NHS Grampian
TB Policy
2011
INTRODUCTION TO NHS GRAMPIAN TB GUIDELINES 2011

The WHO declared TB a global emergency in 1993. It is estimated that one third of the world's population are infected with TB – in the region of 2 billion people. There were approximately 9.4 million new cases of active disease in 2008. Around 2 million people will die from TB every year – that is one TB death every 15 seconds; yet this is a curable infectious disease. In many areas of the world the numbers of cases are still increasing due to rising levels of poverty, migration, levels of HIV infection and poor access to health services.

Over the last 20 years numbers of TB cases in the UK have been rising slowly. In excess of 9000 people now get TB each year – around 15 people in every 100,000 of the population. Indeed in Grampian, the number of cases has increased from 24 cases notified in 2004 to 60 cases in 2010. As the general epidemiological trend both in the UK and worldwide continues to be upwards, and with growing numbers of cases being Multi-Drug Resistant TB (MDR – TB) and/or co-infection with the HIV virus, it remains important that all health professionals are vigilant to the signs and symptoms of TB and are aware of current UK and local policy on its management.

Guidance on control and prevention of tuberculosis was reviewed and NICE published their latest guidance for England and Wales in March 2006. Scotland has since published its own guidance, based on NICE. This is the Health Protection Network Scottish guidance “Tuberculosis: Clinical diagnosis and management of tuberculosis, and measures for its prevention and control in Scotland” which is currently only available on line at http://www.documents.hps.scot.nhs.uk/about-hps/hpn/tuberculosis-guidelines.pdf

NHS Grampian has reviewed its local policy (NHS Grampian Tuberculosis Policy, Working Draft 2005) against the new Scottish guidance and developed an updated series of user friendly “stand alone” flow charts and clear statements to help guide interested parties through the control and management of TB in Grampian. These should be used in conjunction with the online Scottish 2009 guidance.
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FIGURE 1: OVERVIEW OF NHS GRAMPIAN CONTACT TRACING SCREENING POLICY

BOVINE TB in cattle

MICROSCOPY POSITIVE sample\textsubscript{1} from any site except sputum. i.e. non-respiratory TB

MICROSCOPY POSITIVE\textsubscript{1} sputum i.e. respiratory TB

ENVIRONMENTAL MYCOBACTERIA\textsubscript{2}

Generally, advice and information only to herd owners and workers. Screening is only carried out in exceptional circumstances

Casual contacts\textsubscript{3} may be given advice and information but only screened in exceptional circumstances

Close household contacts\textsubscript{3} should be given advice and information and screened following algorithm on Appendices I and II\textsubscript{4}

Assess other close contacts\textsubscript{3} Give advice and information and screen as appropriate following algorithm on Appendices I and II\textsubscript{4}

No screening required
FIGURE 1: OVERVIEW OF NHS GRAMPIAN CONTACT TRACING SCREENING POLICY

Explanatory Notes:

1. Microscopy Positive: is where Acid Fast Bacilli (AFB) are visible after staining the sample with Auramine stain (new cases then confirmed by Ziehl- Neelsen stain). If present it demonstrates the presence of Mycobacteria.
   Microscopy Negative: is where Acid Fast bacilli (AFB) are not visible after staining the sample with Auramine staining.

2. Environmental Mycobacteria: are organisms which can be found in soil and water. There is no evidence of animal to human or human to human transmission. May cause both asymptomatic infection and symptomatic disease. Symptoms can be similar to those of Mycobacteria tuberculosis and diagnosis can only be confirmed from culture of the bacteria.

3. Household contact - People who share a bedroom, kitchen, bathroom or sitting room with the index case.
   Other close contacts - may include e.g. boy/girl friends; frequent household visitors and occasionally workplace associates where the contact takes place within an enclosed environment.
   Casual contacts include - friends, relatives, work place colleagues or those seen at a social gathering who only have contact with the index case on a non-household contact basis or out with an enclosed environment.

4. Mantoux skin testing is offered within the algorithms of the Scottish document and NHS Grampian Appendices I and II.

N.B. All NHS Grampian staff (clinical and honorary) who administer a Mantoux skin test should have completed theoretical training in how to do and interpret this procedure and gained supervised practice and competence prior to practicing on their own. Training and supervised practice can usually be provided by the Health Protection Team.

Interferon gamma tests are also offered within the algorithms, Appendices I and II. There are currently three different interferon–gamma immunological tests commercially available for use in the UK. These tests are carried out using cells or cell products derived from samples of whole blood. They either a) measure the interferon-gamma released from T cells in response to stimulation by specific MTB antigens, or b) enumerate T cells which have been activated by the presence of specific MTB antigens. The tests use MTB antigens which are not present in BCG, and are found in only a few species of environmental bacteria. So, in the absence of MTB infection, BCG vaccination alone does not generate a positive response to these tests.

NHS Grampian offers immunological testing but with limited availability. Testing is conducted by the Virology laboratory at ARI and can only be carried out after discussion and agreement with one of the respiratory Consultant Physicians for TB.
The test normally used is manufactured by Cellestis and is known as the “Quantiferon Gold test.” This test requires three 1ml samples of blood to be taken, 1ml into each of the 3 special test tubes. The kits are available from the Virology laboratory at ARI after discussion and agreement with one of the respiratory Consultant Physicians for TB.

The blood samples must be sent immediately to the Virology lab at ARI where they will be spun down and stored. The testing is usually done once a week, on a Monday, with the results usually available later in the week.
FIGURE 2: RISK ASSESSMENT FACTORS
The risk of infection is related to the infectiousness of the person with TB and the susceptibility of those exposed, the duration of exposure, the proximity to the source case and the efficiency of ventilation in the environment where the contact took place.

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<thead>
<tr>
<th>Risk assess for MDR TB</th>
<th>Consider productivity of cough:</th>
<th>Consider load of AFBs in sputum</th>
<th>Consider susceptibility of contact</th>
<th>Consider environment of contact with case:</th>
<th>Consider duration of contact:</th>
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<td>See Appendix III Main criteria for suspicion:</td>
<td>History of prior TB drug treatment and/or prior TB treatment failure</td>
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<td>Contact with a known case of drug-resistant TB</td>
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<td>Birth in a foreign country, particularly high-incidence countries for MDR TB e.g. those with an incidence of MDR TB of greater than 5% of all new cases</td>
<td>Breakthrough in drug resistance</td>
<td>Numerous = higher risk of infectiousness</td>
<td>Immunosuppressed = higher susceptibility e.g. those on immunosuppressing drugs, HIV, radiotherapy</td>
<td>Less than 8hours = minimal risk and usually below the threshold for screening</td>
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<td>Unproductive = lower risk of infectiousness</td>
<td>Moderate = medium risk of infectiousness</td>
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<td>Very productive = higher risk of infectiousness</td>
<td>Scanty = lower risk of infectiousness</td>
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FIGURE 3 : GP ACTION WHEN SUSPECTING A DIAGNOSIS OF RESPIRATORY TB IN AN ADULT

GP suspects **Respiratory** TB from clinical presentation

Possible symptoms are:
- Persistent cough, sometimes with sputum which can be blood stained
- Unexplained weight loss
- Loss of appetite
- Fever/sweating, especially at night
- Persistent shortness of breath or tightness in the chest

Send 3 samples of sputum taken on consecutive days to Microbiology Lab at ARI for TB microscopy and culture

Urgent referral to the Chest Clinic
- Clearly mark referral letter “Suspected Respiratory TB”
- Should be seen by Chest Physician within 1–2 weeks

FIGURE 3a : GP ACTION WHEN SUSPECTING A DIAGNOSIS OF NON-RESPIRATORY TB IN AN ADULT

GP suspects **Non-Respiratory** TB from clinical presentation

Symptoms will vary depending on the site of the disease

Send any appropriate sample(s) to Microbiology Lab at ARI for direct TB microscopy and culture

Consider referral to appropriate speciality for further investigation and possible biopsy and needle aspiration of site

Consider referral to chest clinic as appropriate
- Clearly mark referral letter “Suspected Non-Respiratory TB”
- Should be seen by Chest Physician/Infectious Diseases Physician within 1-2 weeks
FIGURE 3: GP ACTION WHEN SUSPECTING A DIAGNOSIS OF RESPIRATORY TB IN AN ADULT

Explanatory Notes:

1. Microscopy Positive: is where Acid Fast Bacilli (AFB) are visible after staining the sample with Auramine stain (new cases then confirmed by Ziehl-Neelsen stain). If present this demonstrates the presence of Mycobacteria.

   Microscopy Negative; is where Acid Fast bacilli (AFB) are not visible after staining the sample with Auramine stain.

