

ASIA PACIFIC SOCIETY OF INFECTION CONTROL

APSIC GUIDELINES FOR ENVIRONMENTAL CLEANING AND DECONTAMINATION

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Glossary

Aspergillus - a fungus which spores are present in the air we breathe, but does not normally cause illness. However an individual with a weakened immune status may be susceptible to Aspergillus infection.

Candida - a genus of yeasts. Many species are harmless parasites of hosts including humans, but other species, or harmless species in the wrong location, can cause disease.

CDC - Center for Diseases Control and Prevention

cfu - colony forming unit

Construction - a process that consists of the building or assembling of infrastructure.

Demolition - the tearing-down of buildings and other structures.

Ducts - pipe or tubular runway for carrying smoke or grease

Exhaust hood - an enclosure or canopy provided with a draft for carrying off fumes, sprays, smoke, gas or vapor

Fusarium – a fungus causing vascular wilt disease.

Grease filters - an apparatus containing a filter medium for grease

HCWs - healthcare workers; staff working in healthcare facilities

HEPA Filter (*High Efficiency Particulate Air filter*) - is a high performance filtration device capable of removing particulate matter with minimum collection efficiency of 99.97% for a 0.3 micrometer (micron) diameter of a thermally-generated dioctylphthalate (DOP) particle.

Legionella - a pathogenic Gram negative bacterium, including species that cause legionellosis (Legionnaires' Disease).

MDRO - multi-drug resistant organism

Nocardia - a bacterium causing infection in the lungs, brain or skin. It occurs mainly in people with weakened immune systems.

Neutropenia - a condition with an abnormally low level of neutrophils in the blood.

Spores - reproductive cells produced by certain fungi and some bacteria.

Offal - waste or by-product of a process

Oncology - the branch of medicine that deals with cancer.

Potable - suitable for drinking

Sanitation - promotion of hygiene and prevention of disease by maintenance of sanitary condition

UVC - ultraviolet light C (wavelength)

Ventilation - circulation of air in a room; a system of providing fresh air

Chapter 1 Infection Control and the Environment

Contamination of hospital equipment, medicines, and water supplies with hospital pathogens is a well-recognized cause of common-source outbreaks of infection.^{1,2} Hospital patients shed pathogens into their surrounding environments, but there is debate over the importance of the resulting surface contamination as a source for subsequent transmission. Hospital design and hygienic practices have been largely directed at controlling healthcare associated pathogens contaminating air, hands, equipment, and surfaces.³ However, several studies in the 1970s and early 1980s suggested that the hospital environment contributed negligibly to endemic transmission.^{4,5} Therefore, routine surveillance cultures of the hospital environment were regarded as unjustified, and the significance of environmental cultures performed during outbreaks was questioned.^{6,7} Consequently, the frequency of routine environmental sampling declined from three-quarters of US hospitals in 1975⁶ to virtually none today. Recently, Centers for Disease Control and Prevention (CDC) guidelines environmental sampling is recommended only during outbreaks.⁸ However, there has been a reassessment of the role played by contaminated surfaces in the transmission of healthcare associated pathogens.^{2,9} Pathogen transfer from an affected patient to a susceptible host occurs most commonly via the hands of healthcare workers (HCWs), but contaminated objects, surfaces, and air can be either directly or indirectly involved in the transmission pathway.

Evidence is accumulating that contaminated surfaces make an important contribution to the epidemic and endemic transmission of *Clostridium difficile*, vancomycin-resistant enterococci, methicillin-resistant *Staphylococcus aureus*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and norovirus and that improved environmental decontamination contributes to the control of outbreaks.¹⁰⁻¹² Bacteria, spores, and viruses are shed from infected and/or colonized patients (and sometimes staff) into the hospital environment.¹¹

Patients are the prime source of contamination, so surfaces in the vicinity of patients that are touched frequently by HCWs and patients—termed “high-touch surfaces”—have a higher frequency of contamination than other sites.¹³⁻¹⁶ The presence of a pathogen on a surface does not necessarily represent a transmission risk.⁸ The infectious dose for most environmentally associated healthcare associated pathogens appears to be low. For example, less than 15 *S. aureus* cells were sufficient to cause infection in experimental lesions,¹⁷ less than 1 cfu/cm² was sufficient to cause *C. difficile* disease in mice,¹⁸ and a single norovirus particle is thought to have the capacity to cause infection.¹⁹ Importantly, despite the comparatively low concentration of contamination on surfaces compared with that on the skin of patients, touching a VRE-contaminated surface carries approximately the same risk for acquisition of VRE on hands as touching an affected patient.²⁰⁻²¹ Therefore, the presence of a pathogen on a surface at any concentration may be a risk for transmission, and this is reflected in proposed guidelines for microbiological hygiene standards.²² In addition, healthcare associated pathogens can survive on surface for long period. *C. difficile* spores, VRE, MRSA, and *Acinetobacter* species can survive for 4–5 months or more on dry surfaces, and norovirus can survive for a week or more.²³ Several studies have shown that various bacterial pathogens can be acquired on the hands of HCWs through contact with environmental surfaces in the absence of direct patient contact.²⁴⁻²⁶ A number of studies have also identified the previous presence of a colonized or infected patient in a side room as a risk factor for the acquisition of the same pathogen by a new occupant, presumably because of residual room contamination that is not removed through terminal cleaning and disinfection. This effect has been shown for VRE,^{13,20,24} MRSA,²¹ *C. difficile*,²⁷ multidrug-resistant *P. aeruginosa*,²⁸ and *A. baumannii*.²⁸ Together, these evidence suggesting that the contaminated surface environment contributes to the transmission of healthcare associated pathogens is the effect of improved cleaning and disinfection on infection rates.²

Despite expanding knowledge on environmental cleaning, limited data is available concerning the role of environmental cleaning to limit transmission of healthcare associated

pathogens in Asia Pacific region.²⁹⁻³⁰ In this guideline, we provide evidence and practices of environmental cleaning.

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Chapter 2 Selection of Finishes and Surfaces in the Health Care Setting in Areas Where Care is Delivered

Housekeeping surfaces require regular cleaning and removal of soil and dust. Health care facilities should have policies that include the criteria to be used when choosing furnishings and equipment for patient care areas. In general, the following factors are to be considered in these criteria:

- a) Choosing finishes, furnishings and equipment that are easily cleaned
- b) Ensuring compatibility of the health care setting's cleaning and disinfecting agents with the items and surfaces to be cleaned ^{1,2}

It is highly recommended that Infection Prevention and Control, Occupational Health and Safety and Housekeeping to work collectively in decision making with respect to choices of furniture and finishing for the facilities.

Attention is to be paid to the following when choosing finishes and surfaces ^{1,2} :

- a) Easy maintenance and repair e.g. sharp corners on floors are to be avoided, instead, rounded corners are recommended for easy cleaning and maintenance
- b) Fabrics used in upholstered furniture in patient care areas must be fluid-resistant, non-porous and can withstand cleaning with hospital-grade disinfectants
- c) Choose materials that are less likely to support microbial growth e.g. plastic and metal. Wet organic substrates (e.g., wood) should be avoided in hospital areas with immunocompromised patient ³
- d) Cloth items such as curtains, pillows, mattresses and soft furnishings should:
 - i) Be seamless where possible or have double-stitched seams;
 - ii) Be easily accessed for cleaning;
 - iii) Have removable covers for cleaning;

- iv) Have foam cores that are resistant to mold;
 - v) Not be damaged by detergents and disinfectants;
 - vi) Be quick-drying; and
 - vii) Be maintained in good repair.
- e) Carpets are not recommended in patient care areas as there is the likelihood of spills of contaminated liquids (e.g., intensive care units, laboratory areas, areas around sinks) or alcohol-based hand rub (which could pose a flammability risk); and the risk of infection from dust and particulates containing environmental pathogens in the patient population served by the area (e.g., burn units, intensive care units, operating rooms, transplant units). Carpets should not be used in patient care areas housing immunocompromised patients as these are at risk for invasive fungal infections (e.g., transplant units, some oncology units).⁴
- f) Plastic coverings, including mattress covers and pillow covers, should be cleaned with hospital approved cleaning agent on a regular basis; inspected for damage (mattress and pillow covers should be replaced when torn, cracked or have evidence of liquid penetration); the mattress or pillow should be replaced if it is visibly stained.

Hospital Equipment

Infection Prevention and Control should be consulted when purchasing new equipment. Factors to note include keypads and monitoring screens that can be easily cleaned and disinfected. Plastic skins may be effective to cover computer keyboards, allowing ease of cleaning but must be compatible with the health care setting's cleaning and disinfecting products.

Recommendations:

- 1 Health care settings should have policies that include the criteria to be used when choosing finishes, furnishings and equipment for patient care areas.**

- 2 Infection Prevention and Control, Housekeeping and Occupational Health and Safety should be involved in the selection of surfaces and finishes in health care settings.**

- 3 Surfaces, furnishings, equipment and finishes in health care settings should:**
 - a. Be easily maintained and repaired;**
 - b. Be cleanable with hospital-grade detergents, cleaners and disinfectants**
 - c. Be smooth, nonporous, seamless and unable to support microbial viability.**

- 4 Carpets should not be used in patient care areas and especially in areas that house or serve immunocompromised patients or where there is a high likelihood of contamination with blood or body fluids.**

- 5 Equipment that cannot be adequately cleaned, disinfected or covered, including electronic equipment, are not recommended for use in the patient care area.**

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Chapter 3 Cleaning Agents and Disinfectants

Cleaning is the removal of foreign material (e.g., dust, soil, organic material such as blood, secretions, excretions and microorganisms) from a surface or object. Cleaning physically with water, detergents and mechanical action removes rather than kills microorganisms, reducing the organism load on a surface. The key to cleaning is the use of friction to remove microorganisms and debris. Thorough cleaning is required for any equipment/device to be disinfected, as organic material may inactivate a disinfectant.

Disinfection is a process used on inanimate objects and surfaces to kill microorganisms. Disinfection will kill most disease-causing microorganisms but may not kill all bacterial spores.

3.1 *Detergents and Cleaning Agents*

Routine cleaning with soap and water or detergents is the most useful method for removing organic material and suspended grease or oil. Equipment and surfaces in the health care setting must be cleaned with approved hospital-grade cleaners. The physical action of scrubbing with detergents and surfactants and rinsing with water removes large numbers of microorganisms from surfaces^{1,2}

Equipment cleaning should be done as soon as possible after items have been used. A variety of products from a number of suppliers can be used to achieve effective cleaning. It is important to follow the manufacturer's instructions when using cleaning agents.

3.2 *Disinfectants*

Disinfectants rapidly kill or inactivate most infectious agents. Disinfectants are only to be used to disinfect and must not be used as general cleaning agents, unless combined with a

cleaning agent as a detergent-disinfectant.³ Disinfecting products used in the health care setting¹

- a) Must be approved by the hospital's Infection Prevention and Control and by Occupational Health and Safety
- b) Must be used according to the manufacturers' recommendations for dilution, temperature, water hardness and use; and
- c) Must be used according to the product's Safety Data Sheet (SDS).

1. Choosing a Disinfectant

Environmental surface usually only require cleansing followed by low to intermediate level disinfection. Low-level disinfectants are often labeled "hospital disinfectant" without a tuberculocidal claim, because they lack the potency to inactivate mycobacteria. The following factors influence the choice of disinfectant:²

- a) The nature of the item to be disinfected;
- b) The innate resistance of expected microorganisms to the inactivating effects of the disinfectant;
- c) The amount of organic soil present;
- d) The type and concentration of disinfectant used;
- e) Duration of contact time required for efficacy at the usual room temperature of the health care setting;
- f) Compatibility with medical equipment;
- g) Occupational health considerations:
 - (i) Surface disinfectants contain quaternary ammonium compounds (QUATs), phenolics, hydrogen peroxide or sodium hypochlorite which can cause skin and respiratory irritation;
 - (ii) Disinfectants are one of the leading allergens affecting health care providers;
 - (iii) Staff will be more likely to use products that are non-toxic and not

irritating.

g) Environmental protection:

- (i) Consider products that are biodegradable and safe for the environment;
- (ii) Many disinfectants (e.g., QUATs) may be hazardous both during manufacture and when they are discharged into the waste stream, as they are not readily biodegradable

Recommended disinfectants for environmental use in all health care settings include:

- Chlorine: Sodium hypochlorite (bleach),
- Phenolics
- Quaternary Ammonium Compounds (QUATs)
- Iodophors
- Hydrogen Peroxide (AHP)
- Ethyl alcohol or isopropyl alcohol in concentrations of 60%–90% (used to disinfect small surfaces)

2. Using Disinfectants

When using a disinfectant:¹

- a) It is most important that an item or surface be free from visible soil and other organic items before a disinfectant is applied. These items might interfere the action of the disinfectant, and their presence may reduce or eliminate the effectiveness of disinfectants.
- b) It is important that the disinfectant be used according to the recommended manufacturer's instructions for dilution and contact time.
- c) An environmental disinfectant may be used for equipment that only touches intact skin; examples include intravenous pumps and poles, hydraulic lifts, blood pressure cuffs, apnoea monitors and sensor pads, electrocardiogram (ECG) machine/cables

and crutches.)

- d) Minimize the contamination levels of the disinfectant solution and equipment used for cleaning by ensuring proper dilution of the disinfectant, frequently changing the disinfectant solution and by not dipping a soiled cloth into the disinfectant solution;
- e) Personal protective equipment must be worn appropriate to the product(s) used; and there should be a quality monitoring system in place to ensure the efficacy of the disinfectant over time (e.g., frequent testing of product).

3. New non-critical medical equipment

The equipment that is to be cleaned must be compatible with the cleaning and disinfecting agents used in the health care setting, and the manufacturer's recommendations must be adhered to.

When purchasing new non-critical medical equipment:¹

- a) Do not purchase medical equipment that cannot be cleaned and disinfected according to the recommended standards;
- b) When purchasing cleaning agents or equipment, consideration must be given to occupational health requirements, patient safety, and infection prevention and control and environmental safety issues;
- c) All non-critical medical equipment that will be purchased and will be cleaned must include written item-specific manufacturer's cleaning and disinfection instructions. If disassembly or reassembly is required, detailed instructions with pictures must be included. Staff training must be provided on these processes before the medical equipment is placed into circulation (e.g., patient lifts, specialized chairs and beds); and
- d) Items that are provided by external agencies and returned to the agency for cleaning and disinfection are subject to the same standards as in-house equipment (e.g., therapeutic beds/mattresses)⁴.

3.3 Novel Technologies

New methods for cleaning and disinfection are continually evolving. Before considering a change from current methods for cleaning and disinfection in a health care setting, the newer product/technology must be weighed against current products in terms of efficacy, consistency of results, ease of implementation, toxicity, effects on patient care ergonomic considerations and cost implications. Novel technologies may be considered as adjunct measures in special situations and setting e.g. outbreak management.

1. Microfibres

Microfibers (MF) systems are designed as microfiber mops and ultramicrofibre cloths.

a. Microfibre Mops

Microfibres (MF) are densely constructed polyester and polyamide (nylon) fibres that are approximately 1/16 the thickness of a human hair.⁵ A microfibre mop consists of a synthetic pad fit on a plastic handle. Microfibre mop pads provide a cleaning surface 40 times greater than conventional string mops and increased absorbency. In a 2007 study, a microfibre mop and bucket were compared with traditional mop and bucket system; the MF system demonstrated superior microbial removal compared to cotton string mops used with a detergent cleaner.⁶ Microfibres may be damaged by fabric softeners, oils and grease, highly alkaline products such as bleach, some surfactants and high heat (washing temperature cannot exceed 93°C and drying temperature cannot exceed 60°C.⁶

b. Microfibre and Ultramicrofibre Cloths

Ultramicrofibres (UMF) are thinner than regular MF and are woven from a continuous strand. They are designed for use with low volume of water containing

neither detergent nor biocidal additives. Ultramicrofibre is used for cloths used in cleaning. Microfibre cloths may be used either dry for dusting or wet for general-purpose cleaning. When used dry on a dry surface, MF cloths do not perform better than other types of materials at reducing bioburden or organic material, but may be better for dusting due to its electrostatic properties.⁷ When wet, however, MF cloths remove significantly more soil than general-purpose cloths or paper towel and transfer significantly less organic debris than general-purpose cloths.⁷ UMF cloths conform better to surfaces containing small abrasions invisible to the naked eye, in which bacteria might lodge and remain after passage of conventional cotton or wet loop cloths.⁸ Some UMF cloths are designed to be used without disinfectants. In a recent study, Wren et al demonstrated that UMF cloths were considerably more effective than wet loop cloths at removing MRSA, *Acinetobacter*, *K. oxytoca* and spores of *C.difficile* when moistened with water alone. UMF cloths were also significantly more effective in the presence of organic matter seeded onto surfaces prior to cleaning.⁸

2. Hydrogen Peroxide

Hydrogen peroxide is delivered by a computer-controlled distribution system that ensures even distribution throughout the room while monitoring gas concentration, temperature and relative humidity. These may come in the form of aerosolized (35% hydrogen peroxide) or mist (5% hydrogen peroxide).

