Plan for:  
Tuberculosis Control

Effective Date: July 1, 2013  
Reviewed Date: January 29, 2016  
Revised Date: January 29, 2016  
Scope: School-wide

Policy Expectation:

I. PURPOSE:

A. To prevent nosocomial transmission of tuberculosis (TB) to patients, visitors, volunteers and employees in all system facilities.

B. To provide guidelines, policies and procedures to prevent and/or minimize exposure to TB by employees of Washington University School of Medicine (WUSM).

C. To relate responsibilities for executing the Tuberculosis Control Plan. Noncompliance with this plan will be referred to appropriate university administrators.

II. APPLICABILITY: This policy applies to all WUSM employees and those people working in WUSM space that might come in contact with Mycobacterium tuberculosis.

Each employee has a responsibility to understand the plan and follow it conscientiously. Specific areas or departments may have increased responsibilities as outlined in this plan. Managers have the responsibility to observe infection control practices of their employees related to TB control and take corrective action if necessary.

III. STATEMENT OF POLICY:

A. Introduction

This policy sets forth the minimum standards that must be met at WUSM with respect to the Tuberculosis Control Plan.

B. Program Review

This plan is reviewed and updated not less than annually by the recommending committees:

- Oversight Committee – Manager of WUSM Employee Health, Infection Prevention Specialist, Director of University Safety Office, Director of Biological & Chemical Safety Office, Environmental Health and Safety Health & Safety Professional, and Faculty Practice Plan (FPP) Senior Director of Clinical Operations
- Executive Committee – Associate Vice Chancellor for Clinical Affairs, Assistant Vice Chancellor for Environmental Health & Safety, WUSM Infectious Disease Physician, and Medical Director of Employee Health
C. Methods of Compliance

1. WUSM will follow protocols for early identification and prompt airborne isolation with suspected or confirmed TB.

2. WUSM will maintain a TB screening and tuberculin skin testing program for employees.

3. A risk assessment will be completed by WUSM Occupational Health/Infection Prevention annually.

4. In order to provide a safe work environment, education and training of all employees at risk of occupational exposure to TB will be performed at time of hire and at least annually thereafter.

5. Staff is given respirator training (along with fit testing) regarding the proper use, care, and circumstances to use and not use. Training records will be maintained:
   a. For non-research lab employees by Washington University Environment Health and Safety for each employee with occupational exposure to TB in accordance with OSHA 29 CFR 1910.1020.
   b. For research lab employees in the lab Blue Book.

6. Designated employees must wear NIOSH-approved respiratory protection devices, when indicated. Approved respiratory protection includes disposable N95 NIOSH-approved or Powered Air-Purified Respirator with a minimum N95 filtration.

IV. PROCEDURE

A. Risk Assessment for Healthcare-Associated Transmission of *M. tuberculosis*

The Centers for Disease Control and Prevention (CDC) specifies that every health-care setting conduct initial and ongoing evaluations of the risk for transmission of *M. tuberculosis*, regardless of whether or not patients with suspected or confirmed TB disease are encountered in the setting. The TB risk assessment determines the type of administrative, environmental, and respiratory protection controls needed for a particular setting and serves as an ongoing evaluation tool of the quality of TB infection control and for the identification of needed improvements in infection control measures.

The risk assessment will be completed by Infection Prevention and maintained by an Infection Prevention Specialist.

1. A risk assessment is performed every year utilizing the TB Risk Assessment in Appendix A.
   a. It is recommended that this assessment be completed the first quarter of every calendar year and reflect data from the year prior.
   b. Once the TB risk assessment is completed, the Infection Prevention Specialist will notify WUSM Occupational Health who will collaborate with Infection Prevention and Environmental Health and Safety, as needed, on the respirator fit test program for that calendar year.

2. The risk assessment will consist of, but is not limited to, review of the following:
a. A review of the rates and trends of TB in cities and counties where WUSM facilities are located, and the states of Missouri and Illinois.

b. A review of the number of TB patients encountered in each WUSM healthcare setting.

c. A determination of healthcare workers to be included in the tuberculin skin testing and respiratory protection program.

d. A determination of the number of negative pressure ventilation rooms needed, current engineering controls and where the current negative pressure ventilation rooms are located.

e. The types of environmental controls needed.

f. Identification of areas with increased transmission risk.
   - Prompt recognition and evaluation of M. tuberculosis transmission
   - Tuberculin skin testing conversion rates
   - Inpatients with suspected or confirmed TB in Barnes-Jewish-Christian (BJC) hospitals
   - Drug-susceptibility pattern of TB isolates
   - Nosocomial transmission of TB

**TB Risk Classification**

The CDC specifies that all settings should perform risk classification as part of the risk assessment to determine the need for and frequency of a healthcare worker testing program (see criteria in Appendix A).

**Low Risk** – Persons with TB disease not expected to be encountered, exposure unlikely (see criteria in Appendix A).

**Medium Risk** – healthcare workers who will or might be exposed to persons with TB disease (see criteria in Appendix A).

**Potential Ongoing Transmission** – temporary classification for any settings with evidence of person-to-person transmission of M. tuberculosis (see criteria in Appendix A).

