It was developed as a collaboration between the Centers for Disease Control and Prevention (CDC) and the Infection Control Africa Network (ICAN).

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Cover page photo features Ms. De Bruin, a dedicated and passionate environmental cleaning staff for over 40 years at a hospital in Cape Town, South Africa.

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Table of Contents

Acknowledgements.....	3
Abbreviations	6
Key definitions	7
1. Introduction.....	11
1.1. Environmental transmission of HAIs	11
1.2. Environmental cleaning and IPC.....	13
1.3. Environmental cleaning and WASH infrastructure	13
1.4. Basis and evidence for proposed best practices	14
1.5. Purpose and scope of the document	14
1.6. Intended audience of the document.....	15
1.7. Overview of the document.....	15
2. Cleaning Programs	17
2.1. Organizational elements	18
2.1.1. Administrative support	18
2.1.2. Communication.....	19
2.1.3. Management and supervision	19
2.2. Staffing elements.....	20
2.2.1. Staffing levels	20
2.2.2. Training and education	21
2.3. Supporting infrastructure and supply elements	22
2.3.1. Designated space	22
2.3.2. Water and wastewater services	22
2.3.3. Supplies and equipment procurement and management.....	24
2.3.4. Finishes, furnishings and other considerations	24
2.4. Policies and procedural elements	25
2.4.1. Cleaning policies	25
2.4.2. Standard operating procedures	26
2.4.3. Cleaning checklists, logs, and job aids	27
2.5. Monitoring, feedback and audit elements.....	27
2.5.1. Routine monitoring.....	28
2.5.2. Feedback mechanisms	29
2.5.3. Program audits.....	29
3. Environmental Cleaning Supplies and Equipment.....	30
3.1. Products for environmental cleaning	30
3.1.1. Cleaning products	31
3.1.2. Disinfectants	31

3.1.3. Combined detergent-disinfectants	34
3.2. Preparation of environmental cleaning products	34
3.3. Supplies and equipment for environmental cleaning	35
3.3.1. Preparation of supplies and equipment	36
3.4. Personal protective equipment for environmental cleaning	37
3.5. Care and storage of supplies, equipment, and personal protective equipment	39
4. Environmental Cleaning Procedures.....	42
4.1. General environmental cleaning techniques	42
4.2. General patient areas	44
4.2.1. Outpatient wards	45
4.2.2. Routine cleaning of inpatient wards	45
4.2.3. Terminal or discharge cleaning of inpatient wards	46
4.2.4. Scheduled cleaning	46
4.3. Patient area toilets	47
4.4. Patient area floors	47
4.5. Spills of blood or body fluids	48
4.6. Specialized patient areas.....	49
4.6.1. Operating rooms	49
4.6.2. Medication preparation areas	51
4.6.3. Sterile service departments (SSD).....	51
4.6.4. Intensive care units.....	52
4.6.5. Emergency departments.....	53
4.6.6. Labor and delivery wards.....	54
4.6.7. Other specialized areas.....	54
4.6.8. Transmission-based precaution / Isolation wards	57
4.7. Noncritical patient care equipment	59
4.7.1. Material compatibility considerations	60
4.7.2. Sluice rooms.....	60
4.8. Methods for assessment of cleaning and cleanliness	61
5. Conclusion and way forward	64
Further reading	65
References	66
Appendix A – Risk-assessment for determining environmental cleaning method and frequency	68
Appendix B1 – Cleaning procedure summaries for general patient areas.....	70
Appendix B2 – Cleaning procedure summaries for specialized patient areas	74
Appendix C – Example of high-touch surfaces in a specialized patient area	88
Appendix D – Linen and laundry management	89
Appendix E – Chlorine disinfectant solution preparation	91

Abbreviations

Abbreviation	Term
ATP	Adenosine tri-phosphate
CDC	Centers for Disease Control and Prevention
C. diff	<i>Clostridioides difficile</i>
GRADE	Grading of Recommendations, Assessment, Development and Evaluation
HAI	Healthcare-associated infection
HEPA	High-Efficiency Particulate Air
ICAN	Infection Control Africa Network
ICU	Intensive Care Unit
IPC	Infection Prevention and Control
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
OR	Operating Room
PPE	Personal Protective Equipment
SOP	Standard Operating Procedure
SDS	Safety Data Sheet
UNICEF	United Nations International Children's Emergency Fund
VRE	Vancomycin-resistant Enterococci
WASH	Water, Sanitation and Hygiene
WASH FIT	Water and Sanitation for Health Facility Improvement Tool
WHO	World Health Organization

Key definitions

Antiseptic: a substance that prevents or arrests the growth or action of microorganisms by inhibiting their activity or by destroying them. The term is used especially for preparations applied topically to living tissue.

Automatic dispensing system: systems that provide computer-controls (automation) for preparation of cleaning or disinfectant solutions. These systems replace the need for manual measuring a quantity of cleaning product or disinfectant and water for preparation of cleaning or disinfectant solutions.

Chemical-resistant gloves: gloves that protect the hands from chemicals. Chemical-resistant gloves include latex or another manufactured material, such as nitrile. Chemical-resistant gloves can also be water or liquid proof.

Chemical sterilant: an agent that is applied to inanimate objects or heat-sensitive devices to kill all microorganisms and bacterial spores.

Cleaning: the physical removal of foreign material (e.g., dust, soil) and organic material (e.g., blood, secretions, excretions, microorganisms). Cleaning physically removes rather than kills microorganisms. It is accomplished with water, detergents and mechanical action.

Cleaning cart (also known as cleaning trolley): dedicated cart or trolley that carries environmental cleaning supplies and equipment needed to complete one or more cleaning session, in addition to bags or bins for soiled materials for disposal or reprocessing, such as laundry.

Cleaning products (also known as cleaning agents): liquids, powders, sprays, or granules that remove organic material (e.g., dirt, body fluids) from surfaces and suspend grease or oil. Can include liquid soap, enzymatic cleaners and detergents.

Cleaning session: a continuous environmental cleaning activity performed over a defined time period in defined patient care areas. A cleaning session could include routine or terminal cleaning.

Cleaning solution: a combination of water and cleaning product (e.g., detergent) in the ratio as specified by the manufacturer for use of the product.

Contact time: the time that a disinfectant must be in contact with a surface or device to ensure that appropriate disinfection has occurred. For most disinfectants, the surface should remain wet for the required contact time.

Contamination: the presence of any potentially infectious agent on items such as environmental surfaces, clothing, bedding, surgical instruments or dressings, or other inanimate articles or substances including water, medications, and food.

Critical patient care equipment: equipment and devices that enter sterile tissue or the vascular system, such as surgical instruments, cardiac and urinary catheters.

Detergent: a synthetic cleansing agent that can emulsify and suspend oil. Contains surfactant or a mixture of surfactants with cleaning properties in dilute solutions to lower surface tension and aid in the removal of organic soil and oils, fats, and greases.

Disinfectant fogging: misting or fogging a liquid chemical disinfectant to disinfect environmental surfaces in an enclosed space.

Disinfection: a thermal or chemical process for inactivating microorganisms on inanimate objects.

Disinfectants: Chemical compounds that inactivate (i.e., kill) pathogens and other microbes and fall into one of three categories based on chemical formulation: low-level, mid-level, and high-level. Disinfectants are applied

only to inanimate objects. All organic material and soil must be removed by a cleaning product before application of disinfectants. Some products combine a cleaner with a disinfectant.

Disinfectant solution: a combination of water and disinfectant, in the ratio as specified by the manufacturer for the use of the product.

Dry sweeping: using a broom to clean dry surfaces.

Dry mopping: using a dry mop to clean dry surfaces.

Environmental cleaning: cleaning and disinfection (when indicated) of environmental surfaces (e.g., bed rails, mattresses, call buttons, chairs) and surfaces of noncritical patient care equipment (e.g., IV poles, stethoscopes).

General patient areas: outpatient or ambulatory care wards and inpatient wards with patients admitted for routine medical procedures who are not receiving acute care (i.e., sudden, urgent or emergent episodes of injury and illness that require rapid intervention).

Hand hygiene: A general term referring to any action of hand cleansing, that is, the action of performing hand hygiene for the purpose of physically or mechanically removing dirt, organic material, and/or microorganisms.

Hemodialysis station: the chair or bed with associated hemodialysis machine and at a minimum the connections for that machine to purified water and sanitary sewer. Other potential connections might include acid concentrate and bicarb concentrate in facilities with central delivery.

High-level disinfection: kills all microorganisms, with the exception of small numbers of bacterial spores.

High-touch surfaces: surfaces that are frequently touched by healthcare workers and patients (e.g., bedrails, overbed table, IV pole, door knobs, medication carts), often found within patient care areas.

Environmental cleaning services area: dedicated space for preparing, reprocessing, and storing clean or new environmental cleaning supplies and equipment, including cleaning products and PPE. These rooms have restricted access for cleaning staff and other authorized personnel only.

Incubator (also known as isolette): a self-contained unit that provides a controlled heat, humidity, and oxygen microenvironment for the isolation and care of premature and low-birth weight neonates.

Low-level disinfection: inactivates most vegetative bacteria, some fungi, and some viruses in a practical contact time, but does not kill more hardy viruses (e.g. non-enveloped), bacterial genus (e.g. mycobacteria), or bacterial spores.

Low-touch surfaces: surfaces that are minimally touched by healthcare workers and patients (e.g., walls, ceilings, floors).

Material compatibility: the chemical compatibility and other factors that affect corrosion, distortion, or other damage to materials.

Mechanical action: physical action of cleaning—includes rubbing, scrubbing, and friction.

Microfiber cloths: cloths made from a tightly woven combination of polyester and polyamide (nylon) fibers.

Mid-level disinfection (also intermediate-level disinfection): kills inactivate vegetative bacteria, including mycobacteria, most viruses, and most fungi, but might not kill bacterial spores.

Multi-drug resistant organisms (MDRO) and pathogens: germs (viruses, bacteria, and fungi) that develop the ability to defeat the drugs designed to kill them. Typically refers to an isolate that is resistant to at least one

antibiotic in three or more drug classes.

Noncritical patient care equipment: equipment that come into contact with intact skin, such as stethoscopes, blood pressure cuffs and bed pans.

Patient care areas: any area where patient care is directly (e.g., examination room) and indirectly (e.g., medication preparation area) provided and the surrounding healthcare environment (e.g., patient toilets) within general and specialized patient areas.

Patient zone: the patient and his or her immediate surroundings. The zone includes all surfaces that are temporarily and exclusively designated for that patient.

Personal protective equipment (PPE): clothing or equipment worn by staff to protect themselves against hazards (e.g., blood or body fluids).

Private vs shared toilets: private toilets are dedicated to one person over a specified time period and environmental cleaning always takes place prior to their use by a different person, whereas shared toilets are used by more than one person within a specified time period and may not be cleaned prior to their use by a different person.

Reprocess: the process of cleaning and disinfecting a device or piece of equipment for reuse on the same patient (e.g., hemodialyzers) or other patients.

Resource-limited settings: settings with insufficient individual or societal resources, such as human resources, financial resources and technological resources, to support a robust public healthcare system.

Reusable rubber gloves (also referred to as domestic gloves or household gloves): gloves that protect the hands from liquids, including cleaning or disinfectant solutions, and chemicals. Reusable rubber gloves are stronger (more durable) than disposable (single-use) latex gloves.

Routine cleaning: the regular cleaning (and disinfection, when indicated) when the room is occupied to remove organic material, minimize microbial contamination, and provide a visually clean environment, emphasis is on surfaces within the patient zone.

Safety data sheet (SDS): a document that contains information on potential hazards (health, fire, reactivity, and environmental) and how to work safely with a chemical product. It also contains information on the use, storage, handling, and emergency procedures of the product. SDSs are prepared by the supplier or manufacturer of the material.

Scheduled cleaning: cleaning (and disinfection, when indicated) that occurs concurrently with routine cleaning and aims to reduce dust and soiling on low-touch surfaces.

Semi-critical patient care equipment: equipment that comes into contact with mucus membranes, such as endoscopes, respiratory and anesthesia equipment, and vaginal ultrasound probes.

Sluice room: dedicated room or area where noncritical patient care equipment is reprocessed. Separated into dirty and clean areas. These rooms have restricted access for cleaning staff and other authorized personnel only.

Specialized patient areas: inpatient wards or units (e.g., medication preparation areas) that provide service to high-dependency patients (e.g., ICUs), immunosuppressed patients (e.g., bone marrow transplant, chemotherapy), patients undergoing invasive procedures (e.g., operating theatres), or those who are regularly exposed to blood or body fluids (e.g., labor and delivery ward, burn units).

Standard precautions: are used for all patient care. They're based on a risk assessment and make use of common sense practices and personal protective and other equipment use that protects healthcare providers from infection and prevent the spread of infection from patient to patient.

Surgical field: includes the patient zone in the operating theatre where asepsis is required. Only sterile objects and personnel may be allowed within the surgical field.

Terminal (discharge) cleaning: cleaning and disinfection after the patient is discharged or transferred. Includes the removal of organic material and significant reduction and elimination of microbial contamination to ensure that there is no transfer of microorganisms to the next patient.

Three-bucket system (mopping): floor mopping system when cleaning and disinfection is required. One bucket contains a detergent or cleaning solution, the second bucket contains disinfectant or disinfectant solution, and the third bucket contains clean water for rinsing mop.

Transmission-based precautions: are used in addition to Standard Precautions for patients with known or suspected infections. There are three categories of Transmission-Based Precautions:

- **Contact:** are intended to prevent transmission of infectious agents, including epidemiologically important microorganisms, which are spread by direct or indirect contact with the patient or the patient's environment
- **Droplet:** are intended to prevent transmission of pathogens spread through close respiratory or mucous membrane contact with respiratory secretions
- **Airborne:** are intended to prevent transmission of infectious agents that remain infectious over long distances when suspended in the air (e.g., rubeola virus [measles], varicella virus [chickenpox], M. tuberculosis, and possibly SARS-CoV)

For some diseases that have multiple routes of transmission (e.g., SARS), more than one Transmission-Based Precautions category may be used. When used either singly or in combination, they are always used in addition to Standard Precautions.

Transport equipment: wheelchairs, trolleys, stretchers, or other portable equipment used to transport patients.

Two-bucket system (mopping): floor mopping system when only cleaning is required. One bucket contains a detergent or cleaning solution and the second bucket contains clean water for rinsing mop.

1. Introduction

Healthcare-associated infections (HAI) are a significant burden globally, with millions of patients affected each year.¹ These infections affect both high- and limited-resource healthcare settings, but in limited-resource settings, rates are approximately twice as high as high-resource settings (15 out of every 100 patients versus 7 out of every 100 patients). Furthermore, rates of infections within certain patient populations are significantly higher in limited-resource settings, including surgical patients, patients in intensive-care units (ICU) and neonatal units.

It is well documented that environmental contamination plays a role in the transmission of HAIs in healthcare settings.^{2, 3} Therefore, **environmental cleaning is a fundamental intervention for infection prevention and control (IPC)**. It is a multifaceted intervention that involves cleaning and disinfection (when indicated) of the environment alongside other key program elements to support successful implementation (e.g., leadership support, training, monitoring, and feedback mechanisms).

To be effective, environmental cleaning activities must be implemented within the framework of the facility IPC program, and not as a standalone intervention. It is also essential that IPC programs advocate for and work with facility administration and government officials to budget, operate and maintain adequate water, sanitation and hygiene (WASH) infrastructure to ensure that environmental cleaning can be performed according to best practices.

1.1. Environmental transmission of HAIs

In a variety of healthcare settings, environmental contamination has been significantly associated with transmission of pathogens in major outbreaks of methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococci (VRE), *Clostridioides difficile* (*C.diff*), and more recently in protracted outbreaks of *Acinetobacter baumannii*. Outbreak investigations have determined that the risk of patient colonization and infection increased significantly if the patient occupied a room that had been previously occupied by an infected or colonized patient. Therefore, the role of immediate patient care environment—particularly, environmental surfaces within the patient zone that are frequently touched by or in direct physical contact with the patient such as bed rails, bedside tables and chairs—in facilitating survival and subsequent transfer of microorganisms was established.⁴⁻¹⁰ However, it is important to note that environmental transmission of HAIs can occur via different pathways.

It has also been documented that some healthcare-associated pathogens can survive on environmental surfaces for months.³ In 2006, a laboratory-based study documented the survival times of a range of significant healthcare-associated pathogens, including gram-negative bacilli, and found that they could persist much longer in the environment than was previously understood. For example, *Acinetobacter* spp. survived up to 5 months

¹ Allegranzi B, Begheri Nejad S, Combescure C, Graafmans W, Attar H, Donaldson L, Pittet D. 2011. Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis. *The Lancet*; 377:9761.

² Weber DJ, Rutala WA, Miller MB, et al. 2010. Role of hospital surfaces in the transmission of emerging healthcare-associated pathogens: norovirus, *Clostridium difficile*, and *Acinetobacter* species. *Am J Infect Control* 38:S25–S33.

³ Otter JA, Yezli S, Salkeld J, French G. 2013. Evidence that contaminated surfaces contribute to the transmission of hospital pathogens and an overview of strategies to address contaminated surfaces in hospital settings. *American Journal of Infection Control*; 41: S6–S11

⁴⁻¹⁰ [4] Huang SS, Datta R, Platt R. 2006. Risk of acquiring antibiotic-resistant bacteria from prior room occupants. *Archs Intern Med*; 166:1945–1951. [5] Drees M, Snyderman DR, Schmid CH, et al. 2008. Prior environmental contamination increases the risk of acquisition of vancomycin-resistant enterococci. *Clin Infect Dis*; 46:678–685. [6] Nseir S, Blazejewski C, Lubret R, Wallet F, Courcol R, Durocher A. 2011. Risk of acquiring multidrug-resistant Gram-negative bacilli from prior room occupants in the intensive care unit. *Clin Microbiol Infect*; 17:1201–1208. [7] Datta R, Platt R, Yokoe DS, Huang SS. 2011. Environmental cleaning intervention and risk of acquiring multidrug-resistant organisms from prior room occupants. *Archs Intern Med*; 171:491–494. [8] Shaughnessy MK, Micieli RL, DePestel DD, et al. 2011. Evaluation of hospital room assignment and acquisition of *Clostridium difficile* infection. *Infect Control Hosp Epidemiol*; 32:201–206. [9] Ajao AO, Johnson K, Harris AD, et al. 2013. Risk of acquiring extended spectrum b-lactamase-producing *Klebsiella* species and *Escherichia coli* from prior room occupants in the intensive care unit. *Infect Control Hosp Epidemiol*; 34:453–458. [10] Mitchell BG, Digney W, Ferguson JK. 2014. Prior room occupancy increases risk of methicillin-resistant *Staphylococcus aureus* acquisition. *Healthcare Infect*; 19:135–140.

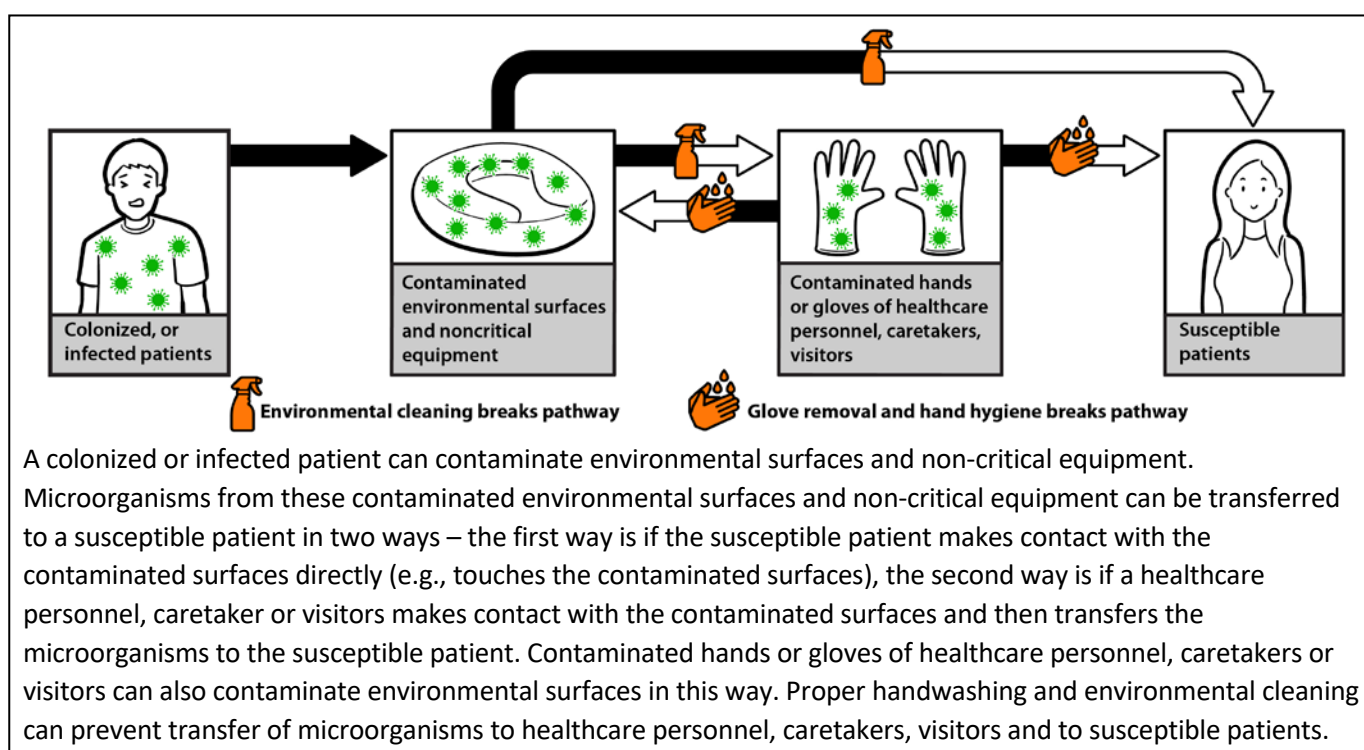
and *Klebsiella* spp. up to 30 months.¹¹⁻¹² **The actual survival times in healthcare settings vary considerably based on factors such as temperature, humidity and surface type.**

Figure 1 (below) illustrates the environmental transmission pathway in general terms. Microorganisms are transferred from the environment to a susceptible host through:

- contact with contaminated environmental surfaces and noncritical equipment
- contact with contaminated hands or gloves of healthcare workers during the provision of care, as well as by caretakers and visitors

Contaminated hands or gloves will also continue to spread microorganisms around the environment. The figure also shows how these pathways can be broken and highlights that environmental cleaning and hand hygiene (preceded by glove removal, as applicable) can break this chain of transmission.

Figure 1. Contact transmission pathway showing role of environmental surfaces, role of environmental cleaning, and hand hygiene in breaking the chain of transmission



A colonized or infected patient can contaminate environmental surfaces and non-critical equipment. Microorganisms from these contaminated environmental surfaces and non-critical equipment can be transferred to a susceptible patient in two ways – the first way is if the susceptible patient makes contact with the contaminated surfaces directly (e.g., touches the contaminated surfaces), the second way is if a healthcare personnel, caretaker or visitors makes contact with the contaminated surfaces and then transfers the microorganisms to the susceptible patient. Contaminated hands or gloves of healthcare personnel, caretakers or visitors can also contaminate environmental surfaces in this way. Proper handwashing and environmental cleaning can prevent transfer of microorganisms to healthcare personnel, caretakers, visitors and to susceptible patients.

Evidence that effective environmental cleaning strategies reduce the risk of transmission and contribute to outbreak control is increasing but remains limited at present.^{7, 13-22} Consequently, the use of multiple (i.e., a

¹¹⁻¹² [11] Kramer A, Schwebke I, Kampf G. 2006. How long do nosocomial pathogens persist on inanimate surfaces? A systematic review. BMC Infect Dis; 6:130. [12] Dancer SJ. 2014. Controlling hospital-acquired infection: focus on the role of the environment and new technologies for decontamination. Clin Microbiol Rev; 27:665-690.

^{7,13-22} [7] Datta R, Platt R, Yokoe DS, Huang SS. 2011. Environmental cleaning intervention and risk of acquiring multidrug-resistant organisms from prior room occupants. Arch Intern Med; 171:491-494. [13] Falk PS, Winnike J, Woodmansee C, Desai M, Mayhall CG. 2000. Outbreak of vancomycin-resistant enterococci in a burn unit. Infect Control Hosp Epidemiol 21:575-82. [14] Rampling A, Wiseman S, Davis L, Hyett AP, Walbridge AN, Payne GC, et al. 2001. Evidence that hospital hygiene is important in the control of methicillin-resistant *Staphylococcus aureus*. J Hosp Infect 49:109-16. [15] Wilcox M., Fawley W., Wigglesworth N., Parnell P., Verity P., Freeman J. (2003) Comparison of the effect of detergent versus hypochlorite cleaning on environmental contamination and incidence of *Clostridium difficile* infection. J Hosp Infect 54: 109–114. [16] Denton M, Wilcox MH, Parnell P, Green D, Keer V, Hawkey PM, et al. 2004. Role of environmental cleaning in controlling an outbreak of *Acinetobacter baumannii* on a neurosurgical intensive care unit. J Hosp Infect 56:106-10. [17] Hayden MK, Bonten MJ, Blom DW, Lyle EA, van de Vijver DA, Weinstein RA. 2006. Reduction in acquisition of vancomycin-resistant enterococcus after enforcement of routine environmental cleaning measures. Clin Infect Dis 42:1552-60. [18] McMullen K., Zack J., Coopersmith C., Kollef M., Dubberke E., Warren D. (2007) Use of hypochlorite solution to decrease rates of *Clostridium difficile*-associated diarrhea. Infect Control Hosp

bundle) interventions as well as an overall multi-modal approach to IPC activities and programs is recommended, for both the outbreak and routine setting.

1.2. Environmental cleaning and IPC

Environmental cleaning is part of Standard Precautions, which should be applied to all patients in all healthcare facilities. **It is important that environmental cleaning programs be implemented within the framework of facility-level IPC programs.** Where possible—during staff training and education, for example—consider generating synergies and highlighting the relationship between environmental cleaning and hand hygiene activities in preventing environmental transmission of HAIs.

Facility-level IPC programs include multiple elements, ranging from surveillance for HAIs to training and education for all healthcare workers on IPC. The World Health Organization (WHO) has defined core components of IPC programs in [Guidelines on core components of infection prevention and control programmes at the national and acute health care facility level](https://www.who.int/gpsc/ipc-components/en/) (<https://www.who.int/gpsc/ipc-components/en/>).

Environmental cleaning is addressed explicitly within Core Component 8: Built environment, materials and equipment for IPC at the facility level, but other components include important aspects for the implementation of environmental cleaning as well, such as Core Component 2: IPC guidelines, Core Component 3: IPC education and training and Core Component 6: Monitoring/audit of IPC practices and feedback. At the national level, it is important that these Core Components (2, 3 and 6) include frameworks and guidance to inform facility level approaches to environmental cleaning.

Given the wide range of IPC responsibilities at acute healthcare facilities, implementation of robust IPC programs requires a dedicated, trained IPC team (or at least a focal person). The IPC team should consult and be involved in the technical aspects of environmental cleaning program (e.g., training, policy development), but a separate team is recommended for the overall management and implementation of the environmental cleaning program. In small primary care facilities with limited inpatient services, the IPC team or focal person may be directly responsible for managing environmental cleaning activities.

1.3. Environmental cleaning and WASH infrastructure

Healthcare facilities must have adequate water and sanitation infrastructure (e.g., safe wastewater disposal) to perform environmental cleaning according to best practices. A recent global report summarized the critical **lack of access to basic water, sanitation and hygiene (WASH) services in healthcare facilities in resource-limited settings, which hinders the ability of facilities to implement effective environmental cleaning programs.**²³

In response to the identified need to improve WASH in healthcare facilities, WHO and UNICEF have engaged partners and proposed practical steps at a range of levels, including ministries and civil society, to improve WASH services. Notably, this includes using and reporting on:

Epidemiol 28: 205–207. [19] Dancer SJ, White LF, Lamb J, Girvan EK, Robertson C. 2009. Measuring the effect of enhanced cleaning in a UK hospital: a prospective cross-over study. BMC Med 7:28. [20] Wilson AP, Smyth D, Moore G, Singleton J, Jackson R, Gant V, et al. 2011. The impact of enhanced cleaning within the intensive care unit on contamination of the near-patient environment with hospital pathogens: a randomized crossover study in critical care units in two hospitals. Crit Care Med 39:651-8. [21] Grabsch EA, Mahony AA, Cameron DR, Martin RD, Heland M, Davey P, et al. 2012. Significant reduction in vancomycin-resistant Enterococcus colonization and bacteraemia after introduction of a bleach-based cleaning-disinfection programme. J Hosp Infect 82:234-42. [22] Mitchell BG, Hall L, White N, Barnett AG, Halton K, Paterson DL, Riley TV, Gardner A, Page K, Farrington A, Gericke CA, Graves N. 2019. An environmental cleaning bundle and health-care-associated infections in hospitals (REACH): a multicenter, randomized trial. The Lancet Infectious Diseases. [23] WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP), 2019. WASH in Health Care Facilities: Global Baseline Report 2019. WHO:Geneva. [24] Rutala WA, Weber DJ. 2016. Monitoring and improving the effectiveness of surface cleaning and disinfection. American Journal of Infection Control 44: e69-e76.

²³ WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP), 2019. WASH in Health Care Facilities: Global Baseline Report 2019. WHO:Geneva.

- harmonized monitoring indicators for the Sustainable Development Goals: [Health care facilities](https://washdata.org/monitoring/health-care-facilities), Joint Monitoring Programme (JMP) (<https://washdata.org/monitoring/health-care-facilities>)
- a facility-based improvement tool to assist facilities make incremental improvements to WASH services: [Water and Sanitation for Health Facility Improvement Tool \(WASH FIT\): a practical guide for improving quality of care through water, sanitation and hygiene in healthcare facilities](https://apps.who.int/iris/handle/10665/254910) (<https://apps.who.int/iris/handle/10665/254910>)
- eight recommended practical steps that provide a roadmap for country improvement in the long term and align with the 2019 World Health Assembly Resolution on WASH in healthcare facilities: [WHO | WASH in health care facilities](https://www.who.int/water_sanitation_health/publications/wash-in-health-care-facilities/en/) (https://www.who.int/water_sanitation_health/publications/wash-in-health-care-facilities/en/)

1.4. Basis and evidence for proposed best practices

The following best practices for environmental cleaning in resource-limited settings are proposed as a standard reference and a resource to supplement existing guidelines, inform the development of guidelines where needed, and ultimately to elevate the attention to this critical and under-resourced aspect of healthcare and patient safety.

These best practices are derived directly from a variety of best practices and cleaning standard documents from several English-speaking high-resource settings, most notably, the United States of America, Canada, the United Kingdom, and Australia. These documents have been generated via a combination of expert opinion and ranking of the current evidence. See the [Further Reading](#) section for a list of the documents that have been used extensively in the development of these best practices.

These best practices were developed by a committee of experts in environmental cleaning in resource-limited settings. Using a consensus-driven process, **we have included the best practices most relevant and achievable for the target context.**

For example, the best practices in ICUs herein include a higher frequency of environmental cleaning than in several of the referenced documents because of the increased HAI risk and burden in ICUs in resource-limited settings. Alternatively, the use of no-touch and novel disinfection devices, which are increasingly common in high-resource settings, were excluded from this document because of their prohibitive cost and limited evidence on their effectiveness in reducing HAIs in resource-limited settings.

This is a living document that will be updated and improved as new evidence becomes available.

1.5. Purpose and scope of the document

The purpose of these best practices is to improve and standardize the implementation of environmental cleaning in patient care areas in all healthcare facilities in resource-limited settings.

Definitions:

Environmental cleaning: cleaning and disinfection (when indicated) of environmental surfaces (e.g., bed rails, mattresses, call buttons, chairs) and surfaces of noncritical patient care equipment (e.g., IV poles, stethoscopes).

Patient care areas: any area where patient care is directly (e.g., examination room) and indirectly (e.g., medication preparation area) provided and the surrounding healthcare environment (e.g., patient toilets) within general and specialized patient areas.

All healthcare facilities: both out- and inpatient settings, at all tiers of health care, from primary to tertiary care, including those that manage cleaning activities internally and those that use contracted cleaning services.

Resource-limited settings: settings with insufficient individual or societal resources, such as human resources, financial resources and technological resources, to support a robust public healthcare system.



The following are outside of the scope of this document:

- cleaning procedures outside of patient care areas, such as offices and administrative areas
- cleaning of the environment external to the facility buildings (e.g., waste storage areas, ambulances and facility grounds)
- decontamination and reprocessing of semi-critical and critical equipment

1.6. Intended audience of the document

This document is intended for healthcare facility staff who have a role in the development, management and/or oversight of environmental cleaning services (internal or contracted) for the healthcare facility.



Primary audience:

full- or part-time cleaning managers and/or cleaning supervisors or other clinical staff who assist with environmental cleaning program development and implementation, such as members of existing infection control or hygiene committees.

Secondary audience:

other staff who assure a clean patient-care environment, such as supervisors of wards or departments, midwives, nursing staff, administrators, procurement staff, facilities management, and any others responsible for WASH and/or IPC services at the healthcare facility.

1.7. Overview of the document

The best practices are divided into three chapters, described below and relationally in [Figure 2](#).

Environmental Cleaning Programs

- An environmental cleaning program is a structured set of elements or interventions which facilitate implementation of environmental cleaning at a facility level.
- Environmental cleaning programs require a standardized and multi-modal approach and strong management and engagement from multiple stakeholders and departments of the healthcare facility, such as administration, IPC, WASH and/or facilities management.
- This chapter provides the best practices for implementing environmental cleaning programs for all program mechanisms (managed in-house or contracted), including the key elements of organization/administration, staffing, supporting infrastructure and supplies in the built environment, policies and procedures, and monitoring, feedback and audit.

Environmental Cleaning Supplies and Equipment

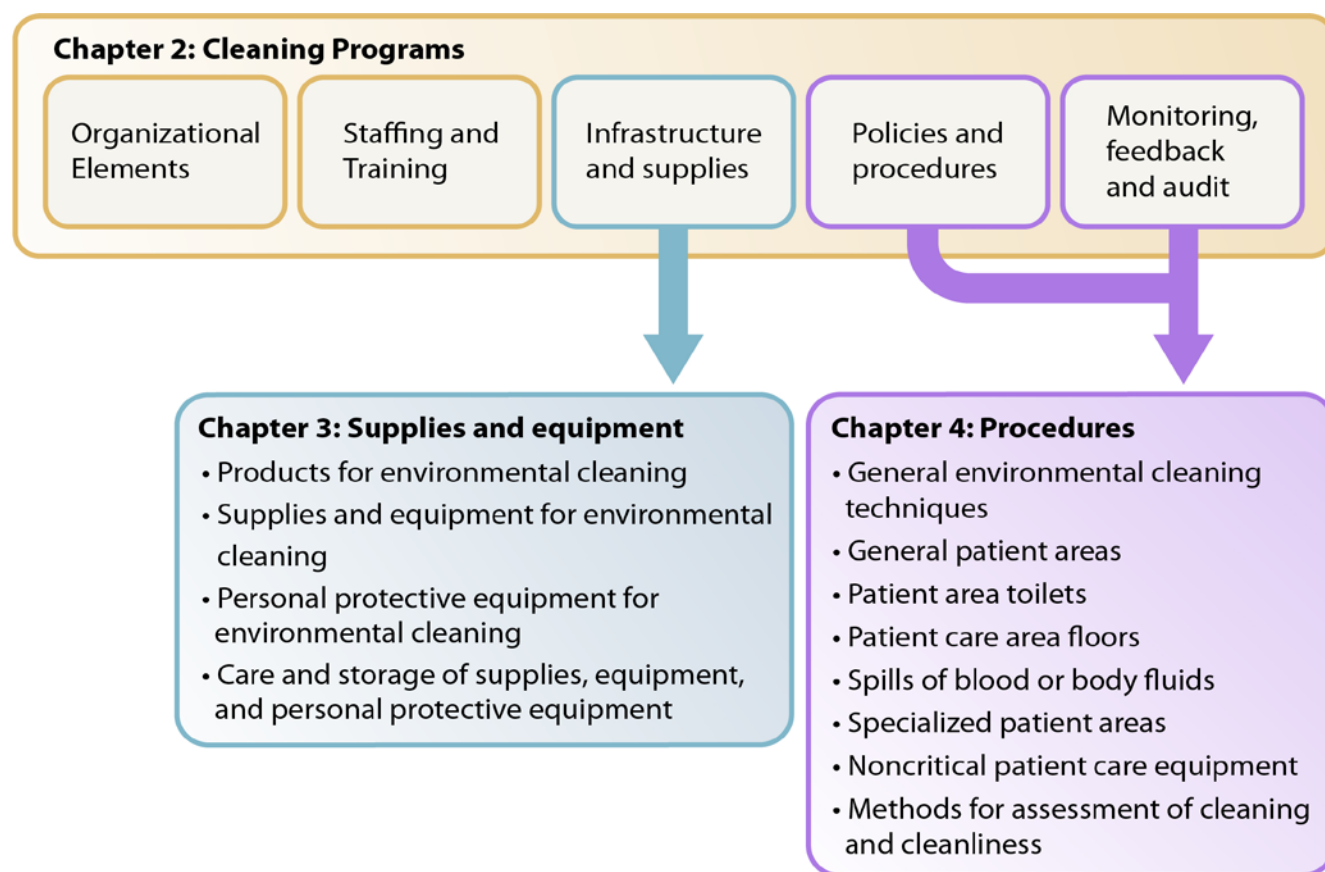
- The selection and appropriate use of supplies and equipment is critical for effective environmental cleaning in patient care areas.
- This chapter provides overall best practices for selection, preparation and care of environmental cleaning supplies and equipment, including cleaning and disinfectant products, reusable and disposable

supplies, cleaning equipment, and personal protective equipment (PPE) for the cleaning staff.

Environmental Cleaning Procedures

- It is critical to develop and implement standard operating procedures (SOP) for patient care areas.
- This chapter provides the overall strategies and techniques for conducting environmental cleaning according to best practice based on risk assessment. These overall strategies, techniques and risk-assessment approaches will help users develop tailored SOPs for all patient care areas in their facility.
- This chapter also provides best practices for the frequency, method, and process for every major area in healthcare settings including outpatient, general inpatient and specialized patient areas.

Figure 2. Chapter outlines and overall framework for the best practices



2. Cleaning Programs

Environmental cleaning programs in healthcare facilities involve resources and engagement from multiple stakeholders and departments, such as administration, IPC, WASH, and facilities management. They require a standardized and multi-modal approach, as well as strong management and oversight, to be implemented effectively.

The scope of the environmental cleaning program and its implementation mechanism (e.g., in-house management versus external contract) can vary, based on the size of the facility and level of services provided. **Comprehensive environmental cleaning programs are most important at acute healthcare facilities and higher tiers of healthcare, where the burden of HAIs is highest.**

Regardless of type of facility, the key elements that are needed for effective environmental cleaning programs are always the same:

- organizational support
- adequate and trained staff
- supporting infrastructure (e.g., water and wastewater services, supplies and equipment)
- policy and procedures
- monitoring and feedback systems

This chapter describes the best practices for each of these standard program elements.

Externally Contracted Programs

Environmental cleaning programs are increasingly implemented by external companies via a *contract or service level agreement*. Contracted staff, including cleaning staff and cleaning supervisors, should work closely with the environmental cleaning program focal point and IPC staff at the facility to ensure that environmental cleaning is performed according to best practices and facility policy.

It is essential that all the standard program elements be described explicitly in the service level agreement with the external company, to ensure accountability for the services provided.

In general, the components to be included in the service level agreement should mirror the facility cleaning policy, and at a minimum should include:

- an organizational chart for all contracted employees, including functional reporting lines and responsibilities
- the staffing plan for each patient care area, including contingency plans for additional staff
- the training content and frequency of training for contracted employees
- a summary of the cleaning schedules and methods for each patient care area, in line with the facility-specific policy
- the methods for routine monitoring and feedback
- the supplies and equipment to be used, including environmental cleaning products

2.1. Organizational elements

Facility-level organizational support is a key program element for the implementation of an effective environmental cleaning program. The main areas of needed support include:

- administrative and leadership support
- formalized communication processes and integration of the cleaning program and IPC
- defined management structure

2.1.1. Administrative support

Required support from the healthcare facility administration for the environmental cleaning program includes:



Designated cleaning program manager or focal point

A facility-based (facility staff member) manager who acts as a focal point is essential to an effective environmental cleaning program.

This focal point is essential regardless of whether the program is managed internally or by a contracted company.

- Can be part-time or full-time
 - Generally, in-house managed programs, particularly at secondary or tertiary care facilities, will require a full-time cleaning program manager
- Should have a written job description/terms of reference, along with salary allocation, to cleaning program activities
- Specific responsibilities include:
 - developing the facility-specific environmental cleaning policy and corresponding service level agreement or contract (as applicable)
 - developing and/or maintaining a manual of standard operating procedures for all required cleaning tasks at the facility
 - ensuring that structured training activities are carried out for all new staff and on a recurring basis
 - ensuring that routine monitoring is implemented and results are utilized for program improvement
 - ensuring that cleaning supplies and equipment are available in required quantities and in good condition (i.e., preventing stock-outs)
 - addressing staff concerns and patient questions about the cleaning program
 - communicating with the contracted company on any of the program elements (if applicable)

Leadership validation of cleaning program policy

The ultimate responsibility for the environmental cleaning program lies at the facility leadership level.



Therefore, leadership must be engaged on the development and validation of the facility cleaning policy and *service level agreement* (if contracted services are used), both of which outline the key technical and programmatic elements (e.g., monitoring and training requirements) of the program. See the [Cleaning policies](#) section.

Annual budget An **annual budget** is essential to an effective environmental cleaning program. The major elements of a budget include:

- personnel (salary and benefits for cleaning staff, supervisors and an overall program manager)
- staff training (at least pre-service and annual refresher)
- environmental cleaning supplies and equipment, including PPE for cleaning staff
- equipment for program monitoring (e.g., fluorescent markers, UV-lights)
- administrative costs
- production and printing costs for checklists, logs and other job aids
- infrastructure/services costs such as supporting water and wastewater services (as applicable)

2.1.2. Communication

An effective environmental cleaning program requires strong communication and collaboration across multiple levels of the facility, both at the program development and implementation stages. **Strong communication systems also improve understanding of the importance of environmental cleaning for IPC and patient safety among all clinical staff.** The primary communication structures to establish include:

Multi-sectorial planning committee A planning committee is essential to engage all facility-based stakeholders during the development of policy, procedures, and service level agreements (if contracted services will be used).

- The members of this committee from facility staff could include: a representative from the IPC committee, a clinical staff representative from each ward (e.g., nurse in-charge), facilities management or WASH staff, and administrative staff in charge of procurement

Routine meetings with key stakeholders Routine meetings with key stakeholders, particularly those representing IPC, are essential to facilitate regular communication between the cleaning program manager, IPC and other stakeholders at the facility level (e.g., ward in-charge staff). These meetings should be conducted at least monthly with:

- the cleaning program manager and the IPC or hygiene committee to review and update technical aspects of the program (e.g., outbreak-related changes in cleaning)
 - Rather than a separate meeting, this could be best accomplished by the cleaning program manager participating in standing IPC or hygiene committee meetings
- the cleaning program manager and person in-charge for each ward or department, to inform ward-level staff of the overall cleaning policy and specific cleaning schedules (e.g., who cleans what) for their wards and to allow feedback from the ward staff on any deficiencies observed in cleaning procedures, cleaning staff or supplies



Monthly meeting should occur between the cleaning program manager and the contracting company to review performance and report deficiencies

2.1.3. Management and supervision

An effective environmental cleaning program requires a defined management structure, including organizational and reporting lines, and on-site supervision. The required elements include:

Cleaning program organizational chart

An **organizational chart** that outlines the functional reporting lines between cleaning staff, supervisors, manager, and any other direct or indirect relationships (e.g., to the facility IPC focal point, to ward in-charge staff)



If supervisors are from an external company, a functional reporting line should still exist from supervisors to the facility cleaning program manager or focal point, who can communicate with the IPC committee and other facility staff, such as facilities management and administrative staff.



Supervisors: On-site supervision of cleaning staff to ensure compliance to best practices through direct monitoring and feedback, and to ensure consistent availability of cleaning supplies and equipment. This also allows cleaning staff to communicate any challenges or concerns about compliance (e.g., supply shortage, safety concerns).

- All cleaning staff should know to whom they report and who they can contact if any issues arise during their work.
- Supervisor-cleaner ratios should allow routine performance observations and monitoring (e.g., on a weekly basis). There is no definitive benchmark for this ratio, which will vary based on a number of factors. An upper limit of 20 cleaning staff per supervisor may be recommended (See PIDAC, 2018 in the [Further Reading](#) section).

2.2. Staffing elements

Appropriate staffing levels (number of staff) and capacity (training and education) are key program elements.

Cleaning staff should always be paid positions that have:

- written job descriptions or terms of reference
- structured, targeted training (e.g., pre-service, annual, when new equipment is introduced)
- defined performance standards or competencies
- access to an on-site supervisor to ensure they can safely perform their work (e.g., address supply shortage, safety concerns)

According to best practices, cleaning staff should:

- be familiar with their job descriptions and performance standards
- be asked to perform duties only for which they were trained (e.g., cleaning staff should not be asked to clean high-risk wards (e.g., OR), unless they have received specific training for that patient care area)
- know the identities and hazards of the chemicals that they could be exposed to in the workplace
- have supplies and equipment, including PPE, to perform their duties
- have working shifts should be consistent with acceptable norms for the given context

2.2.1. Staffing levels

Adequate staffing is one of the most important factors determining the effectiveness of an environmental cleaning program. **In small primary care facilities with limited inpatient services, cleaning staff might be part-time positions and/or have other responsibilities, such as laundry services, but most hospitals require full-time, dedicated cleaning staff.**



Determining Adequate Staffing Levels: The required number of cleaning staff will vary based on several of factors, including:

- number of patient beds
- occupancy level
- type of cleaning (e.g., routine or terminal)
- types of patient care areas (e.g., specialized care areas such as ICUs and ORs)

Staffing levels should include consideration of reasonable shift length, the need for breaks, as well as extra staff for contingencies, such as outbreaks and other emergencies.

There are a variety of methods for estimating staffing needs, ranging from time studies to workload software, but there is no one single best-practice method.

Facilities should consult available expertise in-country to determine resources (e.g., workload software) and existing data available (e.g., from other comparable facilities) for estimating their cleaning staff needs.

In the absence of in-country data, staffing levels should be estimated empirically, based on performing cleaning according to facility policy, and refined over time. See the [Policies and procedural elements](#) section.

2.2.2. Training and education

Training for cleaning staff should be based on the environmental cleaning policy of the healthcare facility or national guidelines. It should be structured, targeted, delivered in the right style, e.g., participatory, as well as mandatory prior to staff working independently within the healthcare facility.

- Training content should include, at a minimum:
 - general introduction to the **principles of IPC**, including transmission of pathogens, the key role cleaning staff play in keeping patients, staff and visitors safe and how cleaning staff can protect themselves from pathogens
 - detailed review of the specific environmental cleaning tasks for which they are responsible, including review of SOPs, checklists and other job aids
 - when and how to safely prepare and use different detergents, disinfectants, and cleaning solutions
 - how to prepare, use, reprocess, and store cleaning supplies and equipment (including PPE)
 - participatory methods, hands-on component with demonstration and practice
 - visual reminders that show the cleaning procedures (i.e., without the need for a lot of reading)
 - orientation to the facility layout and key areas for the cleaning program (e.g., environmental cleaning services areas)
 - other health and safety aspects, as appropriate
- Develop the training program according to the intended audience, in terms of education and literacy level.
- Develop training content specifically for cleaning staff who may be responsible for cleaning procedures in specialized patient areas—particularly high-risk areas, such as ICUs, operating rooms and maternity units.
- Maintain training records, including dates, training content, and names of trainers and trainees.
- Select appropriate qualified trainers at a facility or district level—generally, staff with IPC training who have been involved in the development of environmental cleaning policy are best qualified. They could be members of existing IPC or hygiene committees, the cleaning program manager, and/or local or district-level Ministry of Health staff.

- Conduct periodic competency assessments and refresher trainings as needed (e.g., at least annually, before introduction of new environmental cleaning supplies or equipment).
 - Focus refresher trainings on gaps identified during competency assessments and routine monitoring activities.



If cleaning services are contracted out, the training requirements and content should be specified by the healthcare facility in the service level agreement.

- Promptly address supplemental training needs identified by facility staff (e.g., cleaning program manager) within the scope of the contract.

2.3. Supporting infrastructure and supply elements

The supporting infrastructure at the facility is critical for an effective environmental cleaning program. The main areas of needed infrastructure include^a:

- designated physical space
- access to adequate water and wastewater services/systems
- systems to procure and manage environmental cleaning supplies and equipment
- appropriate selection of finishes, furnishings and patient care equipment

^a Many of the supporting infrastructure and supply elements needed for environmental cleaning programs are also addressed within the Facility level assessment tool (IPCAF) from [WHO | Core components for IPC - Implementation tools and resources](https://www.who.int/infection-prevention/tools/core-components/en/) (<https://www.who.int/infection-prevention/tools/core-components/en/>) and the upcoming WHO publication [Minimum requirements for infection prevention and control in health care facilities](https://www.who.int/infection-prevention/publications/corecomponents/en/) from <https://www.who.int/infection-prevention/publications/corecomponents/en/>

2.3.1. Designated space

For the implementation of effective environmental cleaning programs, it's important that the facility has:

- designated physical space for storage, preparation, and care of cleaning supplies and equipment
- separated sluice rooms or areas (soiled and clean) for reprocessing of noncritical patient care equipment



These areas must be available within the facility itself, regardless of whether the program is managed in-house or by an external company.

The recommended layout and location of these areas according to best practices are included in the [Care and storage of supplies, equipment, and personal protective equipment](#) and [Sluice rooms](#) sections, respectively.

2.3.2. Water and wastewater services

Environmental cleaning requires large quantities of water and produces almost as much wastewater, which must be disposed of safely and appropriately to prevent contamination of the environment and surrounding community.

The Water and Sanitation for Health Facility Improvement Tool (WASH FIT) facilitates a comprehensive process to assess, prioritize and improve basic water, sanitation and hygiene services at healthcare facilities according to the defined indicators (see [Environmental cleaning and WASH](#)). Using these indicators, the additional description of the water and wastewater services needed to perform environmental cleaning according to best practices are described in [Table 1](#).



These services must be available within the facility itself, regardless of whether the program is managed in-house or by an external company.

Table 1. Water, sanitation and hygiene services needed for environmental cleaning programs, expanded from WASH FIT indicators

WHO WASH FIT Indicator	Elements needed for environmental cleaning programs
Improved water supply piped into the facility or on premises and available (i.e., functional)	<ul style="list-style-type: none"> Access to an improved water source on premises will generally meet the water quality needs for environmental cleaning. Water for cleaning does not need to be potable or treated to drinking water standards, but it is important that the water is free from turbidity (i.e., cloudiness due to suspended particles or dirt) because this can reduce the effectiveness of detergents and disinfectant solutions. Note: some non-turbid waters can have higher organic content, so when using chlorine as a disinfectant, monitor the concentration to ensure the target was reached.
Water services are available at all times and of sufficient quantity for all uses	<ul style="list-style-type: none"> Water supply should be continuously available from the water source and/or on-site storage and the available daily quantity (i.e., yield) should be sufficient to meet the cleaning needs of the facility.^b
All endpoints (i.e., taps) are connected to an available and functioning water supply	<ul style="list-style-type: none"> Access points (piped to taps, or within large water storage containers) should be available inside the facility in designated environmental cleaning services areas and sluice areas. For large facilities, there should be a functional tap available in these areas on every floor and every major ward or wing of the facility.
Functioning hand hygiene stations are available in service areas ^c and points of care	<ul style="list-style-type: none"> Cleaning staff should have access to dedicated hand hygiene stations (i.e., not used for cleaning of equipment), with soap and water before and after: <ul style="list-style-type: none"> cleaning and disinfectant solution preparation equipment reprocessing performing environmental cleaning in patient care areas donning and doffing personal protective equipment (PPE)
Graywater (i.e. rainwater or wash water) drainage system diverts water away from the facility (i.e. no standing water) and also protects nearby households	<ul style="list-style-type: none"> Utility sinks or drains (i.e., not sinks used for hand hygiene) should be available inside the facility in designated environmental cleaning services areas and sluice areas. Drains should lead either to on-site wastewater systems (e.g., soakaway system) or to a functioning sewer system.

^b WHO Essential Environmental Health Standards for Healthcare Facilities have defined quantities of water for specific services, including cleaning (e.g., 40-60L per general inpatient per day). However, facilities should determine this amount at a facility level because it will vary depending on a number of factors (e.g., level of dilution required for cleaning and disinfectant products).

^c For the purpose of environmental cleaning, "service areas" are the environmental cleaning services area and sluice areas.

2.3.3. Supplies and equipment procurement and management

The selection and appropriate use of environmental cleaning supplies and equipment is critical for effective environmental cleaning programs. These aspects are covered in the [Environmental Cleaning Supplies and Equipment](#) chapter. **It is equally important to effectively manage the procurement, upkeep, and maintenance of environmental cleaning supplies and equipment to prevent stock-outs.** This requires establishing systems and processes in multiple departments within the facility.



If an external company manages the cleaning program, the contract or service level agreement should include approved environmental cleaning products, supplies, equipment specifications, and the maintenance schedule.

The best practices for supplies and equipment management for **in-house managed programs** are as follows:

- The cleaning program manager, facility procurement team and facility IPC or hygiene committee should develop a master list of the supplies and equipment (i.e., detailed specifications and supplier information) and required quantities (e.g., annual basis).
- The results of routine inspections and maintenance activities should determine the required quantities of supplies and equipment.
 - Regular inventories and inspections of supplies and equipment (e.g., on a monthly basis) will prevent stock-outs, anticipate supply needs, and ensure availability of additional materials that could be needed during contingencies (e.g., outbreaks)
- Large facilities might have a central store that receives supplies and equipment and distributes them to designated environmental cleaning services areas throughout the facility on a regular basis after inventory reports.
 - The cleaning program manager should manage the inspections and restocking of the environmental cleaning services areas, and the facility procurement team should manage and/or maintain supplies at the central store.

2.3.4. Finishes, furnishings and other considerations

It's important to ensure that all finishes, furniture, and patient care equipment can be effectively cleaned and are compatible with the facility disinfectant(s). The facility procurement team, the cleaning program manager, and the IPC or hygiene committee should collaboratively develop a decision-making process and policy to guide selection and procurement and selection of finishes (e.g., flooring for new construction of patient care areas).

The recommended characteristics for selecting finishes and furniture are summarized in Table 2 (below). For direct patient care equipment, there are often fewer options for material composition. Therefore, finding compatible disinfectants may be the main driver rather than the equipment type itself—see the [Material compatibility considerations](#) section.

Table 2. Ideal characteristics of finishes, furnishings and other surfaces (e.g., floors)

Characteristic	Selection guidance
Cleanable	<ul style="list-style-type: none"> • Avoid items with hard-to-clean features (e.g., crevasses) • Do not use carpet in patient care areas • Select material that can withstand repeated cleaning
Easy to maintain and repair	<ul style="list-style-type: none"> • Avoid materials that are prone to cracks, scratches or chips, and quickly patch/repair if they occur • Select materials that are durable and/or easy to repair

Characteristic	Selection guidance
Resistant to microbial growth	<ul style="list-style-type: none"> • Avoid materials that hold moisture, such as wood or cloth, as these facilitate microbial growth • Select metals and hard plastics
Nonporous	<ul style="list-style-type: none"> • Avoid items with porous surfaces, such as cotton, wood and nylon • Avoid porous plastics, such as polypropylene, in patient care areas
Seamless	<ul style="list-style-type: none"> • Avoid items with seams • Avoid upholstered furniture in patient care areas

2.4. Policies and procedural elements

The development of facility cleaning policy, SOPs, checklists, and other job aids are key elements for implementing an effective environmental cleaning program according to best practices.

2.4.1. Cleaning policies

The facility-specific environmental cleaning policy provides the standard to which the facility will perform in order to meet best practices and enables a common understanding of the required program elements among staff.



If an external company manages the cleaning program, the facility policy can be used to develop the contract or service level agreement.

Facility

Environmental Cleaning Policies

Should always include the following elements:

- defined lines of accountability and functional reporting lines and responsibilities for all implicated staff
- **cleaning schedules** for every patient care area and noncritical patient care equipment, specifying the frequency, method, and staff(s) responsible
- contingency plans and required cleaning procedures for environmentally hardy organisms and for outbreak management
- training requirements and performance standards for cleaning staff
- monitoring methods, frequency, and staff responsible
- list of approved cleaning products, supplies, and equipment and any required specifications on their use
- list of necessary PPE and when hand hygiene action is recommended for staff and patient safety

It is best practice to consult national or subnational (e.g., provincial) governmental policies, as appropriate, during the development of facility policies, to ensure that governmental standards for healthcare environmental cleaning are incorporated into the document. For example, governmental bodies might have lists of environmental cleaning products that are approved for use in health care. There could also be national accreditation bodies for hospitals that have requirements for healthcare cleaning programs and policy.

Cleaning Schedules

Detail the key technical requirements for environmental cleaning, including the frequency, method (product, process), and staff(s) responsible for specific cleaning tasks. Consequently, they affect staffing and scheduling needs, oversight, and monitoring needs and have implications for supply and equipment needs (particularly consumable materials).

- Use facility-specific risk assessments to develop cleaning schedules. See [Appendix A – Risk-assessment for determining environmental cleaning method and frequency](#).
 - In the early stages of cleaning program development, use the results of this risk assessment to prioritize the development of SOPs and other job aids for higher-risk areas.
- The [Environmental Cleaning Procedures](#) chapter can also be consulted as a reference for developing cleaning schedules

2.4.2. Standard operating procedures

Facility-specific SOPs for each environmental cleaning task are essential to guide cleaning staff practices. Train cleaning staff on all SOPs for tasks for which they are responsible. The SOPs should be readily available to cleaning staff, cleaning supervisors and other ward staff as needed for reference.



If an external company manages the cleaning program, the facility should provide their SOPs to the contracting company or, at a minimum, internally validate the company SOPs to ensure they are in line with the facility policy.

Standard Operating Procedures (SOP)

Environmental cleaning SOPs should always include the following elements:

- the specific supplies and equipment that are needed for the cleaning session (refer to [Environmental Cleaning Supplies and Equipment](#) chapter)
- preparatory steps, including hand hygiene and required PPE (refer to [Personal protective equipment for environmental cleaning](#) section)
- step-by-step instructions on the cleaning process, in the order they should be performed (refer to [General environmental cleaning techniques](#) section)
- final steps, including collection of soiled cleaning supplies for reprocessing or disposal, safe removal of PPE, and hand hygiene (refer to [Care and storage of supplies, equipment and personal protective equipment](#) section)

Additional SOPs include:

- preparation of environmental cleaning products (i.e., dilution, if applicable)
- reprocessing of reusable cleaning supplies, equipment and personal protective equipment
- reprocessing (i.e., cleaning and disinfection) of noncritical patient care equipment
- **Use manufacturer's instructions to develop these SOPs.**

These are additional best practices for SOPs:

- Always develop SOPs and other written or visual job aids with careful consideration of literacy levels and preferred language of cleaning staff.
 - Some could require infographics to present a clear message.
- A manual with all the facility SOPs should be available with the cleaning program manager. Individual SOPs should also be available in a central location(s) within each ward or service area, as close as possible to where they are needed.

2.4.3. Cleaning checklists, logs, and job aids

It is best practice to develop supplemental materials to assist with the implementation of SOPs.



Cleaning checklists are an interactive tool that can help ensure that all steps of an SOP are completed. For example, a checklist with the individual high-touch surfaces can supplement a SOP for routine cleaning in a specific patient care area.

Cleaning logs are job aids that can help guide the daily workflow for cleaning staff and ultimately become records.

They specify the location (i.e., room, ward), cleaning session (e.g., routine cleaning, terminal cleaning), date, and name/signature of cleaning staff. They are typically developed using occupancy records, where clinical staff (e.g., ward in-charge) record the occupied beds/areas.

They are also important as records that environmental cleaning is occurring as specified in facility policy and accountability and tracking mechanisms.

- Make logs available in a central location(s) and/or where the cleaning task occurs so that supervisory staff can manage them on a daily basis, along with staff (e.g., IPC focal point) responsible for periodic monitoring activities.
- Also develop logs for required periodic or scheduled cleaning tasks (e.g., weekly, monthly), such as replacement of window coverings (e.g., curtains).

Cleaning job aids include posters, pictorial guides, and other visual reminders for key cleaning tasks.



For monitoring environmental cleaning supplies and equipment:

- Use checklists and logs to facilitate routine inspection and maintenance of these items
- To *prevent stock-outs*, keep checklists and logs in the designated environmental cleaning services closet, and the cleaning program manager should periodically review them (e.g., weekly, monthly) to inform the procurement staff or contracting company of supply needs.
- Post job aids (e.g., pictorial guides) in the designated environmental cleaning services closet, for the preparation of environmental cleaning products, supplies and equipment (e.g., cleaning cart, if applicable).

2.5. Monitoring, feedback and audit elements

Structured monitoring programs ensure that environmental cleaning is conducted according to best practices. There must be organizational support and resources available to address deficiencies identified during monitoring activities. **Use a standardized methodology for monitoring, apply it on a routine basis, and provide timely feedback to cleaning staff and program leadership.**



If an external company manages the cleaning program, facility staff such as the cleaning program manager or focal point or a member of the IPC committee should still periodically conduct monitoring activities.

Common monitoring methods are summarized in [Table 3](#) and described in detail in the [Methods for assessment of cleaning and cleanliness](#) section.

Given the advantages and disadvantages of these methods, it is best practice to:

- Use both direct (e.g., performance observation) and indirect methods (e.g., environmental marking).
- Use objective (e.g., ATP bioluminescence) over subjective methods (e.g., visual assessment of cleanliness), if resources allow.

Table 3 Suggested monitoring staff and frequency for common routine monitoring methods

Monitoring method	Monitoring staff ^d	Monitoring frequency
Performance observations	<ul style="list-style-type: none"> • Cleaning supervisors 	<ul style="list-style-type: none"> • At least weekly • Might be more frequent with new cleaning staff and eventually reduce in frequency after a defined time or target score has been reached
Visual assessments of cleanliness	<ul style="list-style-type: none"> • Cleaning supervisors • Cleaning program manager or focal point • IPC or hygiene committee staff 	<ul style="list-style-type: none"> • Developed at facility level, based on local policy and context (e.g., resources) • See Methods for assessment of cleaning and cleanliness
Fluorescent markers (e.g., UV visible)	<ul style="list-style-type: none"> • Cleaning supervisors • Cleaning program manager or focal point • IPC or hygiene committee staff 	<ul style="list-style-type: none"> • Developed at facility level, based on local policy and context (e.g., resources) • See Methods for assessment of cleaning and cleanliness

^d Set up processes so that staff external to the environmental cleaning program conduct periodic monitoring activities to validate findings. For example, IPC or hygiene committee staff not directly involved in day-to-day oversight and management of the cleaning program should periodically conduct monitoring in order to validate the results generated internally by cleaning supervisors

2.5.1. Routine monitoring

In the inpatient setting, it is best practice to **routinely (e.g., weekly)** monitor: (see [Options for Evaluating Environmental Cleaning](#), CDC (<https://www.cdc.gov/hai/toolkits/appendices-evaluating-enviro-cleaning.html>)):

- At least 5% of beds (≥150 bed facilities) or a minimum of 15 patient care beds/areas (for hospitals with less than 150 beds)
 - For facilities with less than 15 beds, this can be increased to 25%
- If resources allow, 10-15% of beds should be monitored on a weekly basis during the first year of the monitoring program

It is important that the agreed-upon frequency (e.g., weekly) can be consistently maintained in order to establish benchmarks and track changes in practice and performance over time.

In the outpatient setting, it is best practice to monitor at least 10-15% of examination or procedural areas on a weekly basis. If resources allow, this can be increased to 25% weekly, allowing every examination or procedural area to be monitored on a monthly basis.

2.5.2. Feedback mechanisms

Promptly return monitoring results to cleaning staff, so they can make immediate improvements to practice, and management (e.g., cleaning program manager), to make more general improvements to the cleaning program. Feedback mechanisms should include:

Direct feedback to staff:	<p>There are various forms of direct feedback to cleaning staff, which serve different purposes and should be conducted concurrently. These include:</p> <ul style="list-style-type: none"> • real-time feedback and coaching, during or following performance observations • a verbal debrief with some reoccurring frequency (e.g., monthly), usually during a one-on-one meeting between the cleaning staff and their direct supervisors • performance review reports (written or verbal), usually prepared on an annual basis
Reporting to management:	<p>Share monitoring results with the cleaning program manager and the facility IPC or hygiene committee so they can present summary or aggregate reports—both at facility level and stratified by patient care area (e.g., ward) or type of clean (e.g., terminal vs routine)—to administration and management. This analysis will identify trends and program-level gaps that require corrective action. For example, there may be consistently lower clean scores for terminal cleans or within the particular patient care area, identifying a need to further understand the barriers and gaps for these cleaning procedures. Generally, these high-level trend reports will be more useful over time when there is more data available from the program.</p>



During early stages of cleaning program development, the most valuable form of feedback is directly "coaching" cleaning staff and supervisors in a non-punitive manner so they can make prompt improvements to practice.

2.5.3. Program audits

Within environmental cleaning programs where routine monitoring programs are functional, it is best practice to periodically perform a comprehensive program audit to review the major program elements, to identify areas for improvement at the programmatic level.

- Program audits should review all the key program elements.
- Perform them annually or every two years.
- Auditors should not be facility staff or at least should not be staff who are directly involved with the program implementation.
- Options for auditors will be context-specific, but some potential options include auditors from an external company, Ministry of Health or subnational (e.g., district/provincial) health officers, or staff from another healthcare facility in the same network.
- File program audit reports and records on-site at the facility to allow benchmarking and to inform the development of remedial action plans and quality improvement projects.



Audit results can also inform needed modifications to contracts or service level agreements, if the cleaning program is managed by an external company.

3. Environmental Cleaning Supplies and Equipment

The selection and appropriate use of supplies and equipment is critical for effective environmental cleaning. This section provides overall best practices for selection, preparation, and care of environmental cleaning supplies and cleaning equipment, which includes cleaning and disinfectant products, reusable/disposable supplies and equipment and PPE used by cleaning staff for performing cleaning procedures.

3.1. Products for environmental cleaning

There are different kinds of products available for environmental cleaning, which all have distinct properties and advantages and disadvantages to their potential use in healthcare.

Ideal Properties	For all products used for healthcare environmental cleaning: <ul style="list-style-type: none">• Nontoxic: it should not be irritating to the skin or mucous membranes of the user, visitors, and patients. Everything being equal, choose products with the lowest toxicity rating.• Easy to use: directions for preparation and use should be simple and contain information about PPE as required.• Acceptable odor: it should not have offensive odors to users and patients.• Solubility: it should be easily soluble in water (warm and cold).• Economical/Low cost: it should be affordable.
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Additional Ideal Properties	For cleaning products: <ul style="list-style-type: none">• Efficacious: should remove dirt, soil and various organic substances.• Environmentally friendly: should not cause environmental pollution upon disposal; biodegradable. For disinfectants: <ul style="list-style-type: none">• Broad spectrum: it should have a wide antimicrobial range, including those pathogens that are common causes of HAIs and outbreaks.• Rapid action: it should be fast acting and have a short contact time.• Remains wet: it should keep surfaces wet long enough to meet recommended contact times with a single application.• Not affected by environmental factors: it should be active in the presence of trace quantities of organic matter (e.g., blood) and compatible with cleaning supplies (e.g., cloths) and products (e.g., detergents) and other chemicals encountered in use.• Material compatibility: it should be proven compatible with common healthcare surfaces and equipment.• Persistence: it should have residual antimicrobial effect on the treated surface.• Cleaner: it should have some cleaning properties.• Nonflammable: it should have flash point of more than 65°C (150°F).• Stability: it should be stable in concentration and use dilution
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These are the best practices for environmental cleaning products (e.g., detergents, disinfectants):

- Develop and maintain a master list of facility-approved environmental cleaning products in the facility cleaning policy, as well as a list of approved suppliers (i.e., manufacturers, distributors).

- Minimize the number of different environmental cleaning products in use at the facility. Clearly stating this in the facility cleaning policy will:
 - simplify the environmental cleaning process
 - minimize the training requirements for cleaning staff
 - reduce the potential for errors in preparation and use
- Store environmental cleaning products in a manner that:
 - eliminates contamination risk and degradation
 - minimizes contact with personnel (e.g., inhalation, skin contact)
- Manage environmental cleaning products according to the product's safety data sheet (SDS). Display the SDS where these products are stored and prepared.
- Prepare cleaning and disinfectant solutions according to manufacturer's instructions; preparing higher-strength concentrations or diluting beyond recommendations may pose unnecessary risk to patients, staff, visitors, and the environment.
- Ensure that environmental cleaning products are selected which do not damage the surfaces and equipment to be cleaned and disinfected.
- Ensure that standard operating procedures or instructions are available for the preparation, use, and disposal of environmental cleaning products

3.1.1. Cleaning products

Cleaning products include liquid soap, enzymatic cleaners, and detergents. They remove organic material (e.g., dirt, body fluids) and suspend grease or oil. This is done by combining the cleaning product with water and using mechanical action (i.e., scrubbing and friction).

For most environmental cleaning procedures, select neutral detergents (pH between 6 and 8) that are easily soluble (in warm and cold water).

There are also specialized cleaning products, which may provide advantages for specific areas or materials within the healthcare facility (e.g., bathroom/toilet cleaners, floor polishers, glass cleaners). However, consider specialized products on a case-by-case basis, weighing the advantages and disadvantages (e.g., additional cost) and ability of the facility to ensure the correct storage, preparation, and use.

3.1.2. Disinfectants

Disinfectants are only for disinfecting after cleaning and are not substitutes for cleaning, unless they are a combined detergent-disinfectant product (see the [Combined detergent-disinfectants](#) section). **Before disinfecting, use a cleaning product to remove all organic material and soil.**

Low-level disinfection is generally adequate for environmental cleaning procedures, but there are specific cases where intermediate-level disinfection with sporicidal properties (e.g., *C. difficile*) is required (see the [Transmission-based precaution / Isolation wards](#) section).

Common low- and intermediate-level disinfectants which can be used for environmental surfaces in healthcare settings include:

- quaternary ammonium compounds
- alcohol (ethyl or isopropyl)
- chlorine releasing agents (e.g., bleach)
- improved hydrogen peroxide

Table 4 (below) shows the main advantages and disadvantages of each of these disinfectants. In practice, the advantages and disadvantages of each product will have to be weighed with other factors, including availability and cost.



Do not use these products for disinfection of environmental surfaces and noncritical patient care equipment:

- liquid chemical sterilant or high-level disinfectants (e.g., glutaraldehyde, peracetic acid, orthophthaldehyde)
- antiseptics (e.g., chlorhexidine, iodophors)
- phenolics (due to high toxicity)

Table 4. Advantages and disadvantages of common healthcare disinfectants (modified from reference 24)

Disinfectant	Spectrum of activity	Advantages	Disadvantages
<p>Low-level disinfectant</p> <p>Quaternary ammonium compounds</p> <p>e.g., alkyl dimethyl benzyl ammonium chloride, alkyl dimethyl ethylbenzyl ammonium chloride</p>	<ul style="list-style-type: none"> • Bactericidal • Virucidal (only enveloped viruses) • Fungicidal 	<ul style="list-style-type: none"> • Toxicity: <ul style="list-style-type: none"> ○ May be used on food contact surfaces. • Wide material compatibility <ul style="list-style-type: none"> ○ Noncorrosive • Detergent properties, with good cleaning ability • Low cost 	<ul style="list-style-type: none"> • Toxicity: <ul style="list-style-type: none"> ○ Skin irritant, can also cause respiratory irritation • <i>Narrow microbicidal spectrum</i> <ul style="list-style-type: none"> ○ Not mycobactericidal or sporicidal, only limited activity against non-enveloped viruses ○ Diluted solutions can support growth of microorganisms, particularly gram negative organisms. • Affected by environmental factors: • Activity reduced by various materials (e.g., cotton, water hardness, microfiber cloths, organic material). • Could induce cross resistance with antibiotics. • Persists in the environment and waterways.

²⁴ Rutala WA, Weber DJ. 2016. Monitoring and improving the effectiveness of surface cleaning and disinfection. American Journal of Infection Control 44: e69-e76.

Disinfectant	Spectrum of activity	Advantages	Disadvantages
Intermediate-level disinfectant Alcohols (60-80%) e.g., isopropyl alcohol, ethyl alcohol, and methylated spirits	<ul style="list-style-type: none"> • Bactericidal • Virucidal • Fungicidal • Mycobactericidal 	<ul style="list-style-type: none"> • <i>Broad spectrum (but not sporicidal)</i> • Rapid action • Nontoxic • Non-staining, no residue • Noncorrosive • Low cost • Good for disinfecting small equipment or devices that can be immersed 	<ul style="list-style-type: none"> • Slow acting against non-enveloped viruses • Does not remain wet. <ul style="list-style-type: none"> ○ Rapid evaporation makes contact time compliance difficult (on large environmental surfaces). • Affected by environmental factors: <ul style="list-style-type: none"> ○ Inactivated by organic material. • Material compatibility: <ul style="list-style-type: none"> ○ Can damage materials (plastic tubing, silicone, rubber, deteriorate glues). • Flammable
Intermediate-level disinfectant Chlorine releasing agents e.g., bleach/sodium or calcium hypochlorite, sodium dichloroisocyanurate (NaDCC)	<ul style="list-style-type: none"> • Bactericidal • Virucidal • Fungicidal • Mycobactericidal • Sporicidal (hypochlorites only at 5000ppm or 0.5%) 	<ul style="list-style-type: none"> • <i>Hypochlorites are broad spectrum (sporicidal)</i> • Rapid action • Nonflammable • Low cost • Widely available • Can reduce biofilms 	<ul style="list-style-type: none"> • Affected by environmental factors: <ul style="list-style-type: none"> ○ Inactivated by organic material. • High toxicity: <ul style="list-style-type: none"> ○ Can release toxic chlorine if mixed with acids or ammonia. ○ Skin and mucous membrane irritant. • Material compatibility: <ul style="list-style-type: none"> ○ Damages fabrics, carpets. ○ Corrosive • Leaves residue, requires rinsing or neutralization. • Offensive odors • Poor stability: <ul style="list-style-type: none"> ○ Subject to deterioration if exposed to heat and UV.

Disinfectant	Spectrum of activity	Advantages	Disadvantages
Intermediate-level disinfectant Improved hydrogen peroxide e.g., 0.5% enhanced action formulation hydrogen peroxide, 3% hydrogen peroxide	<ul style="list-style-type: none"> • Bactericidal • Virucidal • Fungicidal • Mycobactericidal • Sporicidal (only at 4-5%) 	<ul style="list-style-type: none"> • Rapid action • Nontoxic • Detergent properties, with good cleaning ability • Not affected by environmental factors <ul style="list-style-type: none"> ○ Active in the presence of organic material • Safe for environment 	<ul style="list-style-type: none"> • Material compatibility: <ul style="list-style-type: none"> ○ Contraindicated for use on copper, brass, zinc, aluminum • High cost

3.1.3. Combined detergent-disinfectants

Combined (one-step) detergent-disinfectant products can generally be used in place of a two-step (separate detergent and disinfectant product) process when disinfection is indicated for specific environmental cleaning procedures (see the [Environmental Cleaning Procedures](#) chapter).



Do not use a combined (one-step) detergent-disinfectant product (instead use a two-step process) when performing environmental cleaning for:

- *C. difficile* (see the [Transmission-based precaution / Isolation wards](#) section)
- spills of blood or bodily fluids (see the [Spills of blood or body fluids](#) section)

When using a combined product for environmental cleaning, it is recommended to periodically (i.e., on a scheduled basis) use a rinse step to remove residues from surfaces. Additionally, care should be taken to ensure that the combined product stays wetted on the surface for the required contact time (to complete the disinfection process). Consult the product label to get the correct contact time.

3.2. Preparation of environmental cleaning products

Environmental cleaning products are often sold as concentrated formulas that are diluted (i.e., combined with water) to make a solution. These are the best practices for preparation of environmental cleaning products:

- Always prepare solutions according to the manufacturer's instructions. Most chemicals (including cleaning products) work at an optimum dilution—too diluted or too concentrated impacts the effectiveness of the product and may pose unnecessary risk to staff, patients, visitors, and the environment.
- Always prepare environmental cleaning products in designated environmental cleaning services areas (i.e., a dedicated, secured space not used for any other purposes) (see the [Care and storage of supplies, equipment, and personal protective equipment](#) section).
- Provide training and simple instructions (e.g., standard operating procedures (SOPs)) for preparing solutions according to manufacturer's instructions.
- Personal protective equipment (PPE) might be required for preparation of solutions, particularly for disinfectants (e.g., **sodium hypochlorite**). Consult the product's SDS for the required PPE.
- Standardized containers (for measuring solutions) and easy to use job aids (e.g., visual posters) should be used for preparation of solutions.

If feasible, it is highly recommended to:

- Prepare solutions with an automatic dispensing system that is calibrated regularly. Manual dilution and mixing are more subject to error.

- Use test strips to confirm correct concentrations of solutions (e.g., for chlorine-based products).

Solutions are generally batch prepared in large containers, which are then transferred to smaller, portable containers (e.g., bottles, buckets) for daily cleaning procedures—see the [Supplies and equipment for environmental cleaning](#) section. Solutions can also be prepared directly into buckets for environmental cleaning of floors, if a standard-sized bucket is available.

All containers used for storing solutions of environmental cleaning products should:

- be clean, clearly labeled, and have an expiration date based on the manufacturer's instructions for stability
- be thoroughly cleaned and dried before refilling
- never be topped up—use them until the indicated expiration date (after which it should be disposed) or until the container is empty, whichever comes first

3.3. Supplies and equipment for environmental cleaning

Essential supplies and equipment for environmental cleaning include:

- **surface cleaning supplies:** portable containers (e.g., bottles, small buckets) for storing environmental cleaning products (or solutions) and surface cleaning cloths
- **floor cleaning supplies:** mops or cleaning squeegee with floor cloths, buckets, and wet floor/caution signs



Do not use these cleaning supplies and equipment for disinfection of environmental surfaces and noncritical patient care equipment:

- brooms and dry mops
- fumigators (and fumigation) and disinfectant fogging
- spray bottles: use squeeze bottles instead

In general, all the essential environmental cleaning supplies and equipment are reusable; however, facilities can also choose to use disposable supplies (e.g., cloths) for certain cleaning tasks and/or where resources allow. Cleaning equipment should be fit for the intended purpose, cleaned and stored dry between uses, properly used, and well maintained (see the [Care and storage of supplies, equipment, and personal protective equipment](#) section).

There might also be supplemental supplies and equipment for cleaning certain surfaces or areas, such as toilet brushes or abrasive pads. Some facilities might also have access to more sophisticated equipment such as floor scrubbers or vacuum cleaners with high-efficiency particulate air (HEPA) filters. If the use of HEPA filters is part of the facility policy, provide an SOP on its cleaning and maintenance.

Surface cleaning supplies

- **Portable containers** for environmental cleaning products (or solutions) should be clean, dry, appropriately-sized, labelled, and dated. Narrow-necked bottles are preferred over buckets to prevent the "double-dipping" of cleaning cloths, which can contaminate solutions. Squeeze bottles are preferred over spray bottles for applying cleaning or disinfectant solutions directly to cleaning cloths prior to application to a surface.

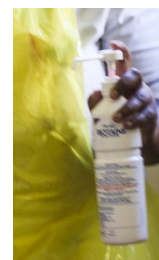


Figure 3. Portable squeeze bottle

- **Surface cleaning cloths** should be cotton or microfiber (disposable wipes can be used if resources allow). **Have a supply of different colored cloths to allow color-coding:** for example, one color for cleaning and a second color for disinfecting. Color-coding also prevents cross-contamination between areas, like from toilets to patient areas, or isolation areas to general patient areas. For example, red cloths could be used specifically for toilet areas, blue for general patient areas, and yellow for isolation areas.



Figure 4. Color-coded cleaning cloths

Floor cleaning supplies

Mop heads or floor cloths should be cotton or microfiber, and generally a cart or trolley with **two or three buckets** should be used for the mopping process—see the **Preparation of supplies and equipment section** (below). It is highly recommended to display a **wet floor/caution sign** prior to starting mopping activities.



Figure 5. Cotton mop (left) and microfiber floor cloth (above)

Microfiber Versus Cotton

Microfiber is increasingly used as an alternative to cotton for both cleaning cloths and mop heads. Microfiber cloths contain charged fibers, which result in higher adherence of dirt particles and microorganisms (i.e., increased absorbency) than cotton. However, microfiber cloths can be damaged by high pH and therefore not compatible with all disinfectant products (e.g., chlorine-based). They need to be laundered separately from cotton cloths/linens, which could be expensive. So careful consideration should be given to the type of material before purchasing cleaning cloths.

Disinfectant or Detergent-Disinfectant Wipes

Prepared (ready-to-use) wipes that are saturated with an appropriate disinfectant or detergent-disinfectant product can be used as an alternative to cotton or microfiber cleaning cloths. Take care to evaluate the appropriateness of the product, considering the recommended properties. It is also important to ensure that they are stored appropriately with the lid sealed/closed, so the wipes remain wet. Wipes should be discarded if they are no longer saturated. Manufacturer's instructions for storing wipes and reprocessing containers must be followed, as well as instructions for use (e.g., recommended contact times).

3.3.1. Preparation of supplies and equipment

Daily preparation of supplies and equipment for a given cleaning staff member or location will depend on local factors, including the size of patient care area(s) and number and type of patient zone(s) to be cleaned.

Cleaning carts and trolleys

- Cleaning carts and trolleys provide several benefits, such as the ability to carry and safely manage all the essential cleaning supplies and equipment and increased occupational safety for cleaning staff.
- Cleaning carts should be stocked with sufficient quantities of supplies (e.g., cleaning cloths, cleaning solutions) to ensure that the cleaning session can be completed and avoid the need to return for more supplies in the middle of cleaning steps in a particular patient care area.

These are the best practices for cleaning carts and trolleys:

- Separate clean and soiled items (e.g., cleaning cloths).
- They should never contain personal items, food, or beverages.
- Equip them with a lockable compartment for containers of cleaning and disinfectant solutions.
- Thoroughly clean them at the end of each day or shift—see the [Care and storage of supplies, equipment, and personal protective equipment](#) section.
- Never leave them unattended or out of sight while in use and store them in a designated environmental cleaning services area when not in use.



Figure 6. Cleaning cart setup, including color-coded buckets for different environmental cleaning solutions (e.g., disinfectants, detergents)

Surface cleaning supplies

Portable containers of environmental cleaning products (or solutions) and cleaning cloths can be carried directly on the cleaning cart or on a caddy kit, if a full cleaning cart is not available.

The cart should have enough cleaning cloths to complete the required cleaning session with a clean cloth for each patient zone, to prevent cross-contamination. Clean clothes should be stocked in one area (e.g., container, section of the caddy) and soiled cloths in another.

Floor cleaning supplies

It is best practice to use a two- or three-bucket system for mopping. This can be facilitated on the cleaning cart or on a separate trolley, if a full cleaning cart is not available.

- Two-bucket system (routine cleaning): one bucket contains a detergent or cleaning solution and the other contains rinse water (Figure 7).
- Three-bucket system (for disinfection): one bucket contains the detergent or cleaning solution, one contains rinse water and one the disinfectant or disinfectant solution (Figure 8).

The rinse water bucket allows the mop to be rinsed and wrung out before it is re-dipped into the prepared solution. This extends the life of the solution (i.e., fewer changes are required), which saves both time and material costs.



Figure 7. Two-bucket mopping system



Figure 8. Three-bucket mopping system

3.4. Personal protective equipment for environmental cleaning

Appropriate PPE for the cleaning staff for all environmental cleaning procedures should always be available and used appropriately to reduce risk to both patients and staff.

PPE is required to prevent:

- exposure to microorganisms
- exposure to cleaning chemicals (e.g., disinfectants)
- reduce the spread of microorganisms from one patient care area to another within the facility (when used correctly)



The PPE required should be visibly marked and/or verbally communicated to cleaning staff by IPC staff directly or via cleaning supervisors, prior to starting every cleaning session.

These are best practices for PPE for cleaning staff:

- Always perform hand hygiene directly *before* wearing gloves (donning) and directly *after* removal (doffing).
- Train cleaning staff on appropriate use, application, and removal of required PPE for all environmental cleaning procedures and tasks for which they are responsible.
 - [Table 5](#) shows the general indications for PPE use, but always consult local IPC staff about location-specific PPE requirements.
- Put on all required PPE before entering a patient care area and remove it (for disposal or reprocessing, if reusable) before leaving that area.
 - Exception: do not take off PPE in an airborne precaution area (e.g., TB ward) where a respirator (e.g., N95 or FFP2) is required, until after departing that isolation area.
- Include required PPE for specific tasks in standard operating procedures and other visual job aids (e.g., signage for isolation areas, preparation of solutions).
- Use SDS to determine required PPE for preparing environmental cleaning products and solutions (e.g., manual dilutions).
- All PPE (reusable and disposable) should be in good supply, well maintained (good quality, appropriately stored stocks), cleaned before use, and in good repair.
- Reprocess (i.e., clean and disinfect) all reusable PPE at least once a day (see the [Care and storage of supplies, equipment, and personal protective equipment](#) section).
- Conduct regular fit-testing for cleaning staff who are required to wear respirators.
- Use reusable rubber gloves for **cleaning**.
- Use chemical-resistant gloves (e.g., nitrile, latex) for **preparation of cleaning chemicals**.

Best Practices for glove usage for cleaning:

- Perform hand hygiene immediately before putting on gloves and directly after taking them off.
- Routine use of gloves is not recommended unless:
 - the patients in the area are on transmission-based precautions
 - there is risk of hand contact with blood or body fluids (e.g., cleaning a spill, cleaning the bed of an incontinent patient)
 - there is prolonged contact with disinfectants (e.g., terminal cleaning)
- **When use of gloves is indicated** (see [Table 5](#)) always change them (i.e., reprocess) between each cleaning session (e.g., routine cleaning of a patient zone under contact precautions, terminal cleaning of a general patient area)

Best Practices for cleaning staff personal attire/grooming:

- Keep sleeves at or above the elbow to not interfere with glove use or hand hygiene.
- Wear rubber-soled closed toe shoes or boots (i.e., not sandals), to prevent accidental injury (e.g., slips and falls) and exposure to cleaning chemicals, dirt, or bacteria.
- Remove wristwatches and hand jewelry before starting cleaning tasks—these items can tear gloves and can also harbor microorganisms.
- Keep fingernails short and free of nail varnish to prevent tearing of gloves and picking up dirt and bacteria.

Table 5 Recommended personal protective equipment for environmental cleaning tasks / cleaning in specific patient areas

Type of cleaning task	Required personal protective equipment for cleaning staff
Routine cleaning (standard precautions)	None (unless spills or contamination risk—see below)
Terminal cleaning (standard precautions)	Reusable rubber gloves
Blood and body fluid spills and high contamination risk areas (e.g., cleaning bed of an incontinent patient, labor and delivery wards)	<ul style="list-style-type: none"> Gown and/or plastic apron Reusable rubber gloves Face shield or face mask and goggles (if splash risk or large spill)
Droplet precautions (routine and terminal cleaning)	<ul style="list-style-type: none"> Gown and/or plastic apron Reusable rubber gloves Face shield or face mask and goggles
Contact precautions (routine and terminal cleaning)	<ul style="list-style-type: none"> Gown and/or plastic apron Reusable rubber gloves
Airborne precautions (routine and terminal cleaning)	<ul style="list-style-type: none"> Respirator (N95 or FFP2), fit tested Reusable rubber gloves
Preparation of disinfectant products and solutions	<ul style="list-style-type: none"> According to specifications in SDS (manufacturer instructions) If SDS not available, then: <ul style="list-style-type: none"> Chemical-resistant gloves (e.g., nitrile) Gown and/or apron Face shield or face mask and goggles



Reusable rubber gloves



Gown and/or plastic apron



Face shield



Goggles



Face mask



Respirator (N95 or FFP2)

3.5. Care and storage of supplies, equipment, and personal protective equipment

Environmental cleaning supplies and equipment quickly become contaminated during their use. Regularly reprocess all reusable items (i.e., thoroughly clean, disinfect, and dry).

The following are best practices for reprocessing reusable cleaning supplies and equipment:

- Send all reusable supplies and equipment (e.g., buckets, rubber gloves) for reprocessing **directly after use in a transmission-based precaution area and when soiled with blood or body fluids**.
- Thoroughly clean, disinfect, and rinse equipment such as buckets and containers whenever solution is replaced and daily. Store them upside down to allow complete drying.
- Launder mop heads, floor cloths, and soiled cleaning cloths **at least daily** (e.g., at the end of the day) and allow them to fully dry before storage and reuse.
- Reprocess all reusable supplies and equipment in a dedicated area that is not used for other purposes (i.e., reprocessing of cleaning equipment should never be conducted in handwashing sinks). Reprocess (e.g., launder) all reusable supplies and equipment according to manufacturer's instructions.

Manual reprocessing steps	<p>If manufacturer's instructions are not available, use this general process to manually reprocess reusable supplies, equipment, and PPE:</p> <ol style="list-style-type: none"> 1. Immerse in detergent solution and use mechanical action (e.g., scrubbing) to remove soil. 2. Disinfect by: <ul style="list-style-type: none"> ○ Fully immersing the items in boiling water or ○ Fully immersing the items in disinfectant solution for the required contact time and rinsing with clean water to remove residue 3. Allow to fully dry <ul style="list-style-type: none"> ○ Lay items to dry in a clean and dry area to prevent recontamination. <ul style="list-style-type: none"> ▪ Position mops with the head up (i.e., inverted) to allow the mop head to fully dry.
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Do not use chlorine-based disinfectants to disinfect microfiber cloths.

Use laundry services with hot water (70–80°C x 10 min) [158–176°F] to reprocess cloths and mop heads, if they are available. Similarly, a commercial dryer can be used for these items, if available (if not, these items are reprocessed as above).

Always launder mop heads and cleaning cloths separately from other soiled hospital textile items.

All reusable supplies and equipment should be well maintained, clean and in good repair. It is important that all reusable equipment is regularly inspected and replaced or repaired whenever needed. Develop a monitoring and maintenance schedule at the facility level that clearly documents the items, frequency of inspection, and responsible staff.

Certain equipment, such as floor polishers, might require maintenance checks by qualified person(s), in accordance with the manufacturer's instructions. Keep a service record and make it available for inspection by the cleaning program manager and the IPC Team.

Environmental cleaning services area

There should be at least one designated environmental cleaning services area within the facility for preparation, storage, and reprocessing of reusable cleaning equipment and supplies. This area should be a dedicated space that is not used for any other purposes. For multistory facilities, it is best practice to have one of these areas on each floor.

The designated environmental cleaning services area should:

- be well-ventilated and illuminated (lighting or window access)
- be labeled with a biohazard sign on the door
- have an appropriate water supply (hot and cold water access, if feasible)
- have a utility sink/floor drain for safe disposal of used solutions
- be designed so that, whenever possible, buckets can be emptied into utility sink/floor drains without lifting them or creating splashes
- have a dedicated handwashing sink, used only for handwashing
- have access to an eyewash station
- have appropriate PPE available
- be designed/have enough space to keep reprocessing (dirty areas) separate from storage areas for cleaned equipment
- be easily accessible in relation to the areas it serves (i.e., easily accessible throughout the facility)
- be appropriately sized to the amount of materials, equipment, and chemicals stored in the room/area
- have printed copies of the SDS for all environmental cleaning products, manufacturer's instructions, and

- job aids for preparation of cleaning and disinfectant solutions
- never contain personal clothing or grooming supplies, food or beverages
- there should be a separate area for cleaning staff to store these items
- have safe chemical storage and access
- have locks fitted to all doors to restrict access only to cleaning staff
- be free from clutter to facilitate cleaning
- have washable surfaces (floors, walls, shelves)

4. Environmental Cleaning Procedures

This section provides the current best practices for environmental cleaning procedures in patient care areas, as well as cleaning for specific situations (e.g., blood spills) and for noncritical patient care equipment. See summary in [Appendix B1 – Cleaning procedure summaries for general patient areas](#) and [Appendix B2 – Cleaning procedure summaries for specialized patient areas](#)

The determination of environmental cleaning procedures for individual patient care areas, including frequency, method and process, should be based on the risk of pathogen transmission. This risk is a function of:

- the **probability** of contamination
- the **vulnerability** of the patients to infection
- the potential for **exposure** (i.e., high-touch vs low-touch surfaces)

These three elements combine to determine low, moderate, and high risk—more frequent and rigorous (via different method or process) environmental cleaning is required in areas with high risk. **Risk determines cleaning frequency, method, and process in routine and contingency cleaning schedules for all patient care areas.** This risk-based approach is outlined in [Appendix A – Risk-assessment for determining environmental cleaning method and frequency](#).

Risk-Based Environmental Cleaning Frequency Principles

- **Probability of contamination:** Heavily contaminated surfaces and items require more frequent and thorough environmental cleaning than moderately contaminated surfaces, which in turn require more frequent and rigorous environmental cleaning than lightly or non-contaminated surfaces and items.
- **Vulnerability of patients to infection:** Surfaces and items in care areas containing vulnerable patients (e.g., immunosuppressed) require more frequent and rigorous environmental cleaning than surface and items in areas with less vulnerable patients.
- **Potential for exposure to pathogens:** High-touch surfaces (e.g., bed rails) require more frequent and rigorous environmental cleaning than low-touch surfaces (e.g., walls).

Every facility should develop cleaning schedules, including identifying the person responsible, frequency, and method (product, process) and detailed SOPs for environmental cleaning of surfaces and noncritical equipment in every type of patient care area.



Checklists and other job aids are also required to ensure that cleaning is thorough and effective.

These aspects are covered in more detail in the [Cleaning checklists, logs, and job aids](#) section.

4.1. General environmental cleaning techniques

For all environmental cleaning procedures, always use the following general strategies:

Conduct Visual Preliminary Site Assessment

- Proceed only after a **visual preliminary site assessment** to determine if:
 - the patient(s) status could pose a challenge to safe cleaning
 - there is any need for additional PPE and/or supplies (e.g., if there are any spills of blood/body fluids or if the patient is on transmission-based precautions)
 - there are any obstacles (e.g., clutter) or issues that could pose a challenge to safe cleaning
 - there is any damaged or broken furniture or surfaces to be reported to supervisor/management

Proceed From Cleaner To Dirtier

Proceed from **cleaner to dirtier** areas to avoid spreading dirt and microorganisms. Practical examples of this strategy include:

- During terminal cleaning, clean low-touch surfaces before high-touch surfaces.
- Clean patient areas (e.g., patient zone(s)) before patient toilets.
- Within a specified patient room, terminal cleaning should start with **shared equipment and common surfaces**, then proceed to **surfaces and items touched during patient care** that are outside of the patient zone, and finally with **surfaces and items directly touched by the patient** inside the patient zone (Figure 9). In other words, high-touch surfaces outside the patient zone should be cleaned before the high-touch surfaces inside the patient zone.

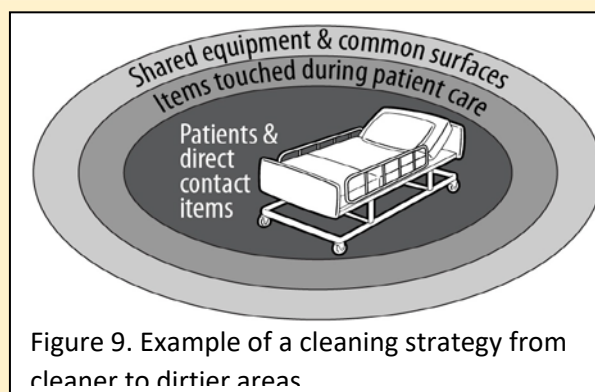


Figure 9. Example of a cleaning strategy from cleaner to dirtier areas

• Clean general patient areas not under transmission-based precautions before those areas under transmission-based precautions.

Proceed From High To Low (Top To Bottom)

Proceed from **high to low (top to bottom)** to prevent dirt and microorganisms from dripping/falling down and contaminating already cleaned areas. Practical examples of this strategy include:

- Cleaning bed rails before bed legs
- Cleaning environmental surfaces prior to cleaning floors
- Cleaning floors last to allow collection of dirt and microorganisms that may have fallen

Proceed in a Methodical, Systematic Manner

Proceed in a **methodical, systematic manner** to avoid missing areas—for example, left to right or clockwise (Figure 10).

- In a multi-bed area, clean each patient zone in the same manner—for example, starting at the foot of the bed and moving clockwise.

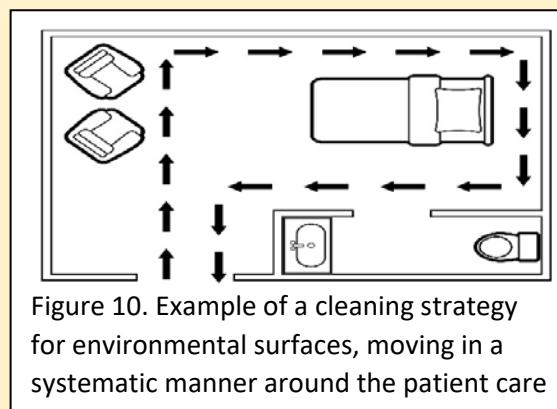


Figure 10. Example of a cleaning strategy for environmental surfaces, moving in a systematic manner around the patient care

Immediately Attend To Body Fluid Spills

Clean spills of blood or body fluids immediately, using the techniques in the **Spills of blood or body fluids** section.

For all environmental cleaning procedures, these are the best practices for environmental cleaning of surfaces:

- Use fresh cleaning cloths at the start of each cleaning session (e.g., routine daily cleaning in a general inpatient ward).
- Change cleaning cloths for a new, wetted cloth when they are no longer saturated with solution (and soiled cloth should be stored for reprocessing).
- For higher-risk areas, change cleaning cloths between each patient zone (i.e., use a new cleaning cloth for each patient bed). For example, in a multi-bed intensive care unit, a fresh cloth is required for every bed/incubator—see the **Specialized patient areas** section for more guidance.
- Ensure that there are enough cleaning cloths to complete the required cleaning session.

This is the general surface cleaning process:

1. Thoroughly wet (soak) a fresh cleaning cloth in the environmental cleaning solution
2. Fold the cleaning cloth in half until it is about the size of your hand as this will ensure that you can use all of the surface area efficiently (generally, fold them in half, then in half again, and this will give 8 sides)
3. Wipe surfaces using the general strategies as above (e.g., clean to dirty, high to low, systematic manner), making sure to use mechanical action (for cleaning steps) and making sure to that the surface is thoroughly wetted to allow required contact time (for disinfection steps)
4. Regularly rotate and unfold the cleaning cloth to use all of the sides
5. When all of the sides of the cloth have been used or when it is no longer saturated with solution, dispose of the cleaning cloth or store it for reprocessing
6. Repeat process from step 1.



- Never double-dip cleaning cloths into portable containers (e.g., bottles, small buckets) used for storing environmental cleaning products (or solutions).
- Never shake mop heads and cleaning cloths—it disperses dust or droplets that could contain microorganisms.
- Never leave soiled mop heads and cleaning cloths soaking in buckets.

High-Touch Surfaces:

The identification of high-touch surfaces and items in each patient care area is a necessary prerequisite to the development of cleaning procedures, as these will often differ by room, ward and facility (see [Appendix C – Example of high-touch surfaces in a specialized patient area](#)). Perform assessments and observations of workflow (if needed) in consultation with clinical staff in each patient care area to determine key high-touch surfaces.



Include identified high-touch surfaces and items in checklists and other job aids to facilitate completing cleaning procedures (see the [Cleaning checklists, logs, and job aids](#) section).

Common high-touch surfaces include:

- | | |
|--|--|
| • bedrails | • patient monitoring equipment (e.g., keyboards, control panels) |
| • IV poles | • transport equipment (e.g., wheelchair handles) |
| • sink handles | • call bells |
| • bedside tables | • doorknobs |
| • counters where medications and supplies are prepared | • light switches |
| • edges of privacy curtains | |

4.2. General patient areas

General patient areas include:

- *outpatient or ambulatory care wards*
- *general inpatient wards with patients admitted for medical procedures, who are not receiving acute care (i.e., sudden, urgent or emergent episodes of injury and illness that require rapid intervention).*

Three types of cleaning are required for these areas:

- *Routine cleaning*
- *Terminal cleaning*
- *Scheduled cleaning*



Generally, the probability of contamination and/or the vulnerability of the patients to infection is low, so these areas may require less frequent and rigorous (e.g., method, process) than specialized patient areas.

4.2.1. Outpatient wards

General outpatient or ambulatory care wards include waiting areas, consultation areas, and minor procedural areas. The best practices for environmental cleaning procedures in outpatient areas are as follows:

Area	Frequency	Method	Process
Waiting / Admission	At least once daily (e.g., per 24-hour period)	Clean	<ul style="list-style-type: none"> High-touch surfaces and floors
Consultation / Examination	At least twice daily	Clean	<ul style="list-style-type: none"> High-touch surfaces and floors
Procedural (minor operative procedures; e.g., suturing wounds, draining abscesses)	Before and after (i.e., between ^g) each procedure	Clean and disinfect	<ul style="list-style-type: none"> High-touch surfaces and floors, with an emphasis on the patient zone, procedure table
Procedural (minor operative procedures; e.g., suturing wounds, draining abscesses)	End of the day (terminal clean)	Clean and disinfect	<ul style="list-style-type: none"> All surfaces and the entire floor Handwashing sinks should be thoroughly cleaned (scrubbed) and disinfected Scrub and sluice areas/sinks
All	Scheduled basis (e.g., weekly, monthly) and when visibly soiled	Clean	<ul style="list-style-type: none"> Low-touch surfaces (see the Scheduled cleaning section)

^g If there is prolonged time between procedures and/or local conditions that create risk for dust generation/dispersal, re-wipe surfaces with disinfectant solution immediately prior to the subsequent procedure.

4.2.2. Routine cleaning of inpatient wards

Routine cleaning of inpatient areas occurs while the patient is admitted, focuses on the patient zone(s) and aims to remove organic material and minimize microbial contamination to provide a visually clean environment.

Note: this occurs when the room is occupied, and systems should be established to ensure that cleaning staff have reasonable access to perform routine cleaning.

Frequency	Method	Process
At least once daily (e.g., per 24 hour period)	Clean	<ul style="list-style-type: none"> High-touch surfaces and floors Handwashing sinks
Scheduled basis (e.g., weekly) and when visibly soiled	Clean	<ul style="list-style-type: none"> Low-touch surfaces (see the Scheduled cleaning section)

4.2.3. Terminal or discharge cleaning of inpatient wards

Terminal cleaning of inpatient areas, which occurs after the patient is discharged/transferred, includes the patient zone and the wider patient care area and aims to remove organic material and significantly reduce and eliminate microbial contamination to ensure that there is no transfer of microorganisms to the next patient.



Responsible Staff

Terminal cleaning requires collaboration between cleaning, IPC, and clinical staff, to delineate responsibility for every surface and item, including ensuring that disposable personal care items and patient care equipment is removed for reprocessing.



It is important that the staff responsible for these tasks are clearly documented in checklists and SOPs to ensure that items are not overlooked due to a confusion in responsibility.

Frequency	Method	Process
Patient transfer or discharge	Clean and disinfect	<ul style="list-style-type: none"> Remove soiled/used personal care items (e.g., cups, dishes) for reprocessing or disposal. Remove facility-provided linens for reprocessing or disposal (see Appendix D – Linen and laundry management) Visually assess window treatments and remove them for laundering (curtains) or on-site cleaning (blinds) if soiled. Reprocess all reusable (noncritical) patient care equipment (see the Noncritical patient care equipment section). All low- and high-touch surfaces, including those that may not be accessible when the room/area was occupied (e.g., patient mattress, bedframe, tops of shelves, vents), and floors. Clean (scrub) and disinfect handwashing sinks.

4.2.4. Scheduled cleaning

Scheduled cleaning occurs concurrently with routine or terminal cleaning and aims to reduce dust and soiling on low-touch items or surfaces. Perform scheduled cleaning on items or surfaces that are not at risk for soiling under normal circumstances, using neutral detergent and water. **But if they are visibly soiled with blood or body fluids, clean and disinfect these items as soon as possible.**

Examples of scheduled cleaning tasks include:

Frequency	Method	Process
Weekly	Clean	<ul style="list-style-type: none"> High surfaces (above shoulder height) such as tops of cupboards, vents Walls, baseboards and corners
Monthly	(See Appendix D – Linen and laundry management)	<ul style="list-style-type: none"> Window blinds, bed curtains
Annually	(See Appendix D – Linen and laundry management)	<ul style="list-style-type: none"> Window curtains

4.3. Patient area toilets

Toilets in patient care areas can be private (within a private patient room) or shared (among patients and visitors). They have high patient exposure (i.e., high-touch surfaces) and are frequently contaminated. Therefore, they pose a higher risk of pathogen transmission than in general patient areas.

Cultural considerations

Toileting practices are highly context-specific, in terms of both the types of toilets in use (e.g., squat or sit, wet or dry) and the adherence to correct use. Therefore, the level of contamination associated with toilet use and the resulting needs for cleaning and disinfection are highly variable. In some cases, more than twice daily cleaning and disinfection may be warranted.



Depending on resource and staffing levels, dedicated cleaning staff posted at shared toilets in healthcare facilities could be a feasible option to minimize risk associated with these areas

Area	Frequency	Method	Process
Private toilets	At least once daily (e.g., per 24-hour period), after routine cleaning of patient care area	Clean and disinfect	High-touch and frequently contaminated surfaces in toilet areas (e.g., handwashing sinks, faucets, handles, toilet seat, door handles) and floors
Public or shared toilets (e.g., patients, visitors, family members)	At least twice daily	Clean and disinfect	High-touch and frequently contaminated surfaces in toilet areas (e.g., handwashing sinks, faucets, handles, toilet seat, door handles) and floors
Both (private and shared)	Scheduled basis (e.g., weekly) and when visibly soiled	Clean	Low-touch surfaces (see the Scheduled cleaning section)

4.4. Patient area floors

Floors generally have low patient exposure (i.e., are low-touch surfaces) and pose a low risk for pathogen transmission. Therefore, under normal circumstances they should be cleaned daily, but the use of a disinfectant is not necessary.

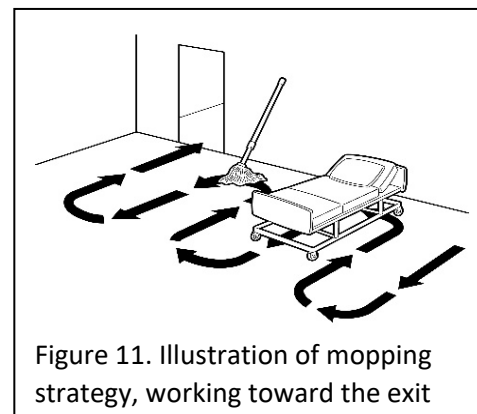


There are situations where there is higher risk associated with floors (e.g., high probability of contamination), so review the specific procedures in the [General patient areas](#) and [Specialized patient areas](#) section for guidance on frequency of environmental cleaning of floors and when they should also be disinfected.

Area	Frequency	Method	Process
Floors in general inpatient and outpatient areas, always cleaned last after other environmental surfaces	At least once daily (e.g., per 24-hour period) or as often as specified in the specific patient care area	Clean (unless otherwise specified within specific patient care area)	See below

These are the best practices for environmental cleaning of general patient area floors:

- Use wet floor or caution signs to prevent injuries.
- Mop from cleaner to dirtier areas.
- Mop in a systematic manner, proceeding from area farthest from the exit and working towards the exit (Figure 11).
- Change mop heads/floor cloths and buckets of cleaning and disinfectant solutions as often as needed (e.g., when visibly soiled, after every isolation room, every 1-2 hours) and at the end of each cleaning session.



This is the general mopping process:

1. Immerse the mop or floor cloth in the bucket with environmental cleaning solution and wring out.
2. Mop with a figure eight, overlapping stroke, turning the mop head regularly (e.g., every 5-6 strokes).
3. After cleaning a small area (e.g., 3m x 3m), immerse the mop or floor cloth in the bucket with rinse water and wring out.
4. Repeat process from step 1.

4.5. Spills of blood or body fluids



Regardless of the normal operating risk-level of an area, if blood or body fluid spills or contamination occurs (e.g., vomitus in corridor, blood spill), clean and disinfect the area immediately in a two-step process.

