Tuberculosis (TB) Exposure Control Plan

Policy Owner: Epidemiology

POLICY STATEMENT

The transmission of *Mycobacterium tuberculosis* is a recognized risk in the healthcare setting. In order to provide adequate protection for patients, visitors, and healthcare workers, a comprehensive plan is developed, implemented and enforced, and periodically reviewed and revised. This plan includes the identification, education, environmental controls, work practice controls, surveillance, personal protective equipment, and healthcare worker requirements. The plan is designed to incorporate each component to provide a safer working environment and to reduce the spread of tuberculosis. The recommendations and standards from the Centers for Disease Control and Prevention (CDC) and the Occupational Safety and Health Administration (OSHA) are utilized in this control plan.

AFFECTED STAKEHOLDERS

*Indicate all entities and persons within the Enterprise that are affected by this policy:*

- ☒ Hired Staff
- ☒ House Staff/Residents & Clinical Fellows
- ☒ Leased staff
- ☒ Medical Staff (includes Physicians, PAs, APNs)
- ☒ Vendors/Contractors
- ☐ Other:

DEFINITIONS

| Healthcare Worker (HCW) | Any employee, licensed independent practitioner, leased employee, contracted employee or vendor working within the medical center and clinics, whether provides direct or indirect patient care. |

Office of Compliance and Enterprise Risk Management Use Only

Policy No.: 3296
Policy Sponsor: Chief Medical Officer
Originally Issued: 01/01/1997
Last Revision: 10/21/2016
Last Review: 10/31/2016
Next Review: 10/31/2017
<table>
<thead>
<tr>
<th><strong>High-Efficiency Particulate Air Filter (HEPA Filter)</strong></th>
<th>A filter that removes $&gt; 99.97%$ of particles 0.3 um in size, including M. tuberculosis—containing nuclei; the filter can be either portable or stationary. Use of HEPA filters in building ventilation systems requires expertise in installation and maintenance.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infectious TB or Tuberculosis Disease</strong></td>
<td>Condition caused by infection with a member of the M. tuberculosis complex that has progressed to causing clinical signs and symptoms or subclinical illness. The bacteria can attack any part of the body but is most commonly found in the lungs (pulmonary TB). Pulmonary TB disease can be infectious. The bacteria are spread through the air when a person with TB of the lungs or throat coughs, sneezes or talks.</td>
</tr>
<tr>
<td><strong>Latent TB or Tuberculosis Infection (LTBI)</strong></td>
<td>Infection with M. tuberculosis without the manifestation of signs and symptoms of disease. A person with LTBI usually has a positive TB skin test and a normal chest x-ray. A person with LTBI cannot spread TB to others.</td>
</tr>
<tr>
<td><strong>Mantoux Method</strong></td>
<td>A skin test performed by intradermally injecting 0.1 ml of PPD tuberculin solution into the volar or dorsal surface of the forearm. This method is the recommended method for TST.</td>
</tr>
<tr>
<td><strong>Multi-Drug Resistant (MDR)</strong></td>
<td>Active TB caused by M. tuberculosis that is resistant to more than one anti-TB drug; in practice, often refers to organisms that are resistant to both INH and Rifampin, with or without resistance to other drugs.</td>
</tr>
<tr>
<td><strong>Negative Pressure Room</strong></td>
<td>A room that is under negative pressure has a lower pressure than adjacent areas, keeping air flowing into the room and preventing air from escaping from the room.</td>
</tr>
<tr>
<td><strong>Tuberculin Skin Test (TST)</strong></td>
<td>A diagnostic aid for identifying M. tuberculosis infection. A small dose of tuberculin is injected just beneath the surface of the skin <em>(see Mantoux Method)</em>, and the area is examined for induration by palpation 48-72 hours after the injection. The indurated margins should be read transverse (perpendicular) to the long axis of the forearm.</td>
</tr>
</tbody>
</table>
PROCESS & PROCEDURES

Tuberculosis Exposure Control Plan Objectives are:

1. To assign supervisory responsibility of the tuberculosis program to specific individuals;

2. To provide for the ongoing assessment of the risk of tuberculosis transmission;

3. To ensure early detection of patients who may have infectious tuberculosis;

4. To provide for prompt triage and appropriate management of patients who may have infectious tuberculosis;

5. To ensure prompt initiation and maintenance of Airborne Precautions when required;

6. To provide policies for ventilation and other engineering controls to reduce the potential for airborne transmission of tuberculosis;

7. To develop, implement, and maintain a respiratory protection program;

8. To educate healthcare workers (HCWs) about tuberculosis and its prevention;

9. To provide for a program of routine periodic screening of HCWs for active tuberculosis and latent tuberculosis infections;

10. To ensure the prompt evaluation of hospital-acquired tuberculosis transmissions; and

11. To coordinate activity with public health departments.

This control plan is enforced throughout the AU Medical Center. The policies and procedures are recognized by each department and each department head is responsible for ensuring compliance by their staff.

Supervisory Responsibility

AU Medical Center’s management and ongoing review of the Tuberculosis Exposure Control Plan is the responsibility of the Chairman of the Infections Committee. Other individuals to support this endeavor are the Director of Hospital Epidemiology, Nurse Epidemiologists, Chief Nursing Officer, Chief Medical Officer, Director of Employee Health, Facilities Management, Nursing Supervisors, and Nurse Managers.
Assessment of Risk

An annual risk assessment will be conducted using the following criteria:

1. The review of community tuberculosis cases;

2. The review of the number of tuberculosis patients hospitalized or seen as an outpatient at AU Medical Center;

3. A review of the drug susceptibility patterns of tuberculosis patients treated at AU Medical Center;

4. An analysis of purified protein derivative (PPD) skin test results of HCWs;

5. An evaluation of current infection control parameters, including an assessment of the efficiency of initiating Airborne Precautions;

6. The efficiency in performing diagnostic tests such as an acid fast bacilli (AFB) smear and culture; and

7. An evaluation of the appropriateness of the Tuberculosis Control Plan and the ranking of AU Medical Center level of TB risk is conducted annually.

The Infections Committee is responsible for overseeing the data collection involved in the initial and annual assessment of TB risk. The Tuberculosis Exposure Control Plan is revised as needed based on the most recent assessment. The Infections Committee is responsible for annually determining if the frequency and comprehensiveness of the PPD skin testing program for HCWs is adequate.

Detection of Patients with Tuberculosis

Each patient or individuals accompanying the patient are asked specific questions which help detect patients with signs or symptoms suggestive of active tuberculosis at all patient entry points, such as Emergency and Express Care Services, Patient Access Services, and Ambulatory Procedure Center.

Tuberculosis is suspected for any patient with a cough of >3 weeks duration and other signs and symptoms compatible with tuberculosis such as night sweats, fever, unexplained weight loss, hoarseness, fatigue, chest pain, and hemoptysis. In groups with a high prevalence of tuberculosis, a greater index of suspicion exists. These groups include patients with a history of human immunodeficiency virus (HIV), intravenous (IV) drug abuse, alcohol abuse, diabetes mellitus, and renal failure. Patients with immunosuppression, such as patients with HIV, and patients who have pulmonary signs and symptoms generally associated with other diagnoses are also evaluated for coexistent tuberculosis.
When tuberculosis is suspected in a patient in any outpatient or inpatient area of AU Medical Center, Airborne Precautions are employed and an evaluation is done promptly. Negative pressure rooms are not available in the outpatient areas; therefore, the patient is placed in a room with the door closed and given a surgical mask and tissues and instructed on their use.

All HIV-infected patients who are > 12 years of age with an undiagnosed pneumonia seen at or admitted to AU Medical Center are treated as potentially having tuberculosis until tuberculosis is diagnosed and treated or is ruled out. Therefore, Airborne Precautions (which require a negative pressure room) are implemented throughout the patient’s visit or admission until tuberculosis is treated or ruled-out.

The following measures are taken when active tuberculosis is suspected:

a. Diagnostic measures for these patients include a complete history and physical examination, chest x-ray, and at least 3 sputum specimens collected for acid fast bacilli (AFB) concentrated smear and culture. A bronchoscopy may be indicated for some patients who still have the possibility of having tuberculosis but have not been diagnosed with other routine testing.

b. Currently, AFB smears on sputum specimens are sent to an outside lab (ARUP) routinely.

c. Hospital Epidemiology is responsible for reporting tuberculosis to the appropriate local and state health departments.