**B. Identification of TB Patients**

1. Early identification of patients with active pulmonary or laryngeal tuberculosis is fundamental. Screening patients for signs and symptoms should be done in the following settings:
   a. In Emergency Department or ambulatory-care setting
   b. Home-based healthcare and outreach settings
   c. Medical offices and dialysis units

2. Early identification of patients with active pulmonary or laryngeal tuberculosis is fundamental. Patients at high risk for TB include:
   a. Persons with Human Immunodeficiency Virus (HIV) infection
   b. Close contacts of infectious TB patients
   c. Persons with medical conditions which increase their risk for progression of latent TB to active TB including:
      1) Diabetes mellitus
      2) Silicosis
      3) Status post gastrectomy or jejuno-ileal bypass surgery
4) Greater than 10% below ideal body weight  
5) Chronic renal failure  
6) High dose corticosteroid or other immunosuppressive therapy  
7) Some malignancies  
8) Abnormal chest x-ray compatible with TB

3. New TB skin test converters: persons who have been infected within the past two years:  
a. Foreign born persons from high-prevalence countries (Asia, Africa, Eastern Europe and Latin America)  
b. Medically underserved populations including minorities (African-Americans, Hispanics, Native Americans)  
c. Alcoholics and injecting drug users  
d. Residents and employees of congregate high-risk settings such as correctional facilities or homeless shelters (current or previous)  
e. Residents of long-term care facilities  
f. Patients with history of previous TB

4. Suspicious Signs and Symptoms  
A diagnosis of TB should be considered in any patient with the following symptoms:  
a. Persistent non-productive cough (> 2 weeks)  
b. Night sweats  
c. Anorexia  
d. Weight loss (> 10 lbs. in past 1-2 months) or failure to thrive in infants and children  
e. Fever > 3 weeks duration  
f. Bloody sputum  
g. Persistent pulmonary signs and symptoms in the presence of immunosuppression (e.g., HIV-infected patient with undiagnosed active pulmonary disease)

5. Diagnostic measures for identifying TB include:  
a. History and physical exam  
b. Tuberculin skin testing read 48-72 hours later  
c. Chest x-ray (CXR)  
d. Acid-fast bacilli (AFB) smear and culture of sputum or other appropriate specimens  
e. Other diagnostic methods such as bronchoscopic lavage or biopsy for culture and stain for AFB

C. Risks for Exposure

*Mycobacterium tuberculosis* is primarily spread by inhaling airborne droplets (droplet nuclei) generated when persons with active pulmonary or laryngeal TB sneeze, cough, speak, cry, or sing. These organisms can be widely dispersed by air currents before being inhaled. Although extrapulmonary TB is not usually communicable, droplet nuclei can be produced by some patients with extrapulmonary disease who have open draining wounds, abscesses, or lesions with high concentrations of AFB. In healthcare workers, acquisition of TB from patients has been associated with delayed diagnosis of TB disease, delayed initiation and inadequate airborne precautions, lapses in Airborne Infection Isolation precautions for cough inducing and aerosol-generating procedures (i.e., sputum induction and aerosol treatments, bronchoscopy, endotracheal intubation and suctioning, open abscess irrigation and autopsy) and lack of adequate respiratory protection. Rigorous implementation of infection-control measures has been shown to prevent healthcare-associated transmission.

D. Prevention and Control Measures

1. Patients at high risk for having TB who should be included in prevention and control measures are those with an:
4. Abnormal CXRs compatible with TB (upper lobe cavitary lesions), who are coughing or have a history of fever, night sweats, weight loss, or hemoptysis.

b. AFB smear-positive respiratory specimens.

2. A high index of suspicion for TB and early identification mechanisms are keys to control. Patients who are being evaluated for TB should:
   a. Have a surgical mask placed over their face, if able. If the patient cannot tolerate mask, the nursing personnel must provide instructions about how to cover face and mouth with cloth or tissue when coughing or sneezing.
   b. Be removed from the waiting room and placed in a negative pressure ventilation room immediately.

3. Transfer of patients to another setting (i.e., Emergency Department)
   a. In the event of a transfer, an Infectious Disease or Pulmonary Physician at the receiving setting must be notified.
   b. Notify staff in testing department of patient’s arrival so testing can be done immediately. Do not leave the patient sitting in hall or waiting room.
   c. When a known or suspected TB patient is to be transferred to another setting by ambulance the following steps must be taken:
      1) Notify the ambulance service of the patient’s infectious diagnosis.
      2) While patient is in vehicle:
         a) The patient should wear a surgical/isolation mask, if tolerated, and instructed to keep mask on at all times
         b) Instruct the patient to cover nose and mouth with tissue when coughing or sneezing if removing the mask
         c) All windows must remain open (weather permitting)
         d) Ambulance personnel must wear approved N95 respirator during transport of patient
         e) There must be no recirculation of vehicle air

4. Isolation of patients
   a. Negative pressure ventilation rooms have three main purposes:
      1) To isolate patients (and other family members) who are likely to have infectious TB
      2) To prevent the escape of droplet nuclei from the room
      3) To provide an environment that reduces the concentration of droplet nuclei in the room through engineering controls. Patients are moved to negative pressure ventilation rooms if TB is suspected. An appropriate notification sign (airborne infection isolation Precautions with N95 Mask) should be placed on the door as soon as possible.
      4) Refer to the Isolation Precautions Policy regarding the re-use of N95 Mask.
   b. In order to discontinue airborne infection isolation Precautions, follow these guidelines:
      1) For confirmed or presumptive TB disease: should remain under airborne infection isolation precautions until they have had three consecutive negative AFB sputum smear results, each collected in 8-24 hour intervals, with at least one being an early morning specimen; have received standard multi-drug antituberculosis treatment (minimum of 2 weeks), and have demonstrated clinical improvement.
      2) For suspected or rule out TB: three consecutive negative AFB sputum smear results, each collected in 8–24 hour intervals with one at least being an early morning specimen or TB disease is considered unlikely and another diagnosis is made.

