Mid Essex Hospital Services NHS
NHS Trust

Preventing Transmission of Tuberculosis in Hospital	**Clinical Guideline** **Register No: 04076** **Status: Public on ratification**

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Document Review History

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1.0		2004
2.0	Infection Prevention Team	1st July 2013
3.0	Infection Prevention Team	10th June 2016

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1. Purpose

1.1 The purpose of this document is to ensure that all staff are aware of the necessary measures to prevent and control the spread of tuberculosis (TB).

1.2 This document provides information and guidance on the management of TB or suspected with TB to all staff thus enabling them to deliver the best possible care. (This policy must be read in conjunction with Standard Infection Prevention, Isolation & Patient Transfer, and Management of TB screening for Healthcare workers policies).

2. Aim

2.1 The aim of this policy is to ensure all patients with or suspected of having TB are managed appropriately, and all staff apply the correct infection prevention and control precautions to reduce the risk of TB transmission to other patients and staff.

3. Introduction

3.1 Tuberculosis (TB) is a major global health problem. Each year there are 9 million new cases of TB and close to 2 million deaths from TB around the world. The number of people developing TB in the UK continued to increase with particular regard to the immigrant population and in association with HIV infection, and other conditions that result in immune impairment (HPA, 2010).

3.2 Most patients with TB can be treated at home; a few need hospital admission for severe illness, adverse effects of chemotherapy or for social reasons. These guidelines relate to the management of patients in hospital and the protection necessary for hospital healthcare workers. They are based on "Control and Prevention of Tuberculosis in the United Kingdom: Code of Practice 2000" produced by the Joint Tuberculosis Committee of the British Thoracic Society and the NICE guidelines 2006, 2011 and 2016

4. Scope

4.1 This policy applies to all staff employed by the Trust on a substantive and temporary basis.

5. Roles and Responsibilities

The following paragraphs outline the main responsibilities and duties of post holders, which should be reflected in relevant job descriptions

5.1 Chief Executive (CEO)

The Chief Executive will have overall responsibility for the effective implementation of this Policy

5.2 Director of Infection Prevention and Control (DIPC)

The DIPC has operational responsibility for the effective implementation of this Policy

5.3 Respiratory Team

- All suspected cases of TB should be referred to the Respiratory Team. The Respiratory Team will make every effort to see cases of respiratory TB within a two week period as an outpatient

- TB cases should be followed up by the Respiratory Team to monitor progress, notify Public Health, decide on duration of therapy, to make therapy changes and finally to discharge the patient and notify completion of therapy

5.4. **Infection Prevention Team**

- To ensure all staff are made aware of this Policy and the standard precautions required to safely care for a TB patient and prevent the transmission of TB to others.

5.5 **All staff**

- To comply with this policy, all staff have a responsibility to ensure infection prevention and control is embedded into their everyday practice and applied consistently at all times

6. Definitions

6.1 **Open pulmonary TB** – the term used to describe tuberculosis in an individual whose sputum is positive for acid fast bacilli (AFB) thereby making them potentially infectious. Patients whose bronchial lavage specimens alone are ZN stain positive are not considered to have open TB provided sputum samples are negative on microscopy.

6.2 **Closed TB** – the term used to describe TB when AFB are not seen in the sputum. This term is also sometimes applied to TB at other body sites e.g. lymph nodes.

6.3 **Smear positive** - organisms of the mycobacterium group have been demonstrated by the use of an Auramine stain on sputum or clinical specimens. This is the initial indication of possible TB

6.4 **Acid fast bacilli** – a type of bacillus that resists decolorizing by acid after a stain. Examples include *M. tuberculosis*.

6.5 **Culture positive** – organisms are isolated from a specimen thereby confirming diagnosis. This may take several weeks

7. Cause, Infectivity, Transmission and Susceptibility

7.1 Causes and Infectivity

7.1.1 Tuberculosis is caused by a bacterium called *Mycobacterium tuberculosis.* (TB bacilli) which usually affects the lungs.

7.1.2 Infectivity is directly related to the number of TB bacilli expelled into the air. In general, patients who have or are suspected of active respiratory TB must be considered infectious especially if:

- their sputum is acid-fast bacilli (AFB) positive
- they are coughing, undergoing cough-inducing or aerosol-generating procedures
- they are not receiving anti-TB drugs
- have just started on treatment i.e. less than two weeks (14 days).

