

## **XI. Infection Control**

- A. OSHA requires all health care facilities to have a tuberculosis infection control plan. The Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Health Care Facilities, 2005, Center for Disease Control, MMWR, December 30, 2005, Vol. 54, No. RR-17 ( <http://www.cdc.gov/tb/publications/guidelines/infectioncontrol.htm> ) should be followed to establish local policies on tuberculosis infection control. At a minimum, the TB infection control plan should include administrative controls, environmental controls, and a respiratory-protection program. Specific details of the plan will vary from setting to setting based on the setting's potential risk of exposure to TB. Additionally, the CDC and NTCA published updated recommendations for testing U.S. health care personnel Tuberculosis Screening, Testing, and Treatment of U.S. Health Care Personnel: Recommendations from the National Tuberculosis Controllers Association and CDC, 2019. MMWR May 17, 2019/Vol.68/No. 19. ( <https://www.cdc.gov/tb/publications/guidelines/infectioncontrol.htm> )
- B. Elements of a Tuberculosis Infection Control Program
1. Designated person responsible for the program. This person should have expertise in latent TB infection and TB disease.
  2. A baseline risk assessment for the facility and specific areas within the facility in order to determine the relative risk of tuberculosis transmission. See appendix B Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Health Care Facilities, 2005, Center for Disease Control, MMWR, December 30, 2005, Vol. 54, No. RR-17. Appendix C is no longer used to determine the frequency that health care personnel (HCP) should be tested. A copy of this is located at the end of this chapter.
  3. Health care personnel without documentation of previous latent TB infection or TB disease should have a baseline TB test using a two-step tuberculin skin test (TST) or a single interferon gamma release assay (IGRA) upon employment. An individual risk assessment should also be completed. See sample individual risk assessment form at the end of this chapter.
  5. If the baseline TST or IGRA is negative, additional testing is only necessary after a known exposure to a person with potentially infectious TB disease without use of adequate personal protection.
  6. HCP with documentation of a positive TST or IGRA and a negative chest X-ray should have a symptom screen done at baseline. A repeat chest X-ray is not required unless they are symptomatic or starting treatment of LTBI. If the employee has not been treated for LTBI in the past, he or she should be encouraged to complete treatment.
  7. HCP with a positive test who do not complete treatment of LTBI should be monitored annually with a symptom screen.
  8. Each health care facility should have a written tuberculosis infection control policy including:
    - a. Administrative controls

- Early identification and management of patients with suspected tuberculosis;
  - Education, counseling, and testing of health care workers; and
  - Evaluation of TST and IGRA conversions.
- b. Engineering controls
- Controlling the source of infection by using local exhaust ventilation and diluting and removing contaminated air by using general ventilation.
  - Controlling airflow to prevent contamination of air in areas adjacent to the source.
  - Required if cough-inducing procedures are performed within the facility.
- c. Respiratory protection controls (for detailed information see OSHA standard 1910.134 at [www.osha.gov](http://www.osha.gov)).
- OSHA requires health care settings in which HCW's use respiratory protection to develop, implement, and maintain a respiratory-protection program.
  - NIOSH-certified personal respirators, e.g., N-95, are required when
    - entering the home of an infectious patient;
    - transporting an infectious patient in a closed vehicle, or
    - performing cough-inducing procedures.
  - OSHA requires a medical evaluation by a physician or advanced practice provider to determine ability to wear a personal respirator prior to being asked to use a respirator in the line of work and if a subsequent medical evaluation is indicated. (Medical evaluation form can be found in OSHA Standard 1910.134 at [www.osha.gov](http://www.osha.gov)).
  - Detailed policy and procedures for training, fit testing, and respirator use by workers, including the performance of a seal check by the user, proper cleaning and disinfection of the respirator based on manufacturer's recommendation, and proper storage.
  - Training and fit-testing are required prior to initial use of a respirator and periodically thereafter in accordance with federal, state, and local regulations ([http://www.osha.gov/SLTC/respiratory\\_protection/index.html](http://www.osha.gov/SLTC/respiratory_protection/index.html)), and when there is a change in the respirator model, or if a significant change to an individual happens (i.e. weight loss or gain, facial deformity)
  - The respirator must be fit-tested by the employee anytime it is used.