5. Traffic control
   Minimize the number of persons who enter rooms designated airborne infection isolation Precautions. Employees who enter the room must wear an N95 or approved respirator.
6. Engineering controls are designed to reduce the concentration of infectious droplet nuclei by controlling the airflow in and out of the patient's room.
   a. Negative pressure ventilation rooms are designed to capture airborne contaminants at or near their source and remove those without exposing people in the area. Hallway and anteroom doors must be kept closed in order to maintain proper negative pressure ventilation.
      1) These negative pressure ventilation rooms have negative air pressure relative to adjacent areas, i.e., with anterooms, air flows from hallway into anteroom, then from anteroom into patient room; no air flows from patient room to anteroom to hallway; in rooms lacking anterooms, air flows from hallway into patient room.
      2) Air is exhausted directly to the outside of the building away from intake vents and people or passes through an high-efficiency particulate air (HEPA) filter prior to discharge.
      3) Negative pressure ventilation rooms have at least six air exchanges per hour; newly renovated areas must have a minimum of 12 air exchanges per hour.
   b. Appropriate portable HEPA filter units can be placed in a non-negative pressure ventilation room to filter infectious droplets from the air. When isolation precautions are discontinued or the patient is moved to negative pressure ventilation, the portable HEPA filter unit must remain on in the room for 1-2 hours to filter any remaining infectious droplets. If the patient is discharged from a negative pressure ventilation room, keep the isolation sign posted, door closed and negative pressure on for one hour prior to opening the room.

7. Preventative maintenance
   a. Negative pressure ventilation rooms should be evaluated for proper function monthly.
   b. Daily monitoring is required when room is in use for airborne infection isolation Precautions.
   c. Checks of function using a titanium-tetrachloride smoke stick or another approved device (i.e., Flowchecker) can be performed, as needed.
   d. All evaluations and/or monitoring results will be documented and kept in the clinical area.

E. Respiratory Protection to Prevent Exposure to TB:

In accordance with the Occupational Safety & Health Administration (OSHA), all clinicians that care for patients with known or suspected TB are required to wear N95 respiratory protection or a powered air purifying respirator with HEPA filtration. Departments/Divisions have designated respiratory protection captains to identify, contact and assist individuals required to wear respiratory protection. The following must be completed prior to using respiratory protection:

   a. Medical clearance: The employee will need to complete an initial medical evaluation form. The completed form will be sent to WUSM employee Health for review and approval by a healthcare professional. A medical clearance will be required every 5 years and/or if there is a negative change in the individual’s health. The respirator or powered air purifying respirator user will be asked if there has been a change in their health status during annual fit-testing and training.

   b. Fit-testing and training: after the individual has been medically approved to wear respiratory protection, initial fit-testing and training is required prior to use and annually thereafter. Individuals using a powered air purifying respirator will need initial and annual training. The designated respiratory protection captain or EH&S will contact the individual to schedule fit-testing and training.

F. Procedure-specific Precautions for Patients with Suspected or Confirmed Active TB

1. Employees entering rooms where cough-inducing procedures are performed on patients who may have TB will wear an N95 respirator as outlined in the RPP.
2. Sputum induction should be performed in negative pressure ventilation rooms.

3. Aerosolized Pentamidine Treatments
   a. Inpatients must be in negative pressure ventilation rooms for the treatment.
   b. Outpatients must receive aerosolized pentamidine treatment in a negative pressure ventilation room or booth.

4. Bronchoscopy
   a. All bronchoscopies on patients with confirmed or suspected TB will be performed in a negative pressure ventilation room.
   b. All personnel involved with bronchoscopy for a potential TB patient will wear an N95 respirator.
   c. Patients with known or suspected TB will not be held or recovered in rooms where other patients are present. These patients will be taken immediately to a negative pressure ventilation room.

G. Autopsy Rooms & Morgue

1. Must maintain at least twelve total air exchanges per hour.
2. Negative pressure ventilation air flow should be maintained in autopsy room.
3. Air must be exhausted directly outside.
4. An N95 respirator will be worn by all personnel performing or assisting in procedures that aerosolize unfixed infectious particles (i.e., sawing, irrigating).

H. Clinics and Outpatient Settings

Patients who present with suspicious pulmonary symptoms, known or strongly suspected to be TB, are to be placed in a negative pressure ventilation room as quickly as possible in the clinic area. If a negative pressure ventilation room is not available, the patient should be placed in an exam room as soon as possible and the door must be kept closed.

1. Patient will be instructed to wear surgical/isolation mask and cover nose and mouth with tissue when coughing (if removing the mask).
2. Patient should not be placed in common waiting rooms.
3. Patients placed in negative pressure ventilation rooms may remove their surgical/isolation mask. Employees must wear N95 respirator when entering the room.
4. Patients placed in an exam room without negative pressure ventilation should continue to wear the surgical/isolation mask unless it is necessary for them to remove it for examination or if they are unable to tolerate wearing the mask. Employees must wear N95 respirator while in room.

