

# Australasian Health Facility Guidelines

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## Part D - Infection Prevention and Control D.0005 - Construction and Renovation

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#### **Australasian Health Facility Guidelines**

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## 05 CONSTRUCTION AND RENOVATION

### 05.01 Risk Management

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#### **RISK MANAGEMENT STRATEGY**

A formal approach to risk management should be part of all building construction and renovation activities. A process for assessing risk and adopting appropriate precautions is provided below. A more detailed review of risk is beyond the scope of this document, but reference to the following documents will provide the framework for a relevant risk management strategy:

- Department of Health, Victoria, 2014, Infection Control Principles for the Management of Construction Renovation Repairs and Maintenance within Health Care Facilities;
- NDSC, 2002, National Guidelines for the Prevention of Nosocomial Invasive Aspergillosis during Construction/Renovation Activities;
- Standards Australia, 2004, AS/NZS 4360:2004 Risk Management (SAI Global);
- Standards Australia, 2001, HB 228: Guidelines for Managing Risk in Healthcare; and
- Standards Australia, 2003, HB 260:2003 Hospital Acquired Infections - Engineering Down the Risk.

#### **RISK IDENTIFICATION**

Building, renovation and maintenance activities within a healthcare facility impose risks. Certain construction activities can increase the risk of invasive Aspergillosis among immunosuppressed patients. Mortality rates from this infection are high.

In occupied facilities, a range of systems and precautions will need to be put in place to support construction and renovation activities. The broad tasks include:

- development of organisational governance arrangements and policies;
- identification of the population at risk; and
- an understanding of the preventative measures needed to control risk.

The risk identification strategy should address as a minimum:

- the extent of construction work;
- the identification of the patient population at risk;
- the location of the patient population in relation to the site and construction;
- ventilation system types and potential impact;
- traffic and supply routes;
- determination of air monitoring requirements, methodology and frequency;
- air quality samples taken to establish a baseline; and
- the identification of possible contaminants and their locations.

Possible contaminants and/or locations include:

- ceiling dust;
- service shafts especially in the presence of damp;
- sprayed-on fire retardants; and
- bird droppings.

Infection prevention and control measures to be considered during construction and renovation include:

- at the time of site induction for building workers, infection prevention and control should be presented as a major component of the OHS induction. This induction process should be documented and signed off by each participating worker;

- monitoring worker compliance with procedures. The results of this monitoring should be communicated to the workers routinely through the builder. A systematic approach should be in place to ensure the management of major breaches;
- installation of barriers to contain the impact of construction;
- inspections by the nominated representatives during the construction of the barriers. These inspections should be monitored and reported; and
- documenting all inspections, including a non-conformance system for defaults, complete with a corrective and preventative action loop.

### 05.02 Hand-over

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Prior to handover it is the responsibility of the commissioning team to ensure the area complies with standards for occupation. Health services should ensure:

- all surfaces including walls, ceilings, windows, ventilation systems, service cavities and ceiling spaces have been thoroughly cleaned;
- all surfaces and joints are free from gaps. In clinical areas, surfaces should be smooth and impervious;
- the placement of hand basins, storage facilities complies with layout plans;
- isolation rooms are operating as designed (e.g. supply air, air changes, exhaust, seals etc);
- air sampling and particle counts have been conducted. A program of regular air sampling should be implemented in high-risk areas, allowing time for culturing, results and repeat cleaning and testing prior to occupation, for example in operating theatre/s. Dot testing may take a period of a week to complete and receive microbiology air testing results in order to support commencement of theatre procedures; and
- recertification of HEPA filters and laminar/clean flow systems where installed.

#### MICROBIAL TESTING

Air and water sampling should be part of the risk management program and be implemented during commissioning. Cumulative data should be used to establish indoor and outdoor background levels of filamentous fungi for a particular site. This will enable establishment of risk profiles for particular locations in and around the healthcare facility.

