



Hume Region  
Infection Control Resource  
and Consulting Service

# Construction and Refurbishment Risk Assessment

And  
Action Plan  
Proforma

Minimisation of dust generated at construction site (internal and external) and elimination of the risk of dust/debris entering into adjacent patient care and patient care support areas and existing buildings is of utmost importance.

## Primary Issues

- Risk Assessment of construction site (internal and external) and adjacent patient care/support areas and buildings.
- Identification of current conditions within existing buildings, including air-conditioning, air handlers and intakes, ducts and vents. Water, plumbing and fire sprinkler systems need to be located and assessed, and any other source where interruption or breach in supply during construction works may impinge on the safe running of systems i.e. medical gases, electricity
- Preparation of site prior to commencement of construction.
- Develop action plan (example proforma attached) that will minimise the risk of dust entry into adjacent patient care/support areas, and existing buildings. Also monitor areas of traffic flow which provide a potential avenue of dust/debris entry and contamination.
  - Creation of barriers to isolate construction site within the hospital or from construction site external to the hospital
  - Identify portals of entry for dust and debris into adjacent patient care/support areas, and existing hospital buildings during excavation and construction
  - Review of patient services to determine if any high risk procedures or activities need to be suspended for duration of construction.
  - Review of patient type who may be susceptible or at increased risk of infection from contaminants generated during construction processes

- Identify traffic areas where persons enter and exit from the construction site, or building. Determine if there is a requirement for an ante room or decontamination area (hand washing facility, removal of boots, overshoes, overalls, protective equipment) for persons at entry points to construction areas deemed at risk
- Identify vehicle/person exit and entry points of the hospital during excavation and construction activities
- During excavation and construction, quality activities are undertaken to monitor dust/contamination levels within the existing building and any water storage reservoirs that may become vehicle for Legionella growth and dispersal.

## **Risk assessment of construction site and adjacent buildings**

A thorough risk assessment of the proposed construction site and adjacent buildings should be undertaken by a qualified person (Project Manager/Construction Engineer) who is knowledgeable of the risk assessment process and intervention planning for construction sites.

Determine level of risk associated with the proposed construction activities. The CCDR 2001-Construction-related Nosocomial Infections in Patients in Health Care Facilities identifies a construction activity and risk group matrix to undertake this risk assessment.

The risk assessment process will identify potential portals of entry for dust and debris from construction site (internal/external) into existing building. This will include inspection of window and door seals, air-conditioning units, water reservoirs, and air vents, intakes and exhausts.

The risk assessment will also look at current plant, water pipe/sewerage and utilities to determine if interruptions or cessation to supply/service or proximity to construction will affect quality and supply. If so, what strategies will need to be put into place and what measures need to be undertaken on recommencement of affected supply i.e. water/electricity?

Following the risk assessment, an action plan will be developed to implement any activities required to protect building/patients/staff from dust and debris. This will include sealing off portals of entry as identified and interim engineering changes to existing air-conditioning, water reservoirs and pipe works.

Of particular note is dust entry into ceiling and building spaces of existing building that does not enter air circulation systems. Whilst not presenting an immediate problem as the dust is contained to spaces, the dust build up in these areas will increase risk if and when renovation and refurbishment works are activated in that area/building and the ceiling spaces are exposed.

A decontamination or ante room areas may need to be located at entry points to the existing buildings to for removal of contaminated footwear, clothing and hand washing prior to entry by persons coming from the worksite/worksite/traffic area who are contaminated with dust/mud/debris into existing hospital building.

## Potential portals of entry of dust/particulate matter

### Physical Environment

- Air-conditionings systems with/without cooling towers
- Dedicated refrigeration units located in windows/walls
- Air intake/exhaust into ceiling spaces from outside
- Doors and windows with poor seals and gaps
- Exhaust fans located in windows of wet areas direct to outside

### Traffic

- Persons
- Equipment
- Delivery of goods and supplies
- Removal of waste/linen etc

## Other areas for consideration

### Occupational Health and Safety/patient visitor safety

- Removal of hazardous building materials i.e. Asbestos
- Noise pollution
- Access to buildings-changed or modified to previous conditions- (how is this communicated to customers)

## **Traffic**

- Direct non-essential traffic as far as practicable away from construction site and construction activities.
- Existing buildings/construction areas may require separate exit and entry points for delivery of incoming clean goods and collection of outgoing contaminated wastes.
- Emergency services access to all parts of existing buildings in the event of disaster (fire etc)
- Access for delivery of clean goods such as linen, dry and perishable foods, sterile and non-sterile supplies,
- Access for collection of hospital wastes, dirty linen
- Exit and entry points should not be shared with construction vehicles/traffic to minimise potential contamination and OH&S risks.