Advantages:¹

- a. It is relatively safe and decomposes to water and oxygen. Once decontamination is completed, an aeration unit in the room converts the hydrogen peroxide into water and oxygen. The time required for the mist decontamination is dependent on room volume and technology used.¹⁵

- b. It is particularly effective for decontaminating complex furniture and equipment that is difficult to clean manually
- c. It may be used to decontaminate entire units/wards during outbreaks
- d. It is effective against a wide range of microorganisms, including bacteria, viruses and spores, particularly those of *C. difficile*⁹. It has been used successfully in eradicating *Serratia marcescens* from neonatal intensive care units, MRSA from surgical units VRE and *C. difficile*.⁹⁻¹⁵. In a study by French et al, isolation rooms contaminated with MRSA were decontaminated more effectively with VHP than with routine cleaning measures alone.¹⁶ A mist hydrogen peroxide system has been used successfully in France to decrease *C. difficile* contamination by 91%, compared to a 50% reduction using sodium hypochlorite.

However, it has some disadvantages including:

- a. Time taken to complete process of decontamination
- b. Biological soiling reduces the efficacy of vaporized hydrogen peroxide
- c. Air ducts from the room must be sealed prior to decontamination
- d. Additional cost

3. Ozone Gas

Ozone is a gas that has bactericidal properties, can be generated cheaply and rapidly dissociates to oxygen. The use of ozone gas as an antibacterial agent in recent studies shows promise for future use in health care settings.^{17,18} .

Ozone gas has some advantages such as:¹

- a. Effectively penetrates all areas of a room, even areas difficult to access or clean by conventional cleaning methods (e.g., fabrics, under beds, inside cracks)
- b. Administration of gas can be controlled from outside the room
- c. Easy and economical to produce

- d. By-products are safe for the environment
- e. Decontaminates surfaces even if biological material has been dried onto them
- f. Decontaminates a large area quickly (less than one hour for an entire room)

Its disadvantages include:

- a. It is, however, toxic at high concentrations, precluding its use in populated areas.
- b. It should only be used in areas that may be completely sealed off for the duration of the treatment and unsealed until ozone levels return to safe limits.

Ozone gas 50-500 ppm has been shown to give synergistic effect when combined with 3% hydrogen peroxide. More studies are needed to validate this finding.

4. Ultraviolet Irradiation (UVI)

The use of ultraviolet irradiation (UVI) in the health care setting is limited to destruction of airborne organisms or inactivation of microorganisms on surfaces. UVI inactivates microorganisms at wavelengths of 240 to 280 nm (UVC).¹⁹ Bacteria and viruses are more easily killed by UVI than are bacterial spores. Germicidal effectiveness of UVI is influenced by the following^{19,20}

- a) Amount and type of organic matter present;
- b) Wavelength of ultraviolet light;
- c) Air mixing and air velocity;
- d) Temperature and relative humidity;
- e) Type of microorganisms present; and
- f) Ultraviolet light intensity, which is affected by distance and cleanliness of lamp tubes.

Portable devices are now available to assist in reducing environmental contamination. If UVI is used in a health care setting, warning signs should be posted in the affected

area to alert staff, patients and visitors of the hazard. A schedule for replacing ultraviolet lamps should be developed according to the manufacturer's recommendations. UVI intensity should be regularly monitored.²⁰

a. UVI Disinfection of the Air

Several studies have demonstrated that UVI is effective in killing or inactivating *M. tuberculosis* and in reducing the transmission of other infectious agents in hospitals. UVI is recommended as a supplement or adjunct to other TB infection control and ventilation measures in settings in which the need to kill or inactivate *M. tuberculosis* is essential, such as airborne isolation rooms.²¹ UVI is not a substitute for HEPA filtration in airborne isolation rooms.²¹

b. UVI Disinfection of Surfaces

UVI disinfection has been used successfully for final disinfection of isolation units once patients have been treated for infections.²² Cleaning of visibly soiled surfaces is necessary before UVI disinfection, as ultraviolet light is absorbed by organic materials and its ability to penetrate is low.²² UVI disinfection of surfaces should not be used alone for disinfection, but may be a good addition to chemical disinfection to lower the bioburden of microorganisms in isolation units and during outbreaks.

Using UVI in this setting has some advantages namely a relatively short exposure time is required, no residue left following disinfection

However, there are some disadvantages as follow: ¹

- Destructive effect over time on plastics and vinyls and fading of paints and fabrics
- Low penetrating effect

- Less effective in the presence of organic materials
- Disinfection does not occur in shadowed areas where the ultraviolet light cannot penetrate
- Additional cost involved

E. Antimicrobial-impregnated Supplies and Equipment

For environment in health care, linens and surfaces around patients recently are developed that incorporate antibacterial or antimicrobial chemicals into them which can eliminate or retard bacterial growth (e.g., antimicrobial linen, stainless steel coated with titanium dioxide, glass coated with xerogel, surfaces brushed or sprayed with surfacine)^{23 - 25}.

Product 'antibacterial' claims on efficacy and safety should be carefully evaluated before replacing existing items.² Treated surfaces and equipment have not been well studied in clinical settings to prove whether they will prevent transmission of pathogens.

Recommendations

- 1. *Cleaning and disinfection should be done as soon as possible after items have been used***
- 2. *Liquid disinfectants chosen for use in environmental health care should:***
 - a. *Be low level disinfectants (used for non-critical items)***
 - b. *Be active against the usual microorganisms encountered in the health care setting;***
 - c. *Ideally require little or no mixing or diluting;***
 - d. *Be active at room temperature with a short contact time;***
 - e. *Have low irritancy and allergenic characteristics; and***
 - f. *Be safe for the staff, patients and environment.***

3. ***Effective use of a disinfectant for environment includes:***
 - a. ***Application of disinfectant only after visible soil and other impediments to disinfection have been removed***
 - b. ***Following the manufacturer's written instructions for dilution and contact time;***
 - c. ***Frequently changing disinfectant solution with no 'double-dipping' of cloths into disinfectant; and***
 - d. ***Appropriate use of personal protective equipment, if required, to prevent exposure to the disinfectant.***

4. ***Non-critical medical equipment, including equipment provided by external agencies, must:***
 - a) ***Be capable of being effectively cleaned and disinfected according to recommended standards***
 - b) ***Must have written, item-specific manufacturer's cleaning and disinfection instruction.***

5. ***Novel technologies may be considered as adjunct measures in special situations and setting.***

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Chapter 4 Cleaning Best Practices for Patient Care Areas

Good housekeeping practices are essential for reducing the risk of transmitting infectious diseases. This will contribute to a culture of safety by providing an atmosphere of general cleanliness and good order. All those using the health care premises have a right to assume that the environment is one where hazards are adequately controlled and that, where appropriate, they receive any necessary information to enable them to safeguard themselves and others from disease.^{1,2}

Housekeeping in the health care setting should be performed on a routine and consistent basis to provide for a safe and sanitary environment. Maintaining a clean and safe health care environment is an important component of infection prevention and control. Despite this, however, there is little evidence of acceptable quality upon which to base guidance related to the maintenance of hospital environmental hygiene. Just because it 'looks' clean doesn't mean it isn't contaminated by bacteria or viruses.¹

4.1 General Principles

Environmental surfaces can be further divided into medical equipment surfaces (e.g., knobs or handles on hemodialysis machines, x-ray machines, instrument carts and dental units) and housekeeping surfaces (e.g., floors, walls, and tabletops).^{1,2} Most environmental surfaces will be adequately cleaned with soap and water or a detergent/disinfectant, depending on the nature of the surface and the type and degree of contamination. The process and products used for cleaning and disinfection of surfaces and medical equipment must be compatible with the surfaces/equipment.³

Cleaning best practices are designed to meet the following needs:¹

- a) The primary focus must remain the protection of the patient, staff and visitors;

- b) The practices must help minimize the spread of infections;
- c) The practices are understandable and attainable;
- d) The practices incorporate workflow measurement to guide human resource issues;
and
- e) The practices must be reviewed as often as required to keep abreast of changes in the health care environment.

A. Resources for Environmental Cleaning

All health care settings must devote adequate resources to Housekeeping that include:^{1,4}

- a) One individual with assigned overall responsibility for the care of the physical facility;
- b) Written procedures for cleaning and disinfection of client/patient/resident areas and equipment that include:
 - i. Defined responsibility for specific items and areas;
 - ii. Clearly defined lines of accountability;
 - iii. Procedures for daily and terminal cleaning and disinfection;
 - iv. Procedures for cleaning in construction/renovation areas;
 - v. Procedures for specific environmentally-hardy microorganisms such as VRE and *C. difficile*;
 - vi. Procedures for outbreak management; and
 - vii. Cleaning and disinfection standards and frequency;
- c) Adequate human resources to allow thorough and timely cleaning and disinfection;
- d) Priority for cleaning given to patient care areas rather than to administrative and public areas;
- e) Provision for additional environmental cleaning capacity during outbreaks that does not compromise other routine patient care cleaning.

- f) Education and continuing education of cleaning staff;
- g) Monitoring of environmental cleanliness and results reported back appropriately to become a part of the employee's performance review; result aggregates reviewed by facility management;
- h) Supervision of cleaning staff by those who are trained and knowledgeable in cleaning standards and practices; and
- i) Ongoing review of procedures.

These cleaning practices apply to all health care settings whether cleaning is conducted by in-house staff, or contracted out. They are designed for use as a standard against which in-house services can be benchmarked, as the basis for specifications if cleaning services are contracted out and as the framework for auditing of cleaning services by cleaning supervisors and managers.

B. Contracted Services

There is no evidence to suggest that the source of Housekeeping labor (whether provided in-house or contracted out) is a factor that determines the success of environmental cleaning in a health care setting. When general housekeeping services are contracted out, the contract must clearly outline the infection control-related responsibilities. These should include not only the housekeeping procedures, but also the contracting agency's responsibility for employee health and mandatory training. Contract staff must work collaboratively with Nursing, Infection Prevention and Control and Occupational Health and Safety to ensure the safety of patients, staff and visitors.

If housekeeping services are contracted out, the following should be included in the legal agreement with the service provider:¹

- a) The Occupational Health and Safety policies of the contracting services must be consistent with the facility's Occupational Health and Safety policies as they relate to infection prevention and control, including immunization (including annual influenza vaccination); transparent sharing of information related to work place exposure incidents; access to staff health policies and measures related to additional precautions; and outbreak investigation and problem-solving, as required under the Infection Prevention and Control Policy.
- b) Recognition that ever-changing activity levels and cleaning protocols will potentially impact on the cost of service; contracts should support (without penalty or financial barrier) a proactive and cooperative environment to consistently implement appropriate cleaning measures; and
- c) There should be clear expectations regarding the levels of cleaning frequency and standards

C. Staffing Levels

Adequately staffed Housekeeping Department is one of the most important factors that govern the success of environmental cleaning in a health care setting. Staffing levels must be appropriate to each department of the health care facility, with the ability to increase staffing in the event of outbreaks.

General staffing levels may be calculated by adding the average time taken for a worker to complete individual tasks.⁵ Average cleaning time is the normal time required for a qualified worker, working at a comfortable pace, to complete an operation when following a prescribed method. Education, training and experiences are important factors in determining average cleaning time: a new worker will not work at the same pace and as efficiently as an experienced worker.

Supervisory staffing levels must be appropriate to the number of staff involved in cleaning. Supervisory staffs have responsibilities to ensure staff training and compliance when using PPE. Supervisors are also responsible for training and auditing staff on cleaning procedures. Adequate supervisory staffing levels will help ensure that these requirements are being met. The following factors should be considered when determining appropriate staffing levels for cleaning and supervisory staff in a health care setting:¹

a) Building Factors

- Age of the facility – older buildings are harder to clean
- Design of the facility – e.g., amount of walking required to complete a task
- Size of the facility
- Climate
- Season
- Exposure of facility to outside dust and soil, e.g., construction site
- Type of floors and walls
- Presence of carpet and upholstered furniture

b) Occupancy Factors

- Occupancy rate and volume of cases
- Patient mix/type of care in the area (e.g., acute care, clinic) vs. no care in the area (e.g., public area)
- Frequency of cleaning required in an area (e.g., once daily vs. after each case)
- Square metres to be cleaned in patient care areas
- Square metres to be cleaned in non-patient care areas
- Admissions/discharges by unit/area – more rapid turnover requires a shorter

turnaround time for rooms and equipment

- Facility rates of VRE and *C. difficile* associated diarrhea (CDAD) – additional staff may be required due to extra cleaning and disinfection required for VRE and *C. difficile*) as well as the requirement to put on and remove PPE
- Additional precautions rooms – extra time will be required to put on and remove PPE
- Presence of outbreaks

c) Equipment Factors

- Type of cleaning tools/equipment available (e.g., automated floor cleaner vs. mop and bucket)
- Methodology required for cleaning (i.e., equipment, chemicals, materials and physical ergonomics)
- Placement of closets used to store cleaning equipment

d) Training Factors

- Amount and level of training given to new staff will influence supervisory staffing levels
- Auditing activities will influence supervisory staffing levels
- Staff experience (inexperienced staff will work slower than experienced staff)

e) Legislative Requirements

- Amount of regulatory responsibility a supervisor may have

4.2 Frequency of Routine Cleaning

The frequency of cleaning and disinfecting individual items or surfaces in a particular area or department depends on:

- a) Whether surfaces are high-touch or low-touch;

- b) The type of activity taking place in the area and the risk of infection associated with it (e.g., critical care areas vs. meeting room);
- c) The vulnerability of patients housed in the area; and
- d) The probability of contamination based on the amount of body fluid contamination surfaces in the area might have or be expected to have

Using these criteria, each area or department in a health care setting may be evaluated and assigned a risk score for cleaning purposes, as illustrated in Table 1. Each score will relate to a particular level of routine cleaning frequency. As the activity or vulnerability of patients in an area changes, the risk score will change as well, impacting on the cleaning frequency.

A. Frequency of Contact with Surfaces

All surfaces in a health care setting have the potential to harbor pathogenic microorganisms. The potential for exposure to pathogens is based on the frequency of contact with a contaminated surface and the type of activity involved.³ For example, a conference room table would have less potential for exposure to pathogens than the doorknob in a patient/room. High-touch surfaces will require more frequent cleaning regimen.

1. High-touch Surfaces

High-touch surfaces are those that have frequent contact with hands. Examples include doorknobs, elevator buttons, telephones, call bells, bedrails, light switches, computer keyboards, monitoring equipment, hemodialysis machines, wall areas around the toilet and edges of privacy curtains.

High-touch surfaces in care areas require more frequent cleaning and disinfection than minimal contact surfaces. Cleaning and disinfection is usually done at least daily

and more frequently if the risk of environmental contamination is higher (e.g., intensive care units).

2. Low-touch Surfaces

Low-touch surfaces are those that have minimal contact with hands. Examples include floors, walls, ceilings, mirrors and windowsills.

