

Appendix B. Tuberculosis (TB) risk assessment worksheet

This model worksheet should be considered for use in performing TB risk assessments for health-care facilities and nontraditional facility-based settings. Facilities with more than one type of setting will need to apply this table to each setting.

Scoring $\sqrt{\text{or Y}} = \text{Yes}$ X or N = No NA = Not Applicable
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1. Incidence of TB

What is the incidence of TB in your community (county or region served by the health-care setting), and how does it compare with the state and national average? What is the incidence of TB in your facility and specific settings and how do those rates compare? (Incidence is the number of TB cases in your community the previous year. A rate of TB cases per 100,000 persons should be obtained for comparison.)* This information can be obtained from the state or local health department.	Community rate _____ State rate _____ National rate _____ Facility rate _____ Department 1 rate _____ Department 2 rate _____ Department 3 rate _____										
Are patients with suspected or confirmed TB disease encountered in your setting (inpatient and outpatient)?	Yes No										
If yes, how many patients with suspected and confirmed TB disease are treated in your health-care setting in 1 year (inpatient and outpatient)? Review laboratory data, infection-control records, and databases containing discharge diagnoses.	<table border="0"> <tr> <td>Year</td> <td>No. patients</td> </tr> <tr> <td></td> <td>Suspected Confirmed</td> </tr> <tr> <td>1 year ago</td> <td>_____</td> </tr> <tr> <td>2 years ago</td> <td>_____</td> </tr> <tr> <td>5 years ago</td> <td>_____</td> </tr> </table>	Year	No. patients		Suspected Confirmed	1 year ago	_____	2 years ago	_____	5 years ago	_____
Year	No. patients										
	Suspected Confirmed										
1 year ago	_____										
2 years ago	_____										
5 years ago	_____										
If no, does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?	Yes No										
Currently, does your health-care setting have a cluster of persons with confirmed TB disease that might be a result of ongoing transmission of <i>Mycobacterium tuberculosis</i> within your setting (inpatient and outpatient)?	Yes No										

2. Risk Classification

Inpatient settings	
How many inpatient beds are in your inpatient setting?	
How many patients with TB disease are encountered in the inpatient setting in 1 year? Review laboratory data, infection-control records, and databases containing discharge diagnoses.	Previous year _____ 5 years ago _____
Depending on the number of beds and TB patients encountered in 1 year, what is the risk classification for your inpatient 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
Outpatient settings	
How many TB patients are evaluated at your outpatient setting in 1 year? Review laboratory data, infection-control records, and databases containing discharge diagnoses.	Previous year _____ 5 years ago _____
Is your health-care setting a TB clinic? (If yes, a classification of at least medium risk is recommended.)	Yes No
Does evidence exist that a high incidence of TB disease has been observed in the community that the health-care setting serves?	Yes No
Does evidence exist of person-to-person transmission of <i>M. tuberculosis</i> in the health-care setting? (Use information from case reports. Determine if any tuberculin skin test [TST] or blood assay for <i>M. tuberculosis</i> [BAMT] conversions have occurred among health-care workers [HCWs]).	Yes No
Does evidence exist that ongