

When to use this guide:



Environmental cleaning is essential to preventing the spread of microorganisms carried in dust and debris generated by construction, renovation and maintenance activities. Use this guide and information from the preventive measures analysis (CSA Z317.13) to confirm the environmental cleaning activities required during these activities and to determine the most responsible person(s) for this work. **Note:** Responsibilities may need to be adjusted based on input from the multidisciplinary team for the project.

Definitions and references may be found at the end of this document.

CMRD Guide: Environmental Cleaning								
Persons Responsible				Environmental Cleaning Activities for Infection Prevention and Control in Healthcare Facilities (HCF)	IPAC Measures Level <sup>††</sup>			
Constructor	Environmental Services	Health Care Workers	Operation & Maintenance		Level I	Level II	Level III	Level IV
<b>Dust Control – Before Renovation, Repairs and Maintenance</b>								
	✓			Remove garbage and sharps from the work area as per facility cleaning protocol	◆	◆	◆	◆
✓	✓	✓	✓	Be familiar with roles and responsibilities to keep the work area and adjacent areas <sup>a</sup> clean during renovation, repairs and maintenance	◆	◆	◆	◆
<b>Dust Control – During Renovation, Repairs and Maintenance</b>								
✓			✓	Securely seal all gaps, holes leading to adjacent areas <sup>a</sup> , and floors above or below the construction area <sup>e</sup> to prevent air leaks. This includes windows and unused doors; plumbing penetrations, electrical outlets, any sources of potential air leaks; air supply and return ducts		◆	◆	◆
			✓	Seal windows, doors, air intake and exhaust vents in adjacent areas <sup>a</sup> , especially around buildings that are going to be demolished		◆	◆	◆
			✓	Check for leakage paths between the construction area <sup>e</sup> and adjacent areas <sup>a</sup> of the HCF. Consider wind and stack effects, and take steps to plug holes in spatial separations (e.g., walls, partitions, floors, and floor slabs) and to seal gaps		◆	◆	◆
✓			✓	Close access panels and replace displaced tiles	◆	◆	◆	◆
✓				Use drop sheets to control dust		◆		
✓				Erect dust barriers with 2 layers of 6 mil poly and drywall on steel studs to enclose the construction area <sup>e</sup>			◆	◆
✓				Repair holes in walls or breaches in the polyethylene containment system immediately when found, and if a temporary repair is made, to complete the permanent repair within 2 hours				◆
✓				Keep contaminant generation at the site of renovation, repair or maintenance within acceptable limits	◆	◆	◆	◆

## Environmental cleaning of health care facilities

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✓				Vacuum <sup>i</sup> mechanical and electrical systems and spaces above drop or false ceilings, if necessary			♦	♦	
✓				Water-misting work while cutting to control dust		♦	♦	♦	
✓				Incorporate dust capturing attachments to the hose of the HEPA vacuum		♦	♦	♦	
			✓	Vacuum <sup>i</sup> or wet-mop the construction area <sup>e</sup> , or both, as necessary		♦	♦	♦	
✓				Place a walk-off mat outside the entrance to the construction area <sup>e</sup> to trap dust from the equipment, debris and footwear of personnel leaving the area, and selecting the mat as specified in clause 6.6.1.9 of CSA-Z317.13-12. When an anteroom is used (for IPAC measures levels 3 and 4), place a walk-off mat outside and inside the anteroom Vacuum <sup>i</sup> dry walk-off mats daily and when visibly soiled. Replace soiled mats that cannot be cleaned Replace adhesive mats (sticky mats) when visibly soiled, or at least daily where there is heavy traffic to and from the construction area <sup>e</sup> Change the antibacterial solution for mats that rest in such solution, according to recommendations by the manufacturer			♦	♦	♦
✓				Vacuum <sup>i</sup> areas outside and immediately adjacent to the project entrances every day or more frequently if necessary (e.g., when there is visible debris)			♦	♦	
✓				Clean service elevator daily			♦	♦	
			✓	Visually inspect filter by a knowledgeable and competent person when CAHU's <sup>d</sup> are put into service or relocated during a project	♦	♦	♦	♦	
			✓	Leak-test and verify the performance of CAHU <sup>d</sup> at the beginning of the renovation, repair or maintenance activity (unless done in the last 12 months)			♦	♦	
			✓	Replace HEPA filters of CAHU <sup>d</sup> when they are loaded, or when the filter change indicator comes on, or in accordance with the manufacturer's recommendations. Leak test the CAHU <sup>d</sup> whenever the HEPA filters are replaced or reseated	♦	♦	♦	♦	
			✓	Inspect thoroughly CAHUs <sup>d</sup> before leaving storage and upon arrival at the work area to ensure they have been cleaned thoroughly to remove dust, dirt, soil, debris, residue, moisture, and biological contamination; and that all filters are in place	♦	♦	♦	♦	
			✓	Rental CAHUs <sup>d</sup> should have been thoroughly cleaned and tested by the rental company prior to being sent to the HCF. There should be written verification that the rental units have not come from a mould amplification site clean-up, or a site where mould amplification was present	♦	♦	♦	♦	