## 10. Records and Documentation

The agency must maintain written and clear records documenting

- a. That the mandated medical evaluation was completed and the HCW approved to use a personal respirator.
- b. The type of fit testing procedure used for the HCW, the date it was done, the type of mask (model, style and size) that was approved for the HCW and who did the fit testing.
- c. That the HCW received training about how to do a seal check each time the mask is applied.

### C. Sample Health Department Tuberculosis Infection Control Policy

\_\_\_\_\_ County Health Department policy requires that all health care personnel (HCP), patients, visitors, volunteers, and students participate in efforts to control occupational exposure to tuberculosis. Implementation of agency policy for prevention and transmission of M. tuberculosis is intended to comply with OSHA requirements that employees be protected from airborne transmission through increased awareness of tuberculosis exposure control.

The person/persons qualified to implement and enforce the TB Infection Control Policy is/are: \_\_\_\_\_

Name/ Title

1. An initial TB risk assessment was completed on \_\_\_\_\_ and a TB risk assessment will be conducted periodically (annually if possible) thereafter.
2. Identification, Evaluation and Treatment of people with suspected or confirmed tuberculosis
  - a. Tuberculosis should be considered in people with epidemiologic risk of exposure and at least two of the following:
    - Unexplained productive cough for three weeks or more;
    - Unexplained weight loss;
    - Unexplained appetite loss;
    - Unexplained fever;
    - Night sweats;
    - Shortness of breath;
    - Chest pain, and;
    - Unexplained increased fatigue.
  - b. Diagnostic evaluation will include:
    - TST or IGRA;
    - Chest X-ray, and;
    - Sputum specimen for bacteriology (**collected outside of facility unless there is an airborne infection isolation (All) room**).
  - c. Suspected or known tuberculosis cases will be started immediately on an appropriate treatment regimen in accordance with the North Carolina Tuberculosis Control guidelines.
3. Management of Suspected or Known Infectious Tuberculosis Cases
  - a. Agency workers are trained to recognize potential signs and symptoms of tuberculosis upon initial patient contact and initiate immediate triage and evaluation by a health care professional (**provide agency-specific detail**).
  - b. Suspected infectious patients identified by agency workers will be:
    - Masked with a surgical mask on entering the agency.
    - Given tissues with instructions to cover the mouth and nose when coughing/sneezing.
    - Placed in \_\_\_\_\_ (Room #) immediately for initial assessment.

- Seen promptly to minimize time spent in the agency.
  - Referred for further evaluation if needed.
- c. Suspected or known infectious patients will not be given appointments to be seen in the health department while they are infectious unless the facility has an airborne infection isolation (AII) room.

4. Respiratory Protection

- a. NIOSH-certified personal respirator, e.g., N-95, will be worn by workers when:
- Transporting a suspected or confirmed infectious patient in a closed vehicle;
  - Performing cough-inducing procedures, or;
  - Entering the home of a suspected or confirmed infectious patient.
- b. HCPs involved in the above activities will be educated and fit-tested in accordance with agency respiratory protection policy and procedure:
- Fit-testing will be done by \_\_\_\_\_.  
(staff, manufacturer's representative, or hospital)
  - Personal respirators will be maintained by the HCP in a clean paper bag and replaced whenever they become soiled or wet.
  - Personal respirators will be re-checked if there is significant weight change, facial injury or scarring, change in dental structure, beard growth or other occurrences that alter respirator fit.

5. Engineering Controls

List engineering controls that are utilized by the agency. Engineering controls should be based on guidance found in Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Health Care Facilities, 2005, Center for Disease Control, MMWR, December 30, 2005, Vol. 54, No. RR-17 ( <http://www.cdc.gov/tb/publications/guidelines/infectioncontrol.htm> )

6. HCP Training and Education

- a. All workers will receive tuberculosis training and education relevant to their occupational group and/or specific job requirements.
- b. Training and education will occur before the worker receives an initial assignment and on an annual basis.
- c. Education will include tuberculosis transmission, signs and symptoms, the purpose and interpretation of TST, principles and practices of TB infection control, guidelines for preventive and curative TB treatment, HIV/TB risk factors, the importance of personal respiratory protection, and confidentiality requirements.

