

The Newcastle upon Tyne Hospitals NHS Foundation Trust

Prevention of Aspergillosis during Building Work Procedure

Effective June 2010

Review May 2013

1 Policy Objective

To identify and define the risks of fungal spore exposure to patients during any building work occurring on the hospital premises and give measures to prevent infection occurring.

2 Scope

This policy is applicable to all Infection prevention and control staff, Estates and construction workers, and staff caring for at risk patients.

3 Background

3.1 What are the main pathogens causing invasive fungal infections?

There are many fungal species that grow in the natural environment, but only a small proportion of these present an infection risk to humans. The main species causing significant human infection is aspergillus. While this policy refers to aspergillus, the same principles apply for the prevention of infection due to other moulds, which may be released into the environment during building work.

3.2 Where does Aspergillus come from?

Aspergillus are ubiquitous fungi and natural inhabitants of soil, water and organic vegetation and debris. Aspergillus spores survive well in the environment and have been cultured from unfiltered air, ventilation systems, dust produced during the course of hospital renovation and construction, food and ornamental plants and flowers.

3.3 Who is at risk?

Whilst aspergillus rarely poses a threat to normal healthy people, it is recognised as a potential cause of severe illness and mortality in highly immunocompromised patients and is the commonest form of invasive fungal infection. For each individual piece of work, there needs to be a risk assessment carried out to determine which patients may be at risk, this is undertaken with the Infection Prevention and Control Team (IPCT).

3.4 How do patients acquire invasive fungal infections?

The primary route of infection is by inhalation of fungal spores which colonise the lungs and can spread via the bloodstream to other major organs. Infection is also believed to occur directly into deep wounds during surgery, however due to the hygiene standards in theatres and the relatively short exposure times involved, this rarely poses a significant risk.

A dose-response relationship exists between exposure to airborne spores and the risk of pulmonary infection. Epidemics of invasive aspergillosis have been traced to

heavy contamination of hospital air and a well recognised association exists between outbreaks of nosocomial invasive aspergillosis and hospital demolition/ building work.

3.5 What is the outcome of susceptible patients being exposed to aspergillus?

Outcome of patients who develop invasive aspergillosis is poor, with a high mortality, this is due to a number of factors. The initial difficulty is that it may not be obvious that exposure has occurred. Symptoms and signs are often non-specific and the diagnosis may be missed or made late. Diagnostic tests for aspergillosis are difficult and may involve invasive procedures. Treatment is lengthy and costly and mortality is still high despite new therapies, thus making prevention a high priority in the management of all at-risk patients.

3.6 What type of work constitutes a risk?

Building work should be regarded as any new build, demolition, renovation, refurbishment, redecoration or maintenance work that involves disturbance to any fabric of the building, including ceiling tiles.

When hospital construction and renovation activities are in the planning stage, it is important to implement a strategy that attempts to protect patients at high risk from aspergillosis and minimise exposure to high ambient air spore levels. This will necessitate creating and maintaining an environment as free of aspergillus spores as possible.

3.7 How are fungal infections prevented?

There are 2 main strategies to prevent nosocomial aspergillosis and they are to minimise the amount of fungal spore release and to keep highest risk patients away from any area where fungal spores may be present. Aspergillus spores have a diameter of between 2.5 and 3.5 microns. In practice this makes the only effective ventilation filtration system to be High Efficiency Particulate Air (HEPA) quality EU12 or above.