## **Monitoring Systems**

Implement monitoring activities to ascertain effectiveness of preventative measures undertaken to prevent dust and debris entry into existing buildings.

- Visual inspections
- Wipe tests of horizontal surfaces
- Review processes and identify breaches or hazards that impinge on the integrity of the risk assessment and planned interventions i.e. change in traffic flow due to building works which compromises separate clean/dirty entry exit points.
- Air sampling of particulate matter if dust problematic and if patient health concerns are identified.
- Specified environmental sampling if identified outbreak of infection thought to be related to construction works occurs.

## **Reference Material**

APIC State of the Art Report. The role of infection control during construction of health care facilities. Judene Mueller Bartley, MS MPH, CIC-2000 (USA)  
<http://www.cdc.gov/ncidod/hip/GUIDE/construct.htm>  
<http://www.apic.org/pdf/srconst.pdf>

Construction-related Nosocomial Infections in Patients in Health Care Facilities-CCDR-access via internet on <http://hc-sc.gc.ca/hpb/lcdc> (Canadian)

HRICRCS –Risk Assessment Proforma for Construction and Refurbishment Activities

<b>Planning Phase-Area or Department (insert name)</b>						
Preventative/risk minimisation strategy	Identified Risk	Potential Source of Risk	Actions Required	Proposed Outcomes	Responsibility and Timeframe	Organisational Risk
<p><b>Identify key personnel to be involved in pre planning phase of the construction activities i.e. Project Manager Organisation Management, Organisation Engineering, Construction Company, Infection Control, Unit managers in the areas of and adjacent to proposed building works, Microbiologist, External consultants OH&amp;S Purchasing officer Environmental/hotel services,</b></p> <p><b>(list not exhaustive)</b></p> <p><b>Identify Construction Activity Type (A,B,C,D). Refer CCDR-2001 pg 17-18</b></p>	<p>All key stakeholders to be involved in planning processes. This will allow input from all areas directly and indirectly affected by construction activities.</p> <p>Activities/areas within the hospital not directly related to the construction site, may be affected by the works whilst in progress i.e. Interruption to utility services (water, electricity)</p> <p>Change in entry and exit locations and traffic flow for delivery, transport of pick up goods/wastes, etc</p>	<p>Unidentified factors/issues that may elevate risks of nosocomial infection/ patient and staff safety during construction period.</p>	<p>Planning meetings to identify risks and how these risks will be addressed and by whom.</p> <p>Pre determined construction site visits by key personnel to ensure appropriate risk minimisation measures are in place.</p> <p>Plan for closure of, or minimising services provided by units /departments during stages in the construction phase that have the potential to increase infection /safety risks to patients, visitors and staff.</p> <p>Unit/Dept Mangers to inform staff of changes to current work practices during construction phase.</p>	<p>All potential issues related to construction site are identified and addressed.</p> <p>Patient, visitor and staff health outcomes have not been compromised by the construction activity</p>		

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<p><b>Containment and minimisation of dust, soil , particulate matter and water reservoirs harbouring micro-organisms i.e. Fungal spores Bacterial spores Legionella</b></p>	<p>Nosocomial infection arising from; exposure of patients, visitors and staff to airborne contaminates, or contamination of hospital environment, equipment, systems by dust /soil generated by construction activities in or outside the hospital.</p>	<p>Direct and indirect communication between construction site and patient care areas, food preparation areas, central sterilising departments, air-conditioning systems (cooling towers) or water systems etc.</p>	<p>Identify all possible external/internal portals of entry for dust i.e. windows, doors, air-vents/exhausts/intakes between construction area and non-construction areas that will need to be sealed</p> <p>Determine the need for erection of baffle/ barrier/ containment walls to meet standards.</p> <p>Identify need and location of designated ingress and egress areas for construction workers including antechamber with decontamination and change of clothing facilities.</p> <p>Plan to obtain portable HEPA filtered dust extractors and fit where appropriate to exhaust dust form construction area directly outside.</p>	<p>Nil incidence of nosocomial infection related to construction activities</p>		

