
1.1 Introduction

This document details the policies, processes and procedures necessary to ensure adequate infection control measures are taken when building construction projects and building maintenance activities are carried out within CDHB facilities.

Associated documents

CDHB Manual, Volume 6 – Health and Safety
Infection Prevention & Control Construction & Maintenance Work Approval Form Ref: 0830

Scope

This document applies to all building construction projects, maintenance activities and information technology (IS) installations that will occur in patient care areas, or adjacent to patient care areas. It also applies to work in units or departments that provide support to patient care areas (e.g. kitchens, sterile services, and laboratories).

Note: This document applies only to the infection control aspects of the above mentioned activities, and in no way detracts from, or substitutes for, other building requirements as laid out in relevant legislation and standards. For example, the Building Act 1991, the Building Regulations 1992, or New Zealand Standards 4303:1990 Ventilation for Acceptable Indoor Air Quality.

Roles and Responsibility

The designated Project Manager, Manager - Maintenance and Engineering, or CDHB Representative in charge of the construction project, maintenance activity or information technology (IS) installation.
The Infection Prevention & Control Service is responsible for providing advice and infection control recommendations to the designated Project Manager, Manager - Maintenance and Engineering or CDHB representative.

1.2 Construction/Maintenance: Planning, Consultation and Approval

Objective

To minimise infection risk to patients, staff and visitors by ensuring that Infection Prevention & Control (IP&C) input is incorporated into:

- the design plans and specifications prior to construction activities commencing
- maintenance activities

Responsibility

The designated Project / Maintenance Manager, or assigned CDHB Representative.

Initiation

- At the concept design stage.
- During planning activities in response to work requests.

Frequency

- On-going consultation with the Infection Prevention & Control Service at all design stages and during the construction activities.
- IP&C must be consulted prior to the start of maintenance activity.

Rationale

Building/Maintenance activities have the potential to increase infection risk in susceptible patients. It is necessary that IP&C advice be sought early in the process to minimise this risk.
**Consultation and Planning**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
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<tbody>
<tr>
<td>1.</td>
<td>Infection risks during proposed construction/maintenance activities must be considered so that the necessary precautions are implemented. The designated Project/Maintenance Manager, or CDHB Representative, does this using the Construction &amp; Maintenance Activity/Infection Risk Matrix in the Infection Prevention &amp; Control Construction and Maintenance Work Approval Form. Follow the instructions on the form to determine the Infection Risk Class.</td>
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<tr>
<td>2.</td>
<td>Where approval is required forward the application form promptly to the Infection Prevention &amp; Control Service (applies to Infection Risk Class III or Class IV, Medium or High risk, Maintenance activities).</td>
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<td>3.</td>
<td>The Infection Prevention &amp; Control Service will liaise with the Project/Maintenance Manager, or CDHB Representative, to clarify the required precautions where necessary. Sign-off will be completed within two - five working days. (Every attempt will be made to respond to urgent maintenance work as quickly as possible).</td>
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<td>4.</td>
<td>The Project/Maintenance Manager, or CDHB Representative, must ensure that the required precautions are documented in the contract/job plan for each contractor.</td>
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<td>5.</td>
<td>The Project/Maintenance Manager, or CDHB Representative, must consult with the Infection Prevention &amp; Control Service to enable a check that infection control precautions have been instigated (e.g. dust suppression methods and hoarding). (This applies to Infection Risk Class III or Class IV, Medium or High risk, Maintenance activities). This is to ensure that patients particularly susceptible to infection are protected.</td>
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<td>6.</td>
<td>The Infection Prevention &amp; Control Service must be advised of the construction/maintenance timetable, and the Project/Maintenance Manager or CDHB Representative, must continue liaison with Infection Prevention &amp; Control staff throughout the construction/maintenance period. This is to ensure the defined infection control precautions are being implemented appropriately.</td>
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<td>7.</td>
<td>The Project/Maintenance Manager or CDHB Representative must discuss any deviations from the specified Infection Prevention &amp; Control requirements with the contractors as a contractual issue.</td>
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<td>8.</td>
<td>For any potential impact on staff health, the Project Manager or CDHB representative shall liaise with the facilities Occupational Safety and Health Manager/Adviser.</td>
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**Note:** After construction or renovation activities, coloured coded hospital floor plans (patient risk groups) should be re-assessed and re-categorised where appropriate.
1.3 General Precautions during Construction & Maintenance