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			✓	Clean thoroughly by vacuuming <sup>i</sup> or damp wiping all surfaces of a CAHU <sup>d</sup> before moving it from a site of renovation, repair or maintenance. Remove, bag and seal pre-filters. Cover the unit intake and exhaust openings with polyethylene and tape seal to prevent dust from being dislodged during transport through the HCF or from site to site. Remove polyethylene covers after transportation and before storage. Do not store the unit with the polyethylene covers in place, or leave the covers in place for more than 8 hours, as this can trap moisture and promote mould growth	♦	♦	♦	♦
	✓			Keep adjacent areas <sup>a</sup> and the occupied areas of the HCF clean and clear of obstructions	♦	♦	♦	♦
	✓			Increase the frequency of cleaning in adjacent areas <sup>a</sup>			♦	♦
	✓			Wet-mop and vacuum <sup>i</sup> the adjacent area <sup>a</sup> as necessary			♦	♦
	✓			Wipe exposed surfaces with a hospital-grade disinfectant			♦	♦
✓				Ensure materials are kept clean and dry during delivery, storage and installation	♦	♦	♦	♦
✓				Clean before installation any woven fabrics, fabric-covered products, and wood-based composite core products with veneers that are exposed to contaminants during storage. Discard if materials cannot be safely and effectively cleaned	♦	♦	♦	♦
		✓		Ensure that patient-care equipment and supplies are protected from dust exposure	♦	♦	♦	♦
✓			✓	Ensure the HCF's permanent ventilation system is cleaned before restarting if contaminated by soil or dust			♦	♦
			✓	Clean (or flush and disinfect) cooling towers that have been taken out of service during renovation, repair or maintenance in accordance with the manufacturer's recommendations before being put back into service				
			✓	Drain cooling towers and evaporative cooling equipment that are out of service for more than 3 days	♦	♦	♦	♦
			✓	Clean (or flush and disinfect) cooling towers in-service during renovation, repair or maintenance quarterly in accordance with the manufacturer's recommendations				
			✓	Close access panels and replace displaced tiles		♦	♦	♦
			✓	Ensure that dust from adjacent construction is not drawn into the HVAC system of the HCF	Excavation, demolition, or significant construction in proximity to the HCF			
			✓	Develop and maintain contingency plans, e.g., due to dust or contaminated water entering the HCF				
			✓	Protect entrances where dust is likely to enter, or limit their use. (Surrounding the entry with an enclosure and directing the opening away from the demolition can help to reduce dust.)				