Area	Frequency	Method	Process
Any spill in any patient or non-patient area	Immediately, as soon as possible	Clean and disinfect <ul style="list-style-type: none"> • do not use combined detergent-disinfectant product • use intermediate-level disinfectant 	See below

This is the general steps for cleaning of spills of blood or body fluids:

1. Wear appropriate PPE (See **Table 5**).
2. Confine the spill and wipe it up immediately with absorbent (paper) towels, cloths, or absorbent granules (if available) that are spread over the spill to solidify the blood or body fluid (all should then be disposed as infectious waste).
3. Clean thoroughly, using neutral detergent and warm water solution.
4. Disinfect, using a facility-approved intermediate-level disinfectant.
 - Typically, chlorine-based disinfectants at 500-5000ppm free chlorine (1:100 or 1:10 dilution of 5% chlorine-bleach; depending on the size of the spill) are adequate for disinfecting spills (however, do not use chlorine-based disinfectants on urine spills), (see [Appendix E – Chlorine disinfectant solution preparation](#)).
 - Take care to allow the disinfectant to remain wet on the surface for the required contact time (e.g., 10 minutes), and then rinse the area with clean water to remove the disinfectant residue (if required).

5. Immediately send all reusable supplies and equipment (e.g., cleaning cloths, mops) for reprocessing (i.e., cleaning and disinfection) after the spill is cleaned up.

4.6. Specialized patient areas

Specialized patient areas include those wards or units that provide service to:

- *high-dependency patients, (e.g., ICUs)*
- *immunosuppressed patients (e.g., bone marrow transplant, chemotherapy)*
- *patients undergoing invasive procedures (e.g., operating theatres)*
- *patients who are regularly exposed to blood or body fluids (e.g., labor and delivery ward, burn units)*

Pay special attention to roles and responsibilities for environmental cleaning.



This vulnerable population is more prone to infection and/or the probability of contamination is high, making these areas higher-risk than general patient areas.



Unless otherwise indicated, environmental surfaces and floors in the following sections require **cleaning and disinfection** with a facility-approved disinfectant for all cleaning procedures described.

4.6.1. Operating rooms

Operating rooms or theatres are highly specialized areas with a mechanically controlled atmosphere where surgical procedures are performed. These require environmental cleaning at three distinct intervals throughout the day:

- before the first procedure
- between procedures
- after the last procedure (i.e., terminal cleaning)



Responsible Staff

Because operating rooms are highly specialized areas, the surgery department clinical staff usually manages environmental cleaning. Operating room nurses and their assistants sometimes perform cleaning duties along with, or sometimes instead of, general cleaning staff.

- **Critical and semi-critical equipment in the operating rooms require specialized reprocessing procedures and are never the responsibility of environmental cleaning staff.** The processes described below pertain only to the cleaning and disinfection of environmental surfaces and the surfaces of noncritical equipment.



Where multiple staff are involved, clearly defined and delineated cleaning responsibilities must be in place for cleaning of all environmental surfaces and noncritical patient care equipment (stationary and portable). The use of checklists and SOPs is highly recommended.

Frequency	Process
Before the first procedure	<ul style="list-style-type: none"> Carefully inspect records and assess the operating space to ensure that the terminal clean was completed the previous evening. Wipe all horizontal surfaces in the room (e.g., furniture, surgical lights, operating bed, stationary equipment) with a disinfectant to remove any dust accumulated overnight. <ul style="list-style-type: none"> Under normal circumstances, it is not necessary to perform the cleaning step in the morning if terminal cleaning was conducted the evening before; rather, this preliminary clean just utilizes a disinfectant to ensure that the space is fully decontaminated prior to the first procedure If there was no written confirmation or terminal cleaning on the previous day, do a full terminal clean (see below). Thoroughly clean and disinfect portable patient-care equipment that is not stored within the operating theatre, such as suction regulators, anesthesia trolley, compressed gas tanks, x-ray machines, and lead gowns, before introduction into the operating theatre.
Before and after each procedure	<ul style="list-style-type: none"> Remove all used linen and surgical drapes, waste (including used suction canisters, $\frac{3}{4}$ filled sharps containers), and kick buckets, for reprocessing or disposal. Clean and disinfect: <ul style="list-style-type: none"> high-touch surfaces (e.g., light switches, doorknobs) outside of the surgical field any visible blood or body fluids outside of the surgical field (e.g., walls, floors) all surfaces (high- and low-touch) and the floor inside of the surgical field <ul style="list-style-type: none"> tops of surgical lights reflective portion of surgical lights suction canisters tourniquet cuffs and leads anesthesia trolley operating table from top to bottom
After the final procedure (i.e., terminal clean)	<ul style="list-style-type: none"> Clean and disinfect: <ul style="list-style-type: none"> horizontal surfaces (high- and low-touch) and fixed equipment in the operating theatre, including booms and wheels of any equipment (e.g., carts) vertical surfaces such as walls and windows as needed to remove visible soiling ventilation (ducts) handwashing sinks, scrub and utility areas/sinks entire floor, including baseboards <ul style="list-style-type: none"> take care to move the operating table and any mobile equipment to make sure to reach the floor areas underneath. Thoroughly clean and disinfect portable patient-care equipment that is not stored within the operating theatre prior to removal from the operating theatre. Examples include: <ul style="list-style-type: none"> suction regulators anesthesia trolley compressed gas tanks x-ray machines lead gowns

Frequency	Process
Scheduled basis (e.g., weekly, monthly)	<ul style="list-style-type: none"> At the same time as daily terminal cleaning, clean and disinfect: <ul style="list-style-type: none"> low-touch surfaces not cleaned every day (unless visibly soiled) <ul style="list-style-type: none"> ceilings walls insides of cupboards

- Environmental Cleaning Supplies and Equipment for the operating room (OR)**
- Have dedicated supplies and equipment for the OR (e.g., mops, buckets).
 - Use fresh mops/floor cloths and mopping solutions for every cleaning session, including between procedures.
 - Use fresh cleaning cloths for every cleaning session, regularly replacing them during cleaning and never double-dipping them into cleaning and disinfectant solutions.

4.6.2. Medication preparation areas

Departments or areas where medication is prepared (e.g., pharmacy or in clinical areas) often service vulnerable patients in high-risk and critical care areas, in addition to other patient populations.



Responsible Staff

The staff who work in the medication preparation area might be responsible for cleaning and disinfecting it, instead of the environmental cleaning staff.



Develop detailed SOPs and checklists at the facility level to delineate roles and responsibilities for environmental cleaning in these areas.

Frequency	Process
Before and after every use	Countertops and portable carts used to prepare and/or transport medications
At least once every 24 hours.	All high-touch surfaces (e.g., light switches, countertops, handwashing sinks, cupboard doors) and floors
Scheduled (e.g., weekly, monthly)	Low-touch surfaces, such as the tops of shelves, walls, vents

4.6.3. Sterile service departments (SSD)

Departments or areas where semi-critical and critical equipment is sterilized and stored (i.e., sterile services) often service vulnerable patients in high-risk and critical care areas, in addition to other patient populations.



Responsible Staff

Staff who work in the SSD might be responsible for cleaning and disinfecting it, instead of environmental cleaning staff. Alternatively, it is possible to train and assign a dedicated cleaning staff member to this area.



Develop detailed SOPs and checklists at the facility level to delineate roles and responsibilities for environmental cleaning in these areas.

Frequency	Process
Before and after every use	Utility sinks used for washing medical devices (e.g., endoscopes)
At least twice daily	All high-touch surfaces (e.g., countertops, surfaces of washing equipment, handwashing sinks) and floors
Scheduled (e.g., weekly, monthly)	Low-touch surfaces, such as the tops of shelves, walls, vents

Additional Best Practices for Sterile Service Departments (SSD) SSDs have two distinct areas, the soiled area (also called dirty area or decontamination area) and the clean area.

- Start daily environmental cleaning with the clean area and finish with the dirty area.
- Provide separate environmental cleaning supplies and equipment, including PPE for cleaning staff (e.g., reusable rubber gloves, gowns), to prevent cross-contamination between these areas.
- If resources permit, assign separate cleaning staff/teams to each area. If not, clean at different times of the day depending on the workflow.

Find further guidance on environmental cleaning in SSDs here: [Decontamination and Reprocessing of Medical Devices for Health-care Facilities](https://www.who.int/infection-prevention/publications/decontamination/en/) (https://www.who.int/infection-prevention/publications/decontamination/en/)

4.6.4. Intensive care units

Intensive care units (ICUs) are high-risk areas due to the severity of disease and vulnerability of the patients to develop infections.

Frequency and process is the same for adult, pediatric and neonatal units, but there are specific considerations for neonatal areas (see **Additional guidance** in the table below).

Frequency	Process / Additional guidance
Twice daily and as needed	<ul style="list-style-type: none"> • Clean and disinfect high-touch surfaces • Clean floors with neutral detergent and water • If a neonatal incubator is occupied, clean and disinfect only the outside; only clean (neutral detergent) on inside. • Ensure that cleaning schedules details responsible staff (e.g., nursing or cleaning staff) for environmental cleaning of surfaces of noncritical patient care equipment.
Scheduled basis (e.g., weekly) and when visibly soiled	<ul style="list-style-type: none"> • Low-touch surfaces • See the Scheduled cleaning section • Change filters in incubators according to manufacturer's instructions, when wet or if neonate was on contact precautions (during terminal clean)
After patient transfer or discharge (i.e., terminal cleaning)	<ul style="list-style-type: none"> • See the Terminal or discharge cleaning of inpatient wards section. • Pay special attention to terminal cleaning of incubators. • Pay special attention to ensure reprocessing of noncritical patient care equipment

- Environmental Cleaning Supplies and Equipment for the ICU**
- Provide dedicated supplies and equipment for the ICU (e.g., mops, buckets) that are not used anywhere else.
 - Use fresh mops/floor cloths and mopping solutions for every cleaning session.
 - Use fresh cleaning cloths for surfaces for every cleaning session (at least two per day), regularly replacing them during cleaning and never double-dipping into cleaning and disinfectant solutions.

4.6.5. Emergency departments

Emergency departments are moderate to high-risk areas because of the wide variability in the condition of patients and admissions, which can:

- increase the probability of contamination of the environment via infectious agents or blood and body fluids
- make them more susceptible to infection (e.g., trauma patients)



Responsible Staff

Because emergency departments are specialized and high-throughput areas, clinical staff (e.g., nurses) might play an active role in performing environmental cleaning, particularly in examination and procedural areas.



Develop detailed SOPs, including checklists, at the facility level to delineate roles and responsibilities for environmental cleaning in these areas.

Area	Frequency	Process
Waiting / Admission	At least once daily (e.g., per 24-hour period)	<ul style="list-style-type: none"> • High-touch surfaces and floors
Consultation / Examination (low acuity)	After each event/case and at least twice daily, and as needed	<ul style="list-style-type: none"> • High-touch surfaces • End of the day: entire floor
Procedural (trauma, critical care)	Before and after (i.e., between ^{vi}) each procedure	<ul style="list-style-type: none"> • High-touch surfaces, procedure table and floor, inside the patient zone
Procedural (trauma, critical care)	End of the day (terminal clean)	<ul style="list-style-type: none"> • All surfaces and the entire floor • Handwashing sinks should be thoroughly cleaned (scrubbed) and disinfected • Scrub and sluice areas/sinks
All	Scheduled basis (e.g., weekly, monthly) and when visibly soiled	<ul style="list-style-type: none"> • Low-touch surfaces (see the Scheduled cleaning section)

^{vi} If there is prolonged time between procedures and/or local conditions that create risk for dust generation/dispersal, re-wipe surfaces with disinfectant solution immediately prior to the subsequent procedure.

4.6.6. Labor and delivery wards

Labor and delivery wards are routinely contaminated and patients are vulnerable to infection.



Responsible Staff

Because labor and delivery wards are often high-throughput areas, clinical staff (e.g., nurses) might play an active role in performing environmental cleaning, particularly between procedures.



Develop detailed SOPs, including checklists, at the facility level to delineate roles and responsibilities for environmental cleaning in these areas.

Frequency	Process
Before and after (i.e., between) every procedure and at least daily	<ul style="list-style-type: none"> Remove soiled linens and waste containers for disposal/reprocessing (see Appendix D – Linen and laundry management) Clean and disinfect: <ul style="list-style-type: none"> high-touch surfaces and floors with focus on the patient zone any surface (e.g., walls) that is visibly soiled with blood or body fluids
After the last delivery (terminal clean)	<ul style="list-style-type: none"> As above Clean and disinfect other high-touch surfaces (e.g., light switches, door handles) outside of the patient zone Clean (scrub) and disinfect handwashing sinks Clean and disinfect entire floor (move patient bed and other portable equipment)
Scheduled basis and when visibly soiled	<ul style="list-style-type: none"> Low-touch surfaces (see Scheduled cleaning)

4.6.7. Other specialized areas

The areas in this section are higher-risk because of:

- high probability of contamination
- high patient vulnerability to infection



Responsible Staff

Nursing and cleaning staff might be responsible for cleaning certain areas/items in these areas, so there must be clearly defined cleaning responsibilities for all surfaces and equipment (stationary and portable).



Develop detailed SOPs, including checklists, at the facility level to delineate roles and responsibilities for environmental cleaning in these areas.

Hemodialysis units include the dialysis stations (chair or bed, table and dialysis machine) for dialysis treatment.

Frequency	Process
Before and after (i.e., between) every patient	Remove disposable patient care items/waste and reprocess reusable noncritical patient care equipment (see Shared Equipment in the Noncritical patient care equipment section). <ul style="list-style-type: none"> • Clean and disinfect: <ul style="list-style-type: none"> ○ all surfaces of the dialysis station/area (e.g., bed/chair, countertops, external surfaces of the machine) and floors in the patient zone ○ any surface (e.g., walls) that is visibly soiled with blood or body fluids
After the last patient (terminal clean)	<ul style="list-style-type: none"> • As above • Clean and disinfect other high-touch surfaces (e.g., light switches, door handles, handwashing sinks) outside of the patient zone • Clean and disinfect entire floor (move dialysis stations and other portable equipment).
Scheduled basis and when visibly soiled	<ul style="list-style-type: none"> • Low-touch surfaces (see Scheduled cleaning)

Burn units house patients with significant burn wounds

Frequency	Process
Before and after (i.e., between) every procedure and twice daily and as needed	<ul style="list-style-type: none"> • Remove soiled linens and waste containers for disposal/reprocessing (see Appendix D – Linen and laundry management) • Clean and disinfect: <ul style="list-style-type: none"> ○ high-touch surfaces and floors with focus on the patient zone ○ any surface (e.g., walls) that is visibly soiled with blood or body fluids
Scheduled basis and when visibly soiled	<ul style="list-style-type: none"> • Low-touch surfaces (see Scheduled cleaning)

Special isolation units house highly immunocompromised patients with specific conditions where white blood cells are depleted (e.g., bone marrow transplant, leukemia)

Frequency	Process
Daily, before cleaning any other patient care area (i.e., first cleaning session of the day)	<ul style="list-style-type: none"> • Clean and disinfect: <ul style="list-style-type: none"> ○ high-touch surfaces ○ any surface (e.g., walls) that is visibly soiled with blood or body fluids • Clean floors with neutral detergent and water
Scheduled basis and when visibly soiled	<ul style="list-style-type: none"> • Low-touch surfaces (see Scheduled cleaning)
Terminal cleaning	<ul style="list-style-type: none"> • see Terminal or discharge cleaning of inpatient wards

Pediatric wards (excludes pediatric intensive care units)

Area	Frequency	Process
Pediatric outpatient wards (waiting/ admission area)	At least daily and as needed (e.g., visibly soiled, blood/body fluid spills)	<ul style="list-style-type: none"> Clean and disinfect: <ul style="list-style-type: none"> High-touch surfaces and floors
Pediatric outpatient wards (consultation/examination area)	After each event/case and at least twice per day and as needed	<ul style="list-style-type: none"> Clean and disinfect: <ul style="list-style-type: none"> High-touch surfaces Last clean of day: entire floor
Pediatric outpatient wards (minor operative/ procedure rooms)	Before/after every procedure	<ul style="list-style-type: none"> Clean and disinfect <ul style="list-style-type: none"> High-touch surfaces and floors, in the patient zone/ procedure table; any surface visibly soiled with blood or body fluids Last clean of the day: other high-touch surfaces and low-touch surfaces, handwashing sinks and scrub/sluice areas and the entire floor.
Pediatric inpatient wards	Same as adult inpatient wards	Same as adult inpatient wards; see Routine cleaning of inpatient wards and Terminal or discharge cleaning of inpatient wards
All pediatric wards	Scheduled basis and when visibly soiled	<ul style="list-style-type: none"> Low-touch surfaces (see Scheduled cleaning)
All pediatric wards	After each use and at least daily	<ul style="list-style-type: none"> Clean and disinfect <ul style="list-style-type: none"> Toys; for toys that may be put into mouth of infant or toddler ensure that they are cleaned, disinfected <i>and rinsed</i> thoroughly after each use

General procedure rooms (e.g., radiology, endoscopy)

Frequency	Process
Before and after (i.e., between) every patient	<ul style="list-style-type: none"> Remove disposable equipment and reprocess reusable noncritical patient care equipment (see Shared Equipment in the Noncritical patient care equipment section) Clean and disinfect: <ul style="list-style-type: none"> high-touch surfaces (e.g., procedure table/station, countertops, external surfaces of fixed equipment) with focus on the patient zone any surface that is visibly soiled with blood or body fluids
After the last patient (terminal clean)	<ul style="list-style-type: none"> As above Clean and disinfect other high-touch surfaces (e.g., light switches, door handles, handwashing sinks) Clean and disinfect entire floor (move procedure table and other portable equipment)
Scheduled basis and when visibly soiled	<ul style="list-style-type: none"> Low-touch surfaces (see Scheduled cleaning)

4.6.8. Transmission-based precaution / Isolation wards

Isolation or cohorted areas with suspected or confirmed cases of infections requiring transmission-based precautions are considered high-risk areas, particularly for environmentally hardy pathogens (e.g., resistant to disinfectants) and for multidrug-resistant pathogens that are highly transmissible and/or are associated with high morbidity and mortality.

The three types of transmission-based precautions are:

- airborne
- contact
- droplet



Transmission-specific PPE is required for all cleaning sessions in areas under transmission-based precautions, according to local policy or [Table 5](#).

PPE should always be put on and removed following the indications posted / recommended by IPC.

A full list of pathogens/infections requiring these precautions are included in CDC's [Guideline for Isolation Precautions](#) (<https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html>).

Best practices for environmental cleaning in transmission-based precaution areas:

- Clean these areas after non-isolation areas.
- Change environmental cleaning supplies and equipment, including PPE, directly after cleaning these areas.
 - If resources permit, dedicate supplies and equipment for these areas
- Post the type of precaution and required procedures, including required PPE, on visible signage outside the isolation area, ensuring that these indications are understood by cleaning staff.
- Do not bring cleaning carts into the area—keep them at the door and only the equipment and bring only the supplies needed for the cleaning process.

Airborne precautions

Frequency	Process
At least once daily (e.g., per 24-hour period)	<ul style="list-style-type: none"> • See the Routine cleaning of inpatient wards section (only cleaning required). • Unit manager and/or shift leader should coordinate schedule. • Take care to keep the door closed during the cleaning process (ventilation requirement).
After patient transfer or discharge (terminal clean)	<ul style="list-style-type: none"> • See the Terminal or discharge cleaning of inpatient wards section. <ul style="list-style-type: none"> ◦ remove privacy and window curtains for laundering • Unit manager and/or shift leader should coordinate schedule. • Take care to keep the door closed during the cleaning process (ventilation requirement).

Contact and droplet precautions

Frequency	Process
At least twice daily and as needed	<ul style="list-style-type: none"> High-touch surfaces and floors Any surface (e.g., walls) that is visibly soiled with blood or body fluids
After patient transfer or discharge (terminal clean)	<ul style="list-style-type: none"> See the Terminal or discharge cleaning of inpatient wards section <ul style="list-style-type: none"> remove privacy and window curtains for laundering.

Cleaning for *C. difficile* (spore-forming):

Two-step process required

1. rigorous mechanical cleaning process (e.g., using friction)
2. disinfectant with sporicidal properties, for example:
 - o sodium hypochlorite solution (e.g., 1,000ppm or 5,000ppm) (see [Appendix E – Chlorine disinfectant solution preparation](#))
 - o enhanced hydrogen peroxide at 4.5%

Cleaning for Carbapenem-resistant Enterobacteriaceae, *Acinetobacter baumannii* and *Pseudomonas aeruginosa* (CRE-CRAB-CRPsA):

These organisms belong to a group of carbapenem-resistant, gram-negative bacteria of national and international concern due to their implication as an emerging cause of severe healthcare-associated infections. In 2017, the World Health Organization published the first global guidelines for the prevention and control of CRE-CRAB-CRPsA in healthcare facilities, which include environmental cleaning and disinfection as a key recommendation. This implementation guide discusses the key elements of environmental cleaning needed for prevention and control of these organisms: [WHO 2019: Implementation manual to prevent and control the spread of carbapenem-resistant organisms at the national and health care facility level \[PDF – 98 pages\]](#) (<https://apps.who.int/iris/bitstream/handle/10665/312226/WHO-UHC-SDS-2019.6-eng.pdf>)



Highly infectious pathogens of epidemic potential, such as those that cause viral hemorrhagic fevers (e.g., Ebola): There might be specific cleaning procedure for isolation areas of highly infectious pathogens. Standalone training programs and strict adherence to required PPE is essential for conducting effective environmental cleaning in these situations.

Find more information on developing context-specific protocols:

- [WHO: Infection prevention and control guidance for care of patients in health-care settings, with focus on Ebola](#) (https://www.who.int/csr/resources/publications/ebola/filovirus_infection_control/en/)
- [WHO | Ebola virus disease: Key questions and answers concerning water, sanitation and hygiene](#) (<https://www.who.int/csr/resources/publications/ebola/water-sanitation-hygiene/en/>)

4.7. Noncritical patient care equipment

Portable or stationary noncritical patient care equipment such as IV poles, commode chairs, blood pressure cuffs, and stethoscopes are:

- touched frequently and directly by patients and/or by healthcare workers (i.e., high-touch surfaces)
- often shared between patients

Note: Critical and semi-critical equipment requires specialized reprocessing procedures and is never the responsibility of environmental cleaning staff.

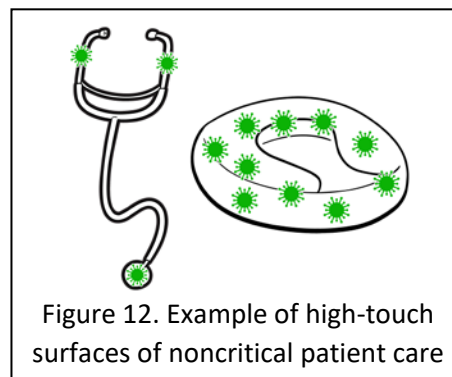


Figure 12. Example of high-touch surfaces of noncritical patient care



Responsible Staff

The responsibility for cleaning noncritical patient care equipment might be divided between cleaning and clinical staff, so it is best practice to clearly define and delineate cleaning responsibilities for all equipment (stationary and portable).



Develop a cleaning chart or schedule outlining the method, frequency and staff responsible for cleaning every piece of equipment in patient care areas and take care to ensure that both cleaning and clinical staff (e.g., nursing) are informed of these procedures so that items are not missed.

These are the best practices for selection and care of noncritical patient care equipment:

- Clean all equipment purchased/obtained by the facility using the methods and products available at the facility.
- All equipment purchased/obtained by the facility should include detailed written instructions for cleaning and disinfection from the manufacturer, including pictorial instructions if disassembly is required.
- Train the staff responsible for cleaning equipment on procedures before the equipment is placed into use.
- In patient care areas, do not purchase, install, or use equipment that cannot be cleaned and disinfected, unless they can be fitted with plastic (or other material) coverings.
- If plastic coverings are protecting difficult-to-clean equipment, clean these items with the same frequency, inspect coverings for damage on a regular basis, and repaired and replaced them as needed.

Type of equipment	Frequency	Method	Additional guidance
Shared (e.g., general inpatient wards)	Before and after each use	Clean and disinfect	<ul style="list-style-type: none"> • Select a compatible disinfectant (see Material compatibility considerations). • Clean and disinfect heavily soiled items (e.g., bedpans) outside of the patient care area in dedicated Sluice rooms. • Disinfect bedpans with a washer-disinfector or boiling water instead of a chemical disinfection process.

Type of equipment	Frequency	Method	Additional guidance
Dedicated (e.g., transmission-based precautions, isolation wards)	According to frequency of patient care area (at the same time as routine cleaning)	Based on the risk level of the patient care area	<ul style="list-style-type: none"> Select a compatible disinfectant (see Material compatibility considerations). Clean and disinfect heavily soiled items (e.g., bedpans) outside of the patient care area in dedicated Sluice rooms. Disinfect bedpans with a washer-disinfector or boiling water instead of a chemical disinfection process.
All	After patient transfer or discharge (i.e., terminal cleaning)	Clean and disinfect	<ul style="list-style-type: none"> Conduct terminal cleaning of all noncritical patient care equipment in designated Sluice rooms.

4.7.1. Material compatibility considerations

A list of compatible cleaning and disinfectant products should be included in manufacturer's instructions or provided by the manufacturer upon request.

If manufacturer instructions are not available, here are the applicable material compatibility considerations and best practices for use of common healthcare disinfectants:

Disinfectant	Material compatibility considerations	Best practices for use on noncritical patient care equipment
Chlorine/hypochlorite-based	Corrosive to metals	<ul style="list-style-type: none"> Concentration should not exceed 1000 ppm or 0.1%. Rinse equipment with clean water after disinfection.
Alcohols (60-80%)	Could cause damage to plastic tubing, silicone, and rubber, and deteriorate glues	Good for disinfecting small equipment or devices that can be immersed (e.g., stethoscopes, thermometers).

4.7.2. Sluice rooms

Each major patient care area should be equipped with a designated sluice room (or "dirty" or "soiled" area) to reprocess soiled noncritical patient care equipment (e.g., commode chairs, bedpans). Alternatively, there may be central depots where these procedures are performed.

Sluice rooms should be as close as possible to the point(s) of care that they serve and should have an organized workflow from soiled (dirty) to clean.

The soiled area (used for **reprocessing** equipment) should be adequately sized and have:

- a door that is kept closed at all times and ideally has hands-free operation
- a work counter and sluice/utility sink with a hot and cold faucet
- a dedicated handwashing sink
- space for washers/disinfectors (if resources allow)
- PPE available to protect staff during cleaning and disinfecting procedures

The clean area (used for **storing** reprocessed equipment) should:

- be separate from (via workflow) soiled areas
- have shelves that are smooth, non-porous and easy to clean
- be protected from water and soil (e.g., dirt, dust)
- be as close as possible to patient areas and easily available to staff

Area	Frequency	Method	Process
Soiled area	At least once daily (e.g., per 24-hours period)	Clean and disinfect	<ul style="list-style-type: none"> • High-touch and frequently contaminated surfaces, including work counters and sinks, and floors (floors only require cleaning)
Clean area	At least once daily (e.g., per 24-hours period)	Clean	<ul style="list-style-type: none"> • Horizontal surfaces and floors • Clean equipment should be covered or removed during cleaning process
Both	Scheduled basis (e.g., weekly) and when visibly soiled	Clean	<ul style="list-style-type: none"> • Low-touch surfaces (e.g., vents, tops of cupboards)

4.8. Methods for assessment of cleaning and cleanliness

It is best practice to perform routine, standardized assessments of environmental cleaning (i.e., practices, level of cleanliness) in order to:

- ensure that environmental cleaning procedures are being performed according to best practices and facility policy
- use results to inform program improvement (e.g., training, resource allocation)

This section includes an overview of the available methods, as well as their advantages and disadvantages. The best practices for developing a system of routine monitoring, audit and feedback within environmental cleaning program implementation are covered in the [Monitoring, feedback and audit elements](#) section.

Methods for assessing cleaning practice include ([Table 6A](#) below):

- direct performance observations
- visual assessment
- fluorescent markers

Methods for assessing the level of cleanliness include ([Table 6B](#) below):

- measuring the residual bioburden (i.e., ATP)
- taking a bacteriological culture of the surface itself using a swab or contact agar plate method

Table 6A. Advantages and disadvantages of monitoring methods for Assessing cleaning practice: adherence to cleaning procedures

Method	Advantages	Disadvantages
<p>Performance observations: observers (e.g., cleaning supervisors) perform direct, structured observations of individual cleaning staff practice, using standardized checklists that are specific to individual patient care areas. This method assesses the adherence to the SOP, for example the proportion of steps that were correctly performed.</p>	<ul style="list-style-type: none"> • Can be used for large areas (units, wards) • Easy to implement • Benchmarking is possible • Simple and inexpensive • Allows immediate and direct feedback to individual staff • Encourages cleaning staff engagement and input • Identifies gaps for staff training/job aid improvements 	<ul style="list-style-type: none"> • Subjective—difficulty in standardizing methodology and assessment across observers • Labor-intensive • Results affected by Hawthorne bias (i.e., more of an assessment of knowledge than actual practice) • Does not assess or correlate to bioburden
<p>Visual assessments of cleanliness: observers assess patient care areas after cleaning to assess proportion of items or surfaces inspected that are visually “clean,” out of a predetermined list of items/surfaces. For example, surfaces are swabbed with gloved fingers and inspected for dust.</p>	<ul style="list-style-type: none"> • Can be applied to entire facility or specific units/wards • Easy to implement • Benchmarking is possible • Inexpensive • Allows immediate and direct feedback to individual staff 	<ul style="list-style-type: none"> • Could be delay in feedback dependent on method used to compile results • Subjective—based on individual determinations of dust/debris levels • Does not assess or correlate to bioburden
<p>Fluorescent markers (e.g., UV visible): measures that cleaning has occurred by using a tracing agent (e.g., fluorescent material, chemical tracer) to mark predetermined items and environmental surfaces prior to cleaning. Post-cleaning, a trained observer can assess the marked surfaces using a detecting agent (e.g., ultraviolet light, enzymatic detector) that allows visualization of the tracing agent to determine whether they were cleaned. A numeric score is generated based on the proportion of marked surfaces/objects that were cleaned thoroughly, partially, or not at all.</p>	<ul style="list-style-type: none"> • Quick • Provides immediate feedback on performance • Minimal training required to perform • Objective • Benchmarking is possible • Relatively inexpensive 	<ul style="list-style-type: none"> • Does not assess or correlate to bioburden • Labor-intensive as surfaces should be marked before cleaning and checked after cleaning has been completed • Some difficulties documented in terms of removal of markers from porous or rough surfaces (e.g., canvas straps) • Time-intensive- need to vary frequency and objects to prevent monitoring system from becoming known

Table 6B. Advantages and disadvantages of monitoring methods for assessing cleanliness: effectiveness of cleaning procedures

Method	Advantages	Disadvantages
<p>ATP bioluminescence: detection of ATP indicates that organic materials are present on an object or surface, which could either be microbial (viable or dead) contamination or other organic material. Therefore, the absence of ATP suggests there is little microbial contamination on a surface. This measurement is used as an indication of the level of cleanliness of a surface, and, if tested before and after cleaning, can indicate the thoroughness of the cleaning procedure itself. A numeric score can be generated based on the proportion of marked surfaces/objects that were under the pre-determined threshold.</p>	<ul style="list-style-type: none"> • Quick • Provides immediate feedback • Minimal training required to perform • Objective 	<ul style="list-style-type: none"> • Expensive • Low sensitivity and specificity • Lacks a standardized threshold or benchmark for determining the level or status of cleanliness (i.e., "safe" post-cleaning ATL levels) for specific surfaces or patient care areas • Variable benchmarks • Technology constantly changing • Interference of cleaning products, supplies and in some cases surfaces, which can both reduce or enhanced ATP levels (e.g., bleach, microfiber, stainless steel)
<p>Environmental cultures: is the only direct measurement of levels of microbial contamination after cleaning surfaces and items. Cultures may be performed by swabbing or use of RODAC or contact agar plates. Culturing by swabbing is used to indicate the presence of specific bacteria on a surface. On the other hand, contact agar plates are used to quantify the level of bacterial contamination on an area of a large, flat surface.</p>	<ul style="list-style-type: none"> • High sensitivity and specificity • Provides direct indication of presence of specific pathogens (direct swab cultures) • May be useful for identifying source of outbreaks and/or environmental reservoir(s) • Objective 	<ul style="list-style-type: none"> • Not recommended for routine use • Expensive • Prolonged time for results (>48hrs) • Requires access to laboratory resources and trained personnel for interpreting results • Lack of defined threshold or benchmark for determining the level or status of cleanliness (e.g., colony-forming units per surface area)

5. Conclusion and way forward

The importance of environmental cleaning as a fundamental IPC intervention cannot be overstated. Environmental contamination plays a role in transmission of HAIs, which are a significant burden globally and disproportionately affect those in resource-limited settings.

The best practices contained herein provide the framework for implementing effective environmental cleaning procedures and programs in healthcare facilities in resource-limited settings. While they are structured to be most relevant for resource-limited settings, implementing all the best practices for cleaning supplies and equipment, cleaning procedures, and, most importantly, for cleaning programs will require a strong and sustained commitment, including dedicated staff time and resources. Strong leadership support for environmental cleaning and recognition of the important role that it plays in IPC is a critical prerequisite to implementing these best practices.

It is important that environmental cleaning is implemented within the framework of a functional IPC program, while ensuring that a multi-sectorial approach is taken to enable engagement and coordination across the various sectors (e.g., WASH) that have a role to play to ensure a functional and effective cleaning program.

A toolkit for guiding the implementation of these best practices is currently under development. It will use the step-wise approach that IPC improvement programs use extensively. It will also address the need to prioritize actions that target the highest transmission risk based on environmental contamination and patient vulnerability, as well as the foundational program elements which are needed first in order to build an effective and robust environmental cleaning program over time.

Further reading

Best Practices from high-resource settings

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Targeted training package for cleaning staff, generated for resource-limited settings

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Appendix A - Risk-assessment for determining environmental cleaning method and frequency

[Reproduced directly from PIDAC, 2018]

Step 1: Categorize the risk factors that determine the need for environmental cleaning:

Probability of Contamination with Pathogens

Heavy Contamination (score = 3)

An area is designated as being heavily contaminated if surfaces and/or equipment are routinely exposed to copious amounts of fresh blood or other body fluids (e.g., birthing suite, autopsy suite, cardiac catheterization laboratory, hemodialysis station, Emergency room, client/patient/resident bathroom if visibly soiled).

Moderate Contamination (score = 2)

An area is designated as being moderately contaminated if surfaces and/or equipment does not routinely (but may) become contaminated with blood or other body fluids and the contaminated substances are contained or removed (e.g., wet sheets). All client/patient/resident rooms and bathrooms should be considered to be, at a minimum, moderately contaminated.

Light Contamination (score = 1)

An area is designated as being lightly contaminated if surfaces are not exposed to blood, other body fluids or items that have come into contact with blood or body fluids (e.g., lounges, libraries, offices).

Vulnerability of Population to Infection

More Susceptible (score = 1)

Susceptible clients/patients/residents are those who are most susceptible to infection due to their medical condition or lack of immunity. These include those who are immunocompromised (oncology, transplant and chemotherapy units), neonates (level 2 and 3 nurseries) and those who have severe burns (i.e., requiring care in a burn unit).

Less Susceptible (score = 0)

For the purpose of risk stratification for cleaning, all other individuals and areas are classified as less susceptible.

Potential for Exposure

High-touch surfaces (score = 3): High-touch surfaces are those that have frequent contact with hands. Examples include doorknobs, telephone, call bells, bedrails, light switches, wall areas around the toilet and edges of privacy curtains

Low-touch surfaces (score = 1): Low-touch surfaces are those that have minimal contact with hands. Examples include walls, ceilings, mirrors

Step 2: Determine the Total Risk Stratification Score:

The frequency of cleaning is based on the factors listed above. A score is given if the factors are present, and the frequency of cleaning is based on the total score as derived in the following matrix:

Risk Stratification Scores for *High-Touch Surfaces* (Score for Potential for Exposure = 3)

Probability of contamination with pathogens	More susceptible population (score = 1)	Less susceptible population (score = 0)
Heavy (score = 3)	7 (3+3+1)	6 (3+3+0)
Moderate (score = 2)	6 (3+2+1)	5 (3+2+0)
Light (score = 1)	5 (3+1+1)	4 (3+1+0)

Risk Stratification Scores for *Low-Touch Surfaces* (Score for Potential for Exposure = 1)

Probability of contamination with pathogens	More susceptible population (score = 1)	Less susceptible population (score = 0)
Heavy (score = 3)	5 (1+3+1)	4 (1+3+0)
Moderate (score = 2)	4 (1+2+1)	3 (1+2+0)
Light (score = 1)	3 (1+1+1)	2 (1+1+0)

STEP 3: Determine the cleaning frequency based on the risk stratification matrix:

Cleaning frequencies for each patient care area are derived from the total score that results from the risk stratification matrix above:

Cleaning Frequencies Based on Total Risk Score

Total Risk Score	Risk Type	Minimum Cleaning Frequency
7	High Risk	Clean after each case/event/procedure and Clean additionally as required
4-6	Moderate Risk	Clean at least once daily Clean additionally as required (e.g., gross soiling)
2-3	Low Risk	Clean according to a fixed schedule Clean additionally as required (e.g., gross soiling)

Patient Care Area Examples:

Location	Probability of Contamination	Potential for Exposure	Vulnerability of Population	Total Score	Minimum Cleaning Frequency
Burn unit	2-3	3	1	6-7	Clean after each case/event/procedure, at least twice daily and clean additionally as required
General inpatient	1-2	3	0	4-5	Clean at least once daily and clean additionally as required

Appendix B1 - Cleaning procedure summaries for general patient areas

General outpatient area (Adult)

Patients being seen for routine outpatient or ambulatory care services, who are not receiving acute care (i.e., sudden, urgent or emergent episodes of injury and illness that require rapid intervention); the probability of contamination and/or the vulnerability of the patients to infection is low.

Area Description	Frequency	Person / Staff Responsible	Product(s) Technique	Additional Guidance / Description of Cleaning
Waiting/ admission areas (Adult)	at least daily	cleaning staff	clean (neutral detergent and water) high-touch surfaces and floors	clean low-touch surfaces on a scheduled basis (e.g., weekly).
Consultation/ examination areas (Adult)	at least twice per day	shared cleaning possible: clinical and cleaning staff	clean (neutral detergent and water) high-touch surfaces and floors, emphasis on the examination table/bed	clean low-touch surfaces on a scheduled basis (e.g., weekly).
Minor operative procedure rooms	before/after every procedure	shared cleaning possible: clinical and cleaning staff	clean and disinfect high-touch surfaces and floors, in the patient zone/ procedure table; any surface visibly soiled with blood or body fluids	Last clean of the day clean and disinfect other high-touch surfaces and low-touch surfaces, handwashing sinks and scrub/sluice areas and the entire floor.

General inpatient area (Adult and Pediatric)

Patients (adult and pediatric) admitted for medical procedures, who are not receiving acute care (i.e., sudden, urgent or emergent episodes of injury and illness that require rapid intervention); the probability of contamination and/or the vulnerability of the patients to infection is low.

Type of Clean	Frequency	Person / Staff Responsible	Product(s) Technique	Additional Guidance / Description of Cleaning
Routine clean	at least daily	cleaning staff	clean (neutral detergent and water) high-touch surfaces, handwashing sinks and floors; work towards patient zone	clean low-touch surfaces on a scheduled basis (e.g., weekly).
Terminal clean	at discharge/transfer	cleaning staff	clean and disinfect high-touch and low-touch surfaces and floors (see additional guidance)	<ol style="list-style-type: none"> 1. Remove soiled/used personal care items (e.g., cups, dishes) for reprocessing or disposal. 2. Remove facility-provided linens for reprocessing or disposal (see Appendix D – Linen and laundry management). 3. Visually assess window treatments and remove them for laundering (curtains) or on-site cleaning (blinds) if soiled. 4. Reprocess all reusable (noncritical) patient care equipment (see the Noncritical patient care equipment section). 5. Clean and disinfect all low- and high-touch surfaces, including those that may not be accessible when the room/area was occupied (e.g., patient mattress, bedframe, tops of shelves, vents), and floors. 6. Clean (scrub) and disinfect handwashing sinks.

Patient area toilets

Toilets in general patient areas can be private (within a private patient room) or shared (among patients and visitors). They have high patient exposure and are frequently contaminated. Therefore, they pose a higher risk of pathogen transmission than in general patient areas.

Area Description	Frequency	Person / Staff Responsible	Product(s) Technique	Additional Guidance / Description of Cleaning
toilets for general inpatient and outpatient areas; frequently used by visitors, family members.	at least once daily (private patient room) at least twice daily (public/shared toilets) and as needed	cleaning staff	clean and disinfect high-touch/frequently contaminated surfaces (e.g., handwashing sinks, faucets, handles, toilet seat, door handles) and floors; any surface visibly soiled with blood or body fluids	clean low-touch surfaces on a scheduled basis (e.g., weekly).

Patient area floors

Floors in general inpatient and outpatient areas generally have low patient exposure (i.e., are low-touch surfaces) and pose a low risk for pathogen transmission.

Area Description	Frequency	Person / Staff Responsible	Product(s) Technique	Additional Guidance / Description of Cleaning
floors in general inpatient and outpatient areas, always cleaned last after other environmental surfaces;	at least daily	cleaning staff	clean (neutral detergent and water) unless otherwise specified within specific patient care area clean to dirty, systematic manner (figure eight, regularly rinsed in rinse bucket)	none

Spills of blood or body fluids

Regardless of the normal operating risk-level of an area, if blood or body fluid spills or contamination occurs (e.g., vomitus in corridor, blood spill), clean and disinfect the area immediately in a two-step process.

Area Description	Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
any spill in any patient or non-patient area	immediately, as soon as possible	cleaning staff	<ol style="list-style-type: none"> 1. Wear appropriate PPE (Table 5). 2. Confine the spill and wipe it up immediately with absorbent (paper) towels, cloths, or absorbent granules (if available) that are spread over the spill to solidify the blood or body fluid (all should then be disposed as infectious waste). 3. Clean (neutral detergent and water) 4. Disinfect, using a facility-approved intermediate-level disinfectant 5. Immediately reprocess all reusable supplies and equipment (e.g., cleaning cloths, mops) after the spill is cleaned up. 	Mark off spill area to prevent contact, as well as accidental slips and falls.

Appendix B2 - Cleaning procedure summaries for specialized patient areas

Operating theatres

Operating rooms or theatres are highly specialized areas with a mechanically controlled atmosphere where surgical procedures are performed; the vulnerability of the patients to infection is high and high degree of asepsis required.

Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
before first procedure	nursing / clinical staff and cleaning staff	disinfect horizontal surfaces around the patient zone / operating table	See Best Practices (Section 4.6.1.) <ul style="list-style-type: none"> Records of previous evening terminal clean required; if not or if no surgeries on the day prior, perform terminal clean (as below).
before/after (in between) procedure	shared cleaning possible: perioperative nursing / clinical staff and cleaning staff	clean and disinfect 1. any surface with visible blood/body fluids 2. high-touch surfaces (e.g., light switches, door knobs) <i>outside</i> surgical field 3. all surfaces and noncritical equipment and the floor <i>inside</i> the surgical field	See Best Practices (Section 4.6.1.) <ul style="list-style-type: none"> remove all used linen and surgical drapes, waste (including used suction canisters, ¾ filled sharps containers), and kick buckets, for reprocessing or disposal portable noncritical (e.g., compressed gas tanks, x-ray machine) equipment should be thoroughly cleaned and disinfected before and after each procedure
after last procedure (terminal clean)	shared cleaning possible: perioperative nursing / clinical staff and cleaning staff	clean and disinfect 1. all surfaces and noncritical equipment in the operating theatre and the entire floor; walls inspected and spot cleaned as needed 2. scrub and utility areas/sinks	See Best Practices (Section 4.6.1.) <ul style="list-style-type: none"> Take care to move the operating table and any mobile equipment to make sure that the floor areas underneath are thoroughly cleaned and disinfected. clean and disinfect low-touch surfaces, (e.g., the insides of cupboards and ceilings/walls) on a facility-determined schedule (e.g., weekly, monthly)

Medication preparation areas

Areas where medication is prepared e.g., pharmacy or in clinical areas) often for patients with high vulnerability to infection (e.g., ICU patients), in addition to other patient populations; high degree of asepsis is required.

Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
between uses	clinical staff	clean and disinfect countertops or portable carts used to transport and/or prepare medications	none
end of day	shared cleaning possible: clinical and cleaning staff	clean and disinfect all high-touch surfaces and floors	clean and disinfect low-touch surfaces, such as the tops of shelves and walls/vents, on a facility-determined schedule (e.g., weekly, monthly).

Sterile services areas

Areas where semi-critical and critical equipment is sterilized and stored (i.e., sterile services) often service patients with high vulnerability to infection (e.g., ICU patients), in addition to other patient populations; high degree of asepsis required.

Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
before and after every use	clinical staff	clean and disinfect utility sinks used for washing semi-critical equipment (e.g., endoscopes)	none
twice daily	shared cleaning possible: clinical and cleaning staff	clean and disinfect all high-touch surfaces (e.g., countertops, surfaces of washing equipment, handwashing sinks) and floors	clean and disinfect low-touch surfaces, such as the tops of shelves and walls/vents, on a facility-determined schedule (e.g., weekly, monthly) during the final daily clean.

ICU (adult, pediatric, neonatal)

Patients in these units are immuno-compromised by underlying diseases and/or by treatment modalities (e.g., invasive devices), as well as by other life-threatening conditions (e.g., major trauma, stroke); the vulnerability of patients to infection is high.

Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
twice daily and as needed	cleaning staff	clean and disinfect high-touch surfaces, focus on the patient zone (only outside of neonatal incubator when occupied)	clean floors with neutral detergent and water; clean low-touch surfaces on a scheduled basis (e.g., weekly).
at discharge/ transfer (terminal clean)	cleaning staff	clean and disinfect high-touch and low-touch surfaces and floors (see additional guidance) 1. Remove soiled/used personal care items (e.g., cups, dishes) for reprocessing or disposal. 2. Remove facility-provided linens for reprocessing or disposal 3. Visually assess window treatments and remove them for laundering (curtains) or on-site cleaning (blinds) if soiled. 4. Reprocess all reusable (noncritical) patient care equipment 5. Clean and disinfect all low- and high-touch surfaces, including those that may not be accessible when the room/area was occupied (e.g., patient mattress, bedframe, tops of shelves, vents), and floors. 6. Clean (scrub) and disinfect handwashing sinks.	Pay special attention to terminal cleaning of incubators. Change filters in incubators according to manufacturer's instructions, when wet or if neonate was on contact precautions (during terminal clean)

Special isolation units

Patients in these units are highly immunosuppressed with specific conditions that deplete white blood cells (e.g., bone marrow transplant, leukemia); vulnerability to infection is high.

Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
daily, prior to cleaning any other patient care area (i.e., first cleaning session of the day)	shared cleaning possible: clinical and cleaning staff	clean and disinfect high-touch surfaces, focus on the patient zone	clean floors with neutral detergent and water; clean low-touch surfaces on a scheduled basis (e.g., weekly).
at discharge/ transfer (terminal clean)	cleaning staff	clean and disinfect high-touch and low-touch surfaces and floors (see additional description)	<ol style="list-style-type: none"> 1. Remove soiled/used personal care items (e.g., cups, dishes) for reprocessing or disposal. 2. Remove facility-provided linens for reprocessing or disposal 3. Visually assess window treatments and remove them for laundering (curtains) or on-site cleaning (blinds) if soiled. 4. Reprocess all reusable (noncritical) patient care equipment 5. Clean and disinfect all low- and high-touch surfaces, including those that may not be accessible when the room/area was occupied (e.g., patient mattress, bedframe, tops of shelves, vents), and floors. 6. Clean (scrub) and disinfect handwashing sinks.

Burn units

Patients in these units are immuno-compromised due to significant burn wounds; vulnerability of the patients to infection and probability of contamination (e.g., with blood and body fluids) is high.

Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
before and after (i.e., between) every procedure and twice daily and as needed	shared cleaning possible: clinical and cleaning staff	clean and disinfect high-touch surfaces inside the patient zone; any surface visibly soiled with blood or body fluids	<ul style="list-style-type: none"> remove soiled linens and waste containers for disposal/reprocessing; last clean of day, clean and disinfect entire floor clean low-touch surfaces on a scheduled basis (e.g., weekly).
at discharge/transfer (terminal clean)	cleaning staff	clean and disinfect high-touch and low-touch surfaces and floors (see additional description)	<ol style="list-style-type: none"> Remove soiled/used personal care items (e.g., cups, dishes) for reprocessing or disposal. Remove facility-provided linens for reprocessing or disposal Visually assess window treatments and remove them for laundering (curtains) or on-site cleaning (blinds) if soiled. Reprocess all reusable (noncritical) patient care equipment Clean and disinfect all low- and high-touch surfaces, including those that may not be accessible when the room/area was occupied (e.g., patient mattress, bedframe, tops of shelves, vents), and floor Clean (scrub) and disinfect handwashing sinks.

General procedure areas

Areas where minor procedures are performed for inpatients, such as radiology and endoscopy services; often service patients with high vulnerability to infection (e.g., immunosuppressed), in addition to other patient populations

Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
before/after every procedure	shared cleaning possible: clinical and cleaning staff	clean and disinfect high-touch surfaces (e.g., procedure table/station, countertops, external surfaces of fixed equipment) and floors inside the patient zone; any surface that is visibly soiled with blood or body fluids	Remove disposable equipment and reprocess reusable noncritical patient care equipment (see Noncritical patient care equipment)
after last patient of the day (terminal clean)	cleaning staff	clean and disinfect all high-touch surfaces (e.g., light switches, door handles) inside and outside of the patient zone, plus handwashing sinks should be thoroughly cleaned (scrubbed) and disinfected; any surface visibly soiled with blood	move the procedure table and other portable equipment, and clean and disinfect the entire floor with neutral detergent and water; clean low-touch surfaces on a scheduled basis (e.g., weekly).

Labor and delivery wards/rooms

Delivery area, may be single bed/private or multiple beds, are routinely contaminated and vulnerability of patients to infection is high.

Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
before/after every procedure	shared cleaning possible: clinical and cleaning staff	clean and disinfect high-touch surfaces and floors inside the patient zone; any surface that is visibly soiled with blood or body fluids (see additional guidance)	remove soiled linens and waste containers for disposal/reprocessing;
after last delivery of the day (terminal clean)	cleaning staff	clean and disinfect all high-touch surfaces (e.g., light switches, door handles) and floor inside and outside of the patient zone, plus handwashing sinks should be thoroughly cleaned (scrubbed) and disinfected (also see additional guidance); any surface visibly soiled with blood	move the patient bed and other portable equipment, and clean and disinfect the entire floor with neutral detergent and water; clean low-touch surfaces on a scheduled basis (e.g., weekly).

Hemodialysis stations/areas

Areas with hemodialysis stations, each station includes the patient bed/chair, table and dialysis machine itself; probability of contamination and vulnerability of patients to infection is high.

Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
after each event/case	shared cleaning possible: clinical and cleaning staff	clean and disinfect all surfaces of the dialysis station on area (e.g., bed, chair, countertops, external surfaces of the machine) and floor inside the patient zone; any surface visibly soiled with blood	Remove disposable patient care items/waste and reprocess reusable patient care equipment per below. Take care to allow enough contact time prior to the next subsequent use of the station/area.
after last case of the day (terminal clean)	cleaning staff	clean and disinfect all surfaces of the dialysis station/area and floor, plus other high-touch surfaces (e.g., light switches, door handles) in the area/room housing hemodialysis stations; any surface visibly soiled with blood	Move station and other portable equipment, and clean and disinfect the entire floor with neutral detergent and water

Pediatric outpatient area

These areas are frequently contaminated and patients are more vulnerable to infections due to pathogens such as enteric viruses and influenza, therefore these areas are higher risk than adult outpatient areas.

Area Description	Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
Waiting/ admission areas	At least daily and as needed (e.g., visibly soiled, blood/body fluid spills)	Cleaning staff	Clean and disinfect High-touch surfaces and floors—clean to dirty, high to low, systematic manner	Clean low-touch surfaces on a scheduled basis (e.g., weekly).
Consultation/ examination areas	After each event/case and at least twice per day and as needed	Shared cleaning possible: clinical and cleaning staff	Clean and disinfect High-touch surfaces, focus on examination table/bed (patient zone)	Last clean of the day: clean and disinfect the entire floor Clean low-touch surfaces on a scheduled basis (e.g., weekly).
Minor operative procedure rooms	Before/after every procedure	Shared cleaning possible: clinical and cleaning staff	Clean and disinfect High-touch surfaces and floors, in the patient zone/ procedure table; any surface visibly soiled with blood or body fluids	Last clean of the day: clean and disinfect other high-touch surfaces and low-touch surfaces, handwashing sinks and scrub/sluice areas and the entire floor.

Emergency department waiting rooms / admissions areas:

Waiting areas and with incoming patients, family members; consultation and examination areas for admitted but noncritical patients (low acuity); procedure areas include trauma areas for high acuity patients; moderate to high-risk areas because of the wide variability in the condition of patients and admissions, which can increase the probability of contamination of the environment via infectious agents or blood and body fluids and make them more susceptible to infection (e.g., trauma patients).

Area Description	Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
Waiting/ admission areas	At least daily and as needed (e.g., visibly soiled, blood/body fluid spills)	Cleaning staff	Clean and disinfect High-touch surfaces and floors—clean to dirty, high to low, systematic manner	Clean low-touch surfaces on a scheduled basis (e.g., weekly).
Consultation/ examination areas	After each event/case and at least twice per day and as needed	Shared cleaning possible: clinical and cleaning staff	Clean and disinfect High-touch surfaces, focus on the examination table/bed	Last clean of the day: clean and disinfect the entire floor Clean low-touch surfaces on a scheduled basis (e.g., weekly).
Procedure areas include trauma areas for high acuity patients	Before/after every procedure	Shared cleaning possible: clinical and cleaning staff	Clean and disinfect High-touch surfaces and floors, in the patient zone/ procedure table; any surface visibly soiled with blood or body fluids	Last clean of the day: clean and disinfect other high-touch surfaces and low-touch surfaces, handwashing sinks and scrub/sluice areas and the entire floor.

Transmission-based precaution / Isolation wards

Isolation or cohorted areas with suspected or confirmed cases of infections requiring transmission-based precautions are considered high-risk areas, particularly for environmentally hardy pathogens (e.g., resistant to disinfectants) and for multidrug-resistant pathogens that are highly transmissible and/or are associated with high morbidity and mortality.

Area Description	Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
Airborne precautions	Daily and as needed	Cleaning staff	Clean (neutral detergent and water) High-touch surfaces, handwashing sinks and floors; work towards patient zone	Clean low-touch surfaces on a scheduled basis (e.g., weekly). Primary focus is adherence to required ppe and additional entry/exit procedures.
Droplet and/or contact precautions	Twice daily and as needed	Cleaning staff	Clean and disinfect High-touch surfaces and floors, focus on all surfaces within the patient zone, noncritical patient care equipment; any surface visibly soiled with blood or body fluids	Cleaning staff must wear required ppe; clean and disinfect low-touch surfaces on a scheduled basis (e.g., weekly); Dispose of or reprocess cleaning supplies and equipment immediately after cleaning
Patient diagnosed with <i>C. difficile</i> on droplet and contact precautions	Twice daily and as needed	Cleaning staff	Clean and disinfect (two-step process required and sporicidal agent) High-touch surfaces and floors, focus on all surfaces within the patient zone, noncritical patient care equipment; any surface visibly soiled with blood or body fluids	Two-step process required (cannot use combined detergent-disinfectant); 1. Rigorous mechanical cleaning process (e.g., using friction) 2. Disinfectant with sporicidal properties, for example: <ul style="list-style-type: none"> sodium hypochlorite solution (e.g., 1,000-5,000ppm) enhanced hydrogen peroxide at 4.5%

Area Description	Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
Dedicated noncritical patient care equipment for patients on transmission-based precautions	Consistent with cleaning frequency for patient zone, before/after each use and as needed	Shared cleaning possible: clinical and cleaning staff	Product(s) based on the risk level of the patient care area	<p>Select a compatible disinfectant (see Material compatibility considerations).</p> <p>Reprocess (i.e., clean and disinfect) dedicated equipment after patient is discharged or transferred (terminal clean).</p> <ul style="list-style-type: none"> Conduct terminal cleaning of all noncritical patient care equipment in designated Sluice rooms.
All transmission-based precautions	At discharge/transfer (terminal clean)	Cleaning staff	<p>clean and disinfect</p> <p>High-touch and low-touch surfaces and floors (see additional guidance)</p> <ol style="list-style-type: none"> 1. Remove soiled/used personal care items (e.g., cups, dishes) for reprocessing or disposal. 2. Remove facility-provided linens for reprocessing or disposal 3. Removal privacy curtains and window coverings for laundering (curtains, blinds) 4. Reprocess all reusable (noncritical) patient care equipment in sluice rooms 5. Clean all low- and high-touch surfaces, including those that may not be accessible when the room/area was occupied (e.g., patient mattress, bedframe, tops of shelves, vents), and floors. 6. Clean (scrub) and disinfect handwashing sinks. 	<p>Conducted in close collaboration with clinical staff, specifically unit manager and/or shift leader, who should coordinate schedule.</p> <p>Airborne precautions:</p> <ul style="list-style-type: none"> Take care to keep the door closed during the environmental cleaning process (ventilation requirement).

Noncritical patient care equipment

Portable or stationary noncritical patient care equipment such as IV poles, commode chairs, blood pressure cuffs, wheel chairs and stethoscopes; this equipment are touched frequently and directly by patients and/or by healthcare workers (i.e., high-touch surfaces) and are often shared between patients

Area Description	Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
Shared equipment (including transport equipment - e.g., wheelchairs) - shared between patients	Before/after every patient, and as needed	Shared cleaning possible: clinical and cleaning staff	Clean and disinfect Confirm material compatibility; refer to manufacturer's instructions	Take care to ensure division of cleaning responsibility between nursing and cleaning staff. Clean and disinfect heavily soiled items (e.g., bedpans) outside of the patient care area in dedicated Sluice rooms. <ul style="list-style-type: none">Disinfect bedpans with a washer-disinfector or boiling water instead of a chemical disinfection process.
Dedicated equipment - when dedicated to a particular patient during their stay	Consistent with cleaning frequency for patient zone, and as needed	Shared cleaning possible: clinical and cleaning staff	Product(s) based on the risk level of the patient care area	Take care to ensure division of cleaning responsibility between nursing and cleaning staff
Shared and dedicated equipment	At patient discharge/transfer	Shared cleaning possible: clinical and cleaning staff	Clean and disinfect High-touch and low-touch surfaces and floors (see additional description)	Take care to ensure division of cleaning responsibility between nursing and cleaning staff <ul style="list-style-type: none">Conduct terminal cleaning of all noncritical patient care equipment in designated Sluice rooms.

Spills of blood or body fluids

Regardless of the normal operating risk-level of an area, if blood or body fluid spills or contamination occurs (e.g., vomitus in corridor, blood spill), clean and disinfect the area immediately in a two-step process.

Area Description	Frequency	Person / Staff Responsible	Products Technique	Additional Guidance / Description of Cleaning
Any spill in any patient or non-patient area	Immediately, as soon as possible	Cleaning staff	<ol style="list-style-type: none"> 1. Wear appropriate PPE (Table 5). 2. Confine the spill and wipe it up immediately with absorbent (paper) towels, cloths, or absorbent granules (if available) that are spread over the spill to solidify the blood or body fluid (all should then be disposed as infectious waste). 3. Clean (neutral detergent and water) 4. Disinfect, using a facility-approved intermediate-level disinfectant 5. Immediately reprocess all reusable supplies and equipment (e.g., cleaning cloths, mops) after the spill is cleaned up. 	Mark off spill area to prevent contact.

Appendix C - Example of high-touch surfaces in a specialized patient area



High touch surfaces include, but are not limited to:

bed rails

tray table

IV poles

bed frames

bedside table

blood-pressure cuff

moveable lamps

handles

Appendix D - Linen and laundry management

Best practices for linen (and laundry) handling

- Always wear reusable rubber gloves prior to handling soiled linen (e.g., bed sheets, towels, curtains).
- Never carry soiled linen against the body. Always place it in the designated container.
- Carefully roll up soiled linen to prevent contamination of the air, surfaces, and cleaning staff. Do not shake it.
- If there is any solid excrement on the linen, such as feces or vomit, scrape it off carefully with a flat, firm object and put it in the commode or designated toilet/latrine before putting linen in the designated container
- Place soiled linen into a clearly labelled, leak-proof container (e.g., bag, bucket) in the patient care area. Do not transport soiled linen by hand outside the specific patient care area from where it was removed.
- Reprocess (i.e., clean and disinfect) the designated container for soiled linen should be reprocessed after each use
- If reusable linen bags are used inside the designated container, do not overfill them, tie them securely, and launder after each use
 - Soiled linen bags can be laundered with the soiled linen they contained.

The effectiveness of the laundering process depends on many factors, including:

- time and temperature
- mechanical action
- water quality (pH, hardness)
- volume of the load
- extent of soiling
- model/availability of commercial washers and dryers

Always use and maintain laundry equipment according to manufacturer's instructions.

Always launder soiled linens from patient care areas in a designated area, which should:

- be a dedicated space for performing laundering of soiled linen
- not contain any food, beverage or personal items
- have floors and walls made of durable materials that can withstand the exposures of the area (e.g., large quantities of water and steam)
- have a separation between the soiled linen and clean linen storage areas, and ideally should be at negative pressure relative to other areas
- have handwashing facilities
- have SOPs and other job aids to assist laundry staff with procedures

Best practices for personal protective equipment (PPE) for laundry staff:

- Practice hand hygiene before application and after removal of PPE.
- Wear tear-resistant reusable rubber gloves when handling and laundering soiled linens.
- If there is risk of splashing, for example, if laundry is washed by hand, laundry staff should always wear gowns or aprons and face protection (e.g., face shield, goggles) when laundering soiled linens.

Best practices for laundering soiled linen:

- Follow instructions from the washer/dryer manufacturer.
- Use hot water (70–80°C X 10 min) [158–176°F]) and an approved laundry detergent.
 - Disinfectant are generally not needed when soiling is at low levels.
 - Use disinfectant on a case by case basis, depending on the origin of the soiled linen (e.g., linens from an area on contact precautions).
- Dry linens completely in a commercial dryer.

Manual reprocessing steps

If laundry services with hot water are not available, reprocess soiled linens manually according to the following:

1. Immerse in detergent solution and use mechanical action (e.g., scrubbing) to remove soil.
2. Disinfect by:
 - Immersing the linen in boiling water or
 - Immersing the linen in disinfectant solution for the required contact time and rinsing with clean water to remove residue.
3. Allowing to fully dry, ideally in the sun

Best practices for management of clean linen:

- Sort, package, transport, and store clean linens in a manner that prevents risk of contamination by dust, debris, soiled linens or other soiled items.
- Each floor/ward should have a designated room for sorting and storing clean linens.
- Transport clean linens to patient care areas on designated carts or within designated containers that are regularly (e.g., at least once daily) cleaned with a neutral detergent and warm water solution.

Appendix E – Chlorine disinfectant solution preparation

Example 1 – Using Liquid Bleach

Chlorine in liquid bleach comes in different concentrations. Any concentration can be used to make a dilute chlorine solution by applying the following formula:

$$[\% \text{ chlorine in liquid bleach} / \% \text{ chlorine desired}] - 1 = \text{Total parts of water for each part bleach}^{\dagger}$$

Example: To make a 0.5% chlorine solution from 3.5%^{†‡} bleach:

$$[3.5\% / 0.5\%] - 1 = 7 - 1 = 6 \text{ parts water for each part bleach}$$

Therefore, you must add 1 part 3.5% bleach to 6 parts water to make a 0.5% chlorine solution.

[†] “Parts” can be used for any unit of measure (e.g. ounce, litre or gallon) or any container used for measuring, such as a pitcher.

[‡] In countries where French products are available, the amount of active chlorine is usually expressed in degrees chlorum. One degree chlorum is equivalent to 0.3% active chlorine.

Example 2 – Using Bleach Powder

If using bleach powder[†], calculate the amount of bleach to be mixed with each litre of water by using the following formula:

$$[\% \text{ chlorine desired} / \% \text{ chlorine in bleach powder}] \times 1\,000 = \text{Grams of bleach powder for each litre of water}$$

Example: To make a 0.5% chlorine solution from calcium hypochlorite (bleach) powder containing 35% active chlorine:

$$[0.5\% / 35\%] \times 1\,000 = 0.0143 \times 1\,000 = 14.3$$

Therefore, you must dissolve 14.3 grams of calcium hypochlorite (bleach) powder in each litre of water used to make a 0.5% chlorine solution.

[†] When bleach powder is used; the resulting chlorine solution is likely to be cloudy (milky)

Example 3 – Formula for Making a Dilute Solution from a Concentrated Solution

$$\text{Total Parts (TP) (H}_2\text{O)} = [\% \text{ Concentrate} / \% \text{ Dilute}] - 1$$

Example: To make a 0.1% chlorine solution from 5% concentrated solution.

$$\text{Calculate TP (H}_2\text{O)} = [5.0\% / 0.1\%] - 1 = 50 - 1 = 49$$

Take 1 part concentrated solution and add to 49 parts boiled (filtered if necessary) water.

Source: AVSC International (1999). Infection Prevention Curriculum. Teacher’s Manual. New York, p.267.
[Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings, with Focus on Ebola \[PDF – 24 pages\]](#), p. 24.
<https://www.who.int/csr/resources/publications/who-ipc-guidance-ebolafinal-09082014.pdf>