7. HCP Counseling, Screening and Education

- a. A two-step Mantoux TST (or IGRA) is provided free of charge to new employees who cannot provide a documented negative TST or IGRA within the preceding twelve months.
- b. Those who provide a documented negative TST within the preceding twelve months receive a single TST and this result is considered the second part of the two-step test.
- c. New employees who provide a documented positive TST have a Record of Tuberculosis Screening (DHHS 3405) or similar screening documented in the employee record.
- d. Employees determined to have a new positive TST will receive further clinical evaluation in accordance with North Carolina Tuberculosis Control guidelines.
- e. Any employee suspected of having infectious pulmonary or laryngeal tuberculosis will receive further clinical evaluation in accordance with North Carolina Tuberculosis Control guidelines.
- f. An employee with suspected or known infectious tuberculosis will be excluded from work until adequate treatment is initiated, cough is resolved, and the employee is no longer considered infectious.
- g. TST or IGRA results that convert to positive during employment and employees diagnosed with active tuberculosis will be recorded in the OSHA 200 log. A log is required for employers with more than ten employees.
- h. TST or IGRA results, medical evaluation, and treatment are considered part of the employee's medical record. This information will be preserved and maintained for the duration of employment plus thirty years.



Does evidence exist that ongoing or unresolved health care–associated transmission has occurred in the health care setting (based on case reports)?	Yes No
Is there a high incidence of immunocompromised patients or HCWs in the health care setting?	Yes No
Have patients with drug-resistant TB disease been encountered in your health care setting within the previous 5 years?	Yes No Year _____
When was the first time a risk classification was done for your health care setting?	_____
Considering the items above, would your health care setting need a higher risk classification?	Yes No
Depending on the number of TB patients evaluated in 1 year, what is the risk classification for your outpatient setting? (See Appendix C)	<input type="radio"/> Low risk <input type="radio"/> Medium risk <input type="radio"/> Potential ongoing transmission
Does your health care setting have a plan for the triage of patients with suspected or confirmed TB disease?	Yes No
<b>Nontraditional facility-based settings</b>	
How many TB patients are encountered at your setting in 1 year?	Previous year _____ 5 years ago _____
Does evidence exist that a high incidence of TB disease has been observed in the community that the setting serves?	Yes No
Does evidence exist of person-to-person transmission of <i>M. tuberculosis</i> in the setting?	Yes No
Have any recent TST or BAMT conversions occurred among staff or clients?	Yes No
Is there a high incidence of immunocompromised patients or HCWs in the setting?	Yes No
Have patients with drug-resistant TB disease been encountered in your health care setting within the previous 5 years?	Yes No Year _____
When was the first time a risk classification was done for your setting?	_____
Considering the items above, would your setting require a higher risk classification?	Yes No
Does your setting have a plan for the triage of patients with suspected or confirmed TB disease?	Yes No
Depending on the number of patients with TB disease who are encountered in a nontraditional setting in 1 year, what is the risk classification for your setting? (See Appendix C)	<input type="radio"/> Low risk <input type="radio"/> Medium risk <input type="radio"/> Potential ongoing transmission

### 3. Screening of HCWs for *M. tuberculosis* Infection

Does the health care setting have a TB screening program for HCWs?	Yes No
If yes, which HCWs are included in the TB screening program? (Check all that apply.) <ul style="list-style-type: none"> <li><input type="checkbox"/> Physicians</li> <li><input type="checkbox"/> Mid-level practitioners (nurse practitioners [NP] and physician’s assistants [PA])</li> <li><input type="checkbox"/> Nurses</li> <li><input type="checkbox"/> Administrators</li> <li><input type="checkbox"/> Laboratory workers</li> <li><input type="checkbox"/> Respiratory therapists</li> <li><input type="checkbox"/> Physical therapists</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Janitorial staff</li> <li><input type="checkbox"/> Maintenance or engineering staff</li> <li><input type="checkbox"/> Transportation staff</li> <li><input type="checkbox"/> Dietary staff</li> <li><input type="checkbox"/> Receptionists</li> <li><input type="checkbox"/> Trainees and students</li> <li><input type="checkbox"/> Volunteers</li> <li><input type="checkbox"/> Others _____</li> </ul>