   Culture: all samples will be cultured in a liquid culture for up to 6 weeks in a MIGIT automated system and 12 weeks on a solid medium looking for a growth of acid fast bacilli in order that the Mycobacteria may be typed and drug sensitivities confirmed.

2. The patient should be referred **urgently** to the chest clinic. Referral should not be delayed to allow routine new entrant screening to take place.
FIGURE 4: GP ACTION WHEN SUSPECTING A DIAGNOSIS OF TB IN A CHILD

GP suspects TB from clinical presentation and/or family history.

- Be aware that children often exhibit few clinical symptoms of Tuberculosis until infection is well advanced.
- They may eventually present with non-specific symptoms of fever, cough, anorexia and weight loss all of which may be mistaken for other common paediatric illnesses

Send urgent referral to, Consultant Respiratory Paediatrician at RACH
Patient will usually be seen in next 1-2 days
FIGURE 5: CLINICAL MANAGEMENT OF A SUSPECTED ADULT CASE OF MTB BY SPECIALIST CLINICAL AND HEALTH PROTECTION TEAMS

Assess level of risk of MDR TB
Make every effort to obtain appropriate samples e.g. bronchoscopy with lavage if sputum unobtainable, FNA, biopsy. Carry out HIV testing

Criteria for admission to hospital
- Severity of illness
- Non compliance with treatment
- Social reasons
- Adverse affects of drug

Culture result can take up to 12 weeks

Sample sent to Microbiology Lab for TB microscopy and culture

Smear result usually available within 24 hours

Commence 4-drug treatment (in most cases) as soon as possible.

Public Health Actions
Clinical Team:
- Consider sputum smear positive cases to be infectious until 14 days of treatment completed
- Notify to Health Protection Team
Health Protection Team:
- Consider need for exclusion from work and places of social gathering under Public Health Legislation
- If excluded consider financial assistance from NHS Grampian
- Consider requesting consent to share information with employer as necessary
- Initiate contact tracing
- If in-patient, confirm HAI team aware and that ward staff have received appropriate guidance on infection control

Clinical Actions
- Closely monitor clinical symptoms
- Monitor compliance with drug therapy
- Monitor side effects
- Follow up at specialist TB clinic at Chest clinic ARI
- Copy of all clinic letters to TB Specialist Nurse

If suspicion of MTB is low:
Await full culture results

If culture positive
Commence 4-drug treatment (in most cases) as soon as possible.

If culture negative - it is a clinical decision regarding continuation of treatment

If culture negative - it is a clinical decision regarding continuation of treatment

If culture negative - it is a clinical decision regarding continuation of treatment

If culture negative - it is a clinical decision regarding continuation of treatment

If culture negative - it is a clinical decision regarding continuation of treatment

If culture negative - it is a clinical decision regarding continuation of treatment
FIGURE 5: CLINICAL MANAGEMENT OF A SUSPECTED ADULT CASE OF MTB BY SPECIALIST CLINICAL AND HEALTH PROTECTION TEAMS

Explanatory Notes:

1. Multi Drug Resistant Tuberculosis (MDR TB): is where the bacteria are resistant to at least two of the standard four drugs used to treat TB i.e. Rifampicin and Isoniazid. MDR-TB is not generally more infectious than MTB, however, the consequences of having MDR-TB are more serious. MDR TB has a mortality rate of up to 80%.

   Risk factors for MDR TB:
   • History of prior TB drug treatment; prior TB treatment failure
   • Contact with a known case of drug-resistant TB
   • Birth in a foreign country, particularly high-incidence countries for MDR TB e.g. those with an incidence of MDR TB of greater than 5% of all new cases (see Appendix III)

2. Fine Needle Aspiration

3. Hospital admission should only be where clinically necessary. Patients do not require to be kept in hospital for the first 14 days of treatment purely for Public Health reasons.

   Whilst in hospital those patients with suspected or confirmed respiratory TB should remain in their room at all times with the door shut. If they need to leave the room for clinical investigation or for other necessary reasons e.g. for a brief time to smoke a cigarette outside in a smoking shelter, they should wear a surgical mask whilst in the hospital corridors or departments. They should not go to any communal areas such as the hospital cafeteria. The surgical mask will help to reduce the risk of droplet spread of MTB bacteria via the patient’s expired air. Do not put a FFP3 mask on the patient. The FFP3 mask does not filter droplets from expired air.

4. Microscopy positive: is where Acid Fast Bacilli (AFB) are visible after staining the sample with Auramine stain (new cases then confirmed by Ziehl-Neelsen stain). If present this demonstrates the presence of Mycobacteria.

   Microscopy negative; is where Acid Fast bacilli (AFB) are not visible after staining the sample with Auramine stain.

   Culture: all samples will be cultured in a liquid culture for up to 6 weeks in a MIGIT automated system and 12 weeks on a solid medium looking for a growth of acid fast bacilli in order that the Mycobacteria may be typed and drug sensitivities confirmed.

5. All suspected and/or confirmed cases must be notified by the clinician to the Health Protection Team via Scottish Care Information (SCI) Gateway within 3 days. In addition, Enhanced Surveillance of Mycobacterial Infections (ESMI) in Scotland forms A, B and C must be completed and signed off by the clinician. All data is recorded on NHS Grampian database and then on the national database held by Health Protection Scotland.
FIGURE 6: MANAGEMENT OF SUSPECTED CASE OF TB BY SPECIALIST CLINICAL AND HEALTH PROTECTION TB TEAMS - CHILD CASE

Assess level of risk of MDR TB
Make every effort to obtain appropriate samples e.g. bronchoscopy with lavage if sputum unobtainable, gastric lavage, FNA, biopsy
Consider HIV testing

Criteria for admission to hospital
- Severity of illness
- Uncertainty about compliance with treatment
- Social reasons
- Adverse affects of drug

Culture result can take up to 12 weeks

Sample sent to Microbiology Lab for TB microscopy and culture
Smear result usually available within 24 hours

Commence 4-drug treatment (in most cases) as soon as possible.

Public Health Actions
Clinical Team:
Although children are very rarely infectious to others, manage on the basis that sputum smear positive cases may be infectious until 14 days of treatment completed.
- Notify to Health Protection Team

Health Protection Team:
- Consider the need for exclusion from nursery/school/social gatherings under Public Health Legislation
- If excluded, consider the need for financial assistance for parents/carers from NHS Grampian
- Initiate contact tracing and search for primary case.
- If in-patient, confirm HAI team aware and that ward staff have received appropriate guidance on infection control.

Clinical Actions
- Closely monitor clinical symptoms
- Monitor compliance with drug therapy
- Monitor side effects
- Follow up by Consultant Respiratory Physician at Out Patient Department at RACH
- Copy of all clinic letters to TB Specialist Nurse

If suspicion of MTB is low – await full culture results

If culture positive

Commence 4-drug treatment (in most cases) as soon as possible

If culture negative – it is a clinical decision regarding continuation of treatment

If suspicion of MTB is high - Commence 4-drug treatment (in most cases) as soon as possible.

 Notify to Health Protection Team

AFB positive

AFB negative
FIGURE 6: MANAGEMENT OF SUSPECTED CASE OF TB BY SPECIALIST CLINICAL AND HEALTH PROTECTION TB TEAMS - CHILD CASE

Explanatory Notes:

1. Multi Drug Resistant Tuberculosis (MDR TB): is where the bacteria are resistant to at least two of the standard four drugs used to treat TB i.e. Rifampicin and Isoniazid. MDR-TB is not generally more infectious than MTB however the consequences of having MDR-TB are more serious. MDR TB has a mortality rate of up to 80%.

   Risk factors for MDR TB:
   • History of prior TB drug treatment; prior TB treatment failure
   • Contact with a known case of drug-resistant TB
   • Birth in a foreign country, particularly high-incidence countries for MDR TB e.g. those with an incidence of MDR TB of greater than 5% of all new cases (see Appendix III).

2. Fine Needle Aspiration

3. Hospital admission should only be where clinically necessary. Patients do not require to be kept in hospital for the first 14 days of treatment purely for Public Health reasons. Whilst in hospital those patients with suspected or confirmed respiratory TB should remain in their room at all times with the door shut. If they need to leave the room for clinical investigation or other exceptional circumstances they should wear a surgical mask whilst in the hospital corridors or departments. They should not go to any communal areas such as the hospital cafeteria. The surgical mask will help to reduce the risk of droplet spread of MTB bacteria via the patient’s expired air. Do not put a FFP3 mask on the patient. The FFP3 mask does not filter droplets from expired air.

4. Microscopy positive: is where Acid Fast Bacilli (AFB) are visible after staining the sample with Auramine stain (new cases then confirmed by Ziehl-Neelsen stain). If present this demonstrates the presence of Mycobacteria.

   Microscopy negative: is where Acid Fast bacilli (AFB) are not visible after staining the sample with Auramine stain.

   Culture: all samples will be cultured in a liquid culture for up to 6 weeks in a MIGIT automated system and 12 weeks on a solid medium looking for a growth of acid fast bacilli in order that the Mycobacteria may be typed and drug sensitivities confirmed.

5. All suspected and/or confirmed cases must be notified by the clinician to the Health Protection Team via Scottish Care Information (SCI) Gateway within 3 days. In addition, Enhanced Surveillance of Mycobacterial Infections (ESMI) in Scotland forms A, B and C must be completed and signed off by the clinician. All data is recorded on NHS Grampian database and then on the national database held by Health Protection Scotland.
FIGURE 7: ISOLATION AND PPE DECISIONS FOR STAFF WHEN PATIENTS ADMITTED TO HOSPITAL WITH SUSPECTED OR CONFIRMED RESPIRATORY TB

Patient admitted via GP or A&E with suspected respiratory TB. Risk assess for MDR TB:

- **Known MDR TB**
  - Transfer to nearest hospital with negative pressure isolation facility if no such facility available locally
  - Send 3 consecutive days’ sputum samples for TB microscopy and culture. Request PCR and RPO (as appropriate).

- **Has risk factor for MDR TB**
  - Admit to single room during assessment ensuring patient stays in room and door is closed at all times. PPE should be worn by all staff entering the room

- **Has no risk factors for MDR TB**
  - Admit to single room during assessment ensuring patient stays in room and door is closed at all times. Limited PPE should be worn by all staff entering the room

- **Sputum microscopy negative, PCR/RPO negative**
  - NO PPE required by staff entering the room.

- **Sputum microscopy negative, PCR positive, RPO negative**
  - All staff should continue to wear PPE when entering the room whenever aerosol generating procedures are being performed or when entering a room within 1 hour of such a procedure taking place AND/OR whenever providing care will lead to an individual care worker having a cumulative total of 8 hours or more close contact with the case.

- **Sputum microscopy positive, PCR/RPO positive**
  - Transfer to nearest hospital with negative pressure isolation facility if no such facility available locally

- **Sputum microscopy positive, PCR positive, RPO negative**
  - All staff should wear PPE when entering room

- **Sputum microscopy positive, PCR/RPO positive**
  - NO PPE required by staff entering the room.

- **Sputum microscopy positive, PCR/RPO negative**
  - All staff should continue to wear limited PPE when entering room.
FIGURE 7: ISOLATION AND PPE DECISIONS FOR PATIENTS ADMITTED TO HOSPITAL

Explanatory Notes:

1. Multi Drug Resistant TB (MDR-TB) is where the bacteria are resistant to at least two of the standard 4 drugs used to treat TB i.e. Rifampicin and Isoniazid. MDR-TB is not generally more infections than MTB, however, the consequences of having MDR-TB are more serious.
   - Risk factors
     - History of prior TB drug treatment; prior TB treatment failure
     - Contact with a known case of drug-resistant TB
     - Birth in a foreign country, particularly high-incidence countries for MDR TB e.g. an incidence of equal to or greater than 5% of all new cases (Appendix III)

2. Microscopy positive: is where Acid Fast Bacilli (AFB) are visible after staining the sample with Auramine stain (new cases then confirmed by Ziehl-Neelsen stain). If present, this demonstrates the presence of Mycobacteria.

   Microscopy negative; is where Acid Fast bacilli (AFB) are not visible after staining the sample with Auramine stain.

   Culture: all samples will be cultured in a liquid culture for up to 6 weeks in a MIGIT automated system and 12 weeks on a solid medium looking for a growth of acid fast bacilli in order that the Mycobacteria may be typed and drug sensitivities confirmed.

3. All microscopy positive sputum samples are sent to the Scottish TB Reference laboratory. Weekly, on a Wednesday, a combined PCR (Polymerase Chain Reaction) and RPO (Rifampicin resistance) probe is used on the samples. This can confirm the presence of MTB complex and resistance to Rifampicin. The RPO test will only demonstrate Rifampicin resistance but, if a sample is Rifampicin resistant, Isonizid resistance is also likely. It should be remembered that this test can give false positives and false negatives and the test result should be considered in the context of the overall clinical assessment of a case.

4. Health care workers providing direct clinical care to, and/or entering the room of, a patient with suspected or confirmed sputum smear positive TB should wear fit tested FFP3 masks when any of the following criteria apply:
   - at all times when caring for a patient with suspected or confirmed MDR TB and/or
   - whenever aerosol generating procedures are being performed or when entering a room within 1 hour of such a procedure taking place and/or
   - whenever providing care will lead to an individual care worker having a cumulative total of 8 hours or more close contact with the case.

   If none of the above criteria apply, no mask need be worn.
When masks are used, the reason for this should be fully explained to the person with suspected or confirmed respiratory TB.

No PPE is required to be worn by porter/ orderly or ambulance staff unless the journey will include more than 8 hours of close contact. In this case fit tested FFP3 masks (a) should be worn and replaced after 8 hours of use.

Domestic assistants need only wear fit tested FFP3 masks (a) whilst cleaning the room of a patient with suspected or confirmed respiratory MDR TB or when cleaning the room of a non-MDR, sputum smear positive MTB patient within 1 hour of an aerosol generating procedure having taken place.

Visitors to those with suspected or confirmed sputum smear positive pulmonary TB should be kept to a minimum and include only those who are already considered close contacts (c) and who will be screened. No PPE is then required to be worn except when the case has suspected or confirmed MDR TB (see FIGURE 9).

The index patient should not leave their room except for clinical investigation. In this case the patient must wear a surgical mask out with their room. The surgical mask will help to reduce the risk of droplet spread of MTB bacteria via the patients expired air. Do not put a FFP3 mask on the patient. The FFP3 mask does not filter droplets from expired air.

(a) European standard EN149.2001 for Respiratory protective equipment at work: a practical guide HSG53 published by the Health and Safety Executive (2005).
(b) An intervention which results in a suspension of extremely small liquid particles (approx 0.001mm in diameter) in the air.
(c) People sharing a bedroom, kitchen, bathroom or sitting room with the index case. This may also include a boyfriend or girlfriend and visitors to the home of the index case who experience 8 hours of cumulative exposure.
FIGURE 8: RISK ASSESSMENT FOR SUSPECTED MDR TB AND MANAGEMENT OF INDEX CASE WITH SUSPECTED OR CONFIRMED MDR TB

Suspected MDR-TB

Risk factors for MDR TB:
- History of prior TB drug treatment; and/or prior TB treatment failure
- Contact with a known case of drug-resistant TB
- Birth in a foreign country, particularly high-incidence countries for MDR TB e.g. those with an incidence of MDR TB of greater than 5% of all new cases (see Appendix III).

Known or very high index of suspicion for Respiratory MDR-TB

Admit patient directly from home to, or move in-patient to (if not locally available), nearest hospital with negative pressure isolation facility for minimum of first 14 days of treatment AND/OR until
- Strain found to be fully sensitive
- 3 consecutive day sputum samples are smear negative
- Patient clinically better and medication tolerated

- Ambulance staff should be made aware of possible diagnosis.
- Patient should wear surgical mask throughout journeys

Prior to discharge, ensure arrangements are in place in the community for administration and supervision of all medication for duration of treatment

In all sputum microscopy positive cases of TB where MDR-TB is being considered – ask Microbiology Lab to arrange for urgent PCR and RPO testing to confirm presence of MTB and Rifampicin resistance

Medium index of suspicion for Respiratory MDR-TB

Patients should not leave isolation except for clinical investigation. In this case the patient must wear a surgical mask when entering patient’s room for any reason.

If negative pressure facility is not available then isolate in single non-negative pressure room and keep door shut at all times.

All staff and visitors should wear fit tested FFP3 masks when entering patient’s room for any reason.

Termination of isolation decided by clinician in charge of patient’s care

FIGURE 8: RISK ASSESSMENT FOR SUSPECTED MDR TB AND MANAGEMENT OF INDEX CASE WITH SUSPECTED OR CONFIRMED MDR TB

Suspected MDR-TB

Risk factors for MDR TB:
- History of prior TB drug treatment; and/or prior TB treatment failure
- Contact with a known case of drug-resistant TB
- Birth in a foreign country, particularly high-incidence countries for MDR TB e.g. those with an incidence of MDR TB of greater than 5% of all new cases (see Appendix III).