Low-touch surfaces require cleaning on a regular (but not necessarily daily) basis, when soiling or spills occur, and when a patient/resident is discharged from the health care setting. Many low-touch surfaces may be cleaned when visibly soiled and on a periodic basis rather than a daily basis.

B. Vulnerability of the Patient Population

Different populations of patients have differing vulnerabilities based on their susceptibility to infection. In some populations, such as bone marrow transplant or burn patients, susceptibility to infection is very high and may be impacted by their environment. The frequency of cleaning may be higher in areas with vulnerable patient populations.

The following designations should be used in the Risk Stratification Matrix to determine the frequency of cleaning (Table 1)

1. More Susceptible

These are patients who are more susceptible to infection due to their medical condition or lack of immunity. These include those who are immune-compromised (e.g., oncology patients); those in transplant and chemotherapy units; neonates (level 2 and 3 nurseries); those who have severe burns, (i.e., requiring care in a burn unit); and those undergoing invasive or operative procedures (e.g., hemodialysis).

2. Less Susceptible

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

C. Probability of Contamination of Items and Surfaces in the Health Care Environment

The probability that a surface, piece of equipment or care area will be contaminated is based on the activity in the area, the type of pathogens involved and the microbial load. Areas that are heavily soiled with blood or other body fluids will require more frequent cleaning and disinfection than areas that are minimally soiled or not soiled. (e.g., lounges, offices).

The following designations should be used in the Risk Stratification Matrix to determine the frequency of cleaning (Table 1)

1. Heavy Contamination

An area is considered heavily contaminated if surfaces and/or equipment are exposed to copious amounts of blood or other body fluids (e.g., birthing suite, autopsy suite, cardiac catheterization laboratory, burn unit, hemodialysis unit, Emergency Department, bathroom if the patient has diarrhea or is incontinent).

2. Moderate Contamination

An area is considered moderately contaminated if surfaces and/or equipment are contaminated with blood or other body fluids as part of routine activity (e.g., patient room, bathroom if patient is continent) and the contaminated substances are contained or removed (e.g., wet sheets). All patient rooms and bathrooms should be considered, at a minimum, moderately contaminated.

3. Light Contamination

An area is considered lightly contaminated or not 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).

4.3 Equipment

Non-critical medical equipment that is within the patient/resident's environment and used between patients/residents (e.g. imaging equipment, electronic monitoring equipment, commode chairs) requires cleaning and disinfection after each use. Selection of new equipment must include considerations related to effective cleaning and disinfection. The health care setting should have written policies and procedures for the appropriate cleaning and disinfection of equipment that clearly define the frequency and level of cleaning and which assign responsibility for cleaning.^{1,2} A system should be in place to clearly identify equipment, which has been cleaned and disinfected. Recommended Minimum Cleaning and Disinfection Level and Frequency for Non-critical Client/Patient/Resident Care Equipment and Environmental Items is shown in Table 2.

Table 1: Risk Stratification Matrix to determine the frequency of cleaning (example)

Discipline	Probability of contamination	Potential for Exposure	Population	Total score
	Light :1 Moderate: 2 Heavy: 3	High-touch : 3 Low -touch:1	Less susceptible:0 More susceptible: 1	
Renal	2	3	1	6
Burns	2	3	1	6
Respiratory Medicine	2	3	0	5
General Medicine	2	3	1	6
Colorectal Surgery	2	3	0	5
Oncology	2	3	1	6
Neurology and Neurosurgery	2	3	0	5
SICU	3	3	1	7
MICU	3	3	1	7

Interpretation of total score: **7: High risk:** clean after each case/event/procedure and at least twice per day, 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 scheduled, clean additionally as required (e.g. Gross soiling)

Table 2: Recommended Minimum Cleaning and Disinfection Level and Frequency for Non-critical Patient Care Equipment and Environmental Items

Article	Minimum cleaning and disinfection level	Minimum Frequency	Remarks
Airflow sensors (Sleep Lab)	LLD	between patients	clean with detergent and water before disinfection
Apnoea Monitor Monitor/Sensor Pad	LLD	between patients and when soiled	
Bath Seat and Raised Toilet Seat			
Single patient use	LLD	when soiled	ideally dedicated to

Article	Minimum cleaning and disinfection level	Minimum Frequency	Remarks
			each patient
Multiple patient use	LLD	between patients	
Bed			
Bedrail and extender	LLD	daily	
Mattress	LLD		clean between patients and when soiled
Halo bed	LLD		after each patient and when soiled
Visitor cot	LLD		change linen and clean between uses
Bedpan and Urinal			
Single patient	CL	clean after each use if designated to patient	remove gross soil and fluids before cleaning
between patients	LLD	between patients	remove gross soil and fluids before cleaning
Blood Pressure Cuff	LLD	between patients and when visibly soiled	ideally stays with patient until discharge
Call Bell	LLD	daily and between patients	
Cardiac Monitor	CL	daily and between patients	
Chair Includes recliners, patient chairs and shower chairs	LLD	daily and when soiled	
Chart Cover Binder and/or clipboard	CL	when soiled	charts and clipboards are not to go into rooms on Additional Precautions replace worn binders
Clippers Surgical	LLD	between patients	disposable heads are preferred
Commode Chairs			
Single patient use	LLD	• when soiled	ideally dedicated to each patient patients with VRE or <i>C.difficile</i> must have dedicated commode for <i>C.difficile</i> , consider cleaning with a sporicidal agent
Multiple patient use	LLD	when soiled between patients	remove gross soil and fluids before cleaning and disinfection
Diagnostic Imaging			
Portable - Machine	CL	when soiled and on leaving Contact Precautions room	
Portable - portable grid/	LLD	between patients if	ideally should be

Article	Minimum cleaning and disinfection level	Minimum Frequency	Remarks
film cassette		not covered	covered (e.g., pillowcase)
Mammography - paddles	LLD	between patients	
Dopplers			
Transducers	CL	after each use	wipe immediately after use to remove residual ultrasound gel before cleaning
Probes	LLD	after each use	probes that contact mucous membranes or non-intact skin require high-level disinfection
ECG			
Machine and Cables	CL	between patients	
Electric Razor Razor body and Handle	CL	as required	must be single patient use
Examination Table	LLD	between patients and when soiled	
Glucometer	LLD	after each use	
Laryngoscope Handle	CL	between patients	laryngoscope blade requires high-level disinfection after each use
Measuring Container (urine)			
Single patient use	CL	after each use	
Multiple patient use	LLD	after each use	one container per patient, labelled with name
Ophthalmoscope	CL	between patients	
Otoscope Handle	CL	between patients	use disposable ear specula or high-level disinfection
Orthopedic Equipment Crutches, traction etc	CL	between patients	
Oximeter Probes	LLD		daily and between patients · refer to manufacturer's instructions for cleaning
Pillow	LLD		· between patients and when soiled · discard if cracked
Reflex Hammer	CL	between patients	
Resuscitation Cart/Arrest Cart	CL	weekly and after use	avoid taking cart into Contact Precautions room, have a designated clean person to pass supplies as required

Article	Minimum cleaning and disinfection level	Minimum Frequency	Remarks
Defibrillator	LLD	after each use	
Supplies/Trays	CL	after each use	all items taken into Contact Precautions room must be discarded and not returned to the cart, even if unopened
Scales			
Adult	CL	daily and when soiled	
Diaper	LLD	after each use	
Infant/Neonate	LLD	after each use	do not use phenolics
Stethoscope	LLD	after each use	ideally use own stethoscope if shared, disinfect ear pieces
Suction Machines	LLD	<ul style="list-style-type: none"> ▪ when soiled ▪ between patients 	
Table			
Bedside Over bed	LLD	<ul style="list-style-type: none"> ▪ daily ▪ when soiled ▪ between patients 	
Transfer Boards	LLD	<ul style="list-style-type: none"> ▪ between patients ▪ when soiled 	
Transport Equipment Walker Wheelchair	LLD	after each use	
Tub Bath board	LLD	after each use	Iodine and chlorine products may damage tub surfaces
Ultrasound Transducers Handle and Cable External	LLD	between patients	use high-level disinfection for transducer probes
Vacutainer Holder	CL		<ul style="list-style-type: none"> ▪ ideally, single patient use ▪ when soiled, discard if visibly soiled
Water Jug	CL	<ul style="list-style-type: none"> ▪ daily 	

Key: CL = cleaning; LLD = low level disinfection

Recommendations

1. ***Housekeeping in the health care setting should be performed on a routine and consistent basis to provide for a safe and sanitary environment.***

 2. ***Adequate resources must be devoted to Housekeeping Department in all health care settings that include:***
 - a. ***Single individual with assigned responsibility for the care of the physical facility;***
 - b. ***Written procedures for cleaning and disinfection of care areas and equipment that include:***
 - i. ***Defined responsibility for specific items and areas;***
 - ii. ***Procedures for daily and terminal cleaning;***
 - iii. ***Procedures for cleaning in construction/renovation areas;***
 - iv. ***Procedures for cleaning and disinfecting areas contaminated with VRE and *C. difficile*;***
 - v. ***Procedures for outbreak management;***
 - vi. ***Cleaning standards and frequency;***
 - c. ***Adequate human resources to allow thorough and timely cleaning and disinfection;***
 - e. ***Education and continuing education of cleaning staff;***
 - f. ***Monitoring of environmental cleanliness; and***
 - g. ***Ongoing review of procedures.***
-
3. ***If housekeeping services are contracted out, the Occupational Health and Safety policies of the contracting services must be consistent with the facility's Occupational Health and Safety policies.***
-
4. ***Housekeeping Department staffing levels should reflect the physical nature and***

the acuity of the facility; levels of supervisory staff should be appropriate to the number of staff involved in cleaning.

5. *Non-critical medical equipment requires cleaning and disinfection after each use. Each health care setting should have written policies and procedures for the appropriate cleaning of non-critical medical equipment that clearly defines the frequency and level of cleaning and which assigns responsibility for the cleaning.*
6. *Cleaning schedules should be developed, with frequency of cleaning reflecting whether surfaces are high-touch or low-touch, the type of activity taking place in the area and the infection risk associated with it; the vulnerability of the patients housed in the area; and the probability of contamination.*

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Chapter 5 Routine Health Care Cleaning Practices

The goal of cleaning is to keep the environment safe for patients, staff and visitors. The objective of cleaning efforts should be to keep surfaces visibly clean, to disinfect high-touch surfaces more frequently than low-touch surfaces and to clean up spills promptly. Cleaning procedures must be effective and consistent to prevent the build up of soil, dust and debris than can harbor microorganisms and support their growth.

5.1 *General Cleaning Practices*

Health care settings are comprised of areas that require either Hotel Clean or Hospital Clean based on the risk of the patient population in the area.

5.1.1 Type of Cleaning Regimen to Apply Based on Population Served

Hotel Clean is a measure of cleanliness based on visual appearance that includes dust and dirt removal, waste disposal and cleaning of windows and surfaces. Hotel Clean is the basic cleaning that takes place in all areas of a health care setting¹.

Hospital Clean is a measure of cleanliness routinely maintained in care areas of the health care setting. Hospital Clean is '*Hotel Clean*' with the addition of disinfection, increased frequency of cleaning, auditing and other infection control measures in client/patient/resident care areas.

Components of Hotel Clean

- Floors and baseboards are free of stains, visible dust, spills and streaks
- Walls, ceilings and doors are free of visible dust, gross soil, streaks, spider webs and handprints

- All horizontal surfaces are free of visible dust or streaks (includes furniture, window ledges, overhead lights, phones, picture frames, carpets etc.)
- Bathroom fixtures including toilets, sinks, tubs and showers are free of streaks, soil, stains and soap scum
- Mirrors and windows are free of dust and streaks
- Dispensers are free of dust, soiling and residue and replaced/replenished when empty
- Appliances are free of dust, soiling and stains
- Waste is disposed of appropriately
- Items that are broken, torn, cracked or malfunctioning are replaced

The key to effective cleaning and disinfection of environmental surfaces is the use of friction to remove microorganisms and debris. Surfaces must be cleaned of visible soil before being disinfected, as organic material may inactivate a disinfectant.

5.1.2 General Cleaning Practices for All Health Care Settings

Before Cleaning:

- Check for Additional Precautions signs; follow precautions indicated
- Remove clutter before cleaning
- Follow the manufacturer's instructions for proper dilution and contact time for cleaning and disinfecting solutions
- Gather materials required for cleaning before entering the room
- Clean hands on entering the room

During Cleaning:

- Progress from the least soiled areas (low-touch) to the most soiled areas (high-touch) and from high surfaces to low surfaces

- Remove gross soil prior to cleaning and disinfection
- Dry mop prior to wet/damp mop
- Minimize turbulence to prevent the dispersion of dust that may contain microorganisms
- Never shake mops
- No '*double-dipping*' of cloths
- Change cloths/mop heads frequently
- Change cleaning solutions as per manufacturer's instructions²; more frequently in heavily contaminated areas; when visibly soiled; and immediately after cleaning blood and body fluid spills
- Containers for liquid soap, cleaners/disinfectants are disposable; the practice of '*topping up*' is not acceptable since it can result in contamination of the container and solution
- Vacuum carpets using vacuums fitted with a HEPA filter
- Be alert for needles and other sharp objects; pick up sharps using a mechanical device and place into sharps container; report incident to supervisor
- Collect waste, handling plastic bags from the top (do not compress bags with hands)
- Clean hands on leaving the room

After Cleaning:

- Do not overstock rooms
- Tools used for cleaning and disinfecting must be cleaned and dried between uses
- Launder mop heads daily; all washed mop heads must be dried thoroughly before re-use
- Clean housekeeping cart and carts used to transport waste daily

5.2 Cleaning Methods

Cleaning methods vary with the areas to be cleaned. When a patient is discharged, the room must be cleaned and disinfected thoroughly before the next patient comes in. Bathrooms should be cleaned last after completing cleaning of the room. Under normal conditions, the use of a disinfectant is not required for cleaning floors in the ward. Non-critical equipment in health care settings should only be cleaned with water and detergent or a low level disinfectant. For electronic equipment, manufacturers cleaning and maintenance instructions must be followed and ensure staff who will be cleaning the item are trained to do so. If toys cannot be cleaned, they should be discarded. In operating rooms, environmental cleaning must be performed with a regular documented cleaning schedule. Each hemodialysis station should be treated, as an individual entity and hand hygiene must be performed on entry to the station and at exit from the station before doing other tasks in the unit. After each hemodialysis treatment, sufficient time between patients must be allotted for adequate cleaning. Products used for cleaning and disinfecting in NICUs must not be toxic to infants (e.g. phenolics must not be used). Details can be found in Appendix A.

Recommendations

- 1. Hotel clean should be applied to all areas of a health care setting***
- 2. Hospital clean should be applied to care areas of the health care setting***

References

- PIDAC Best Practices for Environmental Cleaning for Prevention and Control of Infections (December 2009). Available from:

<http://www.oahpp.ca/resources/documents/pidac/Best%20Practices%20for%20Environmental%20Cleaning.pdf>

2. Schulster L, Chinn RY. Guidelines for environmental infection control in health-care facilities. Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). MMWR Recomm Rep 2003;52(RR-10):1-42. Available from: http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Enviro_guide_03.pdf.

Chapter 6 Cleaning and Disinfection Practices for Patients on Additional

Precautions

In addition to routine cleaning, additional cleaning practices and/or the use of personal protective equipment for cleaning may be required in health care settings under special circumstances.

Rooms on Additional Precautions should be minimally stocked with supplies. There should not be more than one day's supplies available inside the room. Before entering the room, cleaning equipment should be assembled before applying PPE. PPE must be removed, placed in an appropriate receptacle and hands cleaned before moving to another room or task. PPE must not be worn outside the patient room or bed space¹.

Protocols for cleaning must include cleaning of portable isolation carts or built-in holders for isolation equipment.

6.1 *Cleaning Rooms on Contact Precautions*

Cleaning patient rooms when an individual is on Contact Precautions requires the addition of PPE, as noted on the sign outside the room, as well as some extra procedures for patients/residents with VRE or *C. difficile*. All environmental service staff entering a room on Contact Precautions must put on a gown and gloves on entering the room, and must remove them and perform hand hygiene on leaving the room.

Sufficient time must be allowed for cleaning and disinfection of rooms of patients/residents on Contact Precautions, particularly for *C. difficile* or norovirus.

6.1.1. Contact Precautions - MRSA

A. Routine Cleaning

1. Assessment

- Check for Additional Precautions signs and follow the precautions indicated
- Walk through room to determine what needs to be replaced (e.g., toilet paper, paper towels, soap, alcohol-based hand rub (ABHR), gloves, sharps container) and whether any special materials are required; this may be done before or during the cleaning process

2. Assemble supplies

- Ensure an adequate supply of clean cloths is available
- Prepare fresh disinfectant solution according to manufacturer's instructions

3. Clean hands using ABHR and put on gloves²

4. Clean room, working from clean to dirty and high to low areas of the room:

- Use fresh cloth(s) for cleaning each patient/resident bed space:
 - If a bucket is used, do not 'double-dip' cloth(s)
 - Do not shake out cloth(s)
 - Change the cleaning cloth when it is no longer saturated with disinfectant and after
 - Cleaning heavily soiled areas such as toilet and bedpan cleaner
 - If there is more than one patient/resident bed space in the room, use fresh cloth(s)

- For each and complete the cleaning in each bed space before moving to the next
- Start by cleaning doors, door handles, push plate and touched areas of frame
- Check walls for visible soiling and clean if required
- Clean light switches and thermostats
- Clean wall mounted items such as alcohol-based hand rub dispenser and glove box holder
- Check and remove fingerprints and soil from low level interior glass partitions, glass door panels, mirrors and windows with glass cleaner
- Check privacy curtains for visible soiling and replace if required
- Clean all furnishings and horizontal surfaces in the room including chairs, window sill, television, telephone, computer keypads, night table and other tables or desks. Lift items to clean the tables. Pay particular attention to high-touch surfaces
- Wipe equipment on walls such as top of suction bottle, intercom and blood pressure manometer as well as IV pole
- Clean bedrails, bed controls and call bell
- Clean bathroom/shower (see bathroom cleaning procedure)
- Clean floors (see floor cleaning procedure)

5. Disposal

- Place soiled cloths in designated container for laundering
- Check sharps container and change when $\frac{3}{4}$ full (do not dust the top of a sharps container)
- Remove soiled linen if bag is full
- Place obvious waste in receptacles
- Remove waste

6. Remove gloves and clean hands with ABHR; if hands are visibly soiled, wash with soap and water; **DO NOT LEAVE ROOM WEARING SOILED GLOVES**

7. **Replenish** supplies as required (e.g., gloves, ABHR, soap, paper towel)

8. **Clean hands** with ABHR

B. Discharge/Terminal Cleaning

The terminal cleaning practices specified in **Procedure for Routine Terminal/Discharge Cleaning of a Patient Room** may be used for rooms contaminated with MRSA with the addition of:

- a. Extra supplies left in the room must be disinfected, sent for reprocessing or discarded;
- b. Floors should be cleaned;
- c. All horizontal surfaces and high-touch surfaces in the room and bathroom must be disinfected after cleaning;
- d. All curtains (privacy, window and shower) should be removed and laundered after discharge/transfer of a patient with MRSA⁴;
- e. All equipment in the room must be disinfected before it is removed from the room; and all items (e.g., cloths, mop heads) used to clean an MRSA room must be laundered or discarded; they must not be used to clean any other room or bed space.

6.1.2. Contact Precautions - *Clostridium difficile*

Specialized cleaning and disinfection practices are required for *C. difficile*, a spore-forming bacterium which can persist in the environment for months. Control is facilitated through thorough cleaning and disinfection of the patient environment.

C.difficile spores are only killed by sporicidal agents. The following sporicides have shown activity against *C. difficile* spores:

- Sodium hypochlorite (1000 parts per million - ppm)
- Accelerated hydrogen peroxide (4.5%)
- Peracetic acid (1.6%)²⁰⁸

Other sporicidal agents are under development. For adequate removal of *C. difficile*, the use of a sporicidal agent for disinfection after the room has been cleaned should be considered, in consultation with Infection Prevention and Control and Occupational Health and Safety. Environmental contamination with *C. difficile* is most concentrated in patients' rooms³, making these areas the focus of stringent cleaning methods. Specific recommendations include⁵:

- a. Twice daily cleaning of patient/resident room with a hospital-grade disinfectant;
- b. Twice daily disinfection of patient/resident bathroom with a sporicidal agent; and
- c. If using a QUAT for cleaning, thorough rinsing before applying an accelerated hydrogen peroxide agent is required.

Procedure for Cleaning Rooms of Patients on Contact Precautions for *C. difficile*

A. Daily Cleaning – clean twice per day

In addition to hospital clean:

- Use a fresh bucket and mop head (dust mop and wet mop) for each room
- After cleaning, apply a sporicidal disinfectant to all surfaces in the room and ensure sufficient contact time with the disinfectant (omit this step if the cleaning product is also a sporicidal disinfectant)

B. Terminal Cleaning ('Discharge Cleaning') – double cleaning

In addition to the procedure listed in **Procedure for Routine Terminal/Discharge Cleaning of a Patient Room**:

- Remove all dirty/used items (e.g. suction container, disposable items)
- Remove curtains (privacy, window, shower) before starting to clean the room
- Discard and replace the following:
 - Soap
 - Toilet paper
 - Paper towels
 - Glove box
 - Toilet brush
- Use fresh cloths, mop, supplies and solutions to clean the room
- Use several cloths to clean a room. Use each cloth one time only, do not dip a cloth back into disinfectant solution after use to re-use on another surface. **THERE IS TO BE NO RE-USE OF USED CLOTHS**
- Clean and disinfect all surfaces and allow for the appropriate contact time with the disinfectant
- Using fresh cloths, mop, supplies and solutions, re-clean and disinfect the room, using the above procedure
- Replace curtains with clean curtains following second cleaning

6.1.3. Contact Precautions – Norovirus

Noroviruses are a group of non-enveloped viruses that cause acute gastroenteritis in humans. Noroviruses are highly contagious and are transmitted in health care settings by direct person-to-person contact; by hand transfer of the virus after touching contaminated materials and environmental surfaces; or via droplets from vomitus⁶. Outbreaks of norovirus in hospitals and long-term care homes may be

prolonged due to the potentially high level of environmental contamination and regular introduction of susceptible individuals. Noroviruses can survive well in the environment for at least 12 days.

Products used for disinfection of norovirus must have an appropriate virucidal claim. Most QUATs do not have significant activity against noroviruses. In some jurisdictions, hypochlorite at 1000 ppm is recommended. Norovirus is inactivated by heat at 60°C. Vacuum cleaning carpets and buffing floors during an outbreak have the potential to re-circulate norovirus and are not recommended.

Cleaning regimens for norovirus should include:

- a. Prompt cleaning of emesis and faeces, including items in the immediate vicinity, followed by disinfection with an appropriate virucidal disinfectant;
- b. Increased frequency of bathroom and toilet cleaning and disinfection on affected units;
- c. Replacement of privacy curtains on terminal cleaning;
- d. Steam cleaning carpet and soft furnishings following regular cleaning, provided they are heat tolerant and at least 60°C is achieved by the unit; and
 - a. Strict adherence to hand hygiene.

6.2 *Cleaning Rooms on Droplet Precautions*

Environmental service staff entering a room on Droplet Precautions must wear facial protection (i.e., mask and eye protection) when working within two metres of a client/patient/resident on Droplet Precautions.

A. Routine Cleaning

The routine daily cleaning practices specified in **Procedure for Routine Daily Cleaning of Patient Room** may be used for rooms on Droplet Precautions. Because some microorganisms transmitted by the droplet route survive in the environment, attention should be paid to high-touch items in the room as well as all items within the immediate vicinity of the client/patient/resident.

B. Terminal Cleaning

The terminal cleaning practices specified in **Procedure for Routine Terminal/Discharge Cleaning of a Patient Room** may be used for rooms on Droplet Precautions.

6.3 Cleaning Rooms on Airborne Precautions

Housekeeping staff entering a room on Airborne Precautions for tuberculosis must wear a fit-tested and seal checked N95 respirator. Only immune staff may enter a room where airborne precautions are in place for measles or varicella; an N95 respirator is not required. The door must be kept closed to maintain negative pressure, even if the client/patient/resident is not in the room.

A. Routine Cleaning

The routine daily cleaning practices specified in **Procedure for Routine Daily Cleaning of Patient Room** may be used for rooms on Airborne Precautions.

B. Terminal Cleaning

The terminal cleaning practices specified in **Procedure for Routine Terminal/Discharge Cleaning of a Patient Room** may be used for rooms on Airborne Precautions. The following additional measures must be taken:

- a. After patient/resident transfer or discharge, the door must be kept closed and the
- b. Airborne Precautions sign must remain on the door until sufficient time has elapsed to allow removal of airborne microorganisms (dependent on air changes per hour)
- c. It is preferable to wait for sufficient air changes to clear the air before cleaning the room;
- d. If the room is urgently needed before the air has been sufficiently cleared of tubercle bacilli, an N95 respirator must be worn during cleaning; and
- e. Remove N95 respirator only after leaving room and door has been closed.

Recommendations

- 1. All environmental service staff entering a room, which is on Contact Precautions, must put on a gown and gloves on entering the room and must remove them and perform hand hygiene on leaving the room.***
- 2. For adequate removal of C. difficile, the use of a sporicidal agent for disinfection after the room has been cleaned is needed.***
- 3. Housekeeping staff entering a room with Airborne Precautions must wear a fit tested N95 respirator .***
- 4. Housekeeping and clinical staff entering a room with Droplet Precautions must wear a surgical mask.***

References

1. PIDAC Best Practices for Environmental Cleaning for Prevention and Control of Infections (December 2009). Available from: <http://www.oahpp.ca/resources/documents/pidac/Best%20Practices%20for%20Environmental%20Cleaning.pdf>
2. Sehulster L, Chinn RY. Guidelines for environmental infection control in health-care facilities. Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). *MMWR Recomm Rep* 2003;52(RR-10):1-42. Available from: http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Enviro_guide_03.pdf
3. Dubberke ER, Reske KA, Noble-Wang J, Thompson A, Killgore G, Mayfield J, et al. Prevalence of *Clostridium difficile* environmental contamination and strain variability in multiple health care facilities. *Am J Infect Control* 2007;35(5):315-8.
4. Trillis F, 3rd, Eckstein EC, Budavich R, Pultz MJ, Donskey CJ. Contamination of hospital curtains with healthcare-associated pathogens. *Infect Control Hosp Epidemiol* 2008;29(11):1074-6.
5. Infection Prevention and Control Practice. *Clostridium difficile* Associated Diarrhea (CDAD). Proceedings and Recommendations from the International Infection Control Council Global Consensus Conference; Toronto, Ontario, Canada; 2007. Available from: http://www.chica.org/pdf/2008_C_DIFF_RECOMM.pdf
6. Centers for Disease Control and Prevention. Norovirus in Healthcare Facilities Fact Sheet. December 21, 2006

Chapter 7 Cleaning Spills of Blood and Body Substances

7.1 *Small spots of blood or small spills*

Gloves and surgical masks should be worn. Contamination should be wiped up with paper towels soaked in freshly prepared chlorine-based compound containing 10,000 ppm (1% available chlorine). If broken glass is present, first treat the spillage with chlorine-based compound, then carefully remove the pieces of glass with a pair of forceps or scoop to a sharps bin, before wiping up as above. Towels and gloves used should be disposed of in biohazard waste bag for appropriate disposal. Hands must be washed following clearing up.

7.2. *Larger spills other than urine (unless bloodstained)*

Staff, patients and visitors must be kept away¹ from the spillage and if possible a warning sign shown, while preparation is made to handle the spill as outlined below. Gloves, eye protection and a disposable apron² should be worn. If the spillage is extensive, plastic rubber boots may be necessary. Liquid spills should be covered with chlorine releasing granules and left for appropriate contact time according to manufacturer's written instruction, before clearing up with paper towels. Alternatively, the spill may be covered with paper towels and gently flooded with chlorine-based solution containing 10,000 ppm (1% available chlorine). If broken glass is present, first decontaminate the spillage as above, then carefully remove the pieces of glass with disposable forceps or scoop to a sharps bin, before wiping up. Paper towels, gloves and any contaminated clothing should be placed in the biohazard waste bag for appropriate disposal. Finally, the area should be washed with water and detergent and allowed to dry³. A normal mop and bucket should not be used for cleaning blood spillages.

Recommendations

1. Spills of blood and other bodily substances must be contained, cleaned and the area disinfected immediately.

2. Absorbent disinfectant spillage granules may be more convenient to use instead of liquid disinfectant.

References

1. PIDAC Best Practices for Environmental Cleaning for Prevention and Control of Infections (December 2009). Available from: <http://www.oahpp.ca/resources/documents/pidac/Best%20Practices%20for%20Environmental%20Cleaning.pdf>
2. Sehulster L, Chinn RY. Guidelines for environmental infection control in health-care facilities. Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). MMWR Recomm Rep 2003;52(RR-10):1-42. Available from: http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Enviro_guide_03.pdf
3. Spillage management arrangements and guidance. Royal Free and University College Medical School of University College London (Royal Free campus) 1 November 2003

Chapter 8 Infection Control During Construction and Renovation

Cleaning is of particular importance both during construction and after completion of the construction project. Contractors and hospital/healthcare staff may interpret what is considered to be 'clean' differently.

'Construction Clean' is the level of cleaning performed by construction workers to remove gross soil, dust and dirt, construction materials and workplace hazards within the construction zone. This is done at the end of the day, or more frequently if needed, to avoid accumulation of dust. Hotel Clean and Hospital Clean begin where the construction site ends, i.e., outside the hoarding and are generally done by the staff of the health care setting. Construction and renovation activities in the hospital may be associated with transmission of pathogens such as filamentous fungi, including *Aspergillus spp*, *Candida spp*, *Fusarium* and also bacteria such as *Legionella* and *Nocardia*. The most commonly reported hospital construction-related infection is *Aspergillus*, which represent the greatest threat to neutropenic patients.

Construction and renovation activities in the hospital facility are associated with variable levels of risks to the patients. Activities that are associated with significant generation of dusts create risks to immune compromised patients. New construction projects and major demolition of buildings create a lot of dust, which may carry *Aspergillus* spores. Moderate levels of dust may be associated with activities such as sanding of walls prior to painting, construction of new walls and major cabling activities. Inspection and noninvasive activities such as removal of ceiling board for visual inspection, painting and minor plumbing works are low risk activities that generally cause minor generation of dusts.

Patients who are at risk should be identified prior to the construction and renovation activities. Immunocompromised and ventilated patients are at high risks of construction-

associated Aspergillosis. Medium risk patients include endoscopy, cardiology, radiology and physiotherapy units. Office areas pose low risks to patients.

Pre-construction and renovation consultation should be carried out in advance between all the stakeholders. This will help to identify the scope and nature of work and also to assess the degree of risks and potential patient groups that may be affected. Close monitoring of filamentous fungi isolation rates, especially *Aspergillus* by the microbiology laboratory and prompt feedback to infection control units may be helpful to implement control measures.

Procedures to contain or minimize dispersal of dust are necessary during construction activities. Examples include physical partitioning, rerouting of human traffic away from work areas, wet mopping and door mat placement at entrance, prompt debris removal, blocking and sealing of air vents where appropriate, and use of negative pressure at the construction sites.

Prior to the construction and renovation activities, an 'Infection Control (IC) Risk Assessment' (Appendix A 1,2, 3) must be completed. The risk assessment consists of the following 3 steps:-

- I. Identify the type of construction project (Appendix A1)
- II. Identify those patient areas at risk (Appendix A2)
- III. Match the type of construction activity with the patient risk group.
(Appendix A3)

A walk-through of the construction project will be conducted if needed by the Project Manager and Department of Infection Control. Once a determination has been made regarding the 'risk class' (Appendix A3.1) an 'Infection Control Permit' (Appendix B) shall be completed by the Infection Control Team. The 'Infection Control Permit', along with the risk

assessment, must be signed by the Head of Department of Infection control before the project is initiated.