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Preventative/risk minimisation strategy	Identified Risk	Potential Source of Risk	Actions Required	Proposed Outcomes	Responsibility and Timeframe	Organisational Risk
		<p>Plumbing, pipe work and water systems that are interrupted during construction phase.</p> <p>New pipe work into existing systems may create unforeseen deadlegs</p> <p>Cessation of utility services during construction phase i.e. Electricity Gas Water</p>	<p>Plan where possible to fit dust collectors directly to equipment being used.</p> <p>Ensure reactivation of water systems does not generate activation of sediment into existing pipe work.</p> <p>Ensure new pipe work does not create deadlegs which proposes a sedimentation risk (infection risk) in the future</p> <p>Evaluate effect of cessation of utilities such as electricity/gas during construction phase, what risks are associated with start-up if systems have been dormant? Areas affected by cessation of utilities will need to be notified in advance to arrange alternative or plan to close unit for that period of time. What services will be affected during down time of the utility, what risks does this pose to that area?</p>			

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Preventative/risk minimisation strategy	Identified Risk	Potential Source of Risk	Actions Required	Proposed Outcomes	Responsibility and Timeframe	Organisational Risk
<b>Traffic Flow including movement of persons and equipment will be controlled and monitored</b>	Persons Equipment Supplies Removal of waste	Construction workers provide a potential vehicle for spread of dust and debris by direct communication or contact with staff and equipment in non-construction areas.	Ensure there is no direct communication between workers and staff and equipment used for patient care activities. In areas where workers have to ingress and egress construction site via patient care or patient care support areas, an antechamber (air lock) with handwashing, decontamination and clothing change facilities must be provided.	Nil incidence of nosocomial infection related to construction activities		
		Only designated person to enter construction site	Ensure access to construction area is monitored and only to authorised persons.			
		Equipment used for construction purposes must be transported to and from the construction area in manner that minimises contamination risk during transit.	Provide a pathway for transport of equipment that has the least exposure to patient care areas and staff. If equipment can only be transported via these areas to the construction site, then processes to minimise contamination of the			

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Preventative/risk minimisation strategy	Identified Risk	Potential Source of Risk	Actions Required	Proposed Outcomes	Responsibility and Timeframe	Organisational Risk
		Delivery and pick up of goods to and from the patient care area should not share common entry and exit points.	<p>environment must be undertaken i.e. movement during minimal patient activity periods, dust covers (equipment being transported and patient equipment at risk), wiping over of construction equipment to remove visible dust</p> <p>To minimise risk of contamination of supplies, especially sterile goods, a separate mode of entry and exit to construction area should be implemented. Where this is impracticable or unworkable ensure all inwards/outwards goods are covered with plastic, and appropriate infection control procedures for decontamination is undertaken prior to decanting.</p>			

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Preventative/risk minimisation strategy	Identified Risk	Potential Source of Risk	Actions Required	Proposed Outcomes	Responsibility and Timeframe	Organisational Risk
		<p>Removal of waste from construction area provides a risk of contamination to areas through which the waste is transported.</p> <p>Completion of construction and commissioning process</p>	<p>If practicable install a shut direct to outside for removal of waste.</p> <p>If waste has to be transported internally ensure that the waste removal containers are tightly sealed and wiped over to remove excess dust. Removal should be taken during minimal patient activity periods</p> <p>On completion of the construction, appropriate decontamination and cleaning activities within the construction area will be undertaken i.e. Clean and disinfection of barrier wall (internal to construction area). Thorough clean of all surfaces/air-conditioning vents (intake/outlet) within the construction area. Commissioning of new/repaired equipment may need to be undertaken prior to utilisation.</p>			

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Preventative/risk minimisation strategy	Identified Risk	Potential Source of Risk	Actions Required	Proposed Outcomes	Responsibility and Timeframe	Organisational Risk
<b>Changes to current environment or work conditions of staff should not compromise infection control practices.</b>	Changes to current work conditions may affect the ability of staff to comply with, or meet current standards and guidelines pertinent to their areas of work	Removal of, or inaccessibility to utilities required for patient care activities i.e. Handbasins Used linen and waste storage Equipment processing equipment	If construction works inhibit or deny staff access to necessary utilities to support patient care, then provision for allocation of temporary utilities must be undertaken. The temporary facilities should meet with recommended standards and guidelines (infection control OH&S etc) during utilisation to ensure safety of patients and staff. If temporary utilities cannot be instituted, then provision for alternative arrangements should be made i.e. Closure of that patient care area or department until works complete. Outsourcing of services/activities that are unable to be 'safely' undertaken during proposed changes to work conditions	Nil incidence of nosocomial infection related to construction activities.		