Known or very high index of suspicion for Respiratory MDR-TB

Admit patient directly from home to, or move in-patient to (if not locally available), nearest hospital with negative pressure isolation facility for minimum of first 14 days of treatment AND/OR until
- Strain found to be fully sensitive
- 3 consecutive day sputum samples are smear negative
- Patient clinically better and medication tolerated

- Ambulance staff should be made aware of possible diagnosis.
- Patient should wear surgical mask throughout journeys

Prior to discharge, ensure arrangements are in place in the community for administration and supervision of all medication for duration of treatment

In all sputum microscopy positive cases of TB where MDR-TB is being considered – ask Microbiology Lab to arrange for urgent PCR and RPO testing to confirm presence of MTB and Rifampicin resistance

Medium index of suspicion for Respiratory MDR-TB

Patients should not leave isolation except for clinical investigation. In this case the patient must wear a surgical mask when entering patient’s room for any reason.

If negative pressure facility is not available then isolate in single non-negative pressure room and keep door shut at all times.

All staff and visitors should wear fit tested FFP3 masks when entering patient’s room for any reason.

Termination of isolation decided by clinician in charge of patient’s care
Explanatory Notes:

1. Multi Drug Resistant TB (MDR-TB) is where the bacteria are resistant to at least two of the standard 4 drugs used to treat TB i.e. Rifampicin and Isoniazid. MDR-TB is not generally more infections than MTB, however, the consequences of having MDR-TB are more serious. MDR TB has a mortality rate of up to 80%.

2. All microscopy positive sputum samples are sent to Scottish TB Reference laboratory. Weekly, on a Wednesday, PCR (Polymerase Chain Reaction) and RPO (Rifampicin resistance probe) probe are used on the samples. This can confirm the presence of MTB complex and resistance to Rifampicin (RPO will only demonstrate Rifampicin resistance but, if the sample is Rifampicin resistant, Isoniazid resistance is also likely.) It should be remembered that this test can give false positives and false negatives and the test result should be considered in the context of the overall clinical assessment of a case.

3. All staff and visitors entering the room of a patient with suspected or confirmed respiratory MDR-TB should wear a fit tested FFP3 mask. (a) Masks can be used as a one use only or per shift following discussion with the hospital Infection Control and Prevention Team.

4. High risk for MDR TB is where there is a history of prior TB drug treatment which has been incomplete or failed or where there has been contact with a known case of MDR TB.

   Medium risk is where the patient comes from a country with an incidence rate of MDR TB of 5% or more in new cases (see Appendix III)

5. The surgical mask will help to reduce the risk of droplet spread of MTB bacteria via the patient’s expired air. Do not put a FFP3 mask on the patient. The FFP3 mask does not filter droplets from expired air

   (a) European standard EN149.2001 for Respiratory protective equipment at work: a practical guide HSG53 published by the Health and Safety Executive (2005).
FIGURE 9: INITIAL ROLE OF TB SPECIALIST NURSE

Sample is microscopy positive for AFB₁

Sample is microscopy negative for AFB₁ but suspicion of MTB remains high

Sample is microscopy negative for AFB but culture positive

TB Specialist Nurse informed by microbiology and specialist clinical TB team

Interview case and begin contact tracing as per Appendices I and II

Ensure case is notified by clinician via Scottish Care Information (SCI) Gateway to Health Protection Team within 3 days
Ensure Enhanced Surveillance of Mycobacterial Infections (ESMI) in Scotland forms A, B and C are completed and signed off by clinician

- Yellow/white copies of ESMI forms to TB Nurse
- Blue copy in Medical notes
- Photocopy to Health Protection Scotland
FIGURE 9: INITIAL ROLE OF TB SPECIALIST NURSE

1. Microscopy positive: is where Acid Fast Bacilli (AFB) are visible after staining the sample with Auramine stain (new cases then confirmed by Ziehl-Neelsen stain). If present this demonstrates the presence of Mycobacteria.

Microscopy negative; is where Acid Fast bacilli (AFB) are not visible after staining the sample with Auramine stain.

Culture: all samples will be cultured in a liquid culture for up to 6 weeks in a MIGIT automated system and 12 weeks on a solid medium looking for a growth of acid fast bacilli in order that the Mycobacteria may be typed and drug sensitivities confirmed.
FIGURE 10: MANAGEMENT OF PATIENT AND STAFF CONTACTS OF IN-PATIENT INDEX CASE WITH SPUTUM MICROSCOPY POSITIVE MTB

Index case diagnosed with sputum microscopy positive MTB while in-patient or within 3 months of discharge from in-patient admission
- Incident Management Team meeting called by Health Protection Team

Patients and staff with less than 8 hours contact—no further action

- Consider risk of MDR TB
- Consider index case’s infectivity
- Consider ward size and environment
- Consider vulnerability of contacts
- Consider length of admission
- Consider the mobility of case and if sharing dayroom and other ward facilities

Patients with >8 hours close cumulative contact in same ward bay or immediately adjacent beds

- Write in patient’s notes of contact
- Advise and inform patient
- Inform GP
- Screen as for household contacts following algorithm on Appendices I and II

Patients in other parts of ward for >8 hours, and susceptible to infection

- Write in patient’s notes of contact
- Advise and inform patient
- Inform and advise all staff
- Offer screening if staff member “specialed” case for 8 hours or more and no PPE had been worn
- Other staff screening may be considered on a case by case basis

Patients with >8 hours in other part of ward and not susceptible to infection

Staff with > 8hrs contact with case in the ward

- Write in patient’s notes of contact
- Advise and inform patient
- Inform GP
- Offer screening if staff member “specialed” case for 8 hours or more and no PPE had been worn
- Other staff screening may be considered on a case by case basis
FIGURE 10: MANAGEMENT OF PATIENT AND STAFF CONTACTS OF IN-PATIENT WITH RESPIRATORY MTB

Explanatory Notes:

1. Incident Management Team meeting will be called by the Health Protection Team and held as a matter of urgency. The meeting will require the presence of the clinical medical lead for ward involved, nurse manager from ward, Infection Prevention and Control Nurse, Microbiology representative, Corporate Communications representative, Health Protection Team members and, as required, a senior hospital manager. The meeting will be chaired by Consultant in Public Health Medicine.

2. The risk of transmission of infection from the index case should be assessed taking into account the following: the possibility of MDR TB, productivity of cough and load of mycobacteria seen on direct film, duration of contact, mobility of the index case, ward size and environment of contact and vulnerability of contacts (see Figure 2).

3. NICE 2006 guidance (and Scottish version 2009) regards patients as being at risk from infection if they have spent more than 8 hours in the same bay, or (in a Nightingale ward) more than 8 hours in the beds directly adjacent to the index case.

Where the hospital system has no facility for accurately and consistently recording the exact time of movement to another area or time of discharge, an assumption is made that if a patient did not stay in same ward/bay overnight with the case, it is unlikely there will have been 8 hours or more of close prolonged contact and no screening is required.

Close cumulative contact would be where contact was similar to that which takes place within a household i.e. people sharing a bedroom, kitchen, bathroom or sitting room with the index case.

4. Where staff cannot identify the patients who were in the beds, either adjacent to the index case in a Nightingale ward setting, or in the same bay setting, prior to diagnosis then ALL patients in the ward would need to be considered for screening. Depending on the risk assessment, in most circumstances, screening is likely to be restricted to those patients with immunosuppression.

Roles and responsibilities

- Identification of patients who had more than 8 hours of contact to be undertaken by Infection Prevention and Control Nurse in conjunction with ward staff
- The decision which of these should be screened automatically and which should be first assessed for immunosuppression (against criteria, see Appendix IV) will be reached following a risk assessment at the Incident Management Team meeting
- Where a patient requires to be assessed for immunosuppression the responsibility for undertaking this clinical assessment lies with the
Consultant in charge of that patient’s care. The assessment should be carried out within a timescale agreed at the Incident Management Team Meeting.

- Both the patient and their GP to be advised and informed by the Health Protection Team

5. Where a member of staff had “specialed” the index case for a prolonged period in a single room or small bay area and accumulated a minimum of 8 hours close contact similar to that which occurs in a household setting, or where a member of staff has had prolonged exposure to infected aerosolised secretions, and in either case where no FFP3 mask (a) has been worn they will be offered screening.

Following assessment and on a case by case basis other staff may be considered for screening

**PPE Requirements**

Health care workers caring for patients with suspected or confirmed respiratory TB should wear fit tested FFP3 masks (a)

- a) at all times when caring for a patient with suspected or confirmed MDR TB and/or
- b) whenever aerosol generating procedures are being performed or when entering a room within 1 hour of such a procedure taking place (b) and/or
- c) whenever providing care will lead to an individual care worker having a cumulative total of 8 hours or more close contact (c) with the case

When masks are used, the reason for this should be fully explained to the person with suspected or confirmed respiratory TB

When transferring a patient no PPE is required to be worn by portering, orderly or ambulance staff unless the journey will include more than 8 hours of close contact. In this case fit tested FFP3 masks (a) should be worn and replaced after 8 hours of use.