Prompt Triage and Management of Patients with Active Tuberculosis

A more thorough assessment is done of patients suspicious for TB as defined above.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No TB exposure, Not infected</td>
<td>1. No history of exposure</td>
</tr>
<tr>
<td></td>
<td>2. Negative reaction to tuberculin skin test</td>
</tr>
<tr>
<td>TB exposure, No evidence of infection</td>
<td>1. History of exposure</td>
</tr>
<tr>
<td></td>
<td>2. Negative reaction to tuberculin skin test</td>
</tr>
<tr>
<td>TB infection, No disease</td>
<td>1. Positive reaction to tuberculin skin test</td>
</tr>
<tr>
<td></td>
<td>2. Negative bacteriological studies (if done)</td>
</tr>
<tr>
<td></td>
<td>3. No clinical or radiographic evidence of active TB</td>
</tr>
</tbody>
</table>
| Previous TB disease | 1. History of TB **OR** 
2. Abnormal, but stable radiographic findings 
3. Positive reaction of tuberculin skin test 
4. Negative bacteriological studies (if done) **AND** 
5. No clinical or radiographic evidence of active disease |
|---------------------|---------------------------------------------------------------|
| Current TB disease  | 1. Mycobacterium tuberculosis cultured (if done) **OR** 
2. Positive reaction to tuberculin skin test **AND** 
3. Clinical or radiographic evidence of active disease |
| TB suspected        | 1. Diagnosis pending |

If the assessment outcome is **TB Suspected** for an individual patient, placement on Airborne Precautions is required. If Airborne Precautions are not feasible at the time of assessment, a surgical mask is worn by the patient. The patient is instructed to wear the surgical mask until a negative pressure room is available.

1. Patients with confirmed pulmonary tuberculosis or who are suspected of having pulmonary tuberculosis are started on an appropriate regimen promptly according to the current CDC guidelines. Optimally, anti-tuberculosis drugs are administered by direct observed therapy. Patients with known or suspected tuberculosis are placed in a private room with negative pressure and the door remains closed at all times. If a room is not available, a portable HEPA machine may be used until a negative pressure room is available. Place HEPA filter machine between the door and the patient. The door must remain closed. Damp towels should be placed at the bottom of the doors to minimize airflow out of the room, and when the patient is discharged from the room the machine must run for at least 1 hour. This room has at least 6 air exchanges per hour. When a patient is initially placed in an Airborne Precautions room, a representative on the nursing unit notifies Facilities Management. Facilities Management tests the room upon notification and daily thereafter. The test results are recorded in a log until the patient is removed from the floor or Airborne Precautions are discontinued.

Patients on Airborne Precautions are educated by the nursing staff regarding tuberculosis transmission and are taught to cover their mouths when coughing or sneezing by using tissues. Patients are instructed to remain in the Airborne Precautions room with the door closed at all times. If transportation of patient is necessary, the patient wears a surgical mask which is changed when the mask becomes moist. If the patient cannot wear a surgical mask, the patient cannot leave the room.

2. All health care workers who enter the Airborne Precautions room wears an N-95 respirator. All others are instructed of the potential risks and are given surgical
procedure masks, as it is not feasible to provide fit tests for use of the N-95 respirator. Patients with tuberculosis have discharge planning to include a confirmed appointment for follow-up care, sufficient medications to take until the next scheduled appointment, and a referral to the appropriate County Health Department. The primary physician for a patient with infectious tuberculosis is responsible for discharging the patient only to another facility with Airborne Precautions capability or home preferably after an evaluation of the individuals present in the home is completed by the Public Health Department.

**Pediatrics**

Any child who presents with pulmonary cavitary disease or R/O TB (no matter what the age) will be placed on Airborne Precautions.

Children ≤ 10 years of age must be evaluated for the continuation of precautions on a case by case basis by the attending physician and the Hospital Epidemiologist.

Children ≤ 10 years of age with pulmonary tuberculosis or R/O (TB) usually are not infectious. However children frequently contract the disease from an adult, usually a family or household member. Therefore, airborne precautions are necessary for these patients. All visitors who live in the child’s home must wear a surgical mask at all times when they are on the hospital premises until active pulmonary TB can be ruled out. Their activity must be limited to visitation in the patient’s room.

Pulmonary TB can be ruled out with a negative chest x-ray. The following are options for obtaining a chest x-ray:

1. The adult can have their private physician order the x-ray.
2. The adult can have a chest x-ray taken at their local health department.
3. The Hospital Epidemiologist will order a chest x-ray. The adult will then be able to be processed through the AU Medical Center outpatient department. This option should be taken only if option 1 or 2 is not feasible.

All chest-x-ray reports must be submitted to Hospital Epidemiology. The Hospital Epidemiologist or his/her designee will review the chest x-ray report. If the adult has a positive chest x-ray, they will not be allowed to visit the child or any area within the hospital until they can show proof or evaluation showing that TB is not present.

**Ventilation and Engineering Controls**

1. The heating, ventilation, and air conditioning section of Hospital Facilities Management ensures that all federal, state, and local requirements for ventilation are met. When a patient is initially placed in an Airborne Precautions room, a representative on the nursing unit notifies Facilities Management. Facilities Management tests the room upon notification and daily thereafter. The test results
are recorded in a log until the patient is removed from the floor or Airborne Precautions are discontinued.