It is important to consult with a microbiologist experienced in environmental sampling to identify what outcomes are required of the sampling. Equally important is to have an approximate idea of the expected number of fungi that will be obtained: this will determine the appropriate sampling system. For further details, refer to:

- Department of Health, Victoria, 2014, Infection Control Principles for the Management of Construction Renovation Repairs and Maintenance within Health Care Facilities; and
- Queensland Health, 2013, Guidelines for Managing Microbial Water Quality in Health Facilities.

### 05.03 Verification

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All infection prevention and control measures described in this section are required to be verified by inspection.

A multidisciplinary team should be established comprising, but not limited to:

- infection control experts (medical and nursing);
- hospital engineers;
- OHS staff;
- environmental health staff;
- client representatives; and
- project staff (architect, facility planner, consulting engineers, project manager etc.).

These staff should be involved and consulted throughout the stages of planning, design, construction and commissioning.

### 05.04 Construction Risk Assessment and Action Plan

The construction risk assessment and action plan comprises four key steps including:

- identification of the construction activity type;
- selecting the appropriate infection prevention and control group;
- determining the construction classification class; and
- implementation of the infection prevention and control construction guidelines.

#### STEP 1 - IDENTIFY THE CONSTRUCTION ACTIVITY TYPE

The identification of the construction activity type (Table 1) is defined by:

- the amount of dust generated; and
- the duration of the involvement of the heating ventilation and air conditioning systems (HVAC).

**Table 1: Definitions of the Construction Activity Types**

Type A Inspections and general upkeep activities	Type B Small scale, short duration activities, which create minimal dust	Type C Any work that generates a moderate to high level of dust	Type D Major demolition and construction projects
Includes but not limited to : removal of ceiling tiles for visual inspection (limited to 1 tile per 5 m <sup>2</sup> ); painting (but not sanding); installation of wall covering; electrical trim work; minor plumbing; any activities that do not generate dust or require cutting into walls or access to ceiling other than for visual inspection.	Includes, but is not limited to, installation of telephone and computer cabling, access to chase spaces, cutting into walls or ceiling where dust migration can be controlled.	Includes, but is not limited to, demolition or removal of built-in building components or assemblies, sanding of wall for painting or wall covering, removal of floor covering/wallpaper, ceiling tiles and casework, new wall construction, minor ductwork or electrical work above ceiling, major cabling activities.	Includes, but is not limited to heavy demolition, removal of a complete ceiling system, and new construction.

#### STEP 2 - SELECT THE INFECTION CONTROL RISK GROUPS

The infection control risk groups as defined in the table below are indicative only. Where possible, work should be conducted after patient care hours where services are not provided on a 24 hour, seven day basis, such as outpatient clinics and day therapy services.

**Table 2: Infection Control Risk Groups**

Group 1 - Low	Group 2 - Medium	Group 3 - Medium/High	Group 4 - Highest
Office areas	Patient care and other areas not listed under Groups 3 or 4	Emergency department	Oncology units

Non-patient/low risk areas not listed elsewhere	Laundry	Medical Imaging – general	Radiation therapy
	Cafeteria	Recovery rooms	Oncology clinical areas
	Dietary	Delivery rooms	Chemotherapy
	Materials management	High dependency unit	Transplant
	Allied health	Newborn nurseries	Pharmacy admixture/ clean rooms
	Admissions/discharge	Paediatrics (except paediatric ICU)	Operating rooms
	MRI	Microbiology labs	Sterile supply units
	Nuclear medicine	Virology labs	Cardiac catheterisation
	Echocardiography	Long stay-sub-acute units	Angiography rooms
	Laboratories not specified under Group 3	Pharmacy	Outpatient invasive procedure rooms
	Public corridors used by patients and to transport linen & supplies	Endoscopy	Anaesthetic and pump rooms
		Bronchoscopy	All intensive care units – adult, paediatric, neonatal
		Dialysis	

**STEP 3 - DETERMINE THE CONSTRUCTION CLASSIFICATION CLASS**

Using the construction activity type and the infection control risk group selected, apply the matrix below to determine the construction classification class.

The construction classification class matrix (Table 3) determines the procedures to be followed during construction and renovation projects.

