## Tuberculosis Guidelines

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1. **RATIONALE**

1.1. To provide a guide to all healthcare workers involved in caring for a patient with Tuberculosis (TB). This is aimed at reducing the risk of transmission of TB.

2. **AIM**

2.1. To minimise the risks of transmission of TB in the healthcare setting.

2.2. To provide guidelines for health care workers involved with the care of patients with TB in Yeovil District Hospital NHS Foundation Trust.

3. **BACKGROUND**

3.1. TB is caused by the organism *Mycobacterium tuberculosis* (human form) and *Mycobacterium bovis* (cattle form). In this country, TB is almost always caused by the former. Both produce similar disease although *Mycobacterium tuberculosis* more often gives rise to pulmonary disease and *Mycobacterium bovis* to non-pulmonary manifestations of the disease. TB is more common in alcoholics, immunocompromised patients, the very young or old, non-Caucasians and people in poor social circumstances.

3.2. Almost everywhere in the country, TB is caused by the bacillus *Mycobacterium tuberculosis*. TB can infect any part of the body, however it is spread most exclusively by people with active pulmonary disease (PTB) – they have so many tubercle bacilli in their sputum that they can be seen under the microscope. Depending on whether or not any bacilli are seen determines whether samples are classed as Acid Fast Bacilli (AFB) smear positive (+ve) or negative (-ve). If a sample is AFB +ve, this indicates an increased level of infectivity. TB is predominantly spread when someone who is AFB smear +ve coughs, and the infectious droplet nuclei become airborne and are breathed in by other people.

3.3. For people who have competent immune systems, the likelihood of contracting TB following exposure is very low. The aim of infection prevention and control is to minimise the risk of transmission of infection to susceptible individuals or to those who undertake prolonged occupational exposure.

3.4. People with TB, either pulmonary or non-pulmonary, should not be admitted to hospital unless there is a clear clinical or socio-economic need, either for diagnostic tests or for care.

3.5. The vast majority of TB patients are diagnosed and treated as outpatients. Patients in whom TB is suspected and who require hospitalisation may present either to the Emergency Department, Outpatient Department or may be admitted via the GP straight to a ward. All must undergo a risk assessment to establish their infectivity and likelihood of being multi-drug resistant (MDRTB) (Section 6).

3.6. Inpatients with possible or proven TB must be nursed in single rooms until three sputum samples have been reported by Microbiology as being AFB –ve. All patients in whom MDRTB is suspected/confirmed must be transferred to a negative pressure single room and isolation precautions implemented. Negative pressure rooms exchange the room’s air up to 12 times an hour, and channel any potential infective particles, through filters, directly outside the hospital, minimising the risk of nosocomial (hospital acquired) infection.

3.7. Yeovil District Hospital has a negative pressure room in ICU.
4. **ROLES AND RESPONSIBILITIES**

4.1. These guidelines are relevant for all YDH staff involved in the care of patients with suspected/diagnosed TB. These guidelines fall under the Infection Prevention & Control Policy and the roles and responsibilities detailed in that policy are overarching these guidelines for all leads and staff groups identified.

4.2. The following responsibilities are identified as specific to these guidelines:

4.3. **Assessing Clinician**

The assessing clinician is responsible for:
- Risk assessing patients presenting with symptoms of active TB or MDRTB.
- Arranging appropriate investigations.
- Referral to respiratory specialist for advice and treatment.
- Notification of all suspected TB cases to Consultant in Communicable Disease Control/Somerset Health Protection Team (Public Health England).

4.4. **Treating Clinician**

The treating clinician is responsible for:
- Arrangement of any further diagnostic testing required.
- On-going treatment and follow up for active TB
- Notification of all suspected cases to Consultant in Communicable Disease Control/Somerset Health Protection Unit if not already completed by the assessing clinician.