I. Community Outreach

1. Employees will wear appropriate respiratory protection when entering the home of patients or transporting such persons in an enclosed vehicle with known or suspected TB. Use of N95 respirators can be discontinued when the patient has had three negative AFB smears and has completed at least 14 days of continuous appropriate anti-TB medication with clinical improvement.
2. Patients and household members should be educated regarding the importance of taking medications, respiratory hygiene and cough etiquette procedures and proper medical evaluation.
J. Tuberculin Skin Testing Program

1. All employees, students, volunteers and visitors who have the potential for occupational exposures to TB must have an initial and periodic TB screening either by tuberculin skin testing or Interferon Gamma Release Assay (IGRA) testing (see IGRA testing policy).
   a. TB testing will be organized by Occupational/Student Health Services.
   b. Periodic TB testing frequency is based on three TB screening risk classifications: low risk, medium risk and potential ongoing transmission (see Appendix B and C).

2. Initial TB Screening
   a. TB screening for new hires/new students will be completed by WUSM Occupational/Student Health Services. New employees must have their initial TB test completed within 2 weeks of hire.
   b. New hires/new students who do not have a documented negative tuberculin skin testing during the preceding 12 months must have a two-step tuberculin skin testing or single IGRA test performed by Occupational/Student Health staff. Two-step testing is a baseline skin testing procedure used to identify a boosted skin test reaction from that of a new infection. For employees, the first test may be read by Occupational Health or approved personnel at 48 hours up to 7 days. For students, the first test must be read in 48-72 hours. If the first test is positive, the employee/student will have confirmatory IGRA testing. If the first skin test is negative, a second skin test is administered which needs to be read in 48 to 72 hours. A positive reaction on the second test indicates a boosted reaction and the employee/student will have confirmatory IGRA testing.
   c. Two-step skin testing can be conducted by the following method:
      1) Utilizing the Mantoux tuberculin skin testing, administer an intradermal injection of 0.1ml of purified protein derivative (PPD) containing 5 tuberculin units on the flexor of volar surface on the left arm (by American Lung Association guidelines). Test must be repeated immediately in a different site if the initial placement is not correct.
      2) After the correct time frame, interpret the skin test. Document measurement in millimeters of indurations of the horizontal plane (raised, hardened area). Do NOT record results as negative or positive, use measurement in mms. Do NOT measure erythema.

3. Periodic TB Screening
   a. Periodic skin testing for employees and students with patient or specified research subject contact is based upon risk assessment.
      1) After baseline TB testing, additional TB screening will not be required for those working with patients or human research subjects in Washington University facilities classified as “low risk.”
      2) Annual TB testing is required for those working with patients or human research subjects in Washington University facilities classified as “medium risk.”
      3) Annual TB testing is required for those employees working with nonhuman primates.
      4) TB testing is required every six months for those working with M. tuberculosis in a lab setting.
      5) In areas with identified lapses in infection control policies and procedures, testing for infection with M. tuberculosis might need to be performed every 8-10 weeks until lapses in infection control have been corrected and no evidence of ongoing transmission is apparent. The classification of potential ongoing transmission should be used as a temporary classification only. It warrants immediate investigation and corrective steps. After a determination that ongoing transmission has ceased, the setting should be reclassified as medium risk and will maintain that classification for at least one year.
K. Specifics of Tuberculin Skin Testing

1. Employees/students with a previous documented history of positive tuberculin skin testing or documentation of adequate treatment or prophylaxis for active TB will not have the tuberculin skin testing repeated. They must have documentation of CXR. If unable to obtain documentation or history is unclear, WUSM Occupational/Student Health personnel will perform TB testing.
2. Employees/Students are responsible for providing documentation of TB testing and medical evaluation, as requested by WUSM Occupational/Student Health.
3. A physician will provide or direct appropriate prophylaxis and follow-up and will evaluate employees/students who have a positive tuberculin skin testing conversion. This consultation is mandatory.
4. A tuberculin skin testing is not contraindicated in pregnancy. If an employee refuses tuberculin skin testing due to pregnancy, they must provide/have IGRA testing at their expense.
5. Self reading of TB tests is not allowed and is an Occupational and Safety Health Administration (OSHA) mandate.
6. Employees/students who fail or refuse to comply with TB screening procedures will be subject to work restriction.
7. When TB skin testing persons who have had prior Bacille Calmette Guerin (BCG) vaccination consider IGRA testing (see Appendix D).
8. Interpretation of TB skin tests should be made based upon the following guidelines provided by CDC 2005:
   a. Baseline: ≥ 10mm is considered a positive result (either first or second-step)
   b. Serial testing (without known exposure): Increase of ≥ 10mm is considered a positive result (tuberculin skin testing conversion)
   c. Known exposure: > 5mm is considered a positive result in persons who have a baseline tuberculin skin testing of 0mm; an increase of ≥ 10mm is considered a positive result in persons with a negative baseline tuberculin skin testing results or previous follow-up screening tuberculin skin testing result of ≥ 0mm

L. Post-exposure Employee/Student Follow-up

According to CDC guidelines, employees/students who are presumed to have been exposed to \textit{M. tuberculosi}s in a setting should be screened as soon as possible after the exposure has occurred and 8-10 weeks after the end of exposure if the initial tuberculin skin testing result is negative.

Tuberculin skin testing will be performed by WUSM Occupational/Student Health for employees/students who have an unprotected exposure to patients with active TB. An incident report will be completed and placed in the employee’s/student’s file. If positive, follow previous policy regarding positive TB testing.