Once the project is started, the ICT (Infection Control Team) shall conduct rounds (Appendix C) in order to verify infection control compliance. If issues are identified, the Project Manager shall be notified at once for corrective measures. Upon completion of the project, a final walk-through can be completed as in Appendix C. -If corrective measures are not adequate; the head of Department of Infection Control has the authority to stop further work on the renovation/construction project until corrective measures are adequately addressed.

Recommendations:

- 1. Prior to any construction or renovation activity, patients who are at risk should be identified as high risk, medium risk and low risk patients.***

- 2. Pre-construction and renovation consultation should be carried out in advance between all the stakeholders.***

- 3. During construction activities, it is necessary to contain or minimize dispersal of dust.***

- 4. Once the project is started, the Infection Control Team shall conduct rounds in order to verify infection control compliance.***

- 5. If corrective measures are not adequate; the head of Department of Infection Control has the authority to stop further work on the renovation/construction project until corrective measures are adequately addressed.***

References

1. Canada Communicable Disease Report Construction-related Nosocomial Infections in Patients in Health Care Facilities. Decreasing the Risk of *Aspergillus*, *Legionella* and other Infections. 2001. Volume 2752; 17-23
2. The University of Toledo Health Science Campus Capital Improvement. Hospital Environment Clean Construction (H.E.C.C.) Protocol. 2004; 10-11

Chapter 9 Cleaning and Sanitation Practices in Food Preparation Areas

A Personal Hygiene of Employees

All Staff working in the food preparation areas should report to work in good health and should practice good personal hygiene. They should wash hands properly and at appropriate times. They should wear suitable hair restraints while in the kitchen.

B Cleaning and Sanitizing Food Contact Surfaces

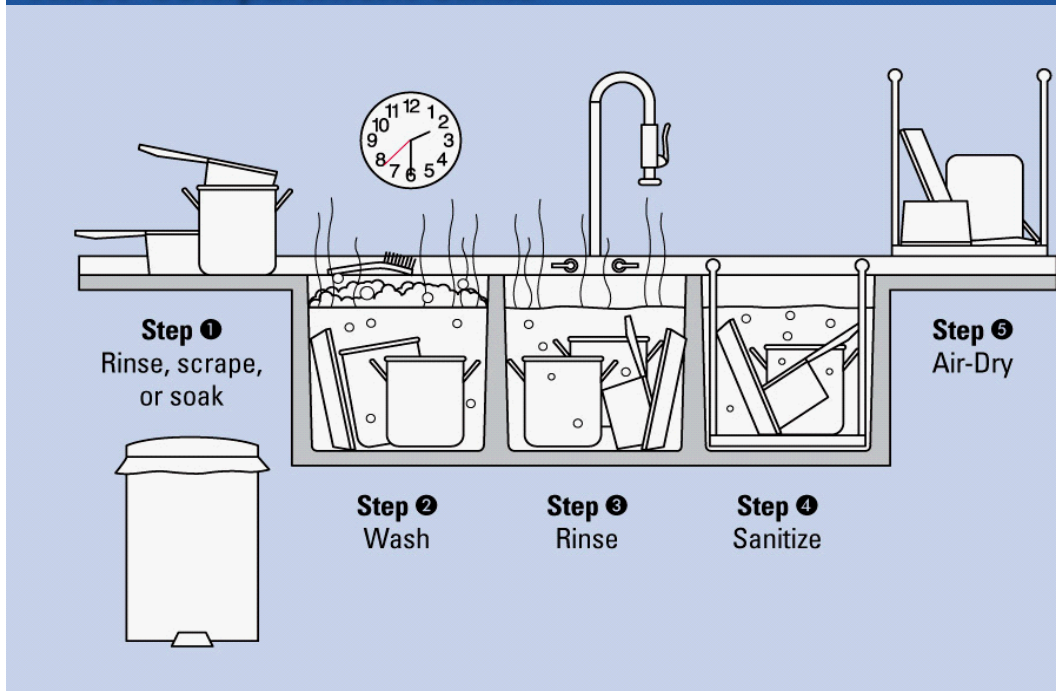
The manufacturer's instructions regarding the use and maintenance of equipment as well as the use of chemicals for cleaning and sanitizing food contact surfaces should be followed. Food contact surfaces such as those of sinks, tables, equipment, utensils, thermometers, carts should be washed, rinsed and sanitized before each use, between uses and anytime contamination occurs.

If a 3-compartment sink is used when cleaning eating utensils, setup and use the sink in the following manner:

- In the first compartment, wash with a clean detergent solution at or above the temperature specified by the manufacturer.
- In the second compartment, rinse with clean water.
- In the third compartment, sanitize with a sanitizing solution mixed at a concentration specified on the manufacturer's label.

If a dishwashing machine is used when cleaning eating utensils, check with the manufacturer to verify that the information on the control panel is correct. Refer to the information on the control panel for determining wash, rinse, and sanitization (final) rinse temperatures; sanitizing solution concentrations; and water pressures, if applicable. Follow manufacturer's instructions for use.

Three-Compartment Sinks



C Sanitary Facilities and Controls

I. Water supply

The water supply shall be sufficient for the operations intended and shall be derived from an adequate source in compliance with applicable water supply regulations. Any water that contacts food or food-contact surfaces shall be safe and of adequate sanitary quality.

II. Plumbing

Plumbing shall be installed, adequately designed, and maintained to carry sufficient quantities of water to required locations; to properly convey sewage and liquid disposable waste; to avoid constituting a source of contamination to food, water supplies, equipment or utensils.

III. Sewage disposal

Sewage disposal shall be made into an adequate and approved sewerage system, which is in compliance with applicable wastewater disposal regulations

IV. Toilet facilities

The area shall be provided with adequate and conveniently located toilets. The toilet facilities shall be kept clean and in good condition.

V. Hand-washing facilities

Hand-washing facilities shall be provided in each separate food preparation or food processing area.

VI. Rubbish and offal disposal

Rubbish and any offal shall be so conveyed, stored and disposed of as to minimize the development of odor, minimize the potential for the waste becoming an attractant and harborage or breeding place for pests, and protect against contamination of food, food-contact surfaces, water supplies and ground surfaces

VII. Chemicals

All chemicals shall be used according to manufacturer's instructions and recommendations and stored in an area with limited access and away from product processing.

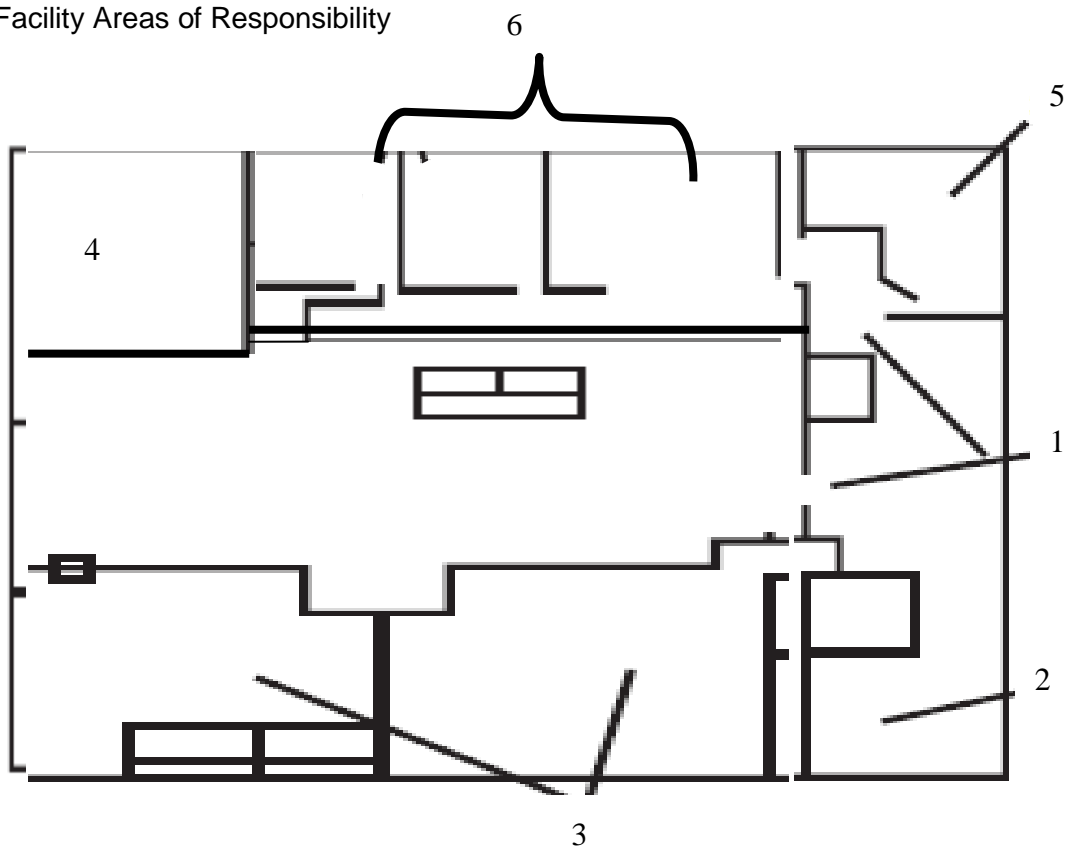
VIII. Ventilation

Adequate ventilation and air exchange shall be provided throughout the facility.

IX. Pest control

No pests or animals shall be allowed in any food preparation area. Effective measures shall be taken to exclude pests from the processing areas and to protect against the contamination of food on the premises by pests. The use of insecticides or rodenticides is permitted only under precautions and restrictions that will protect against the contamination of food, food-contact surfaces and food packaging materials.

Map, Facility Areas of Responsibility



1. Main Entrance, Receiving Entrance and Personnel Entrance to Processing Room
2. Break Area
3. Processing Rooms and Receiving Cold Storage
4. Storage Freezer
5. Personnel Changing Room and Toilets
6. Offices

CLEANING INSTRUCTIONS

Facility Area of Responsibility		Equipment Required	Chemicals Required	Cleaning Method	Frequency	Health and Safety	Special Requirements
I. Main Entrance, Receiving Entrance and Personnel Entrance to Processing Room	A. Exterior Grounds, Driveway and Paved Surfaces	Water hose, weed trimmers, plastic waste bin with felled cover, push-broom or brush, plastic bucket	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Remove weeds, trash and unused equipment; 2. Sweep up loose debris and dispose in waste bin; 3. Spray-down entire surface with water chlorinated to 50 ppm; 4. Scrub entire surface with foaming detergent 5. Rinse with water chlorinated to 50 ppm 	<p><i>Daily:</i> to remove solid waste bins contents;</p> <p><i>Twice Daily:</i> for cleaning, at end of AM and PM work shift</p>	<ol style="list-style-type: none"> 1. Avoid direct skin contact with chlorinated water; 2. Follow direction on container for use of foaming detergent 	Twice daily cleaning required to help control insect pests, especially flies
	B. Exterior walls, Receiving entrance and Main entrance	Water hose, scrub brush, plastic bucket	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Rinse down with water chlorinated to 50ppm; 2. Scrub with brush and foaming detergent 3. Rinse with water chlorinated to 50 ppm 	At end of AM and PM work shifts	Avoid direct skin contact with chlorinated water	Nil

Facility Area of Responsibility		Equipment Required	Chemicals Required	Cleaning Method	Frequency	Health and Safety	Special Requirements
	C. Outdoor waste containers	Water hose, scrub brush and plastic bucket	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Rinse down all surfaces with water chlorinated to 50 ppm; 2. Scrub with brush and foaming detergent; 3. Rinse with chlorinated water to 50 ppm 	Each time waste is picked up	Avoid direct skin contact with chlorinated water	Nil
	D. Personnel Entrance, Door	Water hose, scrub brush, wicker broom, plastic bucket	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Remove all solid debris with water and broom 2. Rinse down all surfaces with water chlorinated to 50 ppm 3. Scrub with brush and foaming detergent 4. Rinse with water chlorinated to 50 ppm 5. Store brooms/brushes with bristles in water chlorinated to 50ppm 	At the end of each AM and PM shifts	Avoid direct skin contact with chlorinated water	Nil

Facility Area of Responsibility		Equipment Required	Chemicals Required	Cleaning Method	Frequency	Health and Safety	Special Requirements
II. Break Area	A. Floors and Walls	Water hose, scrub brush, wicker broom, plastic bucket	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Remove all solid waste and litter; 2. Remove all solid debris with water and wicker broom; 3. Rinse down all surfaces with water chlorinated to 50 ppm; 4. Scrub with brush and foaming detergent; 5. Rinse with water chlorinated to 50ppm; 6. Empty cigarette butt cans; 7. Store brooms/brushes with bristles in water chlorinated to 50 ppm 	At the end of each AM and PM shifts	Avoid direct skin contact with chlorinated water	Nil
	B. Ceilings and light fixtures	Plastic bucket and squeegee	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Use squeegee mop to wipe down with soapy water chlorinated to 50 ppm; 2. Wipe down again with plain chlorinated water on squeegee 	At least twice weekly	Avoid direct skin contact with chlorinated water	<ol style="list-style-type: none"> 1. Report and repair any damage to light fixtures or burned-out fixtures; 2. Report any areas on condensation on ceilings

Facility Area of Responsibility		Equipment Required	Chemicals Required	Cleaning Method	Frequency	Health and Safety	Special Requirements
III. Processing Rooms and Receiving Cold Storage	A. Floors and Walls	Water hose, scrub brush/ brush mop, squeegee, plastic buckets	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Remove all food products from area; 2. Remove all solid waste and litter; 3. Remove all solid debris with water chlorinated to 10 ppm; 4. Rinse down all surfaces with water chlorinated to 10 ppm; 5. Scrub with brush and foaming detergent; 6. Rinse with water chlorinated to 10 ppm and squeegee towards drains; 7. Store brooms/ brushes and squeegees in water chlorinated to 50 ppm 	At the end of each AM and PM shifts	<ol style="list-style-type: none"> 1. Avoid direct skin contact with chlorinated water; 2. Follow directions on container of foaming detergent 	Clean cold storage each time it is empty

Facility Area of Responsibility		Equipment Required	Chemicals Required	Cleaning Method	Frequency	Health and Safety	Special Requirements
	B. Ceilings and light fixtures	Plastic bucket and squeegee	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Use squeegee mop to wipe down with soapy water chlorinated to 50 ppm; 2. Wipe down again with plain chlorinated water on squeegee; 3. Wipe areas of condensation frequently during processing 	At least twice weekly	Avoid direct skin contact with chlorinated water	<ol style="list-style-type: none"> 1. Report and repair any damage to light fixtures or burned-out fixtures; 2. Report any areas on condensation on ceilings
	C. Tables	Water hose, scrub brush, disposable cloth, squeegees	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Remove all solid debris while rinsing all surfaces with water chlorinated to 10 ppm 2. Scrub with brush and foaming detergent, including under the tables; 3. Rinse with water chlorinated to 10 ppm and squeegee towards drains; 4. Wipe down with disposable cloth 5. Store scrub brushes and squeegees in water chlorinated to 50ppm 	Frequently in-process, At least at the end of each AM and PM work shifts	<ol style="list-style-type: none"> 1. Avoid direct skin contact with chlorinated water; 2. Follow directions on container of foaming detergent 	Nil

Facility Area of Responsibility		Equipment Required	Chemicals Required	Cleaning Method	Frequency	Health and Safety	Special Requirements
	D. Hand Washing Stations	Water hose, scrub brush, disposable cloth	Foaming detergent, chlorine powder, and liquid hand soap	<ol style="list-style-type: none"> 1. Remove all solid debris while rinsing all surfaces with water chlorinated to 10 ppm; 2. Scrub with brush and foaming detergent, including faucet fixtures and under the sinks; 3. Rinse with water chlorinated to 10 ppm; wipe down with disposable cloth; 4. Wipe down with disposable cloth; 5. Store scrub brushes 	Frequently in-process. At least at the end of each AM and PM shifts	Avoid direct skin contact with chlorinated water	Adequate liquid hand soap and paper towels shall be present at all times

Facility Area of Responsibility		Equipment Required	Chemicals Required	Cleaning Method	Frequency	Health and Safety	Special Requirements
	E. Plastic Storage Totes and Cutting Boards	Water hose, scrub brush, disposable cloth	Foaming detergent, chlorine powder, and liquid hand soap	<ol style="list-style-type: none"> 1. Remove all solid debris while rinsing all surfaces with water chlorinated to 10 ppm; 2. Scrub with brush and foaming detergent, especially handles and grooves; 3. Rinse with water chlorinated to 10 ppm; 4. Wipe down with disposable cloth; 5. Stack on clean surface; 6. Store scrub brushes 	Frequently in-process. At least at the end of each AM and PM work shifts	<ol style="list-style-type: none"> 1. Avoid direct skin contact with chlorinated water; 2. Follow direction on container of foaming detergent; 3. Report and repair any grooving in cutting boards 	Food contact equipment shall not touch floor

Facility Area of Responsibility	Equipment Required	Chemicals Required	Cleaning Method	Frequency	Health and Safety	Special Requirements	
	F. Knives, Sharpening Stones	Water hose; scrub brush; plastic totes, disposable cloth	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Remove all solid debris while rinsing all surfaces with water chlorinated to 10 ppm; 2. Scrub with brush and foaming detergent, especially handles and grooves; 3. Rinse with water chlorinated to 10 ppm; 4. Wipe down with disposable cloth 5. Store all equipment immersed in water chlorinated to 50 ppm; 6. Store scrub brushes in water chlorinated to 50 ppm 	Frequently in-process. At least at the end of each AM and PM work shifts	<ol style="list-style-type: none"> 1. Avoid direct skin contact with chlorinated water; 2. Follow directions on container of foaming detergent; 3. Report and repair any grooving in cutting boards 	Nil

Facility Area of Responsibility		Equipment Required	Chemicals Required	Cleaning Method	Frequency	Health and Safety	Special Requirements
	G. Receiving Cold Storage	Water hose, scrub brush, squeegees, disposable cloth	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Remove all food product from chiller; 2. Remove all solid debris while rinsing all surfaces with water chlorinated to 10ppm; 3. Scrub with brush and foaming detergent, including rack bottoms and chiller door handles; 4. Rinse with water chlorinated to 10ppm; 5. Wipe down with disposable cloth 6. Store scrub brushes 	At least twice weekly	<ol style="list-style-type: none"> 1. Avoid direct skin contact with chlorinated water; 2. Follow direction on container of foaming detergent 	Time cleaning for periods when food products are not present in chiller

Facility Area of Responsibility		Equipment Required	Chemicals Required	Cleaning Method	Frequency	Health and Safety	Special Requirements
IV. Storage Freezer	A. Floors and Walls	Water hose, scrub brush/brush mop, squeegees, plastic buckets	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Remove all food product from area; 2. Defrost freezer completely; 3. Remove all solid waste and litter; 4. Remove all solid debris with water chlorinated to 50ppm; 5. Rinse down all surfaces, including doors and handles, with water chlorinated to 10 ppm; 6. Scrub with brush and foaming detergent; 7. Rinse with water chlorinated to 50 ppm and squeegee towards doors/drains; 8. Store brooms/brushes and squeegees in water chlorinated to 50 ppm 	At least monthly and whenever freezer unit contains no food product	<ol style="list-style-type: none"> 1. Avoid direct skin contact with chlorinated water; 2. Follow direction on container of foaming detergent 	Nil

Facility Area of Responsibility		Equipment Required	Chemicals Required	Cleaning Method	Frequency	Health and Safety	Special Requirements
	B. Ceilings	Plastic bucket, squeegee mop	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Use squeegee mop to wipe down with soapy water chlorinated to 50 ppm; 2. Wipe down again with plain chlorinated water on squeegee 	At least monthly and whenever freezer unit contains no food product	Avoid direct skin contact with chlorinated water;	Report and repair any damage to light fixtures, refrigeration piping or burned-out light fixtures
V. Personnel Changing Room and Toilets	A. Floors and Walls	Water hose, scrub brush/ brush mop, squeegees, wicker broom, plastic buckets	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Remove all solid waste and litter; 2. Remove all solid debris with water and wicker broom; 3. Rinse down all surfaces with water chlorinated to 50 ppm; 4. Scrub with brush and foaming detergent; 5. Rinse with water chlorinated to 50 ppm; 6. Store brooms/ brushes with bristles in water chlorinated to 50 ppm 	At the end of each AM and PM work shift	Avoid direct skin contact with chlorinated water;	Bathroom shall always be equipped with adequate tissue papers

Facility Area of Responsibility		Equipment Required	Chemicals Required	Cleaning Method	Frequency	Health and Safety	Special Requirements
	B. Ceilings and Light Fixtures	Plastic bucket, squeegee mop	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Use squeegee mop to wipe down with soapy water chlorinated to 50 ppm; 2. Wipe down again with plain chlorinated water on squeegee 	At least twice weekly	Avoid direct skin contact with chlorinated water;	<ol style="list-style-type: none"> 1. Report and repair any damage to light fixtures or burned-out light fixtures 2. Report any areas of condensation on ceilings.
	C. Hand Wash Sinks	Water hose, scrub brush, disposable cloth	Foaming detergent, chlorine powder and liquid hand soap	<ol style="list-style-type: none"> 1. Remove all solid debris while rinsing all surfaces with water chlorinated to 50 ppm; 2. Scrub with brush and foaming detergent, including faucet fixtures and under the sinks; 3. Rinse with water chlorinated to 50 ppm; 4. Wipe down with disposable cloth 5. Store scrub brushes 	Frequently in use. At least at the end of each AM and PM work shifts	<ol style="list-style-type: none"> 1. Avoid direct skin contact with chlorinated water; 2. Follow direction on container of foaming detergent 	Adequate liquid hand soap and paper towels shall be present at all times

Facility Area of Responsibility		Equipment Required	Chemicals Required	Cleaning Method	Frequency	Health and Safety	Special Requirements
VI. Offices	A. General Area	Plastic Bucket and squeegee mop	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Use squeegee mop to wipe down with soapy water chlorinated to 50 ppm; 2. Wipe down again with plain chlorinated water on squeegee 	At least twice weekly	Avoid direct skin contact with chlorinated water	<ol style="list-style-type: none"> 1. Report and repair any damage to light fixtures or burned-out fixtures; 2. Report any areas of condensation on ceilings.
	B.General Area	Brush brooms and dust bins, scrub brush, waste bins with covers and plastic buckets	Foaming detergent and chlorine powder	<ol style="list-style-type: none"> 1. Use brooms and dust bins to sweep floors; 2. Remove all unused equipment, trash and litter; 3. Stack any dry goods stored in area as recommended by the pest control contractor; 4. Scrub down and wash floors and walls; 5. Store scrub brushes in water chlorinated to 50 ppm 	General cleaning weekly. Executive bathroom daily.	<ol style="list-style-type: none"> 1. Avoid direct skin contact with chlorinated water; 2. Follow direction on container of foaming detergent; 3. Report and repair any structural or equipment damage 	Executive bathrooms shall always be equipped with adequate liquid hand soap, paper towels and toilet paper.

Recommendations:

- 1. All staff working in food preparation areas should report to work in good health and should practice good personal hygiene.***

- 2. The manufacturer's instructions regarding the use and maintenance of kitchen equipment should be followed.***

- 3. The manufacturer's instructions regarding the use of chemicals for cleaning and sanitizing food contact surfaces should be followed.***

- 4. Cleaning eating utensils using the 3-compartment sink should involve the following steps:***
 - a) Washing with detergent***
 - b) Rinsing with clean detergent***
 - c) Sanitizing by chlorine or hot water***

- 5. When cleaning eating utensils using the dishwashing machine, the manufacturer's instructions should be followed for use.***

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Cleaning and disinfection

Flood waters are characterized as either clear water, gray water, or black water.¹ Clear water refers to water from tap or rain water, while gray water refer to water from sinks, showers, tubs, and washers. In contrast, black water refers to flood water contaminated with waste from humans and animals.¹ The recommended post-flood cleaning and disinfection processes are contingent upon the type of flood water and the material to be cleaned. Non-porous materials such as metal, glass, and hard plastics can be cleaned after exposure to any of the three types of flood water.^{2,3} Semi-porous materials such as wood and concrete, if structurally sound, can be cleaned after exposure to any type of flood water.² In contrast, after expose to blackwater, it is important to discard water-damaged, porous items, remove dry wall and insulation, and damp-wipe non-porous surface with water and detergent solutions.² Surfaces should be disinfected with either 1:10 bleach solutions or quarterly ammonium compound cleansers follow by using high-efficiency particulate air (HEPA) vacuum after the material has been thoroughly dried and deposits of the contents of the HEPA vacuum in well-sealed plastic.³ For exposure to clear water or gray water, steam cleaning or wet vacuum may be possible for carpets and some upholstered furniture, if the expose is less than 48 hours, followed by damp-wipe non-porous surfaces with water and detergent solution.³ Then, HEPA vacuum should be employed after the material has been thoroughly dried; deposits of the contents of the HEPA vacuum should be kept contained in well-sealed plastic bags.³ During these cleansing procedures, it is recommended that dust disturbance be minimized to reduce the spread of fungal spores, inclusive of setting up barriers during the remediation process to prevent the spread to non-affected areas.³ Workers can additionally set up HEPA filters and hard barrier in designated high-risk areas such as neonatal intensive care, oncology, and transplant units.

A Spaulding classification is generally recommended for cleaning and disinfection for all healthcare equipment.⁴⁻⁵ Cleaning processes for non-medical devices and surfaces should include detergent and water, clean water rinse, use of 1:100 bleach concentration disinfection, and air dry. An exception is use of 1:10 bleach water disinfection for non-medical devices and surfaces suspected of fungal contamination.⁴⁻⁵ It is important to note that bleach water disinfection should be prepared centrally and daily in a well-ventilated area, and distinctive labels should be used to separate different bleach concentrations to avoid confusion. Cleaning and disinfecting of electronic medical equipment should be following according to manufacturers' instructions.

Special approaches for area decontamination may be needed related to use of ultraviolet light C (UVC) and use of hydrogen peroxide vaporizers,⁶⁻⁸ in situations where fungal bioburden were higher than acceptable level. Of concern, UVC may be less efficacious for eradication of fungi (e.g., *Aspergillus* species, *Penicillium* species).⁹ It is also important to address that appropriate PPE should be worn when HCWs performed hydrogen peroxide vaporizers,⁹ as it can be potentially toxic to skin and the respiratory system. Although there is no current evidence to support the use of ozone or other disinfectants (e.g. QUATs), the role of these agents to disinfect mold after extensive flood deserve further investigations. Because of the potential inadvertent exposure to people and damage to surfaces or equipment, chemical fumigants should be used when the benefit is clearly exceeding the risk.¹⁰

Recommendations

- 1. The recommended post-flood cleaning and disinfection processes are dependent upon the type of flood water and material to be cleaned.*
- 2. Cleaning processes for non-medical devices and surfaces should include detergent and water, clean water rinse, use of 10,000 ppm (1% available chlorine) chlorine-based concentration disinfection, and air dry. An exception is use of 100,000 ppm (10% available chlorine) chlorine-based disinfection for non-medical devices and surfaces suspected of fungal contamination.*
- 3. Special approaches (e.g., UVC and use of hydrogen peroxide vaporizers) can be used in situations where fungal bioburden were higher than acceptable level. No recommendation can be made for other special approaches for area decontamination including use of ozone or other disinfectant (e.g. QUATS).*

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Chapter 11 Assessment of Cleanliness and Quality Control (Ling)

In 2003, the Centers for Disease Control and Prevention (CDC) Guidelines for Environmental Infection Control in Healthcare Facilities—Environmental Surfaces recommended that hospitals clean and disinfect “high-touch surfaces.”¹ A subsequent CDC guideline strongly recommended (Category 1B) that hospitals “monitor (i.e., supervise and inspect) cleaning performance to ensure consistent cleaning and disinfection of surfaces in close proximity to the patient and likely to be touched by the patient and health care professionals.”² Checklists and audit tools (examples) will assist supervisory staff in monitoring and documenting cleaning and disinfection. Feedback of these results to Housekeeping staff had been shown to increase motivation and engagement with resulting improvements in cleaning scores.³

There are several methods for assessing environmental cleanliness:

- a. Conventional program of direct and indirect observation (e.g., visual assessment, observation of performance, patient/resident satisfaction surveys);
- b. Enhanced program of monitoring residual bioburden (e.g., environmental culture, adenosine triphosphate – ATP –bioluminescence); and environmental marking tools (e.g., fluorescent marking)

11.1 Conventional program of direct and indirect observation

Observation of the cleaned environment and of the individuals doing the cleaning may be accomplished directly, with the use of checklists and other monitoring tools completed by supervisory or other trained staff; or indirectly, as feedback from patients based on their ‘perceptions’ of cleanliness through a survey. Neither of these methodologies have been standardized. A visually clean surface may not be

microbiologically or chemically clean. It is expected that visual assessment should have a cleaning rate of 100% in a healthcare setting. ⁴

11.2 *Enhanced program*

A. Environmental culture

Routine environmental cultures in health care settings are neither cost-effective nor generally recommended. The presence of a particular microorganism on an environmental surface does not confirm it as the cause of a patient's infection, even if it is the same strain. However, it is normally considered in investigation of major outbreaks.

B. ATP Bioluminescence

Detection of ATP - which is present in all types of organic material (including bacteria, food, and human secretions and excretions) - on environmental surfaces has been used for years in the food and beverage industries to assess the adequacy of cleaning procedures. A specialized swab is used to sample a standardized surface area, which is then analyzed using a portable handheld luminometer. The amount of ATP, both microbial and non-microbial, is quantified and expressed as relative light units (RLU). Of note is that very high RLU readings may represent either the viable bioburden, organic debris including dead bacteria, or a combination of both. ATP measurements can be confounded by food and drink residues, disinfectants, microfibre and manufactured plastics found in the cleaning and laundering industries. Additional studies from multiple health care settings are needed before a standardized ATP bioluminescence breakpoint can be established for defining surfaces as adequately cleaned. ATP testing can be used to provide instant feedback on surface cleanliness, demonstrating deficiencies in cleaning

protocols. and techniques to staff.⁵ It may also be used for the evaluation of novel cleaning methods such as steam cleaning and microfibre cloths.

11.3 *Flourescent Marking*

Environmental marking measures the thoroughness of cleaning using a surrogate marking system. It involves the use of a colorless solution or Glo Germ powder that is applied to objects and surfaces in the patient's environment prior to cleaning, followed by detection of residual marker (if any) immediately after cleaning, usually involving fluorescence under ultraviolet (UV) light.⁶ Solutions used as markers must be environmentally stable, dry quickly, be easily removed with light cleaning and be invisible in regular room light but be easily visualized using other means. The marker solution is applied to high-touch surfaces in patient rooms prior to cleaning, then evaluated to see if the solution was removed by the cleaning. Environmental marking may be used either on a daily basis to assess routine cleaning, or prior to discharge to assess terminal cleaning.

Recommendations:

- 1. There should be a process in place to measure the quality of cleaning in the health care setting.***
- 2. Methods of monitoring cleanliness should include at least the conventional visual assessment and/or fluorescent marking.***
- 3. Results of cleaning audits should be collated and analyzed with feedback to staff, and an action plan developed to identify and correct deficiencies.***

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Chapter 12 Laundry and Bedding

General Information

Laundry in a healthcare facility may include bed sheets and blankets, towels, personal clothing, patient apparel, uniforms, scrub suits, gowns, and drapes for surgical procedures. Soiled linen is rarely implicated in the transmission of infections, although sheets and pyjamas have been shown to harbor microorganisms that readily proliferate in the moist, warm environment next to an individual's body. Policies and procedures should address the collection, transport, handling, washing and drying of soiled linen, including protection of staff and hand hygiene. National regulations must be followed if the facility does its own laundry.

Laundry facilities must have regulations that will ensure that:

- a. Laundry equipment is used and maintained according to manufacturers' instructions
- b. Gross soil is removed before washing and proper washing and drying procedures are used
- c. There is an established procedure to determine when laundry should be sorted in the laundry facility (i.e., before or after washing);
- d. Laundry is cleaned at a temperature of at least 71.1°C if cold water detergents are not used
- e. Cloth linen bags are washed after each use and can be washed in the same cycle as the linen contained in them
- f. Clean laundry is packaged, transported and stored by methods that will ensure their cleanliness and protect them from dust and soil during interfacility loading, transport and unloading.

Epidemiology and General Aspects of Infection Control

Contaminated textiles and fabrics often contain high numbers of microorganisms from body substances, including blood, skin, stool, urine, vomitus, and other body tissues and fluids.

When textiles are heavily contaminated with potentially infective body substances, they can contain bacterial loads of 10^6 – 10^8 CFU/100 cm² of fabric. Disease transmission attributed to health-care laundry has involved contaminated fabrics that were handled inappropriately (i.e., the shaking of soiled linens). Bacteria (*Salmonella* spp., *Bacillus cereus*), viruses (HBV), fungi, and ectoparasites (scabies) presumably have been transmitted from contaminated textiles and fabrics to workers via a) direct contact or b) aerosols of contaminated lint generated from sorting and handling contaminated textiles. Hygienically clean laundry carries negligible risk to health-care workers and patients, provided that the clean textiles, fabric, and clothing are not inadvertently contaminated before use.

Laundry Area

Laundry services for health-care facilities are provided either in-house (i.e., on-premise laundry [OPL]), co-operatives (i.e., those entities owned and operated by a group of facilities), or by off-site commercial laundries. In the latter, the textiles may be owned by the health-care facility, in which case the processor is paid for laundering only. Alternatively, the processor who is paid for every piece laundered on a “rental” fee may own the textiles.

A laundry facility is usually partitioned into two separate areas - a “dirty” area for receiving and handling the soiled laundry and a “clean” area for processing the washed items and storage. To minimize the potential for re-contaminating cleaned laundry with aerosolized contaminated lint, areas receiving contaminated textiles should be at negative air pressure relative to the clean areas. Laundry areas should have hand washing facilities or alcohol hand rub agents readily available to workers. Laundry workers should wear appropriate personal protective equipment (e.g., gloves and protective garments) while sorting soiled fabrics and textiles.

Laundry equipment should be used and maintained according to the manufacturer's instructions to prevent microbial contamination of the system. Damp textiles should not be left in machines overnight.

Soiled Linen

All linen that is soiled with blood, body fluids, secretions or excretions should be handled using the same precautions, regardless of source or health care setting

- a. Remove gross soil (e.g., feces) with a gloved hand and dispose into toilet or hopper; do not remove excrement by spraying with water;
- b. Bag or otherwise contain contaminated laundry at the point-of-care;
- c. Do not sort or pre-rinse contaminated laundry in patient-care areas;
- d. Personal laundry or items (e.g., in long-term care) should be bagged separately at the point of collection, or laundered by family members;
- e. Handle contaminated laundry with minimum agitation to avoid contamination of the air, surfaces and persons (e.g., roll up)
- f. Contain wet laundry before placing in laundry bag (e.g., wrap in a dry sheet or towel); water soluble bags and 'double-bagging' are not necessary and not recommended;
- g. Laundry carts or hampers used to collect or transport soiled linen need not be covered unless otherwise required by regulation
- h. Linen bags should be tied securely and not be over-filled;
- i. If laundry chutes are used, ensure that they are properly designed, maintained and used in a manner that minimizes dispersion of aerosols from contaminated laundry
 - Ensure that laundry bags are securely bagged and tightly closed before placing the filled bag into the chute
 - Do not place loose items in the chute
 - Laundry chutes should be maintained under negative pressure and discharge into the soiled linen collection area

- Laundry chutes should be cleaned on a regular basis
- j. Routine laundering practices are adequate for laundering all linens, regardless of source; special handling of linen for clients/patients/residents on Additional Precautions is not required.

Sorting Linen

Health-care facilities should determine the point in the laundry process at which textiles and fabrics should be sorted. Sorting after washing minimizes the exposure of laundry workers to infective material in soiled fabrics, reduces airborne microbial contamination in the laundry area, and helps to prevent potential percutaneous injuries to personnel. Sorting laundry before washing protects both the machinery and fabrics from hard objects (e.g., needles, syringes, and patients' property) and reduces the potential for recontamination of clean textiles. Sorting laundry before washing also allows for customization of laundry formulas based on the mix of products in the system and types of soils encountered.

Additionally, if work flow allows, increasing the amount of segregation by specific product types will usually yield the greatest amount of work efficiency during inspection, folding, and pack-making operations. Protective apparel for the workers and appropriate ventilation can minimize these exposures. Gloves used for the task of sorting laundry should be of sufficient thickness to minimize sharps injuries.

Clean Linen

Laundering cycles consist of flush, main wash, bleaching, rinsing, and souring. Cleaned wet textiles, fabrics, and clothing are then dried, pressed as needed, and prepared (e.g., folded and packaged) for distribution back to the facility. Clean linens provided by an off-site laundry must be packaged prior to transport to prevent inadvertent contamination from dust and dirt during loading, delivery, and unloading. Functional packaging of laundry can be achieved in several ways, including:

- a. Placing clean linen in a hamper lined with a previously unused liner, which is then closed or covered;
- b. Placing clean linen in a properly cleaned cart and covering the cart with disposable material or a properly cleaned reusable textile material that can be secured to the cart; and
- c. wrapping individual bundles of clean textiles in plastic or other suitable material and sealing or taping the bundles.

Laundry Staff Protection

Protection of staff in laundry areas includes:

- a. Training for all health care providers and laundry staff in the procedures for handling of soiled linen that includes infection prevention and control and WHMIS training
- b. Dedicated hand washing sink that is readily available in laundry areas
- c. The provision of appropriate protective equipment, e.g., gloves, gowns or aprons, face protection, to provide protection from potential cross-infection when handling soiled linen
- d. Hand hygiene whenever gloves are changed or removed;
- e. Disposal of sharps at point-of-use to ensure that there are no residual sharps in linen; laundry staff are at risk of injury from contaminated sharps, instruments or broken glass that may be contained with linen in the laundry bags; and
- f. Immunization of laundry staff against hepatitis B due to the high risk of sharps injury.

Recommendations:

- 1. If the facility does its own laundry, national laundry regulations must be followed.**
- 2. There must be clear separation between clean and dirty laundry.**
- 3. There must be policies and procedures to ensure that clean laundry is packaged, transported and stored in a manner that will ensure that cleanliness is maintained.**

4. There must be designated areas for storing clean linen.

Chapter 13 Care and Storage of Cleaning Supplies and Utility Rooms

All chemical cleaning agents and disinfectants should be appropriately labeled and stored in a manner that eliminates risk of contamination, inhalation, skin contact or personal injury. Chemicals must be clearly labeled with Safety Data Sheets (SDS) readily available for each item in case of accidents.

An automated dispensing system should be used to ensure integrity of dilution ratios and to eliminate the need for decanting. Calibration of the dispensing system should be regularly monitored. If a refillable bottle is filled with a disinfectant solution, it should never be topped up with fresh disinfectant. Always use a clean, dry, appropriately sized bottle, label the product and date it. The product should be discarded when past the expiry date for stability. Equipment used to clean toilets (e.g., toilet brushes, toilet swabs) should not be carried from room-to-room.

If feasible, the toilet brush may remain in the room; if not, consideration should be given to using disposable toilet swabs. Toilet cleaning and disinfecting equipment should be discarded when the patient/resident leaves or as required. In multi-bed rooms, a system should be developed for replacement of toilet brushes on a regular basis or as required. When choosing a tool for cleaning toilets, consideration should be given to equipment that will minimize splashing.

13.1 Housekeeping Rooms/Closets

The staff that performs housekeeping duties in the health care setting uses housekeeping rooms or closets. Sufficient housekeeping rooms/closets should be provided throughout the facility to maintain a clean and sanitary environment, with at least one per patient/resident floor. In general, housekeeping room or closet:

- a) Is a dedicated room, not used for other purposes;

- b) Shall be maintained in accordance with good hygiene practices;
- c) Should have eye protection available;
- d) Should have an appropriate water supply and a sink/floor drain;
- e) Should be well ventilated;
- f) Should have suitable lighting;
- g) Should be easily accessible in relation to the area it serves;
- h) Should have locks fitted to all doors;
- i) Should be appropriately sized to the amount of materials, equipment, machinery and chemicals stored in the room/closet and allow for proper ergonomic movement within the room/closet;
- j) Should never contain personal clothing or grooming supplies, food or beverages;
- k) Shall have chemical storage that ensures chemicals are not damaged and may be safely accessed;
- l) Should be free from clutter to facilitate cleaning; and
- m) Should be designed so that, whenever possible, buckets can be emptied without lifting them.

Cleaning equipment requires attention to avoid cross-transmission of microorganisms and proliferation of microorganisms in dirty environments:

- a) Tools and equipment used for cleaning and disinfection must be cleaned and dried between uses (e.g., mops, buckets, rags);
- b) Mop heads should be laundered daily; all washed mop heads must be dried thoroughly before storage;
- c) Cleaning equipment shall be well maintained, clean and in good repair;
- d) Cleaning carts:
 - i. Should have a separation between clean and soiled items;
 - ii. Should never contain personal clothing or grooming supplies, food or beverages;
 - iii. Should be thoroughly cleaned at the end of the day.

13.2 Soiled Utility Rooms/Workrooms

Each patient care area should be equipped with a room that may be used to clean soiled patient equipment that is not sent for central reprocessing (e.g. IV poles, commode chairs). A soiled utility room/workroom should:

- a) Be physically separate from other areas, including clean supply/storage areas;
- b) Be designed to minimize the distance from point-of-care;
- c) Have a work counter and clinical sink (or equivalent flushing-rim fixture)
- d) Have a dedicated hand washing sink with both hot and cold running water;
- e) Have adequate space to permit the use of equipment required for the disposal of waste;
- f) Have PPE available to protect staff during cleaning and disinfecting procedures; and
- g) Be adequately sized within the unit.

If a soiled utility room is used only for temporary holding of soiled materials, the work counter and clinical sink is not required; however, facilities for cleaning bedpans must be provided elsewhere. Soiled utility rooms/workrooms should not be used to store unused equipment.

13.3 Clean Supply Rooms

Each patient/resident care area should be equipped with a room/area that is used to store clean supplies and equipment. A clean supply room/area should:

- a) Be separate from soiled workrooms or soiled holding areas;
- b) Be able to keep supplies free from dust and moisture;
- c) Be adjacent to usage areas and easily available to staff;

- d) Be equipped with a work counter and dedicated handwashing sink if used for preparing patient care items.

Recommendations:

- 1. *Cleaning agents and disinfectants shall be labeled with SDS information.***

- 2. *Cleaning agents and disinfectants shall be stored in a safe manner in storage rooms or closets.***

- 3. *Automated dispensing systems, which are monitored regularly for accurate calibration, are preferred over manual dilution and mixing.***

- 4. *Disinfectants should be dispensed into clean, dry, appropriately-sized bottles that are clearly labeled and dated; not topped up; and discarded after the expiry date.***

- 5. *Equipment used to clean toilets:***
 - a. *Should not be carried from room-to-room;***
 - b. *Should be discarded when the patient/resident leaves and as required; and***
 - c. *Should minimize splashing.***

- 6. *Sufficient housekeeping rooms/closets should be provided throughout the facility to maintain a clean and sanitary environment.***

- 7. *Cleaning and disinfection equipment should be well maintained, in good repair and be cleaned and dried between uses.***

- 8. *Mop heads should be laundered daily and dried thoroughly before storage.***

9. *Cleaning carts should have a clear separation between clean and soiled items, should never contain personal items and should be thoroughly cleaned at the end of the day.*

Chapter 14 Staff Education

There are clear evidences that cleaning and disinfection of frequently touched surfaces reduces the risk of transmission of multiple drug resistant organisms including *Clostridium difficile*. Healthcare settings need to standardize cleaning procedures, type of chemicals used, and establish a monitoring system to assure that the patient care equipment and environment is cleaned, disinfected and stored appropriately so that patient safety is optimized.¹⁻² Further, it is important that education need to be involved with all stake holders in the hospital environmental hygiene (e.g., hospital administration, leadership, nursing staff, housekeepers). Staff should be educated on the use of the chemicals and annual competencies are recommended to be required for specific disinfection and sterilization procedures. All cleaning, disinfection and sterilization processes should comply with the CDC guidelines.² Given that the performance of environmental cleaning rely on human behavior,³ it is important to develop checklist (see Appendix) or additional mechanisms to monitor the cleaning quality of housekeepers (see Chapter 12).⁴

Staff education, thus, plays a vital role in meeting these requirements and in educating involved healthcare personnel on various infection control aspects on hospital environmental control and cleaning, particularly in view of rapid staff turnover that occurs at many resource-limited settings. Management and supervisory staff should receive training and education that also includes chain of infection, pest control, and outbreak response. Informal education during infection control and quality improvement meetings as well as during infection control walk rounds should be complemented with in-service education on hand hygiene, appropriate and early diagnosis of infections, indications for area decontamination and hospital cleaning, and isolation precautions and policies.⁵ Ongoing staff education is important due to the new research and guidelines published every year, advancements in technology, and regulatory demands. Education should be focused on the role of environmental control to limit the spread of drug-resistant pathogens.⁶ Educational campaigns, including facility-wide, unit-targeted, and informal educational interventions, to

enhance adherence to infection prevention and control can decrease MDRO transmission.⁶ The focus was to encourage a behavior change through improved understanding of the problem MDRO that the facility was trying to control. Whether the desired change involved hand hygiene, antimicrobial prescribing patterns, or something else, enhancing understanding and creating a culture that supported the desired behavior were viewed as essential to success.

Recommendations:

- 1. All aspects of environmental cleaning must be supervised and performed by knowledgeable, training staff**

- 2. Housekeeping must provide a training program which includes:**
 - **A written curriculum**
 - **A mechanism for assessing proficiency**
 - **Documentation of training and proficiency verification**
 - **Orientation and continuing education**

- 3. Infection prevention and control education provided to staff working in Housekeeping should be developed in collaboration with Infection Prevention and Control and Occupational Health and Safety and must include:**
 - **The correct and consistent use of routine practices**
 - **Hand hygiene and basic personal hygiene**
 - **Signage used to designate Additional Precautions in the health care setting**
 - **The appropriate use of personal protective equipment**
 - **Prevention of blood and body fluid exposure, including sharps, safety**

- 4. Housekeeping managers and supervisors must receive training and be certified.**

References:

1. Rutala, D. W. Centers for Disease Control and Prevention. *Guideline for Disinfection and Sterilization in Healthcare Facilities*. Weber Infection Control Practices Advisory Committee (HICPAC); 2008.
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3. Carling PC, Parry MF, Von Beheren SM [Identifying opportunities to enhance environmental cleaning in 23 acute care hospitals.](#) *Infect Control Hosp Epidemiol* 2008;28:1-7.
4. Carling PC, Parry MM, Rupp ME, Po JL, Dick B, Von Beheren S. [Improving cleaning of the environment surrounding patients in 36 acute care hospitals.](#) *Infect Control Hosp Epidemiol* 2008;29:1035-1011.
5. Stoessel K and Truscott W. National Patient Safety Goal 7: Recommendations for Compliance. *Infection Control Today*. July 2009.
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Chapter 15 Occupational Health and Safety Issues Related to Housekeeping

Due to fact that cleaning staff are working in healthcare facilities, the risk of exposure to infectious diseases exist. Hence, occupational health and safety issues include staff immunization, appropriate use of Personal Protective Equipment (PPE), staff exposures to blood and body fluids and other infection hazards, and staff safety issues.

15.1 Immunization

Appropriate immunization will include:

- a) Annual influenza vaccine
- b) Hepatitis B vaccine as they may be exposed to contaminated sharps during work.

Contracts with supplying agencies should include the above immunizations for contracted staff.

15.2 Personal Protective Equipment (PPE)

PPE shall be provided for all cleaning personnel, and replaced when defective. When using novel technologies, it is recommended that manufacturer's written instructions for use be consulted and followed. Cleaning staff should wear PPE:

- a) For protection from microorganisms;
- b) For protection from chemicals used in cleaning; and
- c) To prevent transmission of microorganisms from one patient environment to another.

Training is to be provided in the correct use, application and removal of PPE.

PPE to be used to prevent contact with blood, body fluids, secretions, excretions, non-intact skin or mucous membranes, includes:

- a) Gloves when there is a risk of hand contact with blood, body fluids, secretions or excretions or items contaminated with these;
- b) Gown if contamination of uniform or clothing is anticipated; and
- c) Mask and eye protection or face shield where appropriate to protect the mucous membranes of the eyes, nose and mouth during activities involving close contact (i.e., within one metre) with patients likely to generate splashes or sprays of secretions (e.g., coughing, sneezing).

15.3 Staff Exposures

There must be written policies and procedures for the evaluation of staff (employees or contract workers) that are, or may be, exposed to blood or body fluids and other infectious hazards that include:

- a) A sharps injury prevention program;
- b) Timely post-exposure follow-up and prophylaxis when indicated.

Recommendations:

- 1. Housekeeping staff must be offered appropriate immunizations.**
- 2. There shall be policies and procedures in place that include a sharps injury prevention program; post-exposure prophylaxis and follow-up; and a respiratory protection program for staff who may be required to enter an airborne infection isolation room accommodating a patient with tuberculosis.**

APPENDIX A1

STEP 1: Identify The Infection Control Risk Assessment (ICRA)

TYPE OF CONSTRUCTION ACTIVITY OR PROJECT (circle type of project):

<p>Type A</p>	<p>Inspection and non-Invasive Activities Includes but not limited to:</p> <ul style="list-style-type: none"> • Activities which do not generate dust or require cutting of walls or access to ceilings other than for visual inspection. eg. Removal of ceiling tiles for visual inspection, painting but not sanding, electrical work, minor plumbing that disrupt water supply to localized patient care area (e.g. in one room)
<p>Type B</p>	<p>Small scale short duration activities which create minimal dust Include but not limited to: eg. Activities that require access to duct spaces, cutting of walls, ceilings, sanding of walls for painting, plumbing that requires disruption to water supply of more than one patient care area (> two rooms) for less than 30 minutes.</p>
<p>Type C</p>	<p>Work that generates a moderate to high level of dust or requires demolition or removal of any fixed building components or assemblies Include but not limited to:</p> <ul style="list-style-type: none"> • Sanding of walls for painting or wall covering • Removal of floor coverings, ceiling tiles and case work • New wall construction • Minor duct work or electrical work above ceilings • Major cabling activity • Any activity that cannot be completed within a single work shift.
<p>Type D</p>	<p>Major demolition, construction & renovation projects Includes but not limited to:</p> <ul style="list-style-type: none"> • Activities that require consecutive work shifts • Require heavy demolition or removal of a complete cabling system • New construction/New building project.

APPENDIX A2

STEP 2: Using The Following Table, Identify The Patient Risk Groups Affected by the Activity. If More Than One Risk Group Will Be Affected, Select The Higher Risk Group.

RISK GROUPS. IDENTIFY PATIENT AT RISK (circle area involved):

LOW RISK	MEDIUM RISK	HIGH RISK	HIGHER RISK
<ul style="list-style-type: none"> • All office area • Nonclinical areas 	<ul style="list-style-type: none"> ▪ Admitting Unit ▪ Outpatient Areas ▪ Food prep areas ▪ Radiology ▪ Nuclear Medicine ▪ MRI ▪ Endoscopy Unit ▪ Outpatient Physical Therapy (Rehab) ▪ Psychiatric Services (outpatient) ▪ Cardiology services (outpatient) 	<ul style="list-style-type: none"> ▪ Trauma & Emergency Department ▪ Labor & Delivery Ward ▪ Pediatrics Wards ▪ Pharmacy ▪ Newborn Nursery ▪ Clinical Pathology ▪ Day Care Surgery ▪ Central Stores ▪ Laboratories ▪ Medical Units ▪ Surgical Units ▪ Hemodialysis Unit 	<ul style="list-style-type: none"> ▪ Bone Marrow Transplant Unit ▪ Burn Intensive Care Unit ▪ Cardiac Cath Lab ▪ Pharmacy Sterile Unit ▪ Operating Rooms ▪ Negative Air / Positive Air Pressure Rooms ▪ Isolation Rooms (in all wards/ Units) ▪ Intensive Care Units ▪ Cardiac Intensive Care Unit ▪ Dialysis Unit ▪ PICU ▪ CSSD ▪ Oncology Ward ▪ Any area / ward / unit caring for immunocompromised patients

APPENDIX A3

STEP 3: Match the planned Construction activity type (A,B,C,D) with the Patient Risk Group (low, medium, high, highest) to determine the **Class of Precautions** (1, 11, 111,1V) or level of infection control activities required.

RISK CLASS DETERMINATION

PATIENT RISK GROUPS	CONSTRUCTION ACTIVITY TYPE A	CONSTRUCTION ACTIVITY TYPE B	CONSTRUCTION ACTIVITY TYPE C	CONSTRUCTION ACTIVITY TYPE D
Low Risk	1	11	11	111/ 1V
Medium Risk	1	11	111 or 11	1V
High Risk	1	11 or III	111/ 1V	1V
Highest Risk	11 or I-III	111/ 1V	111/ 1V	1V

Description of Required Infection Control Precautions by class: Refer Appendix A3.1 – A3.2

APPENDIX A3.1

Description of Required Infection Control Precautions by Class

	Pre-Construction	During Construction of Project	Upon Completion of Project
CLASS 1		<ol style="list-style-type: none"> 1. Execute work by methods to minimize raising dust from construction operations 2. Immediately replace a ceiling tile displaced for visual inspection 	Clean work area upon completion of task.
CLASS 2	<ol style="list-style-type: none"> 1. Identify the type of construction project 2. Identify those patients at risk area 3. Discuss with Department of Engineering, Department of Facilities, Department of Nursing, Department of OSHA and Contractor regarding control of dust generation, patient placement and putting up of barriers 4. Get infection control permit 	<ol style="list-style-type: none"> 1. Provide active means to prevent airborne dust from dispersing into atmosphere. 2. Water mist for work surfaces to control dust while cutting 3. Seal unused doors with duct tape 4. Block off and seal air vents. 5. Place dust mat at entrance and exit of work area. 6. Remove or isolate air handling system in areas where work is being performed 	<ol style="list-style-type: none"> 1. Contain construction waste before transport in tightly covered containers. 2. Wipe work surfaces with detergent and water / disinfectant forward areas. 3. Wet mop and/ or vacuum with HEPA-filtered vacuum before leaving work area. 4. Remove alterations of air handling system in the area where the work is being performed.
CLASS 3	<ol style="list-style-type: none"> 1. Identify the type of construction project 2. Identify those patients at risk area 3. Discuss with Department of facilities, Department of Nursing, Department of OSHA and Contractor regarding control of dust generation, 	<ol style="list-style-type: none"> 1. Remove or isolate air handling system in area where work is being done to prevent contamination of duct system. 2. Complete all critical barriers i.e., sheetrock, plywood, plastic, to seal area from non-work area 3. Maintain negative air pressure within work site if necessary. Cease work immediately if negative pressure lost. 	<ol style="list-style-type: none"> 1. Do not remove barriers from work area until completed project is inspected by the Department of Engineering, Department of Infection Control, and thoroughly cleaned by Department of Facilities. 2. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.

	<p>patient placement and putting up of barriers</p> <ol style="list-style-type: none"> 4. Get infection control permit 	<ol style="list-style-type: none"> 4. Contain construction waste before transport in tightly covered containers. 5. Cover transport receptacles or carts. Tape covering unless solid lid. 	<ol style="list-style-type: none"> 3. Vacuum work area including barriers with HEPA-filtered vacuums. 4. Wet mop area with water & detergent / disinfectant in ward areas. 5. Remove alteration to the air handling system in areas where work is being performed.
CLASS 4	<ol style="list-style-type: none"> 1. Identify the type of construction project 2. Identify those patients at risk area 3. Discuss with Department of Facilities Department of Nursing and Department of OSHA and Contractor regarding control of dust generation, placement of patients and putting up of barriers 4. Get infection control permit 	<ol style="list-style-type: none"> 1. Isolate air handling system in area where work is being done to prevent contamination of duct system. 2. Complete all critical barriers i.e., sheetrock, plywood, plastic, to seal area from non-work area 3. Maintain Negative air pressure within the work site. Cease work immediately if negative pressure lost. 4. Contain construction waste before transport in tightly covered containers. 5. Cover transport receptacles or carts. Tape covering unless solid lid. 6. Seal holes, pipes, conduits and punctures appropriately. 7. Construct anteroom and require all personnel to pass through this room so they can be vacuumed using HEPA vacuum before leaving the work site; or they can wear cloth or paper coveralls that are removed each time they leave the work site 8. All personal entering the work site are required to wear shoe covers. Shoe covers must be changed each time the worker exits the work area. 	<ol style="list-style-type: none"> 1. Do not remove barriers from work area until completed project is inspected by Department of Engineering, Department of Infection Control and thoroughly cleaned by Department of Facilities 2. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction. 3. Contain construction waste before transport in tightly covered containers. 4. Contain transport receptacles or carts. Tape covering unless solid lid. 5. Vacuum work area with HEPA-filtered vacuums. 6. Wet mop area with disinfectant. 7. Remove isolation of air handling system in areas where work was performed.

Description of Required Infection Control Precautions by Class

	Pre-Construction	During Construction Project	Upon Completion Project
CLASS 2,3& 4			<ol style="list-style-type: none"> 1. Put on air conditioning full blast for 2 days 2. Lock doors to prevent intruder 3. Final walk through inspection 4. Observe if any dust on furniture 5. Review effectiveness of any problems noted before 6. Air sampling if necessary.

APPENDIX B

INFECTION CONTROL PERMIT (sample)

RISK CLASS: 1__ 11 __ 111 __ 1V__

Location of Project:_____

Estimated Length of Project:_____

Reason for Renovation / New Construction:_____

Contractor Responsible for Projects:_____

Telephone:_____ Phone_____

Contact Person:_____ Phone_____

Project Description:_____

APPENDIX C

CONSTRUCTION ROUNDS (sample)

Location of Project or Room Number: _____

Contact Person: _____

Telephone: _____ Phone /Pager _____

Date: _____

Notified Facilities Services of Non-Compliance Issues: _____

YES NO N/A

___	___	___	Is there an adequate level of protection before project is started?
___	___	___	Are doors kept closed or appropriately sealed?
___	___	___	Are windows closed?
___	___	___	Is debris removed in covered carts?
___	___	___	Has existing ductwork been covered or sealed?
___	___	___	Have occupants of adjacent areas been informed?
___	___	___	Are there walk-off mats and changed as needed?
___	___	___	Is the area being wet mopped or vacuumed as appropriate?
___	___	___	Has traffic been re-routed?
___	___	___	Is adequate signage in place?
___	___	___	Are barriers in place until job completed and cleaned?

___ _ _

Is an anteroom provided, if necessary?

___ _ _

Final walk-through completed?

Other issues:

APPENDIX D

Food Sanitation Inspection Form for Hospital Kitchen

How to use the inspection form

Tick this mark "√" in the column behind the item when Food Handler completely performs this item.

Tick this mark "x" in the column behind the item when the Food Handler does not complete this item.

Tick this mark "-" in the column behind the item when there is no activity or nothing wrong according to food sanitation standard.

Topic	Standard Criteria	Results of Inspection				Remark
		No.1	No.2	No.3	No.4	
A. Preparation /Cooking Area	1. All areas must be clean and tidy, adequate lighting, and not close to garbage receptacle or waste water treatment system					
	2. Wall and ceiling must be durable, smooth, non-absorbent, clean and washable surfaces of light color.					
	3. Cooking table and wall surrounding stove must be made from durable, non-absorbent and easily cleanable materials (i.e., stainless steel or tile). Table must be at least 60 cm above the floor.					
	4. The area maintained free from flies by using wire screen or air-condition.					

Topic	Standard Criteria	Results of Inspection				Remark
		No.1	No.2	No.3	No.4	
	5. Adequate ventilation shall be provided above cooking area with exhaust hood, ducts, fan and filters, which should be always maintained clean.					
B. Food, drinking water and beverage	6. Raw or fresh food (i.e., meat, vegetable, fruit and dried food) must be wholesome, unadulterated from approved sources. Fresh food must be washed and cleaned before cooking and storing. Food must be kept separately according to their types, stored either at least 60 cm above the floor or in refrigerator.					
	7. Canned food and beverage must be in good condition (no swelling, rust or leak), stored at least 30 cm. above the floor.					
	8. Dried food must be kept in separate clean area. The food shall be stored on the shelf at least 30 cm above the floor.					
	9. Adequate cold room or refrigerator to store fresh/raw food shall be provided. In case of cold room, food must be placed at least 30cm above the floor.					
	10. Cooked food must be kept or covered in clean food grade container, placed at least 60 cm above the floor.					
	11. Food transported to patients must be contained in closed carriage.					
	12. Drinking water, beverage and fruit juice must be fit for human consumption, stored in clean and covered containers placed at least 60 cm above the floor. A ladle or spoon with long handle shall be used for serving.					
D. Equipment and Utensils	13. All utensils (i.e., plates, spoons, forks, chopsticks) must be made of non-toxic and non-corrosive materials, and easily cleanable (i.e., stainless steel, tiles, glass, aluminum melamine) with white or light color.					

Topic	Standard Criteria	Results of Inspection				Remark
		No.1	No.2	No.3	No.4	
	14. Proper washing technique of 3 steps used, washing with detergent, rinsing with clean tap water, and sanitizing by chlorine or hot water. The washing facilities should be placed at least 60cm above the floor.					
	15. Proper dish washing machine shall be used for washing, sanitizing and drying all utensils.					
	16. Spoons and forks must be stored with handle up or laid down neatly in clean and covered container or basket. During transport to patients, the utensils must be covered.					
	17. All utensils (i.e. Plates, bowls, trays or glasses) used for patients should be kept in reversed position (bottom up) in a clean container or basket placed at least 60cm above the floor. During transport to patients, the utensils must be covered.					
	18. Cutting boards must be in good condition without any crack or pit. The board must be used separately for cooked and raw food, and covered while it is not being used except when the kitchen has pest protection system.					
E. Garbage and waste water management	19. Garbage bin must be leakproof, non-absorbent, vermin-proof, and covered-container. Plastic bag must be put inside the bin.					
	20. All drains must be in good condition and shall convey liquid waste from kitchen or washing facilities through wastewater treatment system. The liquid waste or wastewater should not discharge directly to public sewer.					
	21. Grease interceptors should be in good condition, preferably employed at washing facilities, and properly maintained before discharging to public sewer.					

Topic	Standard Criteria	Results of Inspection				Remark
		No.1	No.2	No.3	No.4	
F. Toilet facilities	22. Toilet facilities must be clean, well ventilated, with adequate water supply. The toilet should be located separately from food preparation, storage, cooking and washing areas. Hand washing facilities are required within or adjacent to toilet rooms.					
	23. Adequate toilet and hand washing facilities shall be provided for food handler.					
G. Food Handler	24. Food handler must wear clean uniform or suitable protective clothing.					
	25. Food handler must wear uniform with apron and hair covering (i.e., hat or net).					
	26. Food handler shall be healthy, free from diseases transmitted through food, water or equipment, and skin infection. The food handler is required to carry out an annual physical examination					
	27. Food handler must have good personal hygiene (i.e., short finger nails without painting, non-smoking) during handling food. Proper utensils must be used during preparation or serving food to minimize hand contact (i.e. tong, spoons, spatulas, single use plastic gloves)					