

**DEPARTMENT:** Infection Control

**POLICY:** IC-343

**SUBJECT:** Tuberculosis (TB) Exposure Control Plan

**PURPOSE:**

To provide a comprehensive plan to prevent and/or eliminate exposure of tuberculosis to employees, physicians, visitors and other patients at Frances Mahon Deaconess Hospital.

**RESPONSIBILITIES**

- Infection Control Committee is responsible for the design, implementation, and maintenance of the tuberculosis exposure control plan.
- Department managers are responsible for monitoring compliance with the tuberculosis exposure control plan in their department and reporting noncompliance issues to the Infection Control Practitioner.
- Human Resource Director is responsible to provide and maintain documentation of staff education about tuberculosis through the Health Stream training modules.
- Employee Health Nurse is responsible for documenting health screening.
- The Fit testing team is responsible for education on proper PAPR mask testing/N95 fit testing for employees who provide care to patients with suspected or diagnosed tuberculosis. (See IC-370 Airborne Respiratory Protection)
- Facility Service Staff are responsible to evaluate and maintain the ventilation system of the negative pressure rooms.
- Nursing Staff is responsible for instructing visitors to keep doors to the room shut, and to teach visitors (except immediate family) to wear a PAPR mask when visiting.

**POLICY:**

Frances Mahon Deaconess Hospital has adopted measures to achieve the purpose of the tuberculosis exposure control plan. These measures include:

1. Annual Risk Assessment
2. Administrative Controls
  - a. Patient Admission and Placement
  - b. Staff Education
  - c. Health Screening
3. Personal Protective Equipment
4. Workplace Practices
5. Engineering Controls

**ADMINISTRATIVE CONTROLS**

1. Admission: Patients who are coughing at the time of presentation to FMDH will be given tissues, instructed to cover their mouth and nose when coughing and to dispose of tissues in trash can after use.

2. Patient Placement:
  - a. Inpatient
    - i. Patients who meet the following criteria upon admission will be placed in the negative pressure room and Respiratory Precautions, specific for TB will be used:
      1. Three or more signs and symptoms consistent with TB. (For example, persistent cough greater than 3 weeks' duration, bloody sputum, anorexia, fever, lethargy/weakness or night sweats.)
      2. A patient who is coughing, who has a positive chest x-ray consistent with pulmonary TB, and who's AFB (acid fast bacillus) smears have not been done or is incomplete.
      3. Patients who have been identified as being AFB smear positive.
      4. Patients who have been diagnosed with active TB prior to admission.
    - ii. Patients who have a differential diagnosis of pulmonary TB will be admitted to a negative pressure room and TB Respiratory Precautions will be used. Patients who have a diagnosis of extra pulmonary TB can be admitted to a private room that is not negative pressure.
    - iii. No special precautions are required if a TB workup is part of a comprehensive respiratory disease evaluation and is not considered likely in the differential diagnosis.
  - b. Emergency Department: Patients who present with three or more signs and symptoms consistent with TB will be:
    - i. Given a surgical mask to wear.
    - ii. Given tissues, instructed to cover their mouth and nose when coughing and to dispose of tissues in trash can after use.
    - iii. Placed in a room with a door (not a curtain) that is closed or taken to the negative pressure room, if available, to be seen by physician.
  - c. Clinic: Patients who present with three or more signs and symptoms consistent with TB will be:
    - i. Given a surgical mask to wear.
    - ii. Given tissues, instructed to cover their mouth and nose when coughing and to dispose of tissues in trash can after use.
    - iii. Placed in a clinic room.
3. Staff education will be provided about tuberculosis to new employees during orientation and annually thereafter as applicable. (See appendix A for some facts about TB). All employees receive education about TB via the annual Healthstream program.
4. Health screening for employees will be done in accordance with Risk classifications for health-care settings and recommendations for screening frequency. See Appendix C.

## **WORK PLACE PRACTICES**

1. TB Respiratory Precautions (see IC-344 Communicable Diseases policy)
  - a. Patients in TB Respiratory Precautions shall be educated about TB transmission, how to contain secretions from coughing and sneezing, and the reasons for the precautions.

- b. PAPR/N95 masks and other appropriate personal protective equipment for (gown, gloves, and eye protection) will be worn by staff when entering the patient's room.
  - c. The patient will remain in the room at all times unless the patient needs to be taken to another area for a medically necessary procedure that cannot be done in the patient's room. If transportation to another area is necessary, the following will be done:
    - i. The unit from which the patient is transported is responsible to notify the receiving unit that TB precautions are to be used for the patient.
    - ii. The patient will wear a surgical mask while out of the negative pressure room.
    - iii. Because the patient's proper use of the mask cannot be guaranteed, masks should be considered for the healthcare workers in the procedure /test area.
    - iv. The patient must not be left in any public waiting areas.
    - v. The patient must be returned to room promptly after the completion of the procedures.
  - d. Visitors
    - i. The only visitors that will be allowed in to visit the patient are visitors who currently live in the same household with the patient, and these visitors do not need a mask when visiting the patient.
    - ii. In extreme circumstances when a visitor needs to enter the patient's room that is not part of the patient's household, a PAPR must be donned by that visitor. Prior to donning the PAPR and entering the patient's room, education about the PAPR will be provided by nursing staff. In these instances, a RN will accompany the visitor in the room to monitor PAPR function and use.
2. A sign for TB Respiratory Precautions will be posted on the door to the patient room to alert staff and visitors of precautions. (Airborne precaution sign example in Infection Control Policy IC-344)
  3. Hand washing will be done in accordance with Infection Control Policy IC- 352.