7.2 Transmission

- Infection is acquired by inhalation of small airborne droplets containing TB bacilli cough or

sneeze by a TB infected person (smear positive)

- There is also good evidence to suggest an association between aerosol generating procedures (e.g. suctioning) and transmission of respiratory TB

- People with TB in organs other than the lungs, or latent TB (see below) are rarely infectious to others

7.3 **Following infection**

The following can happen after infection:

- In primary infection, our body builds up a defensive barrier against the TB bacilli. In over 90% of these individuals, the body is able to contain the infection and they exhibit no clinical manifestations and will not go on to develop TB in their lifetime.

- However for some, after primary infection, the TB bacilli lay dormant -latent TB. Secondary TB may reactivate within a few months, years or decades later if the individual becomes weakened by disease or drug therapy and in old age. Reactivation occurs most commonly in the apex of the lungs, which is highly oxygenated, allowing TB bacilli to multiply more rapidly to produce destructive lesions, which spill over into other sites in the lung and then organisms spread to other body sites. The infection may spread via the bloodstream or lymphatic system to distant parts of the body e.g. cervical lymph nodes, spine, kidneys, central nervous system (non-respiratory or miliary TB).

- Less than 10% may progress to active TB mostly affecting the lungs

7.4 **Susceptibility**

7.4.1 Anyone can catch TB if exposed to TB bacilli. The risk of acquiring the infection depends mainly on the duration and intensity of exposure. The risk is greatest in those with prolonged, close household exposure to a person with infectious TB. Some people are especially vulnerable, either they are less able to fight latent infection or because they are frequently exposed to people with infectious TB. These people include:

- Close contacts of the person with infectious TB – household; close work colleagues
- Those who have lived, travelled to or receive visitors from places where TB is very common, including ethnic minority communities originating from such areas
- Those with weakened immune systems resulting from HIV or other medical problems e.g. on chemotherapy for treatment of malignancy or corticosteroids for treatment of inflammatory disease
- Very young babies and very elderly people as their immune systems are less robust
- Those with chronic poor health and malnutrition e.g. the homeless, drug and alcohol abusers
- Those living in crowded and poor housing conditions, including hostel

8. Diagnosis

8.1 All suspected cases of TB should be referred to the Respiratory Team

8.2 A risk assessment for MDR TB should be done on admission for each patient with TB (refer to Section 7.3 MDR TB)

8.3 The diagnosis of active respiratory TB is generally based on a combination of the clinical signs and symptoms, and investigations such as chest X-ray changes and multiple sputum samples

8.4 Mantoux testing should be offered to diagnose latent TB in adults aged 18-65 who are close contacts of a person with pulmonary or laryngeal TB. Where the Mantoux test is inconclusive the person should be referred to a TB specialist. If the Mantoux test is positive an interferon-gamma release assay test should be considered.

8.5 *Mycobacterium tuberculosis* is cultured in liquid incubating system and takes up to 6 weeks. The initial finding of acid fast bacilli (AFB) seen on microscopy adds weight to the diagnosis and could indicate the patient has active TB. Appropriate treatment regimen should be started without waiting for culture result, if the clinical signs and symptoms are consistent of TB

9. Collection of microbiological specimens for diagnosis

9.1 Respiratory TB

- At least three deep cough sputum samples collected in metal topped 60ml containers, with one early morning sample, before starting treatment or failing that, within 7 days of starting treatment in people with life-threatening disease.

- If possible spontaneously produced deep cough sputum should be obtained, otherwise induction of sputum or lavage is acceptable in children and adults. Additionally bronchoscopy may be used in adults.

9.2 Non-respiratory TB

Samples taken during surgery, biopsy or needle aspiration should be placed in a dry pot. Do not place part or all of any samples in formalin (or other fixative agent) when sending for TB culture. These include samples from:

- lymph node biopsy
- pus aspirated from lymph nodes
- pleural biopsy
- any surgical sample sent for routine culture
- any radiological sample sent for routine culture
- histology sample
- aspiration sample
- autopsy sample (if pulmonary or laryngeal TB is a possibility)
- urine sample –whole early morning specimen on three consecutive days in a 250 ml container
  (Refer to Appendix 4)

9.2.1 Specimens should be flagged with High Risk or Danger of Infection stickers. Care must be taken not to contaminate the outside of the specimen container. Specimens should be obtained and placed in the specimen bag within the room.

NB: Microbiology specimens should not be sent via the Pneumatic Tube System.

10. Multiple Drug-Resistant Tuberculosis (MDR TB)

10.1 MDR TB is a form of tuberculosis where the organism is resistant to two or more anti-

tuberculous drugs, and must include resistance to Isoniazid and Rifampicin.

10.2 Patients with suspected or known infectious MDR TB should be admitted to hospital with negative-pressure room (NICE Guideline 117). The Trust is unable to provide appropriate isolation facilities as recommended for the safe management of MDR TB as inpatient. Alternative arrangements should be made for the care of patients suspected or known MDR TB i.e. transfer of care to a hospital with these facilities (Barts and the London Hospital).

10.3 Risk Factors for MDR TB

10.3.1 In the UK, occurrence of MDR TB remains low. However, it must be considered as a clinical possibility among patients with known or suspected TB, who:

- have a history of previous TB drug treatment, particularly if there was known to be poor adherence to that treatment
- have had contact with a known case of multidrug-resistant TB
- have been born or reside in a country which the World Health Organisation reports that 5% or more of new TB cases are multidrug-resistant
- have certain immuno-compromised disorders (e.g.) HIV
- are prisoners
- have failed to respond to standard treatment

The patient must be referred to the Respiratory Team.

10.3.2 Spread of MDR TB in health care settings has been reported, but these have generally been amongst immuno-compromised patients, particularly when there is a breakdown in standard infection prevention precautions.

10.3.3 Patients with drug resistance and especially multi drug resistant tuberculosis (MDR TB) should preferably be seen outside an HIV setting e.g. in the chest Clinic, at the end of the clinic when other patients have left. Patients with MDR TB should wear a FFP3 filter mask when going through patient areas. These arrangements should continue until three consecutive negative sputum cultures have been obtained and the clinician believes the patient is complying with and responding to treatment.

10.4 **Extremely Drug Resistant Tuberculosis (XDR TB)**

- Extremely Drug Resistant Tuberculosis (XDR TB) is defined as resistance to Rifampicin, Isoniazid, any Fluroquinolones and at least one of the three following injectable drugs used in anti-TB treatment: Capreomycin, Kanamycin and Amikacin

- Cases should be transferred to a tertiary hospital (Barts and the London Hospital) with the recommended facilities i.e. negative-pressure room and a clinician experienced in managing complex drug-resistant cases.

11. Criteria for Admission

11.1 Criteria for admission include:

- Sick patients who needs urgent assessment and treatment.
- Poor social circumstances
- Suspected MDRTB or XDRTB which may need to be transferred to a tertiary site

The above list is not exhaustive.

12. Notification

12.1 All forms of TB are statutorily notifiable to the Consultant for Communicable Disease Control by the Medical Team. All patients requiring notification must be referred to the TB Nurses as this is now done electronically.

12.2 In all cases where TB is suspected, the appropriate Chest Physician should be contacted in writing for referral. The Chest Clinic will screen close personal contacts. At risk staff must be referred to Occupational Health.

13. Standard Infection Prevention and Control Precautions

13.1 Patients who have suspected or confirmed pulmonary or laryngeal TB, should be risk assessed for drug resistance, isolated on admission and segregated from other patients. The Infection Prevention Team should be informed of this admission. Visitors should be limited to those in close contact with the patient prior to admission. They must not visit other hospital patients, especially immuno-compromised patients. Children are discouraged from visiting.

Children

13.2. Children with known or suspected TB may normally be admitted to the Children's ward and nursed in isolation. However, if immuno-suppressed patients are currently being cared for on the ward or are admitted during the course of the stay, the IPT must be informed immediately and steps taken to ensure adequate segregation of patients.

13.3 Only immediate next of kin should visit or stay with the child and should be kept separate from other people until they have been excluded as a source of infection.

13.4 Any visitors to the child should stay in the room during their visit.

Criteria for Isolation

13.5 Sputum smear positive or suspected respiratory TB patients should be isolated in a single room vented to the outside of the building until:

- patient with active TB has completed 2 weeks of the standard treatment regimen
- they are discharged from hospital

13.6 An important principle is that immuno-compromised patients (HIV, TNF-alpha blockers, cancer chemotherapy, and haematological malignancies) should not be mixed with patients with infectious or potential infectious TB. Ideally these groups should not be managed on the same ward. The room should be vented to the air outside the building and the door kept shut.

