Mycobacterium abscessus
Recommendations for infection prevention and control
November 2017

Report of the Cystic Fibrosis Trust Mycobacterium abscessus
Infection Control Working Group
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Grading scheme for recommendations used in *M. abscessus*

The criteria for the grading of recommendations in this document are based upon a paper by Petrie et al (1995) published on behalf of the Scottish Intercollegiate Guidelines Network.

Much of the data in the document is derived from observational studies where randomisation is not appropriate or possible, however a lot is also from peer reviewed scientific studies. The above grading is therefore not always appropriate.

**Levels of evidence**

<table>
<thead>
<tr>
<th>Level</th>
<th>Type of evidence (based on AHCPR, 1992)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ia</td>
<td>Evidence obtained from meta-analysis of randomised controlled trials.</td>
</tr>
<tr>
<td>Ib</td>
<td>Evidence obtained from at least one randomised controlled trial.</td>
</tr>
<tr>
<td>Ila</td>
<td>Evidence obtained from at least one well designed controlled study without randomisation.</td>
</tr>
<tr>
<td>Iib</td>
<td>Evidence from at least one other type of quasi-experimental study.</td>
</tr>
<tr>
<td>III</td>
<td>Evidence obtained from well-designed, non-experimental, descriptive studies, such as comparative studies, correlation studies or case control studies.</td>
</tr>
<tr>
<td>IV</td>
<td>Evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities.</td>
</tr>
</tbody>
</table>

**Grading of recommendations**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Type of recommendation (based on AHCPR, 1992)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (levels Ia, Ib)</td>
<td>Requires at least one randomised controlled trial as part of the body of literature, of overall good quality and consistency, addressing the specific recommendation.</td>
</tr>
<tr>
<td>B (levels Ila, Iib, III)</td>
<td>Requires availability of well conducted clinical studies but no randomised clinical trials on the topic of the recommendation.</td>
</tr>
<tr>
<td>C (level IV)</td>
<td>Requires evidence from expert committee reports or opinions and/or clinical experience of respected authorities. Indicates absence of directly applicable studies of good quality.</td>
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</table>

**References**


**Summary of main recommendations**

- All cystic fibrosis (CF) services must have a local infection control guideline that addresses *M. abscessus*.
- All CF services must routinely screen for non-tuberculous mycobacteria (NTM) and forward *M. abscessus* isolates to an appropriate reference laboratory for sub-speciation and strain typing.
- All patients with *M. abscessus* colonisation/infection must be segregated.

**Key references**

1. Introduction

This document provides guidance on infection control measures for Mycobacterium abscessus in cystic fibrosis. A separate working group (jointly representing the European Cystic Fibrosis Society and North American Cystic Fibrosis Foundation) has published guidelines on screening and treatment for non-tuberculous mycobacteria (NTM).\(^1\) Guidance from the British Thoracic Society on the diagnosis and management of NTM is also available.\(^2\)

2. Background

Recent research has found evidence for cross-infection by M. abscessus.\(^3,5\) Cross-infection outbreaks have been reported at a US CF centre involving five patients\(^3\) and at a UK CF centre involving 11 people with CF, despite having infection prevention policies and guidelines based on best practice at the time.\(^4\) Another UK study found no clear evidence of direct cross-infection.\(^6\) A study published in 2016 provided evidence of shared strains of M. abscessus species among patients with CF across a number of CF centres worldwide.\(^5\) At present, the mode of transmission is unclear.

At the US CF centre that reported the cross-infection outbreak, no further new cases were detected after implementation of infection control measures comprising staff and patient education, environment sterilisation and patient isolation.\(^7\)

A suspected M. abscessus outbreak was reported involving 9 of 19 patients at a joint adult/paediatric clinic in Hawaii. The source of the outbreak was not identified but an investigation revealed potential issues with adherence to local infection control guidance for cleaning and maintenance of shared equipment, including bronchoscopes and spirometers.\(^8\)

Data from the UK CF Registry show that the prevalence of M. abscessus colonisation/infection has remained relatively static between 2014 and 2016 (table 1).\(^9\)

<table>
<thead>
<tr>
<th></th>
<th>2014 (n=9532)</th>
<th>2015 (n=9587)</th>
<th>2016 (n=9695)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M.abscessus prevalence</strong></td>
<td>300 (3.1%)</td>
<td>321 (3.3%)</td>
<td>337 (3.4%)</td>
</tr>
</tbody>
</table>

Specialist CF care has been shown to be beneficial, with improved clinical outcomes for people with cystic fibrosis.\(^10,11\) Avoiding clinic attendance due to concerns about M. abscessus infection is likely to be harmful as it may seriously interfere with medical care, which will far outweigh any potential risk of acquiring M. abscessus infection.