#### **ENGINEERING CONTROLS:**

1. A Negative Pressure Isolation environment can be achieved in room 110. (Refer to Facilities Services Policy FS-828).
2. FMDH has temporary measures available to provide negative pressure in certain Med/Surg rooms for the purpose of air borne pathogen isolation. (See FS-529) FMDH has one additional negative pressure machine; therefore, one additional room could be negatively pressured. This machine also has the ability to negatively pressure an entire area (i.e. hallways, rooms, etc.).
  - a. Nursing staff will send a work order to the Facility Services Staff (FSS) whenever a patient is being evaluated for TB.
  - b. In the event room 110 is occupied with another TB patient, the charge nurse will notify FSS of the need to set up another isolation room. A negative pressure HEPA filter machine will be set up in the room. If room 110 is occupied by a

patient who does not need isolation precautions the charge nurse will reassign and move that patient to another room.

- c. Daily monitoring for negative pressure will be done and recorded in the preventative maintenance log by FSS.
- d. FSS will notify the Charge Nurse and the Infection Control Practitioner (ICP) if the room does not meet the standard.
- e. In the event of a request for isolation room setup, the charge nurse will notify FSS of the need to set up a Med/Surg patient room with ante room enclosures, and a negative pressure HEPA filter machine in the room.
- f. FSS will be trained annually in the setup and disassembly of the machine.
- g. Upon setup FSS will refresh key nursing staff on how to take periodic negative pressure readings and how to identify any corrective actions, if necessary, in maintaining negative air pressure within the area.

**REVIEW AND REVISION STATEMENT:**

There will be an annual evaluation of this Tuberculosis Exposure Control Plan in terms of its objectives, scope, and performance, and effectiveness. This review will be initiated by the Infection Control Practitioner, reviewed by the Physician Advisor, and forwarded to the Frances Mahon Deaconess Hospital Administrator and Board of Trustees. (original document date June 1994).

## Appendix A

Tuberculosis is caused by *Mycobacterium tuberculosis* and is transmitted in airborne particles and droplet nuclei that can be generated when a person with pulmonary or laryngeal tuberculosis coughs, sneezes, talks, or sings.

Some persons may harbor the tubercle bacilli in their body for many years. These persons do not have any signs or symptoms of tuberculosis and usually have a positive reaction to the purified protein derivative (PPD) tuberculin skin test (TST) (also known as the Mantoux test). These persons are not infectious and are considered to have a condition called latent TB infection (LTBI). These persons have about a 10% risk of developing active TB during their lifetimes. This risk is greatest within the first two years after developing latent TB infection.

Some groups of people who have a higher risk of progressing from latent TB infection to active TB disease are:

- Persons with certain medical conditions (e.g., HIV, silicosis, gastrectomy or jejunio-ileal bypass surgery, being 10% below ideal body weight, chronic renal failure with renal dialysis, diabetes mellitus, immunosuppressed from high dose corticosteroids or other immunosuppressive therapies, and some malignancies).
- Persons who have been infected within the last two years.
- Persons with fibrotic lesions on chest x-ray.
- Children less than four years of age.

Tuberculosis is more prevalent in some segments of the population than others. These groups are more likely than other persons in the general population to have a high rate of TB:

- Contacts of persons with active TB disease
- Foreign-born person from areas of the world with a high prevalence of TB (e.g., Asia, Africa, the Caribbean, and Latin America).
- Medically underserved populations (e.g., some African Americans, Hispanics, Asians & Pacific Islanders, American Indians, and Alaskan natives).
- Homeless persons
- Current or former correctional-facility inmates
- Alcoholics
- IV drug users
- Elderly

### **Signs and symptoms of TB**

- Persistent cough >3 weeks' duration
- Bloody sputum
- Night sweats
- Anorexia
- Fever

### **Diagnostic Measures Used to Identify TB**

- History and physical examination
- Mantoux skin test (PPD)
- Chest x-ray
- Acid Fast Bacillus smear and culture of sputum or another appropriate specimen
- Bronchoscopy or biopsy if indicated

## Appendix B

### MANTOUX SKIN TEST

- Mantoux skin testing is done using Purified Protein Derivative (PPD)
- Inject 0.1 ml of PPD intradermally in either the volar or dorsal surface of the forearm.
- A discrete, pale elevation of the skin 6-10mm in diameter should be produced.