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			✓	To the extent possible, the HCF should inspect the worksite or communicate with worksite managers to confirm the following: <ul style="list-style-type: none"> <li>▪ Appropriate dust containment barriers at the source</li> <li>▪ Soil, rubble, and debris are kept moist to prevent migration</li> <li>▪ Doors, windows, and entries are closed, barred from use, and sealed as appropriate</li> <li>▪ Workers from the site implement hygienic measures to prevent dust and debris from being carried into the HCF</li> <li>▪ Waste is being kept to a minimum</li> </ul>				
	✓			Remove and discard carpet, drywall, furniture and other materials wet by black water <sup>b</sup>	Remediation After Water Leaks and Flooding			
	✓			Remove carpet if still wet with clean <sup>c</sup> or gray water <sup>f</sup> after 72 hours				
	✓			Vacuum <sup>i</sup> non-removable facility materials, followed by cleaning with a detergent solution				
	✓			Thoroughly vacuum <sup>i</sup> all surfaces and materials adjacent to the affected area. Wet-wipe with a mild detergent. The MDT <sup>g</sup> shall assess if the application of a disinfectant, sanitizer, or sterilizer to adjacent materials is necessary				
			✓	Vacuum <sup>i</sup> and wet-wipe the air ductwork to and from the affected area if investigation determines that there is a risk of contamination. Replace all downline filters				
Dust Control – After Renovation, Repairs and Maintenance								
	✓			Collaborate with IPAC personnel to ensure that the construction area <sup>e</sup> is thoroughly cleaned			◆	◆
✓	✓	✓		Wet-mop or vacuum <sup>i</sup> the construction area <sup>e</sup> , or both, as necessary. Wipe horizontal surfaces with a disinfectant. Use a terminal cleaning <sup>h</sup> procedure approved by the IPAC department or the MDT <sup>g</sup>		◆	◆	◆
	✓			Barriers remain in place until area is thoroughly cleaned				◆
✓				Remove the dust barrier to minimize the spread of dust and other debris particles adhering to the barrier by: <ul style="list-style-type: none"> <li>▪ Vacuuming <sup>i</sup> surfaces;</li> <li>▪ Taking down the barrier and vacuuming <sup>i</sup> it again;</li> <li>▪ Rolling up the polyethylene (construction side in) to contain the dust</li> </ul>			◆	◆
			✓	Run CAHU <sup>d</sup> after the completion of renovation, repairs or maintenance for the amount of time <sup>**</sup> recommended to remove 99% (99.9% for IPAC measures levels 3 and 4) of airborne contaminants  ** CSA-Z317.13 Table 4: Time required for airborne contaminant removal at efficiencies of 99 and 99.9% and also listed at end of this guide	◆	◆	◆	◆

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✓	✓		✓	<p>At the completion of renovation, repairs or maintenance, all ductwork shall be cleaned in accordance with NADCA General Specification for the Cleaning of Commercial, Heating, Ventilation and Air Conditioning Systems and CAN/CSA-Z317.2</p> <p>The HCF shall have documentation specifying the responsibilities of the HCF, the constructor, consultants, and other involved parties at each stage of the renovation, repair or maintenance project concerning the measures to be taken by all parties to maintain cleanliness of the system</p>	◆	◆	◆	◆
Water Quality – During Renovation, Repairs and Maintenance								
✓	✓	✓		Report immediately discoloured water and water leaks to the HCF's operation and maintenance staff and IPAC personnel	◆	◆	◆	◆
			✓	Flush intact water systems that have been shut down for renovation, repairs or maintenance at least monthly; flushing at 2-week intervals is recommended	◆	◆	◆	◆
			✓	Hyperchlorinate or superheat water systems or sections of systems that have been stagnant in accordance with clause 6.8 of CSA-Z317.13-12		◆	◆	◆
✓	✓	✓		Report immediately discoloured water and water leaks to the HCF's operation and maintenance staff and IPAC personnel	◆	◆	◆	◆
			✓	<p>Hyperchlorinate or superheat water systems before occupancy in accordance with CSA-Z317.1. (see clause 6.8 in CSA-Z317.13-12)</p> <p>Flush the water lines in the construction area <sup>e</sup> and adjacent patient care areas before reuse. (See clauses 6.7 and 6.8 of CSA-Z317.13-12.)</p>		◆	◆	◆
			✓	<p>Flush water lines of waste before reuse after new plumbing has been installed and before occupancy by patients. This shall include at a minimum the flushing of each distal site for a minimum of 10 minutes</p> <p>Where considerable time has passed since the constructor has flushed the plumbing system before substantial completion of the contract, ensure that the plumbing system does not become stagnant and is routinely flushed at least twice weekly with no more than 3.5 days between flushing. Flush the plumbing system again prior to patient occupancy. (see clause 6.7.8 in CSA-Z317.13-12)</p>				◆