1. If a patient with active TB is identified, Infection Prevention personnel will review the patient’s chart and determine the period of communicability and areas where employees have been exposed. The Infection Prevention or WUSM Occupational/Student Health staff will send the name of the infected patient, dates, times of possible exposures and locations to the department manager(s).
2. Employees with a previously documented positive skin test who have been exposed to an infectious patient do not require routine CXRs following the exposure. They should be screened for symptoms of active pulmonary TB and counseled by their supervisors to report to WUSM Occupational/Student Health Services if symptoms suggestive of TB develop.
3. The involved Clinic Managers are responsible for determining who was exposed, notifying their employees of their potential exposure, and notifying Infection Prevention and/or WUSM Occupational/Student Health Services of all potentially exposed personnel or areas.

4. WUSM Occupational/Student Health Services will arrange for tuberculin skin tests to be placed and read on exposed personnel. Any skin test conversions will be recorded in the OSHA 300 log.

5. WUSM Occupational/Student Health Services is responsible for informing employees of the procedure for obtaining post-exposure follow-up. Unless a negative tuberculin skin testing has been documented within the preceding three months, a baseline tuberculin skin testing of those previously negative will be done as soon as possible after the exposure. If the tuberculin skin testing result is negative, place another tuberculin skin testing 8-10 weeks after the end of exposure to *M. tuberculosis*.

6. Infection Prevention personnel will consult with appropriate Directors/Managers to determine patient contacts. They will notify all attending physicians by telephone or letter of potentially exposed patients. Exposed patients will be followed up by their own physicians.

7. Infection Prevention personnel will evaluate care of the patient and why exposure occurred. Infection Prevention personnel will make recommendations for practice changes to prevent future exposure incidents.

M. Management of Employees with TB Infection (+Tuberculin Skin Testing) or Active Disease

1. Employees/students who have a positive skin test/IGRA test at time of hire will have a CXR, be evaluated by a physician of WUSM Employee/Student Health Services and be given or directed to appropriate counseling and prophylaxis.

2. All new positive tuberculin skin testings and conversions will be reported to the local public department of health as required by law.

3. Employees/students who convert to a positive skin test during employment/enrollment will have a CXR, be evaluated by a physician of WUSM Employee/Student Health Services and be given or directed to appropriate counseling and prophylaxis.

4. Employees/students, eligible for periodic TB screening who have +tuberculin skin testing are required to sign a reactor form yearly in place of receiving a test. If experiencing any of the symptoms listed on the reactor form, further evaluation is needed.

5. Employees/Students with Active TB
   a. All employees/students who develop signs or symptoms suggestive of TB will get a CXR and be evaluated by WUSM Occupational/Student Health for TB infection or disease.
   b. WUSM Occupational/Student Health will report employees/students with active disease to the City or County Health Department.
   c. Decisions about work restrictions for workers with active disease will be made by the WUSM Occupational/Student Health Medical Director with consultation from the Infection Prevention Department as necessary. These decisions will be based on the most current CDC "Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Healthcare Settings."
   d. Employees/students with TB at sites other than lung or larynx usually do not need to be prohibited from work if concurrent pulmonary TB is excluded.
   e. Employees/students with TB who discontinue treatment before the recommended course of therapy has been completed will be excluded from work until treatment is resumed and adequate response to the therapy is documented, i.e., three negative sputum smears on three consecutive days and clinical improvement.
f. Employees/students treated for TB by their private physicians should advise WUSM Occupational/Employee Health Service and the employee/student should be monitored for appropriateness of treatment, symptoms, and duties.

6. Employees/students who fail to comply with these requirements will be subject to the disciplinary process per university policy.

N. Recordkeeping

1. Positive skin tests (except positive tests at time of hire/matriculation) and documented tuberculosis disease will be recorded on the Missouri Department of Health Tuberculin Testing Record and sent to Missouri Department of Health on a monthly basis.

2. Baseline and annual/periodic skin tests will be recorded in the employee’s/student’s WUSM Occupational/Student Health Services file, with medical evaluations and treatment records.

O. Training and Education

1. All employees at risk for occupational exposure to TB will receive initial and annual training pertaining to TB as outlined by their facility’s procedure.

2. Training should include the items listed below. The level of detail should be based on the employee’s work responsibilities and the facility’s risk assessment:

   a. Basic concepts of TB transmission, pathogenesis, and diagnosis
   b. The difference between latent TB infection and active TB disease
   c. Signs and symptoms of TB
   d. Possibility of re-infection in persons with a positive tuberculin skin testing
   e. Potential for occupational exposure to TB
      1) Prevalence of TB in the community
      2) Prevalence of TB at individual BJC HealthCare WUSM facilities
      3) Situations with increased risk for exposure to TB
   f. Practices to reduce the risk of transmission of TB
      1) Early identification and isolation of patients with known or suspected TB
      2) Engineering controls
      3) Purpose, use, fit, and limitations of personal protective equipment
      4) Site-specific control measures
   g. Purpose of TB skin testing
      1) Significance of positive test result
      2) Mandatory compliance with TB Screening Program
   h. Principles of preventative therapy
      1) Indications, use and effectiveness
      2) Potential adverse effects
   i. Responsibility of the employee to seek medical evaluation promptly
      1) Signs and symptoms of TB
      2) Tuberculin skin testing conversion
   j. Principles of drug therapy for active TB
   k. Responsibility of the employee to report signs and symptoms of TB
   l. Responsibility for maintaining confidentiality of the employee
   m. Immunocompromised individuals (including employees) and TB
1) Risk factors for TB disease development
2) Differences in clinical presentation of disease
3) Cutaneous anergy
4) The BJC HealthCare/WUSM policy on voluntary work reassignment options

n. Multi-drug resistant TB

P. Communication with the Department of Health

As soon as a patient or employee is diagnosed with active TB disease or a positive tuberculin skin testing, the information will be reported to the appropriate Department of Health, as required by law.