Objective

To minimise infection risk to patients, staff and visitors during hospital construction by ensuring adequate Infection Prevention & Control precautions are established for such activities.
To clarify the process by which a manager determines whether an Infection Prevention & Control Approval Form is required for a construction project.

Responsibility

The designated Project/Maintenance Manager, or CDHB Representative, is responsible for determining whether an Infection Prevention & Control Approval Form is required, and if so for submitting an application. (Meetings conducted with the IP&C Service during the design process ought to alert the need for the submission of an application). The person arranging and tendering the contract(s) for construction/maintenance work is responsible for ensuring that the necessary Infection Prevention & Control precautions are taken during construction/maintenance, and that they are documented in the contract/job plan for each contractor. A Clinical Nurse Specialist-IP&C is responsible for liaising with the designated Project Manager, or CDHB Representative, before and during construction to ensure that patient, staff and visitor safety is maintained throughout the process.

Frequency

Each separate construction project requires individual consideration.

Infection Risks

Construction/maintenance projects, in particular renovation projects, pose potential patient, staff and visitor health risks. It is important that whenever any construction/maintenance work is carried out, precautions are taken to minimise the spread of dust that may contain potentially pathogenic bacteria and fungi - such as *Aspergillus* spores or Legionella bacterium. *Aspergillus* species are fungi found in dust, water and organic matter. They are normally present in the soil and the environment, and large quantities are released into the air when construction or any earth moving activities are carried out.

Patients who are severely immuno-compromised (e.g bone marrow transplant patients, patients on long-term or high dose steroid therapy, and organ transplant patients) are particularly vulnerable to *Aspergillus* infections. These can be life threatening or even fatal. There have been numerous documented outbreaks of *Aspergillus* infections following construction activities in hospitals. Legionella bacteria are found in aquatic environments, as well as in soil and dust. During construction projects, hospital water systems may be disrupted, and the hospital’s potable water may become contaminated with Legionella when the water supply is restored.
1.3.1 Flowchart – Construction: Planning Consultation and Approval

The flow-chart below outlines the procedure for consultation with the Infection Prevention & Control Service during concept design and planning.

**Plans:** This term is used in the flowchart to refer to documents such as Floorplates, Sections of PEG, Ventilation, Water and Sewerage and Drainage.

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**Note:** Where sections of the project are in dispute they will be placed on hold, however undisputed portions may continue. Unresolved design issues will need referral to Provider Arm Management, and if necessary to the Executive Management Team.
1.3.2 Flowchart - Maintenance: Planning, Consultation and Approval

The flowchart below outlines the procedure for consultation with the Infection Prevention & Control Service before maintenance work in areas assessed to have an Infection Risk Class III or Class IV is initiated.

Evaluation of Maintenance work requests and projects against the Infection Control Risk Matrix

Infection Control Approval Form required?

No

Yes

Forward to Infection Control

Yes

Meets relevant Infection Control Standards?

No

Recommend changes

Yes

Any other suggestions to minimise infection risk?

No

Project proceeds

Yes

Plans revised
1.4 Infection Prevention & Control Guidelines during Construction

Infection Prevention & Control precautions are necessary during construction. The particular Infection Prevention & Control requirements may vary from project to project, and across different hospital sites e.g. an acute service versus a rehabilitation unit or mental health unit. At the time a project is initiated, the specific Infection Prevention & Control measures to be written into the contract will be determined in liaison with the Infection Prevention & Control Service. These may include:

Traffic control
- Designated entry and exit procedures defined.
- Egress paths outside work site clear of debris.
- Signage directing pedestrian traffic away from the construction area and materials.
- A designated “site/contractor area” is to be agreed upon.