4 Roles of staff during any building work

4.1 Role of the Infection Prevention and Control Team (IPCT)

The IPCT must be involved in:

- All phases of any building work where there is a risk to patients e.g. of aspergillus or other fungal spores, whether demolition, construction or internal refurbishment from planning to final hand over of the project.
- Planning, agreement of work programme and duration. Documentary evidence must be completed.
- Undertaking a risk assessment for the area involved.
- Education sessions for contractors.
- Attending all Estates progress meetings and will be available for advice and consultation throughout the project.
- The provision of written documentation on precautions, which need to be instituted

4.2 Role of the building / construction workers

- To be aware of this policy and adhere to the points contained within.
- To attend relevant educational sessions

- To liaise with the IPCT before work commences and during all subsequent phases.
- To maintain the site and their clothing as listed below

4.3 Role of ward staff and those involved in patient's care

- To be aware of this policy and adhere to it
- To maintain a high degree of clinical suspicion of invasive fungal infections during any period of building work
- To liaise with the IPCT if any concerns arise regarding the work or any individual patient

5 Risk Assessment

Patients at most risk of invasive aspergillosis are those who are immunocompromised or immunosuppressed for extended periods of time. These include the following patients:

- Haematopoietic stem cell transplant
- Solid organ transplant
- Oncology
- Haematological malignancy patients especially those with acute leukaemia
- SCIDS (Severe combined immunodeficiency syndrome)

Other patient groups who are at an increased level of risk are:

- Adult, paediatric and neonatal intensive care patients
- Patients on high dose steroids
- Burns
- HIV positive patients
- Patients after major surgery if other factors are present

6 Precautions taken to prevent aspergillus infection

6.1 Permanent protection for the highest risk patients by the use of HEPA filtration ventilation (EU12 or above).

Such systems will be individually designed for specific clinical areas. The performance specification should be approximately 10 - 15 air changes per hour maintaining a positive pressure of between 15 and 20 Pascal's.

6.2 Specific Infection Prevention and Control precautions to be instituted during building work;

6.2.1 Physical Barriers

These are required to minimise spores contaminating clinical areas and may include:

- Plastic sheeting.
- Fire-rated with a > 2 feet overlap for entry.
- Rigid barriers i.e. White washable plywood, which is dust-proof and fire-rated.

- Provision of an entry vestibule for change of clothing, tool storage etc.
- Sealing of windows with adhesive strips.
- Sealing of the area of building work if possible.
- Sealing of doors.
- Sealing of roof space.
- Taking care to minimise dust when dismantling barriers.
- Controlling of dust accumulation by regular 'damping down' with water.

6.2.2 Traffic Control

This can also reduce the dissemination of spores by:

- Directing patients, staff and visitors away from construction area. (Ensure signage is clear and visible).
- Designated entry/exit for contract staff.
- Using separate routes for patients, staff and visitors including separate lifts if appropriate.
- Using routes for removal of building materials and waste which are away from clinical areas.
- For immunocompromised patients, planning journeys avoiding potentially heavily contaminated areas and considering additional precautions e.g. face masks, for patients moving around and visiting the hospital.
- Contractual staff must only use designated routes to work area and change before accessing trust communal catering areas

6.2.3 Ventilation

The direction and movement of air as a vehicle for dissemination of aspergillus spores needs to be considered including the following:

- Use of a negative pressure HEPA filtered vacuum in the construction area, exhausted outside if possible and away from clinically susceptible patient areas.
- Direct airflow should go from clean to dirty areas.
- Protection of the ventilation units of clinical areas.
 - Most important for high risk areas with immunocompromised patients or specialised units.
 - Seal air intakes. However, this will preclude certain clinical areas from being used.
 - Consider carrying out dust generating construction activities out of hours when the air-handling units are shut down. However, this will preclude certain clinical areas from being used.
 - Consider use of additional filters on air intakes. These may block quickly, depending on the type of activity.
 - Monitor filters and air flow.
 - Change filters as required.

6.2.4 Water Supply Disruption

Interruption of mains water supply may increase the risk of contamination of the water by *Legionella* spp. and possibly *Aspergillus*.