- Infection Prevention personnel will report patients as soon as possible
- WUSM Occupational/Student Health will report employees
# APPENDIX A

## Washington University School of Medicine

### TB Risk Assessment for Outpatient Settings

**Setting Name:** ________________  **Date:** ________________  **Completed by:** ________________

<table>
<thead>
<tr>
<th>Assessment covers:</th>
<th>past 3 months</th>
<th>past 12 months</th>
<th>past ______ months</th>
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### Incidence of TB

**Local/Community TB profile:**

Incidence of TB in your community (region served by the health-care setting) and how does it compare with the state and national average? (a rate of TB cases per 100,000 persons should be obtained for comparison)

<table>
<thead>
<tr>
<th>Rate</th>
<th>Community: _____</th>
<th>State: _____</th>
<th>National: _____</th>
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**Number of patients**

<table>
<thead>
<tr>
<th>Year</th>
<th>Suspected</th>
<th>Confirmed</th>
</tr>
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<tbody>
<tr>
<td>1 year ago</td>
<td>_____</td>
<td>_____</td>
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<tr>
<td>2 years ago</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>3 years ago</td>
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Are patients with suspected or confirmed TB disease *encountered* in your setting?

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<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>No patients with confirmed TB disease</td>
<td>Yes</td>
<td>No</td>
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</tbody>
</table>

If no, does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>No cluster of persons with confirmed TB disease that might be a result of ongoing transmission of <em>Mycobacterium tuberculosis</em></td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

### Risk Classification

How many confirmed *M. tuberculosis* patients were in this outpatient setting:

<table>
<thead>
<tr>
<th>Year</th>
<th>Previous year</th>
<th>5 years ago</th>
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<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
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</table>

Depending on the number of TB patients in this setting in one year, what is the risk classification for your outpatient setting?

<table>
<thead>
<tr>
<th></th>
<th>Low risk</th>
<th>Medium risk</th>
<th>Potential ongoing transmission</th>
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</table>
Screening of Healthcare Workers for *M. tuberculosis* Infection

Does this healthcare setting have a TB screening program for healthcare workers?  [ ] Yes  [ ] No

If yes, which healthcare workers are included in the TB screening program?  
( Check all that apply)

- [ ] Nursing
- [ ] Physicians
- [ ] Nurse Practitioners
- [ ] Physician Assistants
- [ ] Administrators
- [ ] Laboratory Workers
- [ ] Respiratory Therapists
- [ ] Dental Staff
- [ ] Nursing Staff
- [ ] Engineering
- [ ] Plant/Facilities
- [ ] Receptionist/Administrative Staff
- [ ] Transporters
- [ ] Trainees/Students (nursing, phlebotomy, etc.)
- [ ] Volunteers
- [ ] Physical/Occupational/Music Therapists
- [ ] Contract staff
- [ ] Construction/Renovation workers
- [ ] Other (insert additional Healthcare Workers for your site)

Is baseline skin testing performed with two-step tuberculin skin testing for healthcare workers?  [ ] Yes  [ ] No

How frequently are healthcare workers tested for *M. tuberculosis* infection?  
Frequency: __________

Are *M. tuberculosis* infection test records maintained for Healthcare workers?  [ ] Yes  [ ] No

---

TB Infection Control Program

Does the healthcare facility have a written infection control plan?  [ ] Yes  [ ] No

Who is responsible for the infection control program?  Name: ____________________________

When was the TB Infection Control Plan last reviewed or updated?  Date: ________________

---

Implementation of TB Infection Control Plan

Is ongoing training and education regarding TB infection control practices provided for healthcare workers?  [ ] Yes  [ ] No
Environmental Controls

How many negative pressure ventilation rooms are in the healthcare setting? ____________

What ventilation methods are used for negative pressure ventilation rooms?

Primary (general ventilation): □ single-pass heating, ventilating and air conditioning □ recirculating HVAC systems

Secondary: □ Fixed room recirculating units □ HEPA filtration □ Ultraviolet germicidal irradiation (UVGI)
□ Other: specify ________________________________

Are environmental controls regularly checked and maintained with results recorded in maintenance logs?
□ Yes □ No

What procedures are in place if the negative pressure ventilation room pressure is not negative?

__________________________________________________________

Respiratory Protection

Does your healthcare setting have a written respiratory protection program (fit testing)? □ Yes □ No

Which healthcare workers are included in the above? (Check all that apply)

□ Nursing □ Physicians □ Nurse Practitioners □ Physician Assistants
□ Administrators □ Laboratory Workers □ Respiratory Therapists
□ Dietary Staff □ Maintenance Staff □ Engineering □ Plant/Facilities
□ Receptionist / Administrative Staff □ Transporters
□ Trainees / Students (nursing, phlebotomy, etc.) □ Volunteers
□ Physical / Occupational/Music Therapists □ Contract staff
□ Construction/renovation workers □ Other (insert additional healthcare workers for your site)

__________________________________________________________

__________________________________________________________

Is annual respiratory protection training for healthcare workers performed by a □ Yes □ No
person with advanced training in respiratory protection?