4.5. **Respiratory Specialist Nurse**

The Respiratory Specialist Nurse is responsible for:
- Carrying out any necessary contact tracing of family (in liaison with Public Health England) or exposed patients and arranging appropriate follow up.
- Supervision of treatment in the community once discharged from hospital.

4.6. **Infection Prevention and Control Team (IPCT)**

The Infection Prevention and Control Team are responsible for:
- Education and training in the infection control management of hospitalised TB patients.
- Monitoring of isolation practices of patients with suspected or confirmed infectious TB.

4.7. **Ward Manager or Deputy:**

The Ward Manager or Deputy is responsible for
- Adhering to the infection control precautions detailed in these guidelines.
- Identifying the names of any staff close contacts prior to the instigation of infection control precautions and forwarding to the Occupational Health Department.
- Ensuring FFP3 masks (Particulate Filter Respirator) are available to all clinical staff in their area.
- Monitoring the alarm systems for negative pressure rooms (ICU only) and reporting any faults immediately to the Estates & Facilities Department.

4.8. **Ward/Clinical staff**

The Ward/Clinical staff are responsible for:

- Adhering to the infection control precautions detailed in these guidelines.
- Ensuring communication of suspected or confirmed TB status of patient if transferred to another NHS body or healthcare facility.

4.9. **Estates & Facilities Department**

The Estates & Facilities department is responsible for:

- Maintaining the negative pressure facilities and air handling units to the required standard, including annual validation and verification.

4.10. **Occupational Health Department**

The Occupational Health Department is responsible for:

- Carrying out any necessary contact tracing of exposed staff and arranging appropriate follow ups under the direction of the IPCT/Public Health England and Respiratory Team.

5. **PATIENTS PRESENTING WITH SYMPTOMS SUGGESTIVE OF PTB**

5.1. Clinicians/Assessment Nurses must consider the assessment questions shown in section 6 for all patients presenting with chest symptoms. If PTB is strongly suspected and the patient has a cough they should be placed into a single room whilst waiting to be seen.

5.2. Doctor’s assessment of the patient, and chest x-ray, must take place quickly so that the potentially infectious patient can be transferred to a single room on an appropriate ward, or, if MDRTB is suspected, transferred to a negative pressure ventilation facility as soon as possible.

5.3. The Respiratory Nurse Specialist (RNS) must be contacted at the earliest opportunity. Interferon Gamma Release Assays, eg. T-Spot TB assay will be arranged by the RNS.

5.4. If MDRTB is suspected, there must be no delay in contacting the Consultant Respiratory Physicians or, in their absence, the Consultant Microbiologists, to ensure that patients are transferred directly to a negative pressure ventilation single room. The IPCT, Clinical Site Manager and Nurse in Charge of the Ward must also be contacted. If out of hours, the on-call Consultant Physician must be contacted.

5.5. Where the risk assessment indicates that MDRTB is not likely, patients requiring admission must be nursed in a single room whilst in hospital at least for the first two weeks of full treatment or until proven to be non-infectious.

5.6. If the patient is unable to control their cough and/or use a tissue to cover their mouth when coughing they must wear a correctly fitted mask to go to X-ray or other
If MDRTB is suspected then the patient must wear a FFP3 mask. If exposure to sputum excretions is unavoidable, staff should wear high filtration masks until infective PTB has been ruled out. Masks are supplied by Materials Management and a supply is kept in the Emergency Department. Any Nurses with reduced immunity or during pregnancy should avoid nursing patient during the first two weeks of full treatment.

5.7. Following the patient’s transfer/discharge, the room must be cleaned (see terminal cleaning of isolation rooms in the Infection Prevention & Control Policy). There is no need to wait before using the room again once it has been cleaned.

6. PATIENT ASSESSMENT

A preliminary assessment should be made by the RNS using the following three questions:

6.1. Question 1: Does the patient have PTB?

6.2. PTB should be suspected in any patient who has a history of a cough lasting for more than three weeks associated with one or more of the following:

- Weight loss
- Anorexia
- Fever
- Night sweats
- Haemoptysis
- Chest x-ray*/CT abnormalities consistent with possible TB
- History of close contact with a known index case of PTB

* A chest x-ray must be carried out AND REPORTED as soon as possible as the lack of abnormality on x-ray makes infectious TB extremely unlikely.

6.3. Question 2: Is the patient likely to be infectious?

6.4. Infectiousness is likely to be increased if the patient is coughing, particularly if producing sputum. However, a true assessment can be made only when results of sputum microscopy are known. Urgent analysis of samples can be arranged by contacting the Microbiology Department. The following patients must be assumed and managed as infectious until proven otherwise:

- Any patient with suspected pulmonary tuberculosis;
- Tuberculosis of the larynx, respiratory tract and endo-bronchial tree;
- All patients with one or more AFB +ve sputum samples.

6.5. Question 3: Is the patient likely to have Multi-drug Resistant Tuberculosis (MDRTB)?

6.6. Until disproved, MDRTB should be suspected if any of the following apply:

- Erratic or incomplete previous drug treatment for TB. NB: Patients treated in the UK prior to 1960 are unlikely to be MDR.
- Previous contact with a case of MDRTB.
A patient born in an area with a high prevalence of drug resistance, or a patient who has recently travelled to or who has been resident in such areas (refer to World Health Organisation website - http://www.who.int/topics/tuberculosis/en/)

The patient is HIV +ve.

Residence in London

Age profile, with highest rates between 25 and 44.

Failure to respond to a standard treatment regime e.g. lack of clinical improvement after 2 weeks of treatment.

Persistently sputum smear +ve after 2 months of treatment or culture +ve after 3 months of treatment.

Male gender

7. ISOLATION OF NON-MDRTB INPATIENTS

The following provides guidance on isolation of TB specific patients. Refer to the Trust’s Isolation Policy for overarching procedures in all instances.

7.1. If TB is a possibility and if the patient has a productive cough the patient must be placed into isolation in a single room. Doors must be kept closed and the patient/relatives educated about the need for isolation.

7.2. If there is no suspicion of MDRTB, patients who have tolerated two weeks continuous anti-TB treatment and show clinical improvement, are deemed to no longer be infectious and may be nursed in an open ward – but away from immunocompromised patients.

7.3. When direct exposure to respiratory secretions is unavoidable, e.g. when the patient is unable to control their coughing or when staff are undertaking prolonged care, resuscitation or aerosol generating procedures such as sputum induction or nebuliser treatment, they must wear a high filtration FFP3 mask.

7.4. Without compromising patient care, persons entering isolation rooms must be kept to a minimum. Immunocompromised staff are advised not to work directly with patients who have pulmonary TB. Contact Occupational Health for further information.

7.5. Visitors must be kept to an absolute minimum (usually only those who have already been in close contact). Any visitor not previously exposed or a known contact must wear a FFP3 mask. Immunocompromised visitors, babies, infants and young children must be discouraged from visiting whilst the patient is potentially infectious.

7.6. Patients must be educated to cough directly into a tissue and dispose of it directly into a yellow clinical waste bag. Staff must ensure that tissues and clinical waste bags are available and within arm’s reach of the patient.

7.7. The use of fans is not permitted as this can blow bacteria out into the main ward.

7.8. Windows must remain closed as they can create a positive pressure blowing bacteria out into the main ward.

7.9. Infectious patients in isolation must not use communal washing facilities, sitting rooms or public areas of the hospital. If bathrooms/showers are unavailable in the side rooms, the main ward bathrooms can be used at a time arranged by nursing staff so that transfer from room to bathroom can be direct. If possible the bathroom should be isolated for use by that patient only. If the patient is unable to control their cough
by only coughing into a tissue they must wear a FFP3 mask when either walking or being transported through the open ward.

7.10. It is essential to document the date and time that the patient was placed into single room isolation in the patient’s medical notes, and date of commencement of TB chemotherapy.

7.11. Patients who are consistently sputum smear negative and are awaiting culture results can be regarded as non-infectious. These patients can be nursed in an open ward but not in the same bay/ward as immunocompromised patients.

7.12. Disposable or marked crockery and separate washing-up facilities are unnecessary.

7.13. Bed linen must be treated as infected linen. The person who cleans the room is not at special risk.

8. **DISCONTINUATION OF ISOLATION**

8.1. The clinical decision to discontinue isolation must be judged individually for each patient. The supervising physician, RNS or the IPCT must be involved in this risk assessment. Discharge/transfer decisions must be recorded in the patient’s medical notes.

8.2. If there is no suspicion of MDRTB, patients with PTB who are initially sputum smear +ve may discontinue isolation following a minimum of two weeks appropriate TB drug therapy if there is:

- Definite clinical improvement as a response to treatment, e.g., remaining afebrile for at least one week and/or resolution of cough; and
- Demonstrated tolerance of the prescribed treatment.

8.3. If these criteria are not met, or if MDRTB is still suspected, the patient must remain in isolation as described above, or if clinically fit, they can be discharged home. Before isolation is discontinued/discharge arranged, advice must be sought from either the Respiratory Consultant Physician or TB Clinical Nurse Specialist (TBCNS).

8.4. Discharge home can take place at any stage of the patient’s care in consultation with the supervising Physician and RNS providing that:

- The patient is clinically well enough.
- The patient will not be exposing new contacts to potential infection.
- Household contacts are not deemed particularly susceptible.

9. **TEMPORARY LEAVE FROM ISOLATION**

9.1. All inpatients with confirmed or suspected infectious pulmonary TB must remain in isolation at all times unless they are visiting another department for an investigation. Temporary leave from respiratory isolation (e.g. to visit home) may be granted under exceptional circumstances. The following apply:

9.2. Temporary leave will only be granted when the Medical Team, RNS and the Ward Manager and/or IPCT have assessed and discussed both the safety and the necessity of the patient’s request.
9.3. Following a team discussion (as stipulated above), all requests for temporary leave from isolation must be approved by the Respiratory Consultant, or in his/her absence, by the Specialist Registrar (SpR).

9.4. Before leaving, the patient must have their observations recorded, including oxygen saturations.

9.5. If MDRTB is suspected the patient must wear a FFP3 mask whilst within the hospital and the mask must be worn on return to the hospital until back into the negative pressure single room.

9.6. Close contact with any members of the public should be avoided (e.g. no use of public transport, no visits to restaurants).

9.7. Patients must agree to comply to these guidelines before temporary leave is granted.

10. CONFIRMATION OF DIAGNOSIS AND INFECTIVITY OF ANALYSIS OF SPUTUM

10.1. It is essential to confirm diagnosis and infectivity by sputum smear analysis as soon as possible to both prevent the transmission of bacteria and minimise any unnecessary isolation of patients. Sputum samples must be submitted in correctly labelled sputum pots along with a correctly completed Microbiology form to the Microbiology Department. The examination required for TB is AFB (Acid Fast Bacilli).

10.2. Urgent analysis of samples can be arranged by contacting the Microbiology Department. Out of hours, transport of samples must be arranged with the on-call Consultant Microbiologist.

10.3. The RNS will co-ordinate the taking of sputum samples. The first sputum sample should be sent as soon as possible after admission. Further samples should be collected and sent on days 2 and 3. If possible, specimens should be collected early morning to facilitate the production of a good quality specimen.

10.4. Bronchial washings may be submitted for examination. If AFB smear +ve on bronchial washings, continue isolation post bronchoscopy until 1 further sputum sample has been collected 24 hours later. If this confirms that the patient is AFB sputum –ve the patient may then be removed from isolation. This is to rule out the potential to induce an AFB sputum smear +ve status through the bronchoscopy procedure itself.

10.5. Bronchoscopy of suspected PTB cases should always be performed at the end of the session.

11. MULTI-DRUG RESISTANT TB (MDRTB)

11.1. MDRTB is defined as a resistance to both Rifampicin and Isoniazid. Additional resistance to other first and second line drugs, such as Pyrazinamide, Ethambutol and Streptomycin, may further complicate management. MDRTB is not known to be more virulent nor more infectious than other forms of TB, but the consequences of acquiring disease are much more serious owing to the complexities of its management.

11.2. If there is any suspicion following the risk assessment, MDRTB must be suspected until 2 weeks of standard TB treatment has resulted in clinical improvement and or drug sensitivities are known.
11.3. All patients with suspected or confirmed MDRTB that require hospitalisation must be admitted to the appropriate standard negative pressure ventilation single room (for guidance see NICE Clinical Guidelines 117 “Clinical diagnosis and management of tuberculosis, and measures for its prevention and control”).

11.4. YDH have a negative pressure room in ICU and this room will be used in accordance with the ICU admission policy.

11.5. If an appropriate negative-pressure single room allocation cannot be made available locally, the patient must be transferred to a hospital with both this facility and staff experienced in the management of such cases.

11.6. Respiratory isolation precautions must be strictly implemented – particularly the use of FFP3 masks which must be worn by all staff and visitors whenever entering the room.

11.7. The patient must remain in negative pressure isolation for duration of hospitalisation or until MDRTB has been ruled out.

11.8. The decision to discharge must be discussed between the supervising Respiratory Consultant, Consultant Microbiologist or IPCT, and the TB Nurse Specialist. The Consultant in Communicable Disease Control (CCDC) must be informed.

11.9. If a patient self-discharges, the Nurse in Charge must inform the supervising Physician, CCDC and TBCNS as soon as is practicable. The notifying person will need to pass the patient’s name, date of birth, Hospital Number, last known address and telephone number(s), date and time of self-discharge, treatment type and length, last known microbiology results and likely destination.

11.10. All requests for temporary leave from isolation must be dealt with as per section 9.2.

12. **PTB IN INTENSIVE THERAPY UNIT (ITU)**

12.1. Confirmed or suspected cases of infectious PTB in ICU that are not ventilated via a closed ventilation circuit must be nursed in a single room preferably with negative pressure ventilation. See section 6 for help with risk assessment and diagnosis.

12.2. If the patient is intubated/ventilated via a closed system and secretions are contained, masks are not required to be worn except when exposure to uncontrolled secretions is unavoidable e.g. whenever the closed system is disconnected, changing filters, catheter mounts, tubing or suction apparatus.

12.3. Chest physiotherapy producing respiratory secretions must not be performed in an open ward area. Staff must wear FFP3 masks.

12.4. If the patient is not fully ventilated and a closed circuit cannot be maintained, e.g. on CPAP or T piece etc, carers must wear a FFP3 mask in the room at all times unless the patient is considered no longer infectious.

12.5. If MDRTB is suspected and negative pressure facilities are not available, the patient must be moved to a single room and the supervising team must consider transferring the patient to a hospital with such facilities.

13. **CHILDREN AND TB**

13.1. Young children with tuberculosis are usually non-infectious but may have a close family contact with active disease who is infectious. Therefore, precautions must be
taken until it has been established that patient and visiting family members are clear of infectious pulmonary TB.

13.2. For treatment guidance, please refer to the ‘Chemotherapy and management of tuberculosis in the United Kingdom’ recommendations (BTS 1998).

13.3. If admission to hospital is clinically necessary, the child must be admitted to a single room within the children’s unit unless MDRTB is suspected, in which case they must be admitted to negative pressure facilities. Doors and windows must be kept closed to prevent accidental positive pressure transferring bacteria to other clinical areas.

13.4. If the child is able to produce sputum, three sputum samples should be obtained (see section 5). If the child is unable to produce sputum, the supervising Paediatrician must decide on whether they wish to attempt gastric washings/bronchoscopy to try to isolate AFB. If taken, gastric/bronchoscopy washings must be labelled and processed in the same way as sputum samples (see section 10).