Domestic assistants need only wear fit tested FFP3 masks whilst:

- a) cleaning the room of a patient with suspected or confirmed respiratory MDR TB
- b) cleaning the room of a patient with suspected or confirmed respiratory TB within one hour of an aerosol generating procedure having been performed in the room

Visitors to those with suspected or confirmed sputum smear positive respiratory TB should be kept to a minimum and include only those who are already considered to be close contacts (c) and who will be screened. No PPE is then required to be worn except when the case has suspected or confirmed MDR TB (see Figure 11).

The index patient should not leave their room except for clinical investigation. In this case the patient must wear a surgical mask out with their room. The surgical mask will help to reduce the risk of droplet spread of MTB bacteria via the
patients expired air. Do not put a FFP3 mask on the patient. The FFP3 mask does not filter droplets from expired air.

Management of patient and staff contacts is the same when the in-patient index case is a child.

Footnotes
(a) European standard EN149.2001 for Respiratory protective equipment at work: a practical guide HSG53 published by the Health and Safety Executive (2005)
(b) An intervention which results in a suspension of extremely small liquid particles (approx 0.001mm in diameter) in the air
(c) Contact that is equivalent to people sharing a bedroom, kitchen, bathroom or sitting room with the index case.
FIGURE 11: MANAGEMENT OF PATIENT AND STAFF CONTACTS OF INDEX CASE WITH RESPIRATORY MTB WHO IS A STAFF MEMBER

Consider risk of MDR TB
Consider index case’s infectivity
Consider ward size and environment
Consider vulnerability of contacts
Consider length of shifts and type of work carried out

Index case diagnosed with respiratory MTB whilst working in a care giving setting or within previous 3 months prior to diagnosis
- Incident Management Team meeting called by Health Protection Team

Patients admitted for less than 8 hours, and staff with less than 8 hours of close cumulative contact, – no further action

- Write in patient’s notes of contact
- Advise and inform patient
- Inform GP
- Screen as for household contacts following algorithm on Appendices I and II

Patients with >8 hours close cumulative contact in same ward bay or immediately adjacent beds

Patients in other parts of ward for >8 hours and susceptible to infection

Patients with >8 hours in other part of ward and NOT susceptible to infection

Staff with > 8 hours contact with the case in the ward

- Inform and advise
- Staff screening may be considered on a case by case basis
FIGURE 11: MANAGEMENT OF PATIENT AND STAFF CONTACTS OF INDEX CASE WHO IS A STAFF MEMBER

1. Incident Management Team meeting will be called by the Health Protection Team and held as a matter of urgency. The meeting will require the presence of the clinical medical lead for ward involved, nurse manager from ward, Infection Prevention and Control Nurse, Microbiology representative, Corporate Communications representative, Health Protection Team members and, as required, a senior hospital manager. The meeting will be chaired by Consultant in Public Health Medicine.

2. The risk of transmission of infection from the index case should be assessed. The following factors should be taken into account: the possibility of MDR TB, productivity of cough and load of mycobacteria seen on direct film, duration of contact, ward size and environment of contact and vulnerability of contacts (See Figure 2).

3. NICE 2006 guidance (and Scottish version 2009) regards patients as being at risk from infection if they have spent more than 8 hours in the same bay, or in close ‘household-like’ contact with the index case.

Where the hospital system has no facility for accurately and consistently recording the exact time of movement to another area or time of discharge, an assumption is made that if a patient did not stay in the same ward/bay overnight with the case, it is unlikely there will have been 8 hours or more of close prolonged contact and no screening is required.

Close cumulative ‘household-like’ contact would be where contact was similar to that which takes place within a household i.e. people sharing a bedroom, kitchen, bathroom or sitting room with the index case.

4. Where staff cannot identify individual patients who may have had close cumulative contact of 8 hours or more with the member of staff then ALL patients in ward would need to be considered for screening. In most circumstances, screening is likely to be restricted to those patients with immunosuppression.

Roles and responsibilities
- Identification of patients who had more than 8 hours as an inpatient to be undertaken by Infection Prevention and Control Nurse in conjunction with ward staff
- The decision which of these should be screened automatically and which should be first assessed for immunosuppression (against criteria, see Appendix IV) will be reached following a risk assessment at the Incident Team meeting
- Where a patient requires to be assessed for immunosuppression the responsibility for undertaking this clinical assessment lies with the Consultant in charge of that patients’ care. The assessment should be carried out within a timescale agreed at Incident Management Team Meeting.
• Both the patient and their GP to be advised and informed by the Health Protection Team

5. Following assessment and on a case by case basis, staff may be considered for screening

Management of patient and staff contacts is the same when the in-patient index case is a child.

Footnotes
(a) European standard EN149.2001 for Respiratory protective equipment at work: a practical guide HSG53 published by the Health and Safety Executive (2005)
(b) An intervention which results in a suspension of extremely small liquid particles (approx 0.001mm in diameter) in the air
(c) Contact that is equivalent to people sharing a bedroom, kitchen, bathroom or sitting room with the index case. This may also include a boyfriend or girlfriend and visitors to the home of the index case with 8 hours cumulative exposure
FIGURE 12: MANAGEMENT OF RESIDENTS AND STAFF CONTACTS OF INDEX CASE WHO IS A RESIDENT OR STAFF MEMBER WITH RESPIRATORY TB IN A CARE HOME

- Consider the risk of MDR TB
- Consider index case’s infectivity
- Consider size of home and general environment
- Consider length of admission/length of shifts
- Consider vulnerability of contacts

Index case diagnosed with sputum smear positive MTB whilst resident or staff member or within 3 months of discharge/leaving post
- Consider Incident Management Team meeting

Residents or staff with less than 8 hours contact – no further action

Residents with more than 8 hours contact

- Advise and inform resident and/or next of kin.
- Consider Adult with Incapacity (Scotland) Act 2000 Adult.

Screen as for household contact either by
1. CXR or, if unfit to attend,
2. Interferon Gamma Blood test

1. CXR
If “normal” – no further action
If “abnormal” refer to Chest Physician for follow-up

2. Interferon Gamma Blood test
If “negative” – no further action
If “positive” – review ability of resident to attend for CXR
If unable to attend, in agreement with GP / care home staff and Next of Kin, monitor condition

Staff with more than 8 hours of contact with the case

- Inform and advise all staff
- Offer screening if staff member “specialed” case for 8 hours or more AND no PPE had been worn

Other staff screening may be considered on a case by case basis.
FIGURE 12: MANAGEMENT OF RESIDENTS AND STAFF CONTACTS OF AN INDEX CASE WHO IS A RESIDENT OR STAFF MEMBER WITH RESPIRATORY TB IN A CARE HOME

Explanatory Notes:

1. Incident team meeting will be called by the Health Protection Team and held as a matter of urgency. The meeting will require the presence of the GP representative for unit, nurse manager from unit, Microbiology representative, Corporate Communications representative and Health Protection Team members. The meeting will be chaired by Consultant in Public Health Medicine.

2. The risk of transmission of infection should be assessed taking into account the following: the possibility of MDR TB, productivity of cough and load of mycobacteria seen on direct film, duration of contact, environment of contact and vulnerability of contacts (see Figure 2).

3. NICE 2006 guidance (and amended Scottish version 2009) regards patients as being at risk from infection if they have close cumulative contact and/or have spent more than 8 hours in the same bay within a ward, or in the beds directly next the index case’s bed, as an inpatient with sputum smear positive TB who has a cough. Close cumulative contact would be where contact was similar to that which takes place within a household.

4. Adults with Incapacity (Scotland) Act 2000 sets out the framework for regulating intervention in the affairs of adults (people over 16) who have impaired capacity and therefore ability to consent to screening or treatment.

5. Interferon gamma tests are immunological tests carried out using cells or cell products derived from samples of whole blood. They either a) measure the interferon-gamma released from T cells in response to stimulation by specific MTB antigens, or b) enumerate T cells which have been activated by the presence of specific MTB antigens. The tests use MTB antigens which are not present in BCG, and are found in only a few species of environmental bacteria. So, in the absence of MTB infection, BCG vaccination alone does not generate a positive response to these tests.

NHS Grampian offers immunological testing but with limited availability. Testing is conducted by the Virology laboratory at ARI and can only be carried out after discussion and agreement with one of the respiratory Consultant Physicians for TB.

The test normally used is manufactured by Cellestis and is known as the “Quantiferon Gold test” This test requires three 1ml samples of blood taken, 1ml into each of the 3 special test tubes. The kits are available from the Virology laboratory at ARI after discussion and agreement with one of the respiratory Consultants for TB.
The blood samples must be sent immediately to the Virology lab at ARI where they will be spun down and stored. The testing is usually done once a week on a Monday with the results usually available later in the week.

6. Where a member of staff had “specialed” the index case for a prolonged period in a single room or small bay area and accumulated a minimum of 8 hours close contact similar to that which occurs in a household setting, or where a member of staff has had prolonged exposure to infected aerosolised secretions, **AND** (in either case) where no FFP3 mask **(a)** has been worn they will be offered screening. Following assessment and on a case by case basis, other staff may be considered for screening.

**PPE Requirements**

Health care workers caring for patients with suspected or confirmed sputum smear positive TB should wear fit tested FFP3 masks **(a)**:

- at all times when caring for a patient with suspected or confirmed MDR TB **and/or**
- whenever aerosol generating procedures are being performed or when entering a room within 1 hour of such a procedure taking place **(b)** **and/or**
- whenever providing care will lead to an individual care worker having a cumulative total of 8 hours or more close contact **(c)** with the case

If none of the above criteria apply, no mask need be worn.

When masks are used, the reason for this should be fully explained to the person with suspected or confirmed respiratory TB.

No PPE is required to be worn by portering/ orderly or ambulance staff unless the journey will include more than 8 hours of close contact. In this case fit tested FFP3 masks **(a)** should be worn and replaced after 8 hours of use.

Domestic assistants need only wear fit tested FFP3 masks **(a)** whilst cleaning the room of a patient with suspected or confirmed respiratory MDR TB or when cleaning the room of a non-MDR, sputum microscopy positive MTB patient within 1 hour of a an aerosol generating procedure having taken place.

Visitors to those with suspected or confirmed sputum microscopy positive pulmonary TB should be kept to a minimum and include only those who are already considered close contacts **(c)** and who will be screened. No PPE is then required to be worn except when the case has suspected or confirmed MDR TB (see FIGURE 9).

Whilst infectious, the index patient should not leave their room except for clinical investigation. In this case the patient must wear a surgical mask out with their room. The surgical mask will help to reduce the risk of droplet spread of MTB bacteria via the patients expired air. Do **not** put a FFP3 mask on the patient. The FFP3 mask does not filter droplets from expired air.
Footnotes
(a) European standard EN149.2001 for Respiratory protective equipment at work: a practical guide HSG53 published by the Health and Safety Executive (2005)
(b) An intervention which results in a suspension of extremely small liquid particles (approx 0.001mm in diameter) in the air
(c) People sharing a bedroom, kitchen, bathroom or sitting room with the index case. This may also include a boyfriend or girlfriend and visitors to the home of the index case with 8 hours cumulative exposure
FIGURE 13: MANAGEMENT OF VISITORS TO SPUTUM MICROSCOPY POSITIVE TB /MDR TB CASES

Visitors to suspected or confirmed sputum microscopy positive respiratory TB case

Adult case

Child case

Adult visitors
Only those who are already considered close contacts should visit while patient is infectious i.e. during the first 14 days of receiving treatment. In this case no PPE need be worn.

Child visitors
Should not visit at all until the patient is non-infectious

Segregate child and visitors from the rest of the ward until visitors who are close contacts are screened and excluded as source of infection.

N. B. Where an index case has suspected or confirmed MDR-TB then all visitors should wear fit tested FFP3 masks.

Visitors to a suspected or confirmed MDR TB case should be rigorously restricted to only those already considered to be close contacts who have to be screened themselves, or until status of index case is clarified or index case considered non-infectious.
FIGURE 13: MANAGEMENT OF VISITORS TO SPUTUM MICROSCOPY POSITIVE TB/MDR TB CASES

Explanatory Notes:

1. Multi Drug Resistant Tuberculosis (MDR TB): is where the bacteria are resistant to at least Rifampicin and Isoniazid. MDR-TB is not generally more infectious than MTB, however, the consequences of having MDR-TB are more serious. MDR TB has a mortality rate of up to 80%.

Risk factors for MDR TB:

   1. History of prior TB drug treatment; prior TB treatment failure
   2. Contact with a known case of drug-resistant TB
   3. Birth in a foreign country, particularly high-incidence countries for MDR TB e.g. those with an incidence of MDR TB of greater than 5% of all new cases (see appendix IV).

2. Visitors to a patient with suspected or confirmed sputum microscopy positive respiratory MDR TB should be restricted to a minimum and to those who are already considered close contacts (a) and will be screened. These visitors should wear fit tested FFP3 masks (b) when entering the room.

   Only in exceptional circumstances would any visitors to other patients i.e. not the index case be considered for screening. Such circumstances might be where a visitor has spent many days/hours visiting a relative in an adjoining bed to the index case with respiratory TB.

Footnote

(a) People sharing a bedroom, kitchen, bathroom or sitting room with the index case. This may also include a boyfriend or girlfriend and visitors to the home of the index case with 8 hours cumulative exposure

(b) European standard EN149.2001 for Respiratory protective equipment at work: a practical guide HSG53 published by the Health and Safety Executive (2005)
FIGURE 14: MANAGEMENT OF SCHOOL CONTACTS OF A NURSERY/SCHOOL PUPIL DIAGNOSED WITH TB

Nursery/school pupil with Tuberculosis

Sputum microscopy negative or Non-Respiratory TB

1. No action in school is normally required.
2. Screen household close contacts to identify possible index case as soon as possible.
3. Offer screening to rest of his/her class if single class group or rest of year group where classes shared, and to close friends out with this, following algorithm for screening close contacts on Appendices I and II

Sputum microscopy positive Respiratory TB

1. Consider Incident Management Team meeting
2. Consider extending contact tracing to the pupil’s teaching staff, children and teachers involved in extracurricular activities with the index case and to non-teaching staff on the basis of:
   - The degree of infectivity of the index case
   - The length of time the index case was in contact with others
   - Whether contacts are unusually susceptible to infection
   - The proximity of contact
   See Figure 2

Further cases identified

- Initiate Outbreak Control Team to assess the situation and determine the need for, and extent of, further screening required

No further cases identified

No further action required

Children aged less than 12 years are rarely a source of infection to others

Children aged less than 12 years are rarely a source of infection to others.
FIGURE 14: MANAGEMENT OF SCHOOL CONTACTS OF A SCHOOL PUPIL DIAGNOSED WITH TB

Explanatory Notes:

1. Microscopy positive: is where Acid Fast Bacilli (AFB) are visible after staining the sample with Ziehl-Neelsen stain. If present it demonstrates the presence of Mycobacteria.

   Microscopy negative; is where Acid Fast bacilli (AFB) are not visible after staining the sample with Ziehl-Neelsen stain (or Auramine staining).

2. Incident Management Team meeting will be called by the Health Protection Team and held as a matter of urgency. The meeting will require the presence of the clinician with responsibility for the case, Microbiology representative, Health Visiting and/or School Nursing management, Corporate Communications representative, Health Protection Team members. The meeting will be chaired by Consultant in Public Health Medicine.

3. Close contact would be where contact was similar to that which takes place within a household i.e. people sharing a bedroom, kitchen, bathroom or sitting room with the index case.
FIGURE 15: MANAGEMENT OF NURSERY/SCHOOL CONTACTS OF A TEACHER DIAGNOSED WITH TB

Teacher with Tuberculosis

Sputum microscopy Negative or non-respiratory TB

- Screen close household contacts only as soon as possible

Sputum microscopy positive Respiratory TB

- Consider Incident Management Team Meeting

All pupils in his/her class/es during the preceding 3 months should be screened as close contacts as on Appendices I and II

Consider extending contact tracing to the teaching staff, children and teachers involved in extracurricular activities with the case, and to non-teaching staff on the basis of:
- The degree of infectivity of the index case
- The length of time the index case was in contact with others
- Whether contacts are unusually susceptible to infection
- The proximity of contact

Further cases identified

- Initiate Outbreak Control Team to assess the situation and determine the need for, and extent of, further screening required.

No further cases identified

- No further action required

No further cases identified

- No further action required

Further cases identified

- Initiate Outbreak Control Team to assess the situation and determine the need for, and extent of, further screening required.

See Figure 2
FIGURE 15: MANAGEMENT OF NURSERY/SCHOOL CONTACTS OF A TEACHER DIAGNOSED WITH TB

Explanatory notes

1. Microscopy positive: is where Acid Fast Bacilli (AFB) are visible after staining the sample with Auramine stain (new cases then confirmed by Ziehl-Neelsen stain. If present this demonstrates the presence of Mycobacteria.