**Table 3: The Construction Classification Matrix**

Construction Activity Risk Level	Type A	Type B	Type C	Type D
Group 1	Class I	Class II	Class II	Class III/IV
Group 2	Class I	Class II	Class III	Class IV

Group 3	Class I	Class III	Class III/IV	Class IV
Group 4	Class III	Class III/IV	Class III/IV	Class IV

**STEP 4 - IMPLEMENT THE INFECTION CONTROL CONSTRUCTION GUIDELINES**

Infection control construction guidelines (Table 4) outline procedures to control the release of airborne contaminants resulting from construction, demolition or renovation activities.

Implement the appropriate infection control construction guideline based on the construction activity type as identified using the construction classification matrix (Table 3).

An infection control checklist can be found in the Infection Control Checklist.

**Table 4: The Infection Control Construction Guidelines**

Class	Guideline
Class I	<p>Execute work by methods to minimise raising dust from construction operations.</p> <p>Replace any ceiling tile displaced for visual inspection as soon as possible.</p>
Class II	<p>Provide active means to prevent air-borne dust from dispersing into atmosphere.</p> <p>Seal unused doors with duct tape.</p> <p>Contain construction waste before transport in tightly covered containers.</p> <p>Wet mop and/or vacuum with HEPA filtered vacuum.</p> <p>Place dust-mat at entrance and exit of work area and replace or clean when no longer effective.</p> <p>Isolate HVAC system in areas where work is being performed.</p> <p>Wipe casework and horizontal surfaces at completion of project.</p>
Class III	<p>Isolate HVAC system in area where work is being done to prevent contamination of the duct system.</p> <p>Complete all construction barriers before construction begins.</p> <p>Maintain negative air pressure within work site utilising HEPA filtered ventilation units or other methods of maintaining negative pressure. In each jurisdiction, the relevant public safety officers will monitor air pressure.</p> <p>Do not remove barriers from work area until complete project is thoroughly cleaned.</p> <p>Wet mop or vacuum twice per eight hour period of construction activity or as required in order to minimise tracking.</p> <p>Remove barrier materials carefully to minimise spreading of dirt and debris associated with construction. Barrier material should be wet wiped, HEPA vacuumed or water misted prior to removal.</p> <p>Contain construction waste before transport in tightly covered containers.</p> <p>Place dust-mat at entrance and exit of work area and replace or clean when no longer effective.</p> <p>Wipe casework and horizontal surfaces at completion of project.</p>
Class IV	<p>Isolate HVAC system in area where work is being done to prevent contamination of duct system.</p>



Complete all construction barriers before construction begins.

Maintain negative air pressure within work site utilising HEPA filtered ventilation units or other methods of maintaining negative pressure. In each jurisdiction, the relevant public safety officers will monitor air pressure.

Seal holes, pipes, conduits, and punctures to prevent dust migration.

Construct Anteroom and require all personnel to pass through the room. Wet mop or HEPA vacuum the Anteroom daily.

During demolition, dust producing work, or work in the ceiling, disposable shoes and coveralls are to be worn and removed in the Anteroom when leaving work area.

Do not remove barriers from work area until completed project is thoroughly cleaned.

Remove barrier materials carefully to minimise spreading of dirt and debris associated with construction.

Barrier material should be wet wiped, HEPA vacuumed or water misted prior to removal.

Contain construction waste before transport in tightly covered containers.

Place dust-mat at entrance and exit of work area and replace or clean when no longer effective.

Keep work brooms clean and remove debris daily

Wet mop hard surface areas at completion of project, HEPA vacuum carpeted surfaces at completion of project.

Wipe casework and horizontal surfaces at completion of project.

### 05.05 References

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- AusHFG, 2010, AusHFG Part F: Project Implementation, Australasian Health Facility Guidelines, Sydney, Australia.
- Department of Health, Victoria, 2014, Infection Control Principles for the Management of Construction Renovation Repairs and Maintenance within Health Care Facilities, Department of Health, Victoria, Melbourne, Australia.
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