13.7 A green Respiratory Isolation sign should be placed on the door of the room (see Appendix 1).

13.8 TB (Latent or non-respiratory TB) at sites other than the lung is rarely infectious and normally these patients do not need isolation.

Exceptions to this are as follows:

- Patients with open lesions (e.g. discharging sinuses) should remain isolated until 14 days of chemotherapy has been given

- Abscess or wound irrigation procedures which may generate aerosols should not be done on the open ward. A patient who is in a bay should be moved to separate facilities for these procedures and appropriate personal protective equipment worn.

Personal Protective Equipment (PPE)

13.9 Disposable plastic aprons must routinely be worn when examining a patient or for hands on nursing care. When handling respiratory secretions, disposable non-latex gloves must be worn. Remove gloves and aprons, dispose of these as clinical waste **inside** the room and wash hands. Refer to Respiratory Isolation sign in Appendix 1.

Masks

13.10 Clinical staff caring for patients suspected or confirmed respiratory TB do not need to use a mask, gowns or barrier nursing techniques unless;.

- MDR TB is suspected

- Aerosol generating procedures such as bronchoscopy, sputum induction or nebuliser treatment are being performed.

13.11 When masks are required, Fine Filter Particulate 3 (FFP3) should be worn.

When such equipment is used, the reason should be explained to the patient.

13.12 In accordance with the requirements of the Health & Safety Executive (HSE) all staff using FFP3 masks should be fit-tested and trained in the use of the mask. Fit-testing is critically important. The FFP3 mask must seal tightly to the face or air will enter around the sides. A good fit can only be achieved if the area where the mask seals against the skin is clean shaven. Beards, long moustaches, and stubble may cause leaks around the respirator. A fit check should be carried out each time a mask is worn by the wearer.

13.13 In the event that a patient with suspected or confirmed MDR TB, visitors entering the room must also wear FFP3 face masks.

13.14 The patient should receive education regarding coughing into tissues (respiratory hygiene) and hand hygiene. Supplies of tissues must be available. A bag should be supplied for disposal of used tissues. This must be disposed of as clinical waste.

13.15 Clinical staff who are required to wear an FFP3 mask should contact the IPT, and arrange to be fit tested.

Transfer of a patient

13.16 When requests are made for radiology and other investigations or procedures, the request form should contain details which make clear the infectious condition of the patient, or

labeled with a risk of infection sticker. This will enable departments to make appropriate arrangements in advance. The patient with confirmed respiratory TB should not wait with other patients.

13.17 A patient with suspected or confirmed smear positive respiratory TB, should wear a surgical mask when leaving the isolation room to be transported for investigations (e.g. X-ray), as they may come into contact with other susceptible patients. The patient must be instructed on how to fit the mask and how to dispose of it. This should continue until they have had at least 2 weeks of treatment.

Discharge of a patient

13.18 Discharge from hospital may be considered in people who;

- do not have a continuing clinical or public health need for admission with pulmonary TB and
- are unlikely to be rifampicin resistant (i.e do not have risk factors for multidrug-resistant TB) or
- have negative rifampicin resistance on nucleic acid amplificiation test or culture

13.19 If discharged, the person should avoid congregate settings for the first 2 weeks of their treatment.

Invasive procedures

13.20 It is adequate for all staff to wear a surgical mask when involved with direct care during surgery except when intubating or carrying out aerosol-generating procedures

13.21 All patients with a strong clinical suspicion or confirmed respiratory TB should be at the end of the theatre/procedure list.

13.22 Disposable anaesthetic masks, laryngoscope blades, endotracheal tubes and ventilator tubing are to be used in both the anaesthetic room and operating theatre. Ventilators should be adequately protected against TB and other organisms by filters.

Waste

13.23 Sputum should be expectorated into disposable sputum containers with tight fitting lids and then discarded into an orange clinical waste bag. Used tissues and other clinical waste must also be disposed of into an orange clinical waste bag within the room. Encourage patient to decontaminate hands after contact with respiratory secretions.

Linen

13.24 Linen to be disposed of as infected linen in accordance with Trust's policy.

Food and drink

13.25 It is not necessary to use disposable crockery and cutlery.

Cleaning

13.26The person cleaning the room is at low risk as they are not expected to have prolonged contact with the patient or be involved in any aerosol generating procedures. The room

should be cleaned in the same way as any other isolation room including terminal clean.

Last offices

13.27 Last offices should be performed in accordance with the Nursing Procedures Manual. Appropriate PPE should be worn during this procedure; a body bag is required.