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Preventative/risk minimisation strategy	Identified Risk	Potential Source of Risk	Actions Required	Proposed Outcomes	Responsibility and Timeframe	Organisational Risk
<p><b>Identification of Population and Geographic Risk Groups (refer CCDR-2001 pg 18)</b></p> <p><b>Assign Patient Risk Group i.e. Group One, Group Two, Group Three, Group Four</b></p>	<p>Particular patient groups and patient care areas are at higher risk to exposure of dust and contaminants during construction works as identified in the CCDR reference</p> <p>Identify which patients groups will be at risk, and which geographic areas will be at risk i.e</p> <p>Dialysis Patients/Unit ICU Patients /Unit Theatre Patients /Unit Chemotherapy Patients/Unit</p>	<p>Contaminated environment via air-conditioning, equipment, supplies, food and contaminated persons in contact with patients and patient care equipment.</p> <p>Cessation of utilities/changes to work conditions within particular departments or units.</p>	<p>Identify patients and persons at risk within your facility and implement risk minimisation activities. Refer above to dust minimisation measures. During movement between different patient care areas and departments ensure patients are not exposed to 'unprotected' areas.</p> <p>Implement monitoring activities to determine if risk minimisation strategies are effective i.e. visual inspections, wipe tests, process review if changes to original preventative risk strategy have occurred</p>	<p>Nil incidence of nosocomial infection related to construction activities</p>		

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Example only

Construction Phase-Area or Department (insert name) Construction Class Matrix (I, II, III, IV) Refer CCDR-2001 pg 19				
Risks identified in planning phase	Actions Required to eliminate / minimise risks	Responsibility for implementing action	Identified as actioned (tick)	Identified by (the person identified in responsibility and timeframe planning phase)
<b>Containment and minimisation of dust, soil, particulate matter and water reservoirs harbouring micro-organisms i.e.</b>	1. Seal all windows, doors with protective covering/duct tape.	1. Bob the Builder -Construction Site Foreman	1. <input checked="" type="checkbox"/>	1. Bill Bloggs-Engineer
	2. Erect barrier wall between construction area non-construction areas.	2. ....	2. <input type="checkbox"/>	2. ....
	3. Portable dust extraction units with HEPA filters	3. ....	3. <input type="checkbox"/>	3. ....
	4. Equipment used in construction area is fitted with dedicated dust collection systems	4. ....	4. <input type="checkbox"/>	4. ....
	5. Changes to plumbing will cut water supply to the ..... unit/dept. for one day. Unit/Dept. manager to be notified two days prior to cessation of supply.	5. Bob the Builder -Construction Site Foreman	5. <input checked="" type="checkbox"/>	5. Bill Bloggs-Engineer
	6. ....	6. ....	6. <input type="checkbox"/>	6. ....
	7. ....	7. ....	7. <input type="checkbox"/>	7. ....
	8. ....	8. ....	8. <input type="checkbox"/>	8. ....

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Risks identified in planning phase	Actions Required to eliminate / minimise risks	Responsibility for implementing action	Identified as actioned (tick)	Identified by (the person identified in responsibility and timeframe planning phase)	
<b>Traffic Flow</b>	9. Patients and staff accessing.....unit are to enter via..... Signage to be posted	9. ....	9. <input type="checkbox"/>	9. ....	
	10. Construction workers only to enter and exit construction area via door No 6 into antechamber room. To be signposted.	10. ....	10. <input type="checkbox"/>	10. ....	
	11. Staff transporting catering trolleys and supplies from the kitchen to use the .....access to the unit during construction phase.	11. John Cook-Hotel Services Manager	11. <input checked="" type="checkbox"/>	11. John Cook-Hotel Services Manager	
	12. ....	12. ....	12. <input type="checkbox"/>	12. ....	
	13. ....	13. ....	13. <input type="checkbox"/>	13. ....	
	14. ....	14. ....	14. <input type="checkbox"/>	14. ....	
	15. ....	15. ....	15. <input type="checkbox"/>	15. ....	
	16. ....	16. ....	16. <input type="checkbox"/>	16. ....	