- Microbiological testing may be appropriate in specific areas. Infection Prevention and Control will advise.
- Potential remedial actions may include:

- Flushing of the system
- Chlorination
- Pasteurisation of the water supply
- Chlorine dioxide

6.2.5 Waste

Spore contaminated waste may also pose a risk. This can be minimised by:

- Removing waste through a designated route avoiding clinical areas as far as practically possible.
- Removing debris in tightly sealed, lidded container. Heavy duty bags may need to be used. Alternatively, cover it with a suitable covering, e.g. tarpaulin.
- Removing waste regularly, at least on a daily basis. Do not allow waste to accumulate remove at quiet times – e.g. end of day, end of session.
- If construction activity is above ground level, remove bagged waste via a chute
- Building rubble chutes should be sealed when not in use.
- Ensuring that the chutes are designed to empty directly into a covered skip or container, avoiding gaps.

6.2.6 Builders Clothing and Equipment

Construction workers and their equipment should be free of debris and dust on exiting the building area, particularly if they are passing through clinical areas.

The use of the following strategies may be recommended:

- Hoovers containing a HEPA filter for clinical areas.
- Change of clothing in an airlock if available.
- Overshoes to be put on when entering a construction area and removed on leaving.
- Overalls.
- 'Tacky mats'.
- Wiping down equipment before it leaves the area.

6.2.7 Protection of High-Risk Patients

The risk for individual patients needs to be considered including:

- The possibility of delaying admission, admitting elsewhere or deferring elective immunosuppression if the patient cannot be nursed in a clean environment. This needs to be discussed between the named Consultant, Infection Prevention and Control and the patient.
- Planning movements of susceptible patients, including access to hospital for outpatients and admission of inpatients, to avoid high risk areas if possible.
- The use of high efficiency face masks if the patient may potentially be exposed to dust.
- Prophylactic antifungal agents (e.g. itraconazole) may be considered in extremely vulnerable patients.
- If water supply may be compromised, consider the risk to patients.

- Ensuring appropriate physical barriers are in place. Seal windows, doors and ceiling space. (Solid ceilings are preferred to false ceilings in units with high risk patients).
- Use of HEPA filtered air or laminar air flow. Temporary or permanent facilities may be available.
- Ensuring that the air flow is in the right direction in order to protect the patient i.e. the supply to the patient's room is greater than air supply in the adjacent corridor (supply should be 10–20 % greater than the exhaust).
- Monitoring may be appropriate e.g.
 - Air flow or pressure.
 - Particle counts.
 - Air sampling.

7 Monitoring

During construction, the IPCT will review its progress in order to identify any potential problems at the earliest opportunity.

Inspection will include considerations such as:

- Dust and debris.
- Traffic control.
- Barriers.
- Cleanliness of adjacent sites.

Formal monitoring may be appropriate under some circumstances e.g.

- Airflow.
- Air sampling.
- Particle counting.
- Water testing.
- Temperature.
- Humidity.
- A construction monitoring form will be used by the Infection Prevention and Control team.
- A thorough check of the area by Infection Prevention and Control and Estates will be made at the time of commissioning.
- Following completion of the work, a project appraisal should be completed within 1 month.

7.1 Air Monitoring

In areas where HEPA filtration is in use, regular monitoring should be performed to ensure the satisfactory functioning of the filters.

In the event of concerns about the functioning of the HEPA filtration system the IPCT must be informed and if air monitoring is unsatisfactory the IPCT will: Contact the Estates Department.

- If necessary ask for work to be stopped until the problem has been rectified.
- Arrange for appropriate cleaning of the area with domestic services.

7.2 Clinical Monitoring

Clinicians will be asked to report clinical cases of suspected hospital acquired fungal infection to the Medical Microbiologists.

The IPCT will then investigate possible causes.