Airborne Precautions rooms are maintained under negative pressure in relation to the corridor, have at least 6 air exchanges per hour, and have the air directly exhausted to the outside or through a high efficiency particulate air (HEPA) filter. Hospital Facilities Management is responsible for evaluating all negative pressure rooms on a routine basis and daily while in use for negative pressure. If any negative pressure room does not meet the above stated requirements, Hospital Epidemiology, the responsible Nurse Manager are notified immediately by phone and Hospital Facilities Management personnel take appropriate corrective measures. Additionally, negative pressure rooms are used when all cough-inducing procedures are conducted on known or suspected infectious tuberculosis patients.

2. The use of ultraviolet germicidal irradiation (UVGI) is considered an adjuvant to ventilation control for reducing the concentration of infectious droplet nuclei. Upper room UVGI is considered as an option for tuberculosis control in high-risk areas. At AU Medical Center UVGI is used in the waiting rooms in Infectious Disease Practice Site and Emergency and Express Care Services. UVGI is used in selected air handlers. UVGI is not used as a substitute (1) for negative pressure ventilation, (2) for high efficiency particulate air (HEPA) filtration if air from Airborne Precautions rooms is re-circulated to other areas in the hospital, or (3) for HEPA filtration in areas where cough-inducing procedures are performed.

3. Because the intensity of the ultraviolet (UV) lamps fluctuates as the lamps age, a schedule for replacement is maintained. The UV lamps are checked periodically for dust build-up. Wall-mounted or ceiling-mounted fixtures have louvers or baffles to block downward radiation. The UV lamps are not visible from any normal position in the room.

Respiratory Protection

1. All health care workers (HCW) and students must wear an N-95 (or other respirator as stipulated by federal regulations) when in the room of a patient on Airborne Precautions.

2. HCWs must be fit-tested for the respirator as required by current regulations.

3. Employee Health will fit test all HCWs upon hire and annually.

Cough-Inducing Procedures

Procedures that involve instrumentation of the lower respiratory tract or induce coughing increase the probability of expelling nuclei containing acid fast bacillus (AFB) being expelled in the air. These procedures include endotracheal intubation and suctioning, sputum induction, aerosolized treatments and bronchoscopy. Other procedures that
may generate aerosols include irrigation of tuberculosis abscesses and homogenization of lyophilized tissue. These procedures are not performed unless absolutely necessary and only in a negative pressure room meeting the aforementioned requirements and when a room is not available a HEPA machine will be used. HCWs will wear an N-95 mask and patients will remain in the room until the procedure and/or the patient’s cough subsides. Before others can use a negative pressure room where a cough-inducing procedure has been performed, one hour has to elapse. With the room door closed, 6 air exchanges per hour provides a removal efficiency of approximately 99% of airborne particles. Individuals entering the room during this one hour period (e.g. housekeepers and transporters) must wear an N-95 mask.

**Airborne Precautions Discontinuation Criteria for *Mycobacterium tuberculosis***

When **ruling out** *Mycobacterium tuberculosis*:

Three negative concentrated Acid Fast Bacilli (AFB) smears obtained at least 8 hours apart to 72 hours are required before discontinuing Airborne Precautions or one negative BAL smear. An early morning sputum specimen is preferred.

When **tuberculosis has been diagnosed**:

Three negative smears are **not** required to discontinue Airborne Precautions, unless the *Mycobacterium tuberculosis* strain is multiply-resistant (at least two (2) drugs). The indicators used for discontinuing Airborne Precautions are:

1. clinical improvement (i.e. less cough, fewer night sweats, no fever for 48 to 72 hours, increased appetite); and
2. at least 14 days of effective therapy and two (2) negative smears **OR** one (1) BAL negative for AFB.

Children 12 years of age and younger are **not** considered contagious. Children between the ages of 10 and 12 must be evaluated for precautions on a case-by-case basis. Notify Hospital Epidemiology for further instructions.

**Education and Training of Healthcare Workers**

1. All HCWs receive education about tuberculosis as appropriate to their job category. Training is provided during new employee orientation and annually thereafter.

2. The documentation of tuberculosis training is maintained with other HCW training records. Department managers are responsible for ensuring that all of their HCWs complete annual mandatory training.

**Healthcare Worker Counseling, Screening, and Evaluation**

1. All HCWs are encouraged to determine if they have a condition that may suppress their immunity since this increases the risk of rapid progression from latent tuberculosis to active pulmonary tuberculosis. HCWs at risk for HIV infection are encouraged to seek counseling and testing for HIV antibodies status through
Employee Health’s confidential testing program, a private physician, or the Public Health Department. All HCWs are counseled about the potential risk of severely immunocompromised individuals and the need to follow existing recommendations for proper infection prevention and control practices.