3. Definition of patients with M. abscessus colonisation/infection for the purpose of infection control measures

A patient is defined as having M. abscessus colonisation/infection if they fall in to one or more of the following groups.

1. Patients who have had M. abscessus isolated from sputum or bronchoalveolar lavage (BAL) cultures within the last 12 months (whether or not they are symptomatic for M. abscessus infection).
2. Patients who are currently prescribed treatment for M. abscessus.
3. Patients who have completed treatment for M. abscessus within the last 12 months.
For the above patients to be subsequently considered free of *M. abscessus*, quarterly sputum samples must have tested negative for mycobacteria when a patient is not receiving treatment, with an interval of one year between the first negative sample and last negative sample. For instances where sputum cannot be obtained, a negative BAL one year off treatment would suffice.

Current evidence suggests that in applying infection control recommendations there should be no distinction between smear positive and smear negative cases of *M. abscessus* colonisation/infection.

### 3.1 Recommendations
- The patient should be kept informed of their infection status [C].
- If subsequent sputum samples become negative for *M. abscessus*, the patient should still be regarded as a potential carrier from the date of the first negative sample for a total of at least twelve months. A minimum of four negative sputum samples are required during this twelve-month period, with the final negative sample at least twelve months after the first negative sample. For instances where sputum cannot be obtained, a negative BAL one year off treatment would suffice [C].
- For infection control, there should be no distinction between smear positive and smear negative cases of *M. abscessus* colonisation/infection [C].

### 4. Screening of patients with CF for *M. abscessus* infection

Screening for NTM is an important part of the care of patients with cystic fibrosis. The US Cystic Fibrosis Foundation/European Cystic Fibrosis Society consensus guidance on NTM screening for people with cystic fibrosis is published and accessible via this link: [http://thorax.bmj.com/content/71/Suppl_1.toc](http://thorax.bmj.com/content/71/Suppl_1.toc).

#### 4.1 Recommendations
- Routine screening for NTM is recommended at least once a year for all individuals able to produce sputum, with microbiological processing of samples [C].
- Cough swabs should not be used [C].
- Consider induced sputum or BAL for patients unable to produce sputum at will (where there is clinical suspicion of infection) [C].
- For CF centres where cross-infection with *M. abscessus* is suspected, more frequent sampling for NTM should occur [C].
- All *M. abscessus*-positive patients must have an isolate referred to the appropriate reference laboratory for sub-speciation and strain typing [C].

### 5. Preventing spread

The mode of transmission of *M. abscessus* in cross-infection outbreaks is unclear. General infection control measures should be adhered to.

#### 5.1 Recommendations
- Each CF service must have its own local infection control guideline that covers *M. abscessus* and its use by regular audit is recommended [C].
- The specialist CF centre/CF clinic and local infection control team should know the incidence and prevalence of *M. abscessus* in their CF population [C].
- Current inpatient and outpatient facilities should be evaluated for their present air exchange and air flow and measures taken to optimise this wherever possible [C].
Patients with CF with *M. abscessus* colonisation/infection must be segregated from each other and from all other people with cystic fibrosis. The methods used to segregate patients should be determined by local guidelines and must take into account communal areas such as pharmacy and radiology [C].

CF centres should educate staff, patients and visitors in the need to adhere to cross infection prevention measures within all areas of the CF centre and the wider, communal areas of the hospital [C].

A high standard of hygiene should be practised by staff, in particular hand washing; alcohol gels or other suitable preparations must be available in every room [C].

If CF clinics suspect they have cross-infection with *M. abscessus*, advice from the local infection control team should be sought [C].

Patients must be seen in well-ventilated rooms [C].

Rooms must be left with the door closed, with at least an hour (amended depending on knowledge of air flow/exchange) between patients to allow for dispersion of possible airborne contamination and then cleaned according to local infection control guidelines [C].

Gloves and aprons/gowns must be worn and hand washing with soap and water must be performed before and after contact with each patient with *M. abscessus* colonisation/infection and/or their immediate environment [C].

Staff may wish to wear masks when in contact with patients with *M. abscessus* colonisation/infection. There is currently insufficient evidence to recommend the routine use of masks by healthy staff. Staff should follow local policies [C].

Patients may wish to wear masks. There is currently insufficient evidence to recommend the routine use of masks by patients, but local policies should be followed [C].

Patients must wash their hands with soap and water before use of a spirometer or other handheld apparatus [C].

Spirometry should be performed in the patient's own room. Other respiratory function tests should be performed in a well-ventilated room away from other patients [C].

Collection of respiratory samples must take place in the patient's own room [C].

Sputum pots should be covered and soiled tissues must be disposed of in the clinical waste bin immediately after use. Sputum should not be expectorated down toilets, sinks, washbasins or in showers [C].

Airway clearance techniques and any other physiotherapy procedures must be carried out in the patient's own room [C].

Equipment must be single-patient use where possible [C].