## Definitions

**Adjacent areas**<sup>a</sup> refers to all of the areas surrounding an area where construction, renovation, or maintenance work is occurring, including where applicable, all or part of the floors above and below. Determining what constitutes an adjacent area depends on the risks created by the work. For example, in an area where work that does not generate dust is being performed, only the rooms whose walls, floors, and roof/ceilings adjoin the construction area may be considered adjacent areas. Conversely, when construction work involving major demolition or road repair outside the HCF is being performed, the entire facility may be considered an adjacent area. This determination is based on a risk assessment.

**Black water**<sup>b</sup> contains raw sewage and is heavily contaminated and grossly unsanitary. It includes water overflow from a toilet bowl containing faeces or a broken sewer line, backed up sewage and all forms of ground surface water rising from rivers or streams.

**Clean water**<sup>c</sup> comes from broken pipes, tub overflows, sink overflows, appliance malfunctions, falling rainwater, and broken toilet tanks.

**Construction air handling unit**<sup>d</sup> (CAHU) is a machine used to move HEPA-filtered air into or out of a construction site.

**Construction area**<sup>e</sup> refers to the area where renovation, repair or maintenance work is occurring.

**Gray water**<sup>f</sup> has some degree of contamination present. It may come from overflow from a dishwasher, washing machine or a toilet bowl (not containing faeces), broken aquarium, and punctured water bed. Gray water in flooded structures is significantly aggravated by time and temperature.

**Multidisciplinary team** (MDT)<sup>g</sup> is a group of representatives from various disciplines in the health care facility that works with the project management team and others to ensure that the appropriate infection prevention and control measures are followed during construction activities. MDTs will generally be involved in all phases of health care facility construction, including planning, design, implementation phases, commissioning, occupancy, and maintenance. MDTs can vary in size, scope, and time of service depending on the type of health care facility and the level of construction activity.

**Terminal cleaning**<sup>h</sup> is the thorough cleaning of a clinical space to remove contaminating microorganisms following construction, renovation, repair or maintenance and prior to use of the space for patient care, medical equipment, or the storage of clean or sterile supplies.

**Vacuum cleaner**<sup>i</sup> used for environmental cleaning to prevent infections associated with construction and renovation in health care facilities should be equipped with a HEPA filter.

## References

1. CSA Group. CSA Z317.13-12: Infection control during construction, renovation and maintenance of health care facilities. Toronto, ON: CSA; 2012. Table 2, Population risk groups and geographical areas; p.85-6. Available at: <http://shop.csa.ca/en/canada/health-care-facility-engineering/z31713-12/invnt/27019572012>
2. Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee. Best practices for environmental cleaning for prevention and control of infections in all health care settings. 2<sup>nd</sup> ed. Toronto, ON: Queen's Printer for Ontario; 2012. Available at: [www.publichealthontario.ca/en/eRepository/Best\\_Practices\\_Environmental\\_Cleaning\\_2012.pdf](http://www.publichealthontario.ca/en/eRepository/Best_Practices_Environmental_Cleaning_2012.pdf)