

Tuberculosis

Key Points

In general only “open” pulmonary tuberculosis is infectious to others

Patients with suspected or confirmed infectious tuberculosis in hospital should be cared for in a negative pressure isolation room, where possible

Patients with suspected or confirmed multi-drug /extensively drug resistant tuberculosis (MDR-TB/ XDR-TB) must be cared for in a negative pressure isolation room

The need for special respirator masks should be risk assessed when caring for any patient with open tuberculosis

Special respirator masks are mandatory when caring for patients with suspected or confirmed MDR-TB/ XDR-TB

Children and people with HIV are more susceptible to tuberculosis

***Mycobacterium tuberculosis* is a Hazard group 3 organism**

Definitions

Tuberculosis - is an infection caused by the *Mycobacterium tuberculosis* or *Mycobacterium bovis*. TB is usually considered to be a pulmonary disease. *M. tuberculosis* is contracted primarily from humans and *M bovis* from cattle.

Suspected pulmonary tuberculosis - clinical symptoms and/ or signs suggestive of tuberculosis with or without microbiological/ histological support.

- These cases should always be considered infectious

Open pulmonary tuberculosis - when direct examination of the patient’s sputum shows the presence of acid-fast bacilli (sometimes called sputum smear positive disease).

- These patients are always considered to be infectious

Closed tuberculosis - sputum smear negative pulmonary disease, but culture positive. Non pulmonary tuberculosis is also considered 'closed'.

- Although generally not considered to be infectious, isolation is often maintained (always discuss with the Infection Prevention Control team)

Non-pulmonary tuberculosis - may occur in any organ or tissue including lymph nodes, meninges, pleura, pericardium, kidneys, bones, joints, larynx, skin, peritoneum, intestines and eyes.

- Not usually considered infectious unless there is a high concentration of organisms draining from an open abscess or lesion, and particularly where wounds are irrigated during the dressing process. Surgery involving these lesions also presents a risk of infection and additional precautions will be required.

Multi-drug resistant tuberculosis (MDR-TB) - high level resistance to isoniazid and rifampicin.

- Always considered infectious and must be isolated in negative pressure isolation room

Extensively drug resistant tuberculosis (XDR-TB) - extensively resistant to current anti-tubercular drugs.

- Always considered infectious and must be isolated in negative pressure isolation

Risk Factors for MDR-TB

The possibility of drug resistant disease should be considered if there is:

- a history of previous TB drug treatment; especially prior TB treatment failure
- contact with a known case of drug resistant TB disease
- birth in a foreign country, particularly high-incidence countries
- HIV infection
- residence in London
- age profile, with highest rates between ages 25 & 44
- male gender
- disease not responding to treatment

Contact your Infection Prevention Control Team and/or Infectious Diseases if MDR-TB is suspected



Notifications

- All newly-diagnosed cases of tuberculosis must be notified to the Consultant in Communicable Disease Control (CCDC) for the Health Board in which the patient lives, to ensure adequate contact tracing.
- Notification is by completion of a TBS1 form; this is the responsibility of the doctor in charge (Consultant or GP) of the patient and should be undertaken as soon as possible. (This is a carbon copy form so cannot be provided electronically but is available from Public Health or your local Respiratory Physician).
- Inform the Infection Prevention and Control Team (IPCT) if a case is identified.
- It is the responsibility of the nurse-in-charge to inform the IPCT when a patient with suspected /confirmed tuberculosis is admitted to the ward, even if the patient is already on treatment.

Guidance

Patient Management: management of confirmed cases of tuberculosis in the community / home setting

Treatment

- Adherence to therapy is vital for effective treatment
- The TB health visitor, public health nurse, CCDC, GP or the respiratory nurse specialist will advice on adherence to drug therapy and contact tracing. They will also advice on prophylaxis if necessary.
- Direct Observational Therapy (DOT) is co-ordinated by the TB respiratory nurse specialist.
- DOT can be carried out by a responsible family member but only under the co-ordination of a healthcare worker specialising in TB
- Patients diagnosed with open pulmonary tuberculosis are generally considered infectious until they have received 14 days of appropriate chemotherapy Such patients should not attend day-care or social areas and should not live in residential settings with immunocompromised patients. Advice should be sought from the TB health visitor, public health nurse, CCDC, GP or the respiratory nurse specialist.

Infection Control Measures

- Routine hand hygiene should be performed with soap and water (or an alcohol based sanitiser) before and after entering the patient's home.
- Staff carrying out DOT, general home visits or routine care do not require specialised personal protective equipment (PPE).
- On rare occasions were staff (e.g. a physiotherapist) carry out cough inducing procedures, an FFP3 mask must be worn.



- Patients who cannot reliably cover their mouth/ nose should wear a surgical mask if asked to by healthcare workers carrying out direct care.
- Attempting to separate household contacts of the patient is unnecessary and impractical.

Equipment and Waste

- Respiratory equipment (e.g. peak flow meters and portable nebulisers) should be single patient use. If re-usable equipment is necessary this must be disinfected following manufacturers guidance. Refer also to the CREST guidance on respiratory equipment
- Staff carrying out DOT, general home visits or routine care do not require specialised personal protective equipment (PPE).

Patient Procedures: suspected / diagnosed open pulmonary tuberculosis admitted to hospital

- Admission to diagnose tuberculosis or institute treatment is rarely required. However, patients may be very ill and may even require intensive care, some are admitted for investigations of Pyrexia Unknown Origin (PUO) and the diagnosis of tuberculosis is then made. Occasionally patients are admitted because of reactions to antibiotics.
- Source Isolate patients in a side-room (preferably with negative pressure ventilation) with the door shut for the first 14 days of therapy.
- A decision to discharge a patient home may be made during this initial treatment period, provided the patient is likely to comply with treatment at home.
- Patients diagnosed with open pulmonary tuberculosis are generally considered infectious until they have received 14 days of appropriate chemotherapy. Patients who have a very high bacterial load in the sputum at the start of treatment or have multi-resistant organisms may require isolation for longer, at the discretion of the medical staff and the Infection Prevention Control Team.

Diagnostic Laboratory Specimens

- Suspected cases of pulmonary tuberculosis should have three consecutive early morning sputum/urine samples sent for direct Acid Fast Bacilli (AFB) examination and culture.
- All microbiological samples (container and form) from suspected tuberculosis patients should be labelled 'Hazard group 3'.
- "Induced sputum" is excellent for obtaining deep cough specimens for the diagnosis of tuberculosis. This procedure is dangerous because an aerosol is generated deliberately and must ONLY be done in a room with negative pressure ventilation away from susceptible patients. Staff carrying out this procedure should wear respiratory protection and approach the patient from behind to reduce risk of infection.
- Sputum induction MUST not be carried out if the patient is suspected of having MDR-TB/ XDR-TB.

Source Isolation Procedures

- Masks are not normally required for routine care of tuberculosis patients
- FFP3 respiratory masks must be worn by all carers entering the room of known/suspected MDR-TB/ XDR-TB patients.
- Special protective respirator masks (FFP3) should be worn when performing procedures likely to cause an aerosol in non multi-drug resistant tuberculosis.
- Instances where FFP3 respiratory masks should be worn include;-
 - during bronchoscopy
 - during and after cough inducing procedures
 - during prolonged care of a dependent patient or where the patient is unable to protect the healthcare worker from their cough
 - during intubation
- In addition to respiratory masks standard infection control precautions need to be applied including disposable plastic apron and gloves.
- Aprons and gloves should also be worn when caring for patients with open discharging tuberculous lesions, or when performing bronchoscopy or tracheal suction.
- Wash your hands before and after dealing with the patient and when you leave the room.
- Wear disposable gloves when handling secretions (e.g. sputum pots).
- Disposable crockery and cutlery are not necessary.
- Clinical waste must be placed in yellow bags.
- Linen should be placed in an alginate bag and then into an outer plastic bag - infected linen bag before being sent to the laundry.