2. At the time of hire, all HCWs and volunteers, including those with a history of Bacille-Calmette-Guerin (BCG) vaccine, will receive a PPD (and when required a two (2) step PPD) test. Those HCWs with a documented history of a positive PPD test, disease treatment, or preventive therapy are exempt from PPD screening unless they develop signs or symptoms suggestive of tuberculosis and are evaluated yearly by Employee Health. Repeat PPD testing of HCWs is determined by the Tuberculosis Control Plan risk assessment. PPD tests are administered and interpreted according to the current CDC and American Thoracic Society (ATS) guidelines.

3. Any HCW exhibiting signs and symptoms compatible with tuberculosis are to report to Employee Health for prompt evaluation. HCWs do not return to work until tuberculosis is excluded or the HCW is on therapy and is noninfectious, based on the resolution of symptoms and 3 consecutive negative sputum AFB concentrated smears. Consultation with the Hospital Epidemiologist is necessary for the HCW to return to work. The HCW must remain on effective drug therapy for the appropriate time. If the HCW does not continue prescribed therapy, s/he is excluded from work until treatment is resumed and an evaluation for non-infectiousness and consultation with the Hospital Epidemiologist has occurred.

4. All HCWs with newly discovered positive PPD test conversion are evaluated by the Employee Health Nurse and Medical Director of Employee Health and are referred to the Richmond County Health Department for further evaluation and testing.

5. When conversions are identified, other HCWs assigned to the same work area or groups are retested to determine if evidence of excessive transmission exists. Retesting is done no sooner than 10 weeks after the last exposure. If a recent baseline PPD skin test is not available, an initial baseline is done first. Results of the PPD skin test are recorded in the HCW's Employee Health record and listed with other HCW's results so that periodically an analysis for the risk in areas or groups can be done.

6. The testing for newly discovered positive PPD Tests includes a history and physical to determine if any signs or symptoms of active tuberculosis are present and a chest x-ray. HCWs without active tuberculosis are considered for treatment of latent tuberculosis infection with isoniazid. HCWs with an active case of tuberculosis are treated according to current CDC and ATS guidelines.

A history of possible exposure to tuberculosis is obtained and the drug susceptibility patterns are used when the source is identified to determine the appropriate preventive therapy. This practice will become more important when multidrug-resistant cases of tuberculosis are admitted to AU Medical Center.
7. All Health Care Workers (HCW) receive education about tuberculosis as appropriate to their job category.

   A history of possible exposure to tuberculosis is obtained and the drug susceptibility patterns are used when the source is identified to determine the appropriate preventive therapy. This practice will become more important when multidrug-resistant cases of tuberculosis are admitted to AU Medical Center.

Responsibility

1. It is the responsibility of the physician to assess patients for screening, early identification, treatment, and instituting appropriate isolation precautions on patients with suspected or confirmed TB.

2. It is the responsibility of all employees to assist the physician in the identification of patients who meet the criteria of OSHA guidelines for confirmed or suspected TB.

3. Routine monitoring of air flow parameters for negative pressure rooms is the responsibility of Facilities Management and the Safety Officer.

4. Management of employee tuberculin skin test conversions will be coordinated through Employee Health and Wellness.

5. Reporting of confirmed or suspected TB among inpatients to public health officials will be the responsibility of Hospital Epidemiology.

6. It is the responsibility of Employee Health and Wellness to monitor and implement the fit-testing of the N-95 respirator for employees.

7. It is the responsibility of Employee Health and Wellness to maintain pertinent records on patients with confirmed TB and HCWs with tuberculin skin test conversion.

8. It is the responsibility of Employee Health and Wellness to remind all employees with a history of TB or positive tuberculin tests the risk for reactivation TB and the need to promptly report compatible symptoms. Documentation of this discussion should be placed in the employee file.

Questions Regarding the Tuberculosis Exposure Control Plan

All questions regarding this Control Plan should be referred to your supervisor or the Hospital Epidemiologist (extension 1-2224).
REFERENCES, SUPPORTING DOCUMENTS, AND TOOLS
Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health Care Settings, 2005. CDC MMWR 2005: 54 (RR-17)

RELATED POLICIES
Transmission Based Precautions
Hand Hygiene Policy
Personal Protective Equipment
Pre-admission Communicable Diseases Screening of Children

APPROVED BY
Chief Executive Officer, AU Medical Center Date: 10/31/2016