<ul style="list-style-type: none"> <li>o Contract staff</li> <li>o Construction or renovation workers</li> <li>o Service workers</li> </ul>	
Is baseline skin testing performed with two-step TST for HCWs?	Yes No
Is baseline testing performed with QFT or other BAMT for HCWs?	Yes No
How frequently are HCWs tested for <i>M. tuberculosis</i> infection?	
Are the <i>M. tuberculosis</i> infection test records maintained for HCWs?	Yes No
Where are the <i>M. tuberculosis</i> infection test records for HCWs maintained? Who maintains the records?	
If the setting has a serial TB screening program for HCWs to test for <i>M. tuberculosis</i> infection, what are the conversion rates for the previous years? † 1 year ago _____ 4 years ago _____ 2 years ago _____ 5 years ago _____ 3 years ago _____	
Has the test conversion rate for <i>M. tuberculosis</i> infection been increasing or decreasing, or has it remained the same over the previous 5 years? (check one)	<input type="radio"/> Increasing <input type="radio"/> Decreasing <input type="radio"/> No change
Do any areas of the health care setting (e.g., waiting rooms or clinics) or any group of HCWs (e.g., lab workers, emergency department staff, respiratory therapists, and HCWs who attend bronchoscopies) have a test conversion rate for <i>M. tuberculosis</i> infection that exceeds the health care setting's annual average?	Yes No If yes, list _____ _____ _____
For HCWs who have positive test results for <i>M. tuberculosis</i> infection and who leave employment at the health setting, are efforts made to communicate test results and recommend follow-up of latent TB infection (LTBI) treatment with the local health department or their primary physician?	Yes No Not applicable

#### 4. TB Infection-Control Program

Does the health care setting have a written TB infection-control plan?	Yes No
Who is responsible for the infection-control program?	
When was the TB infection-control plan first written?	
When was the TB infection-control plan last reviewed or updated?	
Does the written infection-control plan need to be updated based on the timing of the previous update (i.e., >1 year, changing TB epidemiology of the community or setting, the occurrence of a TB outbreak, change in state or local TB policy, or other factors related to a change in risk for transmission of <i>M. tuberculosis</i> )?	Yes No
Does the health care setting have an infection-control committee (or another committee with infection control responsibilities)?	Yes No
If yes, which groups are represented on the infection-control committee? (Check all that apply.) <input type="checkbox"/> Physicians <input type="checkbox"/> Nurses <input type="checkbox"/> Epidemiologists <input type="checkbox"/> Engineers <input type="checkbox"/> Pharmacists	<input type="checkbox"/> Laboratory personnel <input type="checkbox"/> Health and safety staff <input type="checkbox"/> Administrator <input type="checkbox"/> Risk assessment <input type="checkbox"/> Quality control (QC) <input type="checkbox"/> Others (specify) _____
If no, what committee is responsible for infection control in the setting?	



**5. Implementation of TB Infection-Control Plan Based on Review by Infection-Control Committee**

Has a person been designated to be responsible for implementing an infection-control plan in your health care setting? If yes, list the name: _____	Yes No
Based on a review of the medical records, what is the average number of days for the following:	
• Presentation of patient until collection of specimen _____	
• Specimen collection until receipt by laboratory _____	
• Receipt of specimen by laboratory until smear results are provided to health care provider _____	
• Diagnosis until initiation of standard antituberculosis treatment _____	
• Receipt of specimen by laboratory until culture results are provided to health care provider _____	
• Receipt of specimen by laboratory until drug-susceptibility results are provided to health care provider _____	
• Receipt of drug-susceptibility results until adjustment of antituberculosis treatment, if indicated _____	
• Admission of patient to hospital until placement in airborne infection isolation (AII) _____	
Through what means (e.g., review of TST or BAMT conversion rates, patient medical records, and time analysis) are lapses in infection control recognized?	
What mechanisms are in place to correct lapses in infection control?	
Based on measurement in routine QC exercises, is the infection-control plan being properly implemented?	Yes No
Is ongoing training and education regarding TB infection-control practices provided for HCWs?	Yes No