Patients should be encouraged to use their own possessions and equipment in hospital [C].

All other equipment and surfaces must be cleaned and dried between patients, according to local infection control guidelines [C].

After a room is vacated by a patient with *M. abscessus* colonisation/infection it should undergo terminal cleaning as per local hospital guidance [C]. An example from the CF centre in Papworth can be found in Appendix 1.

Inpatients should have well-ventilated single rooms with their own bathroom. Negative pressure rooms should be used where available [C].

Exercise should be performed in a patient's own room with the door closed and any equipment appropriately decontaminated after use. If exercise is performed in a communal area this must be on an individual basis, at the end of the day and the room terminally cleaned after use [C].

Disinfection of bronchoscopes, irrespective of the purpose they are used for, should comply with the national policy ‘Management and decontamination of flexible endoscopes (HTM 01-06)’ [C]. The policy is accessible via this link: https://www.gov.uk/government/publications/management-and-decontamination-of-flexible-endoscopes.
6. Future recommendations for cystic fibrosis clinic facilities

6.1 Recommendations

- Any new facilities for patients with CF must take into account the potential for cross-infection with *M. abscessus*. This must include the provision of enhanced ventilation for both inpatient and outpatient care and adequate ventilation in other areas [C].

- Any new facilities should consider the space required for integration of exercise equipment into inpatient rooms [C].

7. References


### Appendix 1: Example of terminal cleaning protocol from Papworth Hospital

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>M. abscessus + ve inpatient (LOS 1 night +) plus post bronchoscopy day cases*</th>
<th>Ambulatory M. abscessus care episode (no overnight stay) CTBI*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nursing staff</strong></td>
<td>Dispose to clinical waste any disposable items/items that cannot be cleaned.</td>
<td>Ventilate the room as soon as the patient vacates the room (open door and window)</td>
</tr>
<tr>
<td></td>
<td>Dispose of any bed linen into red water-soluble bag and then into a white plastic laundry bag</td>
<td><strong>Nursing staff</strong> Dispose to clinical waste any disposable items/items that cannot be cleaned.</td>
</tr>
<tr>
<td>Domestic staff/PEA</td>
<td>Dispose to orange bag (offensive waste stream) any disposable curtains from room.</td>
<td>Domestic staff/PEA Dispose to orange bag (offensive waste stream) clinical waste/curtains from room.</td>
</tr>
<tr>
<td><strong>Leave room for an hour before taking any further action</strong></td>
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<td></td>
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<table>
<thead>
<tr>
<th>Stage 2</th>
<th>Nursing staff</th>
<th>Nursing staff</th>
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</thead>
<tbody>
<tr>
<td><strong>Nursing staff</strong></td>
<td>Contact trained nursing staff for environmental sampling after inpatient stay LOS ≥ 1 night</td>
<td>Ventilate the room for 1 hour prior to cleaning</td>
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<td>(2 rooms being sampled per week, check and log sampling in NTM folder)</td>
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<table>
<thead>
<tr>
<th>Stage 3</th>
<th>Nursing staff</th>
<th>Nursing staff/PEA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nursing staff</strong></td>
<td>Use sporicidal wipes (contact time 1 minute) or chlorine based products (contact time 5 minutes) to clean all surfaces and medical equipment. After the prescribed contact time wipe all surfaces with a detergent wipe.</td>
<td>Use sporicidal wipes (contact time 1 minute) or chlorine based products (contact time 5 minutes) to clean all surfaces and medical equipment. After the prescribed contact time wipe all surfaces with a detergent wipe.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 4</th>
<th>Domestic staff</th>
<th>Domestic staff</th>
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</thead>
<tbody>
<tr>
<td><strong>Domestic staff</strong></td>
<td>Complete final exit clean</td>
<td>Complete final exit clean</td>
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<thead>
<tr>
<th>Stage 5</th>
<th>Nursing staff</th>
<th>Nursing staff</th>
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<tbody>
<tr>
<td><strong>Nursing staff</strong></td>
<td>Taking care not to splash, use bottle brush or sponge stick to clean sink and shower outlets ensuring all visible gunk rinsed away. Taking care not to splash, apply 1 bottle of bleach; leave bleach in outlets for 12 hours.</td>
<td>Leave room overnight.</td>
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<thead>
<tr>
<th>Stage 6</th>
<th>Nursing staff</th>
<th>Re introduce room for clinical use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nursing staff</strong></td>
<td>After 12-hour period flush shower and sink outlets with tap water for 5 minutes</td>
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</tbody>
</table>

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<thead>
<tr>
<th>Stage 7</th>
<th>Nursing staff</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nursing staff</strong></td>
<td>If the room is being swabbed please contact trained nursing staff for environmental sampling</td>
<td></td>
</tr>
</tbody>
</table>

| Stage 8 | Re introduce room for clinical use | |

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