13.28 The mortuary attendants should be informed of the infectious nature of the body within normal working hours or as soon as possible the next working day especially if a post-mortem is anticipated.

14. Protection of Staff

14.1 Employees new to the NHS who will be working with patients or clinical specimens should not start work until they have completed a TB screen or health check, or provide documentary evidence of such screening taking place within the preceding 12 months

14.2 Non-immunised staff will not be allowed to work within clinical areas where there is a high risk of TB acquisition. Particular risks to staff health will be discussed with the Occupational Health Department and the Chest Clinic. Pregnant staff, if immunised, are safe to work with TB positive patients. Immuno-compromised staff or staff known to be HIV positive should not work in areas where there is a high risk of contact with patients known or suspected to have respiratory TB.

14.3 Staff in casual contact with a case of confirmed respiratory TB (smear positive) should be reassured and reminded of the possible symptoms of TB to report. Staff who have undertaken prolonged mouth to mouth resuscitation without appropriate protection, prolonged care of a high dependency patient, or repeated chest physiotherapy on a patient with undiagnosed respiratory TB should be managed as close contacts.

14.4 Staff who are in regular contact with TB (or who has worked in such an environment for four weeks or longer) should be sent annual reminders about the symptoms of TB and the need to report symptoms promptly. The Occupational Health Department will co-ordinate this activity.

14.5 HIV infected healthcare workers

14.5.1 Refer to Staff HIV AIDS Policy.

14.6 Staff at risk

14.6.1 Staff who provided prolonged care for a high dependency patient, repeated chest physiotherapy, or involved in endotracheal intubation on a patient with undiagnosed respiratory TB, should be managed as close contacts.

14.6.2 The Ward Manager will collect all the names of the staff and forward this to the Occupational Health Department who will review staff records regarding BCG status.

15. Contact Tracing

15.1 Patients

15.1.1 If a patient on an open ward is subsequently diagnosed as having infectious TB, the risk to

other patients is small. The incident should be logged on Datix

15.1.2 Inform Consultant Microbiologist/Infection Prevention Nurses **IMMEDIATELY**, who will liaise with the Chest Physician to decide a course of action. Action will depend on:

- Degree of infectivity of the index case
- Length of time before the infectious patient was isolated
- Proximity of the contact
- Any unusual susceptibility of the other patients

15.1.3 In general, patients in the same bay (rather than whole ward) are considered to be at risk if the infectious patient was coughing and present in the bay for more than eight hours before isolation.

15.1.4 Based on risk assessment, taking account of the above factors the Microbiologist may consider it necessary to document the possible exposure in the records, inform the contact's GP, Consultant and the patient.

15.1.5 If the infectious patient was on a main ward/bay for more than a day or two and the other patients are known to be susceptible (i.e. immuno-compromised) the risk should be assessed even if they did not share the same bay.

15.1.6 If the infectious patient is subsequently diagnosed with MDRTB contact tracing must be rigorous.

15.2 **Staff**

15.2.1 Refer to Management of Tuberculosis Screening for Healthcare Workers Policy.

16. New born

16.1 Babies with a parent or grandparent who was born in a country where the incidence of TB is 40/100,100 or greater, must be offered BCG (Bacillus Calmette-Guèrin) vaccination, and the vaccination is preferably given before the babies are discharged from hospital.

16.2 Newly born baby who has been exposed to a mother with TB (smear positive), should not be tested immediately or given the vaccine, but must be assessed by a Consultant Paediatrician for chemo-prophylactic treatment. (Refer to the Green Book)

16.3 All BCG vaccination must be administered by the Senior Paediatric Registrar.

17. Training

17.1 Staff exposed to aerosol generating procedures while caring for a TB patient must be fit tested for an FFP3 mask and trained how to put on the mask and dispose of all PPE appropriately. This training will be undertaken by the IPT on an appointment basis. Infection prevention and control training including the key principles of PPE is delivered at induction for all new permanent and Flexible Employment Direct (FED) staff and as part of mandatory training provision for the ongoing education of existing staff.

18. Auditing

18.1 An audit of compliance with this Policy will be undertaken as part of the annual Infection Prevention audit programme.

19. Equality and Diversity

19.1 The Trust is committed to the provision of a service that is fair, accessible and meets the needs of all individuals.

20. Implementation and Communication

20.1 This policy will be issued by Infection Prevention Team to the following staff to disseminate. These individuals will ensure their staff is made aware of the policy:

- Ward Managers – issue to relevant nursing staff within their ward
- Departmental Managers – issue to relevant nursing staff within their department
- Bed Management Team/Service Co-ordinators – issue to On-call Managers' folder
- Associate Chief Nurses, Lead Nurses and Matrons
- Chief Nurse
- Clinical Directors
- Hotel Services and Estate Managers
- Consultants – to issue to relevant Medical Staff

20.2 The guideline will also be notified via Staff Focus and made available on the Intranet and website

21. Contact Numbers

20.1 For information on issues not covered in this Policy, then please contact the Infection Prevention Team on 01245 516398.

22. References

BTS Guidelines (2000) Joint Tuberculosis Committee of the British Thoracic Society, Control and prevention of tuberculosis in the United Kingdom. Code of Practice 2000, Thorax*. 55.* 887 - 901.

Department of Health Interdepartmental Working Group (1996). The Prevention and Control of Tuberculosis in the United Kingdom: Recommendations for the Prevention and Control of Tuberculosis at Local Level*.* London Department of Health.

NICE (January 2016 [updated May 2016]) Tuberculosis nice.org.uk/guidance/ng33

NICE 117 (March 2011) Tuberculosis Clinical diagnosis and management of tuberculosis, and measures for its prevention and control.

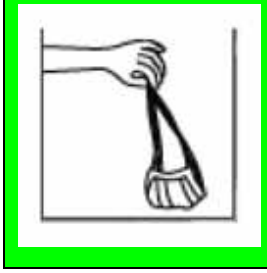
Goering, VR, Dockrell, HM, Zuckerman, M, Wakelin, D, Roitt, IM, Mims, C and Chiodini, PL, (2008) Mims' Medical Microbiology, 4th, Mosby Elsevier

Department of Health, Immunization against infectious disease- The Green Book- 2006 updated version (2007), London
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_079917

Health Protection Agency, Pregnancy and Tuberculosis, Patient and Public information sheet (2006), London