Demolition
- Debris within hospital buildings to be removed in bins with tightly fitted covers using designated traffic routes, or other adequate dust suppression precautions instituted during removal.
- Debris removed frequently during periods of low activity (confirm times with the Project Manager or CDHB Representative).

Exterior windows
- Windows to occupied areas adjacent to a construction site fixed shut as appropriate. The contractor returns these windows to the state they were in prior to being fixed shut, at the completion of the project.

Construction Worker Education
- Clinical Nurse Specialists-Infection Prevention & Control to provide appropriate IC education, for construction workers on induction

Ventilation and environmental control
- Removal and capping off of existing HVAC ductwork between construction and operational areas, where there are common HVAC systems. Reinstatement once all works are completed.
- Airflow patterns need to be considered to minimise dust dispersion where construction activities necessitate work within internal areas of the hospital.
- Status of sealed penetrations and intact ceilings verified by the contractor to the Project Manager, or CDHB Representative, and a representative from the Infection Prevention & Control Service.
- HEPA vacuuming of dust affected areas, and flushing of debris from water systems at practical completion of the construction project.

Dust suppression methods
- Exterior hoardings at least 1.8 metres above proposed ground levels, and compliant with NZBC Approved Document F/5/AS1.
- Rubbish skips covered (or with hinged covers) or other adequate dust suppression precautions instituted during removal.
- Loads of dirt, sawdust, soil (or other material that will aerosolise) ought to be covered on open deck vehicles entering and exiting the work site, or other adequate dust suppression precautions instituted during removal (e.g. wetting down loads).
- Wetting down of the soil on the construction site at a frequency that ensures dust dispersion is minimised, and that dust is contained within the work site as far as is practicable.
- A wash-down area for contract works vehicles is desirable for large scale excavation activities.
• Contractor and subcontractor clothing free of loose soil and debris before leaving the construction site and entering a clinical and food service areas.
• Visitors to the work site ought to be accompanied by a site worker that has previously been inducted into Infection Prevention & Control requirements for the site.

**Dust Suppression Methods (within hospital buildings)**

• Where it is necessary for the contractor or subcontractors to enter existing hospital buildings, new 'tack' entrance mats positioned at the internal hoarded entranceways. These mats shall be of a type that captures dirt and debris. Mats cleaned regularly to maintain effective dust suppression function.
• Workers entering occupied areas of the hospital have clean overalls and boots.
• Workers wash hands thoroughly prior to entering clinical areas.
• Tools and equipment damp-dusted before use in clinical areas of hospital buildings.
• Internal hoardings ought to effectively minimise dust dispersion from the work site to other areas of the hospital. The nature of the work will determine the type of hoarding necessary (refer to “Hoarding Guidelines” Site Redevelopment Location Manual).
• Where it is necessary for the contractor or subcontractors to enter existing hospital buildings, temporary solid wall partitions erected to minimise the tracking of dust and debris into the hospital. All doors within the immediate area of the work zone should be kept closed.
• Where works are being undertaken in occupied areas that lack external access, contractors and subcontractors are to remove or change dusty work clothing before entering clinical areas.
• Windows within a construction area should be kept closed to prevent wind blowing dust through into an adjacent clean area.
• On completion of construction/renovation activities, the contractor will perform an initial clean. This will be followed by appropriate cleaning and disinfection processes performed by the hospital cleaning services. The CNS Infection Prevention & Control will inspect the final clean and will verify that the area is safe for occupation.
• Air sampling and particle counts in high risk areas (BMTU, Operating Theatres etc) must be factored in, allowing time for culturing of results and repeat cleaning (if necessary) and testing prior to occupation.

**Special Note**
In a situation where emergency measures are carried out it is accepted that not all steps will be able to be followed. However, Infection Prevention & Control Service involvement in assessing post-incident risk to patients in such a case is essential. Infection Prevention & Control Service shall be informed as soon as practicable.

### 1.5 Infection Prevention & Control Guidelines during Maintenance

Infection risks during proposed maintenance activities in areas assessed to have an Infection Risk Class III or Class IV (Medium High or High Risk) must be considered, so that where necessary precautions are implemented. The particular Infection Prevention & Control requirements may vary from project to project, and across hospital sites. These may include:

**Removal of Rubbish**
• Debris removed in sealed bags, bins with tightly fitted covers or wrapped in plastic sheeting or other adequate dust suppression precautions instituted during removal. Debris removed via a short, safe route out of the hospital building.
Debris removed frequently during periods of low activity (confirm times with the Project Manager or CDHB Representative) using designated traffic routes.

- No rubbish chutes used.
- Filters bagged and sealed before leaving the work area.

**Ventilation and environmental control**

- Removal and capping off of existing HVAC ductwork to maintenance and operational areas, where there are common HVAC systems. Reinstatement once all work complete.
- Airflow patterns need to be considered to minimise dust dispersion where maintenance activities necessitate work within areas determined to have an Infection Risk Class III or Class IV.
- Status of sealed penetrations and intact ceilings is to be verified by the Project Manager, or CDHB Representative, and a representative from the Infection Prevention & Control Service.
- HEPA filtered vacuum cleaners must be used to clean hoarded and non-hoarded areas in clinical areas. HEPA vacuuming of affected areas occurs at practical completion of the project.

**Dust Suppression Methods**

- Temporary solid wall partitions erected to minimise the tracking of dust and debris around the hospital. All internal hoardings (temporary solid wall partitions) sealed and airtight, to limit dust and dirt dispersion. Internal hoardings ought to effectively minimise dust dispersion from the work site to other areas of the hospital. The nature of the work will determine the type of hoarding necessary (refer to “Hoarding Guidelines” Site Redevelopment Location Manual).
- All doors and windows within the immediate area of the work zone should be kept closed.
- Where maintenance projects are carried out in occupied areas of hospital buildings, ‘tacky’ entrance mats positioned at designated entries to the work area. These mats shall be of a type that captures dirt and debris. A designated person/or persons to ensure that the sticky layers of these mats are peeled off and discarded once the ‘tacky’ surface has stopped functioning. This is to maintain the effective dust suppression function of these mats.
- Workers entering occupied areas of the hospital have clean overalls and boots.
- Tools and equipment damp-dusted before being brought into hospital buildings, and before removal from the work area.
- Workers hands thoroughly washed prior to entering clinical areas.
- Worker clothing to be free of dust and debris before leaving the work site, and entering clinical areas.
- If protective clothing is not worn, a HEPA filtered vacuum used to remove dust from clothing before leaving containment area.
- Where significant Maintenance projects are being undertaken in occupied areas that lack external access, an area should be provided where workers are able remove or change dusty work clothing before entering clinical areas.

**Special Note**

In a situation where emergency measures are carried out it is accepted that not all steps will be able to be followed. However, Infection Prevention & Control Service involvement in assessing post-incident risk to patients in such a case is essential. Infection Prevention & Control Service should be informed as soon as practicable.
1.6 Infection Prevention & Control Design Guidelines

Purpose
To ensure New Zealand Health & Disability (Infection Prevention & Control) Standard 8134.3.2008 is applied to new building projects, maintenance projects and information technology (IS) installations that will occur in patient care areas, or adjacent to patient care areas. This includes changes to occupancy or purpose of a room, ward or area. These standards are the minimum general requirements for patient care areas. Additional requirements may be necessary in specialist areas.

Scope
All patient care areas, and areas attached or adjacent to patient care areas.

Definitions
A “patient care area” means an area that is occupied by patients, or intended for the performance of clinical activities, patient examination and minor surgical procedures. It does not include rooms designated for consultation only, or for consultative therapy.

Design Guidelines

- A hand wash basin must be provided in each bedroom, treatment room and in close proximity to each toilet and/or bathroom facility, preferably with hands free, elbow, foot, or sensor operated taps. Taps should be fitted with an antisplash back device. Liquid soap, paper towel and disposable glove dispensers and rubbish bins will also need to be provided. Additional hand wash basins may be indicated for other rooms or departmental areas.

- Floors: floor surfaces in all patient care environments must be non-absorbent, easy to clean and are not physically affected by germicidal cleaning solutions.

- Carpets: These are not recommended in any area where body fluid spills or chemical spills may occur. In low risk areas, other considerations (e.g. health & safety) may occasionally take precedence over Infection Prevention & Control aspects of floor coverings - but in all cases; the ability to adequately clean up and decontaminate body fluid spills must be considered, as well as general ease of cleaning.

- The surfaces of walls and ceilings must be easy to clean, scrub able and designed in such a way to discourage the accumulation of dust and microorganisms. Wall finishes in the immediate vicinity of plumbing fixtures shall be smooth and water resistant, Wall and window fittings must be easy to clean. Vertical and horizontal blinds are difficult to clean and should only be fitted in clinical areas between two panes of glass. Washable blinds and curtains are suitable window fittings for clinical areas.

- “Clean” and “dirty” items must be located in geographically separate areas.
  - Examples of “clean” items are:
    - clean linen, CSSD supplies, medications
  - Examples of “dirty” items are:
    - contaminated linen, rubbish, and used equipment
    - blood and body fluids

- The clean utility room and sluice/disposal room must both contain a hand wash basin separate to any sink.

- Where possible, design of the area should allow for removal of dirty items without needing to travel through clean areas. Removal of contaminated linen and rubbish should not be through public thoroughfares.

- Adequate storage must be provided for holding clean linen, disposable items and equipment such as wheelchairs.

- Air Quality: Ventilation systems should comply with Ventilation Standard. Within clinical areas, air-conditioning should be ducted and this ducting, as well as filters, should be appropriately cleaned on a regular basis. When Health Care Facilities are developed consideration should be given to one whole floor level, or a defined section of inpatient accommodation being designed with separate air conditioning and exhaust (will enable the
facility to accommodate an infectious outbreak incident within the CDHB.

- Individual ventilation units may be required for specified areas e.g. TB rooms, areas with oncology patients, isolation rooms, and operating suites. Ventilation requirements for specific circumstances may include positive pressure, negative pressure, or HEPA filtration systems. **A copy of the validation of newly commissioned positive or negative pressure rooms must be sent to that hospital services Clinical Nurse Specialist, IP&C.**

- For further information refer to either the Australasian Health Facilities Guidelines November 2006, Department of Health Code of Practice “Accommodation in Hospitals” or The American Institute of Architects Academy “Guidelines for the design and construction of Hospitals and Health Facilities 2010”.

- Isolation Room Planning to consider the following:
  - Sufficient storage space for linen and waste containers inside the room and for gowns, gloves and masks inside the room or outside in an anteroom.
  - An observation window with good visual observation for staff and privacy for patients (a blind within double glazing should be considered).
  - Provision of a communication system such as a phone or intercom to allow for communication between staff, patients and visitors without leaving the room.

- For specialist areas refer to other applicable standards, guidelines and recommendations from professional bodies, e.g. Centers for Disease Control (CDC), the Association of Operating Room Nurses (AORN), the Hospital Infection Society (HIS) or to the Infection Prevention & Control Service.

**References**


QHNZ Accreditation Standards for Health and Disability Support Services - Safe Environment and Practice Standard 7.0.


Australasian Health Facility Guidelines Nov 2006