Does your healthcare setting provide initial fit testing for healthcare workers?  
☐ Yes  ☐ No

If yes, when and how frequently is it conducted?  
Date: ________________  
Frequency: __________  
Method: ____________

**Reassessment of TB Risk**

How frequently is the TB risk assessment conducted or updated in the healthcare setting?  
Frequency: __________

When was the last TB risk assessment conducted?  
Date: ________________

What problems were identified during the previous TB risk assessment?

1. ________________________________________________________________  
2. ________________________________________________________________  
3. ________________________________________________________________  
4. ________________________________________________________________

What actions were taken to address the problems identified during the previous TB risk assessment?

1. ________________________________________________________________  
2. ________________________________________________________________  
3. ________________________________________________________________  
4. ________________________________________________________________
## APPENDIX B
### Risk Classification for Health Care Settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Low Risk</th>
<th>Medium Risk</th>
<th>Potential Ongoing Transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient with less than 200 beds</td>
<td>Less than 3 TB patients per year</td>
<td>Greater than or equal to 3 TB patients per year</td>
<td>Evidence of ongoing <em>M. tuberculosis</em> transmission regardless of setting</td>
</tr>
<tr>
<td>Inpatient with greater than or equal 200 beds</td>
<td>Less than 6 TB patients per year</td>
<td>Greater than or equal to 6 TB patients per year</td>
<td>Evidence of ongoing <em>M. tuberculosis</em> transmission regardless of setting</td>
</tr>
<tr>
<td>Outpatient facility based</td>
<td>Less than 3 TB patients per year</td>
<td>Greater than or equal to 3 TB patients per year</td>
<td>Evidence of ongoing <em>M. tuberculosis</em> transmission regardless of setting</td>
</tr>
<tr>
<td>Laboratories</td>
<td>Laboratories in which clinical specimens that might contain <em>M. tuberculosis</em> are not manipulated</td>
<td>Laboratories in which clinical specimens that might contain <em>M. tuberculosis</em> are manipulated</td>
<td>Evidence of ongoing <em>M. tuberculosis</em> transmission regardless of setting</td>
</tr>
</tbody>
</table>

### Recommendations for screening frequency

| Baseline two-step tuberculin skin testing | Yes, for all healthcare workers upon hire | Yes, for all healthcare workers upon hire | Yes, for all healthcare workers upon hire |
| Serial testing for screening of healthcare workers | Every 12 months for employees at risk of occupational exposure to TB (see Appendix C) | Every 12 months for employees at risk of occupational exposure to TB (see Appendix C) | As needed in the investigation of potential ongoing transmission |

### Tuberculin skin testing for healthcare workers upon unprotected exposure to *M. tuberculosis*

- Unless a negative tuberculin skin testing has been documented within the preceding three months, a baseline tuberculin skin testing of those previously negative will be done as soon as possible after the exposure. If the tuberculin skin testing result is negative, place another tuberculin skin testing 8-10 weeks after the end of exposure to *M. tuberculosis*.

- For those with a history of positive tuberculin skin testing, or documentation of adequate treatment or prophylaxis for active TB, tuberculin skin testing will not be repeated. Instead, those employees will receive a symptom screen annually. OH/EH personnel may repeat tuberculin skin testing if history is unclear or poorly documented.

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APPENDIX C

Healthcare workers to Include in Annual TB Surveillance Program

The potential for occupational exposure to TB is based on job tasks and location. At a minimum, healthcare workers who meet any of the following conditions should be included in the annual screening program:

1. Have duties that may involve face-to-face contact with patients with suspected or confirmed TB disease.
2. Enter patient rooms or treatment rooms that house patients with suspected or confirmed TB disease.
3. Participate in aerosol-generating procedures (e.g., bronchoscopy, sputum induction, and administration of aerosolized medications).
4. Participate in suspected or confirmed *M. tuberculosis* specimen processing.
5. Install, maintain, or replace environmental controls in areas in which persons with TB disease are encountered.