Author: Senior Infection Prevention and Control Nurse / Consultant Microbiologist

References

1. Sub-Committee of the Scientific Advisory Committee of the National Disease Surveillance Centre. National guidelines for the prevention of nosocomial invasive aspergillosis during construction/renovation activities. Dublin, Ireland, National Disease Surveillance Centre; 2002.
2. CCDR. Construction-related nosocomial infections in patients in health care facilities. Minister of Health, Canada; 2001.
3. NHS Estates. Infection Control in the built environment. Department of Health, London; 2002.
4. Health Building note (HBN) 4. Isolation facilities in acute settings. The Stationery office, 2005.
5. CDC. Guidelines for preventing health care associated pneumonia, 2003. MMWR 2004;53 (RR03); 1-36

Building Works Infection Prevention and Control Advice

Hospital Site: Area:

Estates Lead: Tel:

Contractor: Tel:

IPCN: Tel:

Information	Yes/No/Date
Method Statement Requested	
Date method statement received	
Commencement date	
Duration of work	
Completion date	
IPCN to attend pre-start meeting	
IPCN to receive minutes of progress meetings	
IPCN to attend hand-over meeting	

<p>Brief description of building work:</p>

Advice	Yes/No
Area to be screened:	
<ul style="list-style-type: none"> • Heavy duty double plastic (including ceiling void if appropriate) • Clean white washable plywood (including ceiling void if appropriate) • Heavy duty washable tape 	
HEPA extract	
HEPA Hoovers	
Sticky mats on entry and exit to the area	
Debris to be bagged internally prior to removal	
Debris to be deposited in covered skips	
Specify area:	
Fixed time for removal of debris	
Specify	
Area(s) to be cleaned:	
Daily	
Other- specify frequency:	
Cleaning arranged by:	
Windows to be sealed	
Air sampling	
Contractor/Estates to inform IPCN when screens erected	
Date informed:	
IPCN to check screens	
Education sessions for contractors required	
Nominated route for contractors	
Specify:	
Re-direction of patients/staff/visitors	
Wall washers on completion of work	
Domestics on completion of work	

THE NEWCASTLE UPON TYNE HOSPITALS NHS FOUNDATION TRUST
IMPACT ASSESSMENT – SCREENING FORM A

This form must be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval.

Policy Title:	Prevention of Aspergillosis during Building Work Procedure	Policy Author:	Dr D Wearmouth, Dr A Galloway
		Yes/No?	You must provide evidence to support your response:
1.	Does the policy/guidance affect one group less or more favourably than another on the basis of:		
	• Race	NO	
	• Ethnic origins (including gypsies and travellers)	NO	
	• Nationality	NO	
	• Gender	NO	
	• Culture	NO	
	• Religion or belief	NO	
	• Sexual orientation including lesbian, gay and bisexual people	NO	
	• Age	NO	
	• Disability – learning difficulties, physical disability, sensory impairment and mental health problems.	NO	
2.	Is there any evidence that some groups are affected differently?	NO	
3.	If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?	NO	
4(a).	Is the impact of the policy/guidance likely to be negative? <i>(If “yes”, please answer sections 4(b) to 4(d)).</i>	NO	
4(b).	If so can the impact be avoided?		
4(c).	What alternatives are there to achieving the policy/guidance without the impact?		
4(d)	Can we reduce the impact by taking different action?		

Comments:	Action Plan due (or Not Applicable): Not Applicable
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Name and Designation of Person responsible for completion of this form: Dr D Wearmouth, Dr A Galloway Consultant Microbiologists

Date: 20.05.10

Names & Designations of those involved in the impact assessment screening process: Infection Prevention and Control Committee.....

(If any reader of this procedural document identifies a potential discriminatory impact that has not been identified on this form, please refer to the Policy Author identified above, together with any suggestions for the actions required to avoid/reduce this impact.)

For advice on answering the above questions please contact Helen Lamont, Deputy Director Nursing & Patient Services, or, Christine Holland, Senior HR Manager. On completion this form must be forwarded electronically to Steven Stoker, Clinical Effectiveness Manager, (Ext. 24963) steven.stoker@nuth.nhs.uk together with the procedural document. If you have identified a potential discriminatory impact of this procedural document, please ensure that you arrange for a full consultation, with relevant stakeholders, to complete a Full Impact Assessment (Form B) and to develop an Action Plan to avoid/reduce this impact; both Form B and the Action Plan should also be sent electronically to Steven Stoker within six weeks of the completion of this form.