Note: A case of tuberculosis should NOT be isolated in a ward known to care for Immunocompromised patients e.g. HIV

Patient Movement

- Movement of patients with infectious tuberculosis to other wards, departments or hospitals should be kept to a minimum.
- If a patient with infectious tuberculosis is transferred to another ward, department or hospital for ongoing care or investigation the receiving area must be notified in advance, to allow suitable isolation and appropriate precautions to be taken.
- Patients with infectious tuberculosis who cannot reliably cover their mouth and nose should wear a surgical mask if being transported through public or patient areas.
- Patients with infectious tuberculosis should be dealt with quickly and not stay in shared waiting areas for any longer than necessary.

Tuberculosis in Children

- Children with primary pulmonary tuberculosis are usually not infectious. If primary lesions are discharging (e.g. lymph nodes or osteomyelitis), source isolate the child for the first 14 days of treatment.

- Be aware of the possibility that visiting relatives may have open tuberculosis. It is the responsibility of the Medical Staff to ensure that close relatives of children are assessed for tuberculosis, usually through formal notification but also by direct questioning.
- These relatives should not have contact with other patients in the ward until this assessment has been completed.
- Please ensure that the Infection Prevention Control Team are informed.

Tuberculosis in Staff

- Staff members who are ill with respiratory symptoms must consult their general practitioners and report to Occupational Health, making them aware if they have had recent contact with a case of tuberculosis. Common symptoms of tuberculosis include malaise, unexplained weight loss, fever and night sweats, dry cough, cough with blood-stained sputum.
- Staff with tuberculosis will stay off work until deemed non-infectious by a respiratory physician.

Visitors

- It is essential to perform a risk assessment of visitors entering the room of a patient with tuberculosis.
- Those who have not had recent close contact with the patient should be discouraged from visiting.
- Children should also be discouraged from visiting

Delayed Recognition of Tuberculosis in an Open Ward or Facility

- When a patient on an open ward is found to have infectious tuberculosis, a list of all patient contacts will be drawn up by the ward/ facility manager. The consultants and GP's of these contacts will be informed of this exposure by the Index patient's Consultant.
- The Ward Doctor should make a note in the chart of these patients stating that they have had contact with open pulmonary tuberculosis. This should also be included as an alert on the patient's notes.
- Any other information (e.g. about drug resistance) will be included in the letter.

Surgery

- Sometimes it is necessary to resect part of a lung in a patient with tuberculosis, particularly when the organism is resistant to antibiotics. Such procedures present a high risk to the operators and staff in the immediate vicinity of the patient. For this reason, special respirator masks (FFP3) will be provided for staff. The operation should be done last on the list. The minimum essential staff should be present. The patient should be recovered in the operating theatre and must be transferred immediately to a negative pressure ventilated isolation room.

Deceased

- See last offices for guidance and additional precautions in tuberculosis patients.

References

1. National Institute for Health and Clinical Excellence (NICE). Clinical diagnosis and management of tuberculosis, and measures for its prevention and control 2006. Available at <http://www.nice.org.uk/CG033>
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3. Health Protection Agency. General advice on Infections such as tuberculosis including surveillance data: available at: <http://www.hpa.org.uk/> (look at Infectious diseases tab, then A-Z list of infections.)
4. Immunisation Against Infectious Disease 2006 'The Green book' chapter 32. Available from: <http://www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/GreenBook/> Scroll down and click on chapter 32: Tuberculosis to read about the use of the BCG vaccine.
5. Clinical Resource Efficiency Support Team (CREST). Guidance on respiratory equipment in Northern Ireland 2006. Available at: <http://www.crestni.org.uk/publications/prevention-infection-equip.pdf>