<table>
<thead>
<tr>
<th>Examples of healthcare workers/Departments at Risk of Occupational Exposure to TB*</th>
<th>Examples of healthcare workers/Departments Not at Risk of Occupational Exposure to TB*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admitting Department</td>
<td>Accounting/Finance</td>
</tr>
<tr>
<td>Bronchoscopy/GI Lab</td>
<td>Administration</td>
</tr>
<tr>
<td>Cardiac Cath Lab</td>
<td>Food Service Workers (who do not enter patient rooms)</td>
</tr>
<tr>
<td>Central Sterile Processing</td>
<td>Geropsychiatry in low risk facilities</td>
</tr>
<tr>
<td>Pharmacists, Clinical</td>
<td>Health Information Management/Medical Records</td>
</tr>
<tr>
<td>EKG/Vascular Lab</td>
<td>Information Systems</td>
</tr>
<tr>
<td>Emergency Department</td>
<td>Marketing</td>
</tr>
<tr>
<td>Facilities/Maintenance</td>
<td>Obstetrics and Nursery staff in low risk facilities</td>
</tr>
<tr>
<td>Food Service Workers who enter occupied patient rooms</td>
<td>Pharmacy</td>
</tr>
<tr>
<td>Home Care staff providing direct patient care</td>
<td>Pharmacists, Non-clinical</td>
</tr>
<tr>
<td>Housekeeping/Environmental Services</td>
<td>Telecommunications</td>
</tr>
<tr>
<td>Housestaff Physicians and Fellows</td>
<td>Transcription</td>
</tr>
<tr>
<td>Microbiology Lab</td>
<td><em>This is a sample list, each entity must determine who should be included in the annual TB screening program</em></td>
</tr>
<tr>
<td>Nursing staff in areas of risk (units with negative pressure ventilation rooms)</td>
<td></td>
</tr>
<tr>
<td>Occupational Therapists</td>
<td></td>
</tr>
<tr>
<td>Operating Room (including PACU and holding areas)</td>
<td></td>
</tr>
<tr>
<td>Orderlies</td>
<td></td>
</tr>
<tr>
<td>Pathology Lab</td>
<td></td>
</tr>
<tr>
<td>Phlebotomy</td>
<td></td>
</tr>
<tr>
<td>Physical Therapists</td>
<td></td>
</tr>
<tr>
<td>Radiology</td>
<td></td>
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<tr>
<td>Respiratory Therapy</td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td></td>
</tr>
<tr>
<td>Speech Therapists</td>
<td></td>
</tr>
<tr>
<td>Transport/Dispatch</td>
<td></td>
</tr>
<tr>
<td>Obstetrics and Nursery staff (in medium risk and ongoing transmission facilities)</td>
<td></td>
</tr>
<tr>
<td>Physicians with patient care responsibilities</td>
<td></td>
</tr>
</tbody>
</table>
Appendix D

Washington University School of Medicine Health Service

Interferon Gamma Release Assay (IGRA) Policy

The Tuberculosis Skin Test (TST) is not the only way to test for Latent Tuberculosis Infection (LTBI). The introduction of blood based tests (IGRAs), such as the T-SPOT test provides alternate way to detect LTBI. Selection of the most suitable test or combination of tests for detection of Tuberculosis should be made on the basis of the reasons and the context for testing, test availability and overall cost effectiveness of testing.

The T-SPOT test may be used in screening most groups for TB infection, including health care workers, Tuberculosis suspects and contacts, HIV-positive persons, and immunosuppressed patients. Unlike the TST there is no association with BCG vaccination and T-SPOT test results.

**Situations in which T-SPOT testing is acceptable:**

T-SPOT testing is preferred for **new hires/students** who have received BCG (as a vaccine or for cancer therapy). Use of the T-SPOT in this population is expected to increase diagnostic specificity and improve acceptance of treatment for LTBI.

**New** employees that state that they had a positive TB test in the past, who describe a poor history and have no documentation of previous positive TST or Chest x ray.

**New** employees who claim to have an “allergic reaction” to skin testing.

T-Spot testing can be used in place on “2 step TST skin testing to increase compliance upon employees, since reading is not necessary.

All **newly** positive TST conversions discovered as part of a new employee/student evaluation or during annual testing.

A T-SPOT test may be used to test recent contacts of persons known or suspected to have active tuberculosis. If the T-SPOT is to be used in contact investigations, negative results obtained prior to 8 weeks post exposure typically should be confirmed by repeat testing 8-10 weeks post exposure. In these instances, both tests should be charged to workers compensation.

T-SPOT testing for annual use will be performed on a case by case basis depending on the circumstances and Tuberculosis testing history. (For example, it may be used for employees that have a TST > 15mm, due to a “booster phenomenon” but the TST is still considered negative.) Employees may request that a T-SPOT be performed in lieu of traditional skin testing.

The T-SPOT is the preferred method of testing all visitors, volunteers; summer and work study students in place of the “two step TB testing”. Their respective departments or the individual will be charged a fee for services.

**Situations in which T-SPOT testing is not acceptable:**

Individuals that have been treated for LBTI should not be tested with T-SPOT as the test has not been studied for that use.
Procedure
Whole blood samples should be drawn in a dark green top tube and maintained between 18°C and 25°C until processed.

The tube contents must be inverted (8 – 10 times) to ensure that the whole blood is mixed thoroughly with the anticoagulant. Store collected blood at room temperature (18-25°C). Do not refrigerate or freeze.

For an immunocompetent patient, it is recommended that two tubes of blood be drawn and sent to the lab.

Follow the manufacturer shipping and packing instructions.

Medical Management after Testing
For persons with an indeterminate or borderline test results; repeat the T-SPOT by drawing a new sample of blood and submitting two full tubes for analysis is recommended.

Persons with a positive T-SPOT should be evaluated for the likelihood of M. Tuberculosis by obtaining a chest x-ray and making an appointment with the physician.

In healthy persons who have a low likelihood both of *M. tuberculosis* infection and of progression to active tuberculosis if infected, a single positive T-SPOT or TST should not be taken as reliable evidence of *M. tuberculosis* infection. Because of the low probability of infection, a false-positive result is more likely. In such situations, the likelihood of M. tuberculosis and of disease progression should be reassessed and the initial results should be confirmed. Repeat testing, with either the initial test of different test may be considered on a case by case basis. For such persons an alternative is to assume, without additional testing, that the initial result is a false positive.

In persons with discordant test results (i.e., one positive and the other negative) decisions about medical management require individualized judgment for the probability of infection, the risk for disease if infected and the risk for poor outcome if disease occurs. Inadequate evidence exists on which to base recommendations for dealing with discordant results.

For persons who have received BCG and who are not at increased risk for a poor outcome if infected, TST reactions of <15mm in size may reasonably be discounted as false positives when the T-SPOT is clearly negative.