Appendix 1

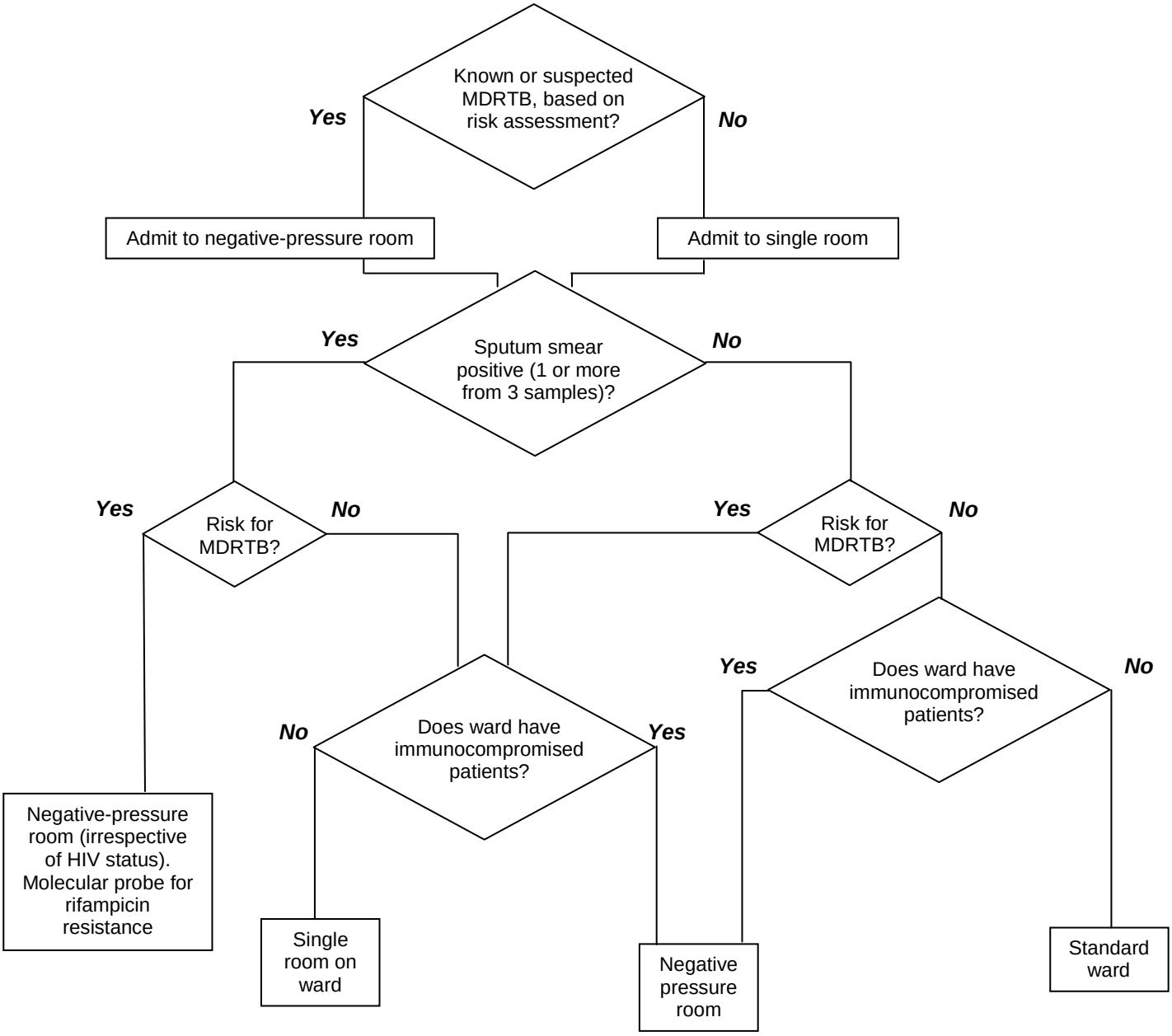
Respiratory Isolation

	Visitors, medical and nursing ward rounds	Examining patient, 'hands on nursing care'
Hands	**Wash your hands**	**Wash your hands**
Masks	**Not required**	**FFP3 is only required for aerosol generating procedures**
Aprons and gloves	**Not required.**	**Wear apron and gloves**
Door	**Must be closed**	**Must be closed**
Before leaving	**Wash and dry your hands thoroughly**	**Dispose of aprons and gloves as clinical waste** **Wash and dry your hands thoroughly** **Decontaminate all Equipment used e.g. stethoscope**
After leaving the room 	• **Remove the mask by handling the ties only** • **Dispose of mask as clinical waste** **Wash and dry hands thoroughly**	• **Remove the mask by handling the ties only** • **Dispose of mask as clinical waste** **Wash and dry hands thoroughly**

Appendix 2

Isolation decisions for suspected TB from NICE

Isolation decisions for patients with suspected respiratory TB



Appendix 3

HIV Related Tuberculosis

Any patient with suspected or confirmed infectious tuberculosis must be nursed in isolation in a sideroom. If the sideroom is in a ward or clinical area where significantly immunocompromised, especially HIV infected patients are housed, the isolation room should be at negative air pressure; this will need to be automatically and continuously monitored.

The Trust does not have such isolation facilities and therefore patients who are significantly immunocompromised, especially if HIV infected, should not be nursed in the same ward as patients with infectious tuberculosis.

Outpatient Care

Patients with drug sensitive tuberculosis are likely to be rendered non-infectious after two weeks treatment with a standard regimen. However until drug sensitivity test results are confirmed or they become sputum negative, they should avoid contact with other immunocompromised patients in the outpatient setting.

Appendix 4

Table 1 Suggested site-specific investigations in the diagnosis and assessment of non-respiratory TB

Site	Imaging	Biopsy	Culture
Lymph node		• Node	• Node or aspirate
Bone/joint	• Plain X-ray and computed tomography (CT) • Magnetic resonance imaging (MRI)	• Site of disease	• Biopsy or paraspinal abscess • Site or joint fluid
Gastrointestinal	• Ultrasound • CT abdomen	• Omentum • Bowel	• Biopsy • Ascites
Genitourinary	• Intravenous urography • Ultrasound	• Site of disease	• Early morning urine • Site of disease • Endometrial curettings
Disseminated	• High-resolution CT thorax • Ultrasound abdomen	• Lung • Liver • Bone marrow	• Bronchial wash • Liver • Bone marrow • Blood
Central nervous system	• CT brain • MRI	• Tuberculoma	• Cerebrospinal fluid
Skin		• Site of disease	• Site of disease
Pericardium	• Echocardiogram	• Pericardium	• Pericardial fluid
Cold/liver abscess	• Ultrasound	• Site of disease	• Site of disease