**6. Laboratory Processing of TB-Related Specimens, Tests, and Results Based on Laboratory Review**

Which of the following tests are either conducted in-house at your health care setting's laboratory or sent out to a reference laboratory?	In-house	Sent out
Acid-fast bacilli (AFB) smears		
Culture using liquid media (e.g., Bactec and MB-BacT)		
Culture using solid media		
Drug-susceptibility testing		
Nucleic acid amplification (NAA) testing		
What is the usual transport time for specimens to reach the laboratory for the following tests?		
AFB smears _____		
Culture using liquid media (e.g., Bactec, MB-BacT) _____		
Culture using solid media _____		
Drug-susceptibility testing _____		
Other (specify) _____		
NAA testing _____		
Does the laboratory at your health care setting or the reference laboratory used by your health care setting report AFB smear results for all patients within 24 hours of receipt of specimen? What is the procedure for weekends?	Yes No	_____ _____

**7. Environmental Controls**

Which environmental controls are in place in your health care setting? (Check all that apply and describe)	
<u>Environmental control</u>	<u>Description</u>
o AII rooms	_____
o Local exhaust ventilation (enclosing devices and exterior devices)	_____
o General ventilation (e.g., single-pass system, recirculation system.)	_____
o Air-cleaning methods (e.g., high-efficiency particulate air [HEPA] filtration and ultraviolet germicidal irradiation [UVGI]) _____	_____

What are the actual air changes per hour (ACH) and design for various rooms in the setting?	
<u>Room</u>	<u>ACH</u> <u>Design</u>
_____	_____
_____	_____
_____	_____
_____	_____
Which of the following local exterior or enclosing devices such as exhaust ventilation devices are used in your health care setting? (Check all that apply)	
<input type="checkbox"/> Laboratory hoods <input type="checkbox"/> Booths for sputum induction <input type="checkbox"/> Tents or hoods for enclosing patient or procedure	
What general ventilation systems are used in your health care setting? (Check all that apply)	
<input type="checkbox"/> Single-pass system <input type="checkbox"/> Variable air volume (VAV) <input type="checkbox"/> Constant air volume (CAV) <input type="checkbox"/> Recirculation system <input type="checkbox"/> Other _____	
What air-cleaning methods are used in your health care setting? (Check all that apply)	
<u>HEPA filtration</u>	
<input type="checkbox"/> Fixed room-air recirculation systems <input type="checkbox"/> Portable room-air recirculation systems	
<u>UVGI</u>	
<input type="checkbox"/> Duct irradiation <input type="checkbox"/> Upper-air irradiation <input type="checkbox"/> Portable room-air cleaners	
How many AII rooms are in the health care setting?	_____
What ventilation methods are used for AII rooms? (Check all that apply)	
<u>Primary (general ventilation):</u>	
<input type="checkbox"/> Single-pass heating, ventilating, and air conditioning (HVAC) <input type="checkbox"/> Recirculating HVAC systems	
<u>Secondary (methods to increase equivalent ACH):</u>	
<input type="checkbox"/> Fixed room recirculating units <input type="checkbox"/> HEPA filtration <input type="checkbox"/> UVGI <input type="checkbox"/> Other (specify) _____	
Does your health care setting employ, have access to, or collaborate with an environmental engineer (e.g., professional engineer) or other professional with appropriate expertise (e.g., certified industrial hygienist) for consultation on design specifications, installation, maintenance, and evaluation of environmental controls?	Yes No
Are environmental controls regularly checked and maintained with results recorded in maintenance logs?	Yes No
Are AII rooms checked daily for negative pressure when in use?	Yes No
Is the directional airflow in AII rooms checked daily when in use with smoke tubes or visual checks?	Yes No
Are these results readily available?	Yes No
What procedures are in place if the AII room pressure is not negative?	_____
Do AII rooms meet the recommended pressure differential of 0.01-inch water column negative to surrounding structures?	Yes No