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<b>Construction Phase-Area or Department (insert name) Construction Class Matrix (I, II, III, IV) Refer CCDR-2001 pg 19</b>				
Risks identified in planning phase	Actions Required to eliminate / minimise risks	Responsibility for implementing action	Identified as actioned (tick)	Identified by (the person identified in responsibility and timeframe planning phase)
<b>Changes to current environment and work conditions of staff</b>	17. Utility room in .....unit will be unavailable for two days during construction. Unit/Dept. manager to be notified two days prior to closure of the utility room.	16. ....	17. <input type="checkbox"/>	17. ....
		17. ....	18. <input type="checkbox"/>	18. ....
		18. ....	19. <input type="checkbox"/>	19. ....
	18. Windows within the .....unit are not to be opened during the construction phase.	19. ....	20. <input type="checkbox"/>	20. ....
	19. Storage of patient equipment not in use to be relocated to.....unit during construction period	20. ....	21. <input type="checkbox"/>	21. ....
	20. ....	21. ....	22. <input type="checkbox"/>	22. ....
	21. ....	22. ....	23. <input type="checkbox"/>	23. ....
	22. ....			
	23. ....	23. ....	24. <input type="checkbox"/>	24. ....
	24. ....			

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Risks identified in planning phase	Actions Required to eliminate / minimise risks	Responsibility for implementing action	Identified as actioned (tick)	Identified by (the person identified in responsibility and timeframe planning phase)	
<b>Population and Geographic Risk Groups as identified in pre planning phase</b>	25. Dialysis Unit will be unable to function during construction phase. Patients directed to .....hospital in interim.	24. ....	25. <input type="checkbox"/>	25. ....	
	26. ....	25. ....	26. <input type="checkbox"/>	26. ....	
	27. ....	26. ....	27. <input type="checkbox"/>	27. ....	
	28. ....	27. ....	28. <input type="checkbox"/>	28. ....	
	29. ....	28. ....	29. <input type="checkbox"/>	29. ....	
	30. ....	29. ....	30. <input type="checkbox"/>	30. ....	
	31. ....	30. ....	31. <input type="checkbox"/>	31. ....	
	32. ....	31. ....	32. <input type="checkbox"/>	32. ....	

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**Example only**

<b>Construction Phase-Area or Department (insert name) Construction Class Matrix (I, II, III, IV) Refer CCDR-2001 pg 19</b>				
Risks identified in planning phase	Actions Required to eliminate / minimise risks	Responsibility for implementing action	Identified as actioned (tick)	Identified by (the person identified in responsibility and timeframe planning phase)
<b>Other risks identified by planning committee</b>	33. ....	32. ....	33. <input type="checkbox"/>	33. ....
	34. ....	33. ....	34. <input type="checkbox"/>	34. ....
	35. ....	34. ....	35. <input type="checkbox"/>	35. ....
	36. ....	35. ....	36. <input type="checkbox"/>	36. ....
	37. ....	36. ....	37. <input type="checkbox"/>	37. ....
	38. ....	37. ....	38. <input type="checkbox"/>	38. ....
	39. ....	38. ....	39. <input type="checkbox"/>	39. ....
	40. ....	39. ....	40. <input type="checkbox"/>	40. ....

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**Example only**

<b>Post Construction Phase-Area or Department (insert name) -example only</b>				
Risks identified in planning phase	Actions Required to eliminate / minimise risks	Responsibility for implementing action	Identified as actioned (tick)	Identified by (the person identified in responsibility and timeframe planning phase)
<b>Removal of Dust containment strategies and recommencement of services</b>	1. Clean and disinfection of barrier wall (internal to construction area).	1. ....	1. <input type="checkbox"/>	1. ....
	2. Thorough clean of all surfaces/air-conditioning vents (intake/outlet) within the construction area.	2. ....	2. <input type="checkbox"/>	2. ....
		3. ....	3. <input type="checkbox"/>	3. ....
	4. ....	4. ....	4. <input type="checkbox"/>	4. ....
	5. ....	5. ....	5. <input type="checkbox"/>	5. ....
	6. ....	6. ....	6. <input type="checkbox"/>	6. ....
	7. ....	7. ....	7. <input type="checkbox"/>	7. ....
	8. ....	8. ....	8. <input type="checkbox"/>	8. ....