Microscopy Negative; is where Acid Fast bacilli (AFB) are not visible after staining the sample with Auramine stain.

2. Incident Management Team meeting will be called by the Health Protection Team and held as a matter of urgency. The meeting will require the presence of the clinician with responsibility for the case, Microbiology representative, Health Visiting and/ or School Nursing management, Corporate Communications representative, Health Protection Team members. The meeting will be chaired by Consultant in Public Health Medicine

3. Close contact would be where contact was similar to that which takes place within a household i.e. people sharing a bedroom, kitchen, bathroom or sitting room with the index case.
FIGURE 16: PROPOSED* SCREENING OF NEW ENTRANTS – CHILDREN UNDER 16 YEARS OF AGE

Currently, there is no routine provision locally for screening of new entrant children who come from the highest risk countries.

An established process is still to be agreed with key stakeholders in NHS Grampian*. The Scottish TB guidance 2009 has an algorithm of recommended actions that are required and this is shown in Appendix V.
FIGURE 17: SCREENING OF NEW ENTRANTS (ADULTS) WHO HAVE NO SYMPTOMS OF TB DISEASE, AND WHO ARE FROM SELECTED COUNTRIES WITH A HIGH TB INCIDENCE

Adult aged 16 years or older

Age 16 – 35 years and from a selected and/or highest risk country

Age 36 years or older and from a selected and/or highest risk country

Receive written information and advise only

Refer to New Entrant screening clinic for Mantoux test

Mantoux 4 0-5 mm

No prior BCG Vaccination

No further action and letter to GP

Mantoux 4 6-14 mm

Has had prior BCG Vaccination

Refer to TB Clinic, ARI for assessment

Mantoux 4 15 mm or more

No further action and letter to GP

CXR

CXR Normal

Discuss treatment for latent TB

CXR Abnormal

Refer to TB Clinic, ARI for assessment
The responsibility for identifying new entrant adults who should be advised to attend TB screening is shared between:

- Primary care staff (using information from new patient registrations with general practices)
- Health Protection Team (from Port of Arrival reports and work with universities and selected employers)
- School Nursing Staff (using information from entry to education)
- Statutory and voluntary groups working with new entrants

**NB:** Any healthcare professional working with new entrants should encourage them to register with a GP
FIGURE 17: SCREENING OF NEW ENTRANTS1 (ADULTS) WHO HAVE NO SYMPTOMS OF TB DISEASE, AND WHO ARE FROM SELECTED COUNTRIES2 WITH A HIGH TB INCIDENCE

Explanatory notes

1. **Definition of “new entrant”**
   For local TB screening purposes, “new entrant” is any person asymptomatic for TB who has arrived in or returned to the UK within the last three years from a very high risk country (TB incidence > 500/100,000), a country in sub-Saharan Africa or India, having lived there for three months or more.

2. **Selected and/or highest risk country**
   This is any country with a TB incidence >500/100,000, a country in sub-Saharan Africa or India.

3. **New Entrant Clinic**
   This is organised via the Health Protection Team.

4. **Interpretation of Mantoux test** (Ref: Immunisation Against Infectious Disease 2006 Department of Health and Scottish Executive – otherwise known as the “Green Book”)
   - 0 – 5 mm of induration  **Negative** – previously unvaccinated individuals can be given BCG if no contraindications.
   - 6 – 14 mm of induration  **Positive** – should not be given BCG. May be due to previous TB infection / BCG / exposure to non-MTB mycobacteria.
   - 15 mm or more of induration  **Positive** – suggests TB infection or disease. Refer for investigation.

**Rationale for local (NHS Grampian) New Entrant screening policy**
National policy proposes initial screening for active respiratory TB disease on entry, by chest X-ray, of all new entrants aged 11 years and above coming from a high risk country (i.e. TB incidence >40 cases/100,000). This should be followed by a Mantoux test, to detect active non-respiratory disease and latent TB infection, administered to all individuals aged under 16 years in the above group plus any individual aged 16 years and above who has come from a very high risk country (i.e. TB incidence of >500 cases/100,000) country or a country in sub-Saharan Africa. All individuals coming from a high risk country who may be pregnant or aged less than 11 years should have a Mantoux screening test rather than chest X-ray in the first instance.

Locally, there is a substantial new entrant population but limited capacity to undertake new entrant screening. It has therefore been necessary to adapt national policy and develop a local TB screening policy which can be implemented within the available resource. During the period 2007-2009, a total of 130 Grampian residents were diagnosed with active TB disease. Of these, 93 (72%) had a non-UK country of origin. Very few of these individuals had
symptoms of active TB disease at or shortly after they arrived in the UK. Most developed symptoms around two to three years (or more) following arrival. It is probable that, in a majority of these cases, reactivation of long-standing latent infection led to TB disease. Local epidemiology shows a majority of these cases (51 out of 93) arose in new entrants coming from countries with a very high TB incidence (>500,100,000), countries in sub-Saharan Africa and India. We therefore focus screening on new entrants coming from these selected countries in order to make most effective use of the screening resource available.

Our local screening objectives are to:
- Provide relevant information to all new entrants from the selected countries detailed below.
- Detect active TB disease and latent infection in new entrants aged less than 36 years coming from very high risk countries, sub-Saharan countries in Africa and India.
- Provide appropriate BCG vaccination to those coming from the above countries who are not infected and who are previously unvaccinated.

As a consequence, local NHSG new entrant TB screening policy differs from national recommendations in the following ways:
- Testing is only offered to those new entrants coming from countries of very high TB incidence*, countries in sub-Saharan Africa* and India. Screening is not routinely offered to new entrants coming from other high risk countries.
- No chest x-ray or Mantoux screening is carried out on asymptomatic new entrants aged 36 years and above. This is because evidence from chest X-ray screening of new entrants conducted at the main UK Ports of Entry has demonstrated that such screening of asymptomatic individuals is not cost effective. It has a very low detection rate for finding individuals suffering from active respiratory disease. Chest X-ray examination cannot detect latent TB infection. Mantoux screening for latent infection is not routinely undertaken in persons in this age group as the risk from treatment of latent infection (should it be found) usually outweighs the risk to the individual of developing active TB disease. Instead, new entrants to Grampian aged 36 years and above from the selected countries are contacted and offered advice and information about TB disease, advised to register with a general practitioner and seek medical advice early if they have symptoms suggestive of TB disease.
- Screening of individuals aged less than 36 years is undertaken by Mantoux testing. It is not preceded by chest x-ray examination. Local experience has demonstrated that uptake of initial Mantoux testing is considerably higher than chest x-ray, especially where testing can be carried out at a location convenient to the individual. In addition, unlike chest x-ray examination, Mantoux testing has the advantage of being able to detect both active disease and latent TB infection. This approach also avoids exposing non-infected individuals to unnecessary chest X-ray.

* www.hps.scot.nhs.uk/tb-countries
FIGURE 18: MANAGEMENT OF POSSIBLE TRANSMISSION OF TB ON AN AIRCRAFT


Contact tracing of passengers is NOT routinely undertaken

Consider sending information and advice to passengers seated within the 3 rows on either side of, in front of and behind the index case in the aircraft only if:
- Case is sputum microscopy positive
- Either MDR TB or non-MDR TB and known to have coughed frequently during flight
- Less than 3 months has passed since the flight
- The flight lasted more than 8 hours
Animal Health informs the Health Protection Team about a cattle herd which has tested positive to bovine TB and provides the name and address of the registered owner of the herd.

Information and advice is sent to the herd owner for distribution to all contacts who have had close contact with the cattle.

Consider screening those under 16 who have not had BCG vaccination and who have regularly drunk unpasteurised milk from animals with TB udder lesions.
FIGURE 20: SCREENING OF NEW NHS EMPLOYEES

For further guidance see Department of Health 2007 guidance “Health clearance for tuberculosis, hepatitis B, hepatitis C and HIV: New healthcare workers”

ALL employees (including medical, nursing and other clinical students, agency and locum staff and contract ancillary workers) new to the NHS who will have direct contact with patients or clinical specimens should NOT start work until they have completed a TB health check or documentary evidence is provided of such screening having taken place within the preceding 12 months.

Health check should include:-
- Assess personal or family history of TB
- Symptoms and signs enquiry possibly by questionnaire
- Documentary evidence of Mantoux testing and/or BCG scar check by OH professional within the last 5 years
- BCG vaccination should be offered as per 2006 “Green Book” guidance

ALL employees new to the NHS who will not have direct contact with patients or clinical specimens may start work prior to completion of health check unless they have any symptoms of TB. In this case refer to GP for clinical assessment.