**8. Respiratory-Protection Program**

Does your health care setting have a written respiratory-protection program?	Yes No
Which HCWs are included in the respiratory protection program? (Check all that apply)	
<input type="checkbox"/> Physicians <input type="checkbox"/> Mid-level practitioners (NPs and PAs) <input type="checkbox"/> Nurses <input type="checkbox"/> Administrators <input type="checkbox"/> Laboratory personnel <input type="checkbox"/> Contract staff <input type="checkbox"/> Construction or renovation staff <input type="checkbox"/> Service personnel	<input type="checkbox"/> Janitorial staff <input type="checkbox"/> Maintenance or engineering staff <input type="checkbox"/> Transportation staff <input type="checkbox"/> Dietary staff <input type="checkbox"/> Students <input type="checkbox"/> Others (specify) _____ _____ _____ _____
Are respirators used in this setting for HCWs working with TB patients? If yes, include manufacturer, model, and specific application (e.g., ABC model 1234 for bronchoscopy and DEF model 5678 for routine contact with infectious TB patients).	
<u>Manufacturer</u>	<u>Model</u>
<u>Specific application</u>	
_____	
_____	
_____	
Is annual respiratory-protection training for HCWs performed by a person with advanced training in respiratory protection?	Yes No
Does your health care setting provide initial fit testing for HCWs? If yes, when is it conducted? _____	Yes No
Does your health care setting provide periodic fit testing for HCWs? If yes, when and how frequently is it conducted? _____	Yes No
What method of fit testing is used? Describe. _____ _____	
Is qualitative fit testing used?	Yes No
Is quantitative fit testing used?	Yes No

**9. Reassessment of TB risk**

How frequently is the TB risk assessment conducted or updated in the health care setting?	
When was the last TB risk assessment conducted?	
What problems were identified during the previous TB risk assessment?	
1) _____	
2) _____	
3) _____	
4) _____	
5) _____	
What actions were taken to address the problems identified during the previous TB risk assessment?	
1) _____	

2)	_____
3)	_____
4)	_____
5)	_____
Did the risk classification need to be revised as a result of the last TB risk assessment?	
	Yes No

\* If the population served by the health care facility is not representative of the community in which the facility is located, an alternate comparison population might be appropriate.

† Test conversion rate is calculated by dividing the number of conversions among HCWs by the number of HCWs who were tested and had prior negative results during a certain period (see Supplement, Surveillance and Detection of *M. tuberculosis* infections in Health-Care Settings).

## Tuberculosis (TB) Screening and Risk Assessment Form for Newly Hired HCP

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Preferred Contact Information: \_\_\_\_\_

1. What position are you hired for? \_\_\_\_\_ What is your start date? \_\_\_\_\_
2. Have you EVER spent more than 30 days in a country with an elevated TB rate? This includes all countries except those in Western Europe, Northern Europe, Canada, Australia, and New Zealand.
  - a. YES I have been in a foreign country for  $\geq 30$  days **(not including those listed above)**
  - b. NO I have not been in any country for  $\geq 30$  days **except the ones listed above**
3. Have you had close contact with anyone who had active TB since your last TB test?  
YES / NO
4. Do you currently have any of the following symptoms:
  - a. YES / NO unexplained fever for more than 3 weeks
  - b. YES / NO cough for more than 3 weeks with sputum production
  - c. YES / NO bloody sputum
  - d. YES / NO unintended weight loss >10 pounds
  - e. YES / NO drenching night sweats
  - f. YES / NO unexplained fatigue for more than 3 weeks
5. Have you ever been diagnosed with active TB disease?  
YES / NO
6. Have you ever been diagnosed with latent TB infection *or* had a positive skin test *or* a positive blood test for TB?
  - a. YES one or more of these is true for me
  - b. NO none of these is true for me
7. Have you been treated with medication for TB *or* for a positive TB test (eg, taken "INH")?  
YES / NO  
If YES, what year, with which medication, for how long, and did you complete the treatment course?  
\_\_\_\_\_
8. Do you have a weakened immune system for any reason including organ transplant, recent chemotherapy, poorly controlled diabetes, HIV infection, cancer, or treatment with steroids for more than 1 month, immune-suppressing medications such as a TNF-alpha antagonist or another immune-modulator? (If you are not sure, ask your Occupational Health provider)
  - a. YES, one or more of these is true for me
  - b. NO, none of these is true for me

\_\_\_\_\_  
Occupational Health Reviewer Signature

\_\_\_\_\_  
Date