#### Interpretation of the Mantoux skin test

- Mantoux tests will be interpreted by designated personnel 48-72 hours after injection.
- Measure the transverse diameter of the induration and record the diameter in millimeters.
- Interpretation is based on induration, not redness or erythema.
- An induration of 5mm is classified as positive in:
  - persons who have HIV infection or risk factors for HIV infection whose HIV status is unknown;
  - Persons who have had recent close contact with a person with active TB;
  - Persons who have fibrotic chest x-rays (consistent with healed TB).
- An induration of 10mm is classified as positive in all persons who do not meet any of the criteria above but who have other risk factors for TB including:
  - **High-risk groups**
    - Injecting-drug users known to be HIV seronegative;
    - Persons who have other medical conditions that reportedly increase the risk for progressing from latent TB infection to active TB;
    - Children <4 years of age.
  - **High-prevalence groups:**
    - Persons born in Asian, African, Caribbean, or Latin American countries which have a high prevalence of TB;
    - Persons from medically underserved, low-income populations;
    - residents of long-term-care facilities (i.e. nursing homes and prisons);
    - Persons from high-risk populations in their communities, as determined by local public health authorities.
- An induration of 15mm is classified as positive in persons who do not meet any of the above criteria.
- Recent converters are defined on the basis of both size of induration and age of the person being tested:
  - 10 mm increase within a 2-year period is classified as a recent conversion for persons <35 years of age;
  - 15 mm increase within a 2-year period is classified as a recent conversion for persons 35 years of age.

## Appendix C

### BOX 1. Indications for two-step tuberculin skin tests (TSTs)

Situation	Recommended testing
No previous TST result	Two-step baseline TSTs
Previous negative TST result (documented or not) >12 months before new employment	Two-step baseline TSTs
Previous documented negative TST result $\leq$ 12 months before new employment	Single TST needed for baseline testing; this test will be the second-step
$\geq$ 2 previous documented negative TSTs but most recent TST >12 months before new employment	Single TST; two-step testing is not necessary
Previous documented positive TST result	No TST
Previous undocumented positive TST result*	Two-step baseline TST(s)
Previous BCG <sup>†</sup> vaccination	Two-step baseline TST(s)
Programs that use serial BAMT, <sup>§</sup> including QFT <sup>¶</sup> (or the previous version QFT)	See Supplement, Use of QFT-G** for Diagnosing <i>M. tuberculosis</i> Infections in Health-Care Workers (HCWs)

\* For newly hired health-care workers and other persons who will be tested on a routine basis (e.g., residents or staff of correctional or long-term-care facilities), a previous TST is not a contraindication to a subsequent TST, unless the test was associated with severe ulceration or anaphylactic shock, which are substantially rare adverse events. If the previous positive TST result is not documented, administer two-step TSTs or offer BAMT. SOURCES: Aventis Pasteur. Tuberculin purified protein derivative (Mantoux) Tubersol<sup>®</sup> diagnostic antigen. Toronto, Ontario, Canada: Aventis Pasteur; 2001. Parkdale Pharmaceuticals. APLISOL (Tuberculin purified protein derivative, diluted [stabilized solution]). Diagnostic antigen for intradermal injection only. Rochester, MI: Parkdale Pharmaceuticals; 2002. Froeschle JE, Ruben FL, Bloh AM. Immediate hypersensitivity reactions after use of tuberculin skin testing. Clin Infect Dis 2002;34:E12-3.

<sup>†</sup> Bacille Calmette-Guérin.

<sup>§</sup> Blood assay for *Mycobacterium tuberculosis*.

<sup>¶</sup> QuantiFERON<sup>®</sup>-TB test.

\*\* QuantiFERON<sup>®</sup>-TB Gold test.

## APPENDIX D

Airborne Precautions: Use for patients who are infected with known or suspected microorganisms that are transmitted by airborne droplet nuclei which remain suspended in the air and can be spread within the room and to surrounding areas by air currents.

- I. Patient placement
  - A. A private room with negative air pressure which has 6 air changes per hour, and is exhausted to the outside.
  - B. The patient must remain within the room.
  - C. Doors and windows in the patient's room must remain closed.
  - D. If no private is room available, consult with Infection Control Practitioner.
  
- II. Gloves and Hand washing
  - A. Hand washing is done before and after all patient contact.
  - B. Gloves are needed for standard precautions if contact with blood or bloody body fluids anticipated.
  
- III. Respiratory Protection
  - A. Surgical mask will be worn by persons entering the room.
  - B. A PAPR respiratory system will be worn by persons entering the room of a patient on TB precautions.
  - C. A N95 mask that is fit tested may also be worn by persons entering the room of a patient on TB precautions.
  
- IV. Gowns: Impervious gowns will be worn if it is anticipated that clothing may come in contact with blood or bloody body fluids.
  
- V. Eye protection will be worn if it is anticipated that clothing may come in contact with blood or bloody body fluids.
  
- VI. Patient transport: If transport is necessary, have patient wear a surgical mask to limit the spread of droplet nuclei.