13.5. Visitors must be kept to an absolute minimum. All close family members must be referred to the RNS for screening as soon as possible. Until deemed to be non-infectious, they must be educated on the need to come and go directly to the room when visiting and must not use the relatives’ kitchen, childrens’ common room, etc.

13.6. Isolation can be discontinued when it has been confirmed that both the patient and visiting family members are non-infectious.

14. NEW CASES DISCOVERED IN OPEN WARDS

14.1. Occasionally a diagnosis of PTB will be confirmed in a patient on an open ward. If AFB sputum smear +ve, the patient must be moved into isolation based on the isolation criteria.

14.2. There is a very low risk of TB transmission to other patients. Staff must contact the RNS and IPCT who will assist the Ward Manager in conducting a risk assessment to establish if any patients require contact screening. The patient must be informed of any potential exposure risk and a letter documenting the potential exposure must be placed into the patient’s medical notes with a copy sent to the General Practitioner (GP).

14.3. Staff who have been identified as close contacts (more than 8 cumulative hours of close contact) with a patient who is AFB sputum smear +ve, must report their exposure to their Occupational Health Department. Due to on-going occupational exposure and the low risks of transmission, formal TB screening is generally not warranted. However, the exposure must be documented in the staff’s medical record. Staff have a duty at all times to report any symptoms indicative of TB to the Occupational Health Team.

15. CONTACT TRACING

15.1. Patients – If a patient on an open ward is diagnosed as having smear positive tuberculosis the risk of other patients being infected is likely to be small. Patients in a bay who have had over 8 hours contact with an infectious pulmonary TB case prior to the instigation of isolation precautions will be contact traced and followed up by the RNS.

15.2. Staff – Those staff involved in the care of a patient with smear positive TB prior to the instigation of infection control precautions will be followed up in accordance with the current Occupational Health and Safety Department procedure. The Ward Manager
should inform the Occupational Health Department of any staff contacts prior to the instigation of infection control precautions. Information should include whether the staff member had close contact with the patient (defined as staff that have administered prolonged care of a high dependency patient equivalent to close household contact, or repeated chest physiotherapy) or casual contact.

15.3. **Family Close Contacts** – Family and close contacts will be followed up by the RNS in liaison with Public Health England.

15.4. **Notification** – All forms of TB are notifiable to the Consultant for Communicable Disease Control under the Public Health Control of Disease Act 1988. The clinician making or suspecting the diagnosis is responsible for notification. A decision to commence treatment indicates a level of suspicion which should trigger notification for all forms of TB. The notification should indicate the sputum smear status of the patient and should be telephoned to South West (South) Acute Response Centre on 0844-225-3557.

16. **DECEASED PATIENTS**

16.1. **Last offices** – A body bag must be used and TB status entered on the Confirmation of Death form.

16.2. **Post Mortem** – If a post mortem is required on a patient with suspected or known TB and an incision into the lungs will be made, all persons present during the post mortem must wear a FFP3 mask.

17. **FFP3 MASK FIT TESTING**

17.1. All staff who may need to wear FFP3 particulate mask respirator masks should have received fit testing training. It is the responsibility of the member of staff and their manager to ensure that this has been carried out.

18. **APPLICABILITY**

18.1. These guidelines apply to all staff of Yeovil District Hospital NHS Foundation Trust. All queries regarding current TB Diagnosis, Management, Monitoring, Prevention and Control should be referred to the NICE guidelines below or the Royal College of Physicians Guidelines ISBN-186016 227 0.

19. **IMPLEMENTATION, MONITORING AND EVALUATION**

19.1. These guidelines will be implemented, monitored and evaluated through the Infection Prevention & Control Committee.

20. **REFERENCES**

NICE clinical guideline 117 - Tuberculosis – Clinical diagnosis and management of tuberculosis, and measures for its prevention and control, March 2001