Employees of any age who are new to the NHS AND have come from working/living in a country of high TB incidence i.e. 40/100,000 or more (see Appendix VI) OR who have had contact with patients in settings with a high TB prevalence should have a Mantoux test regardless of BCG status unless they can provide documentary evidence that this has been carried out within the previous 12 month period:-
- if negative (less than 6mm) - follow 2006 “Green Book” guidance regarding possible BCG vaccination
- if between 6 and 14mm - no follow up but advise patient if they did develop any symptoms suggestive of TB they should consult their GP or OHS urgently.
- if positive (15mm or greater) - refer to Chest Clinic, ARI for clinical assessment and chest X-ray
- If CXR “normal” - consider treatment for latent TB
- If CXR “abnormal” - treat as appropriate

Employees of any age, new to the NHS from the UK or other low incidence countries i.e. less than 40/100,000 (see appendix VI) and without previous BCG vaccination should have a Mantoux test
- if negative (less than 6mm) - follow 2006 “Green Book” guidance regarding possible BCG vaccination
- if between 6 and 14mm - no follow up but advise patient if they did develop any symptoms suggestive of TB they should consult their GP or OHS urgently.
- if positive (15mm or greater) - refer to Chest Clinic, ARI for clinical assessment and chest X-ray
- If CXR “normal” - consider treatment for latent TB
- If CXR “abnormal” – treat as appropriate
FIGURE 21: SCREENING OF PREGNANT WOMEN FROM COUNTRIES WITH A HIGH INCIDENCE OF TB

Community Midwife completes routine TB Risk questions in Pregnancy Record by the end of booking (by 12 weeks gestation)

If pregnant woman, father-to-be or any of the grandparents-to-be were born in a country with an incidence of TB of 40/100,000 or more (see Appendix VI)

If pregnant woman comes from Sub-Saharan African country or one where the incidence is 500/100,000 or more and is aged 35 years or younger (see Appendix VI)

Baby will require BCG at birth

Discuss need for her to be screened for latent or active TB.

Provide NHS Grampian information sheet: “Pregnancy and tuberculosis – Information for pregnant women”

Refer pregnant woman (if she gives consent) to TB Specialist Nurse – susan.duthie@nhs.net for screening appointment to be arranged. Details required are the pregnant woman’s name, address, date of birth and CHI number.

Clinics are Friday afternoons for mantoux skin test and Monday lunchtimes for reading.

Clinics are only held at chest clinic, ARI, Aberdeen

The outcome of any screening will be reported back in writing to the Community Midwife, GP and when appropriate to the Consultant Obstetrician for information.
Consider DOT (even for an in-patient) for those with:-
• Suspected or confirmed MDR TB
• Previous non compliance issue or incomplete treatment
• Those with chaotic lifestyles who may be known to other services e.g. homeless, alcohol abusers, IDU, difficult to contact
• children

Health Protection Team to identify and agree a “responsible person” to administer DOT to patient from:-
• Family member/close friend
• Current service provider with whom patient already has regular contact from health, social or voluntary sectors
• Health Care Worker e.g. Health Visitor, District Nurse, School Nurse

If in-patient – do not discharge until arrangements for DOT are agreed and in place

Minimum of weekly risk assessment and management review between Health Protection Team and “responsible person”
APPENDIX I: TESTING AND TREATING ASYMPTOMATIC HOUSEHOLD AND OTHER CLOSE CONTACTS OF ALL CASES OF ACTIVE TB

For children aged between 4 weeks and 2 years old who are contacts of people with sputum smear-positive TB, use the algorithm on page 72.

1. Previous BCG vaccination cannot be accepted as evidence of immunity in HIV-infected patients.

2. A negative test in immunocompromised people does not exclude TB infection.

3. People advised to have treatment for latent TB infection, but who decline, should have 'inform and advise' information reinforced and chest X-ray follow-up at 3 and 12 months.

4. If interferon-gamma test is not available presume the result is positive. The next steps involve clinical review and a chest X-ray at which the risk for TB will be assessed.

APPENDIX II: TESTING AND TREATING ASYMPTOMATIC CHILDREN OLDER THAN 4 WEEKS BUT YOUNGER THAN 2 YEARS WHO ARE CONTACTS OF PEOPLE WITH SPUTUM SMEAR POSITIVE TB

APPENDIX III: ESTIMATES OF MDR TB BY WHO IN 2008 – COUNTRIES WITH RATES AMONGST NEW CASES OF 5% OR MORE

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>RATE</th>
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<tbody>
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<td>Armenia</td>
<td>9.4%</td>
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<tr>
<td>Azerbaijan</td>
<td>22.3%</td>
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<tr>
<td>Belarus</td>
<td>12.5%</td>
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<tr>
<td>China</td>
<td>5.7%</td>
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<tr>
<td>Croatia</td>
<td>12.5%</td>
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<tr>
<td>Dominican Republic</td>
<td>6.6%</td>
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<tr>
<td>Estonia</td>
<td>15.4%</td>
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<tr>
<td>Iceland</td>
<td>20%</td>
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<tr>
<td>Iran</td>
<td>5%</td>
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<tr>
<td>Jordan</td>
<td>5.4%</td>
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<tr>
<td>Kazakhstan</td>
<td>14.2%</td>
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<tr>
<td>Kyrgyzstan</td>
<td>12.5%</td>
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<tr>
<td>Latvia</td>
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<tr>
<td>Lithuania</td>
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<td>Republic of Moldova</td>
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<td>Russian Federation</td>
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<tr>
<td>Tajikistan</td>
<td>16.5%</td>
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<tr>
<td>Ukraine</td>
<td>16%</td>
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<tr>
<td>Uzbekistan</td>
<td>14.2%</td>
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</tbody>
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Extracted from: Multi drug and extensively drug resistant TB. 2010 Global Report on Surveillance and Response, WHO
APPENDIX IV: CRITERIA TO CONSIDER WHEN IDENTIFYING A PATIENT AS IMMUNOCOMPROMISED

The following list suggests criteria which it may be helpful to consider when seeking to identify patients who are likely to be immunocompromised and at increased risk of developing active Tuberculosis infection. The list is not exhaustive and is intended as a guide only. Clinicians may also wish to include patients suffering from other conditions and co-morbidities who they judge to be at increased risk of developing active Tuberculosis disease.


- Patients with evidence of severe primary immunodeficiency, e.g. severe combined immunodeficiency, Wiskott-Aldrich syndrome and other combined immunodeficiency syndromes.
- Patients currently being treated for malignant disease with immunosuppressive chemotherapy or radiotherapy, or who have terminated such treatment within at least the last six months.
- All patients who have received a solid organ transplant and are currently on immunosuppressive treatment.
- Patients who have received a bone marrow transplant, until at least 12 months after finishing all immunosuppressive treatment, or longer where the patient has developed graft-versus-host disease.
- Patients receiving systemic high-dose steroids, until at least three months after treatment has stopped. This would include children who receive prednisolone, orally or rectally, at a daily dose (or its equivalent) of 2mg/kg/day for at least one week, or 1 mg/kg/day for one month. For adults, an equivalent dose is harder to define but immunosuppression should be considered in those who receive at least 40 mg of prednisolone per day for more than one week. Occasionally, individuals on lower doses of steroids may be immunosuppressed and at increased risk from infections.
- Patients receiving other types of immunosuppressive drugs (e.g. azathioprine, cyclosporin, methotrexate, cyclophosphamide, leflunomide and the newer cytokine inhibitors) alone or in combination with lower doses of steroids until at least six months after terminating such treatment.
- Patients with immunosuppression due to human immunodeficiency virus (HIV) infection.


Page 30
1.6.1.9 Patients who:
- are HIV positive
- are injecting drug users
- have had solid organ transplantation
• have a haematological malignancy
• have had a jejuno-ileal bypass
• have chronic renal failure or receive haemodialysis
• have had a gastrectomy
• are receiving anti-TNF-alpha treatment
• have silicosis
• have diabetes
• are receiving chemotherapy
• are receiving immunosuppressants
• are very old or very young


1.1 page 4: “those with chronic poor health and nutrition because of lifestyle problems such as homelessness, drug abuse or alcoholism.”

Version 5/April 2010
APPENDIX V: NEW ENTRANT SCREENING

APPENDIX VI: TUBERCULOSIS INCIDENCE RATES

The most up to date list of TB incidence rates by rate and alphabetically by country can be found at [www.hps.scot.nhs.uk/tb-countries](http://www.hps.scot.nhs.uk/tb-countries)

Current list of sub Saharan African countries and those with a rate of 500/100,000 of their population – WHO 2011

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<tr>
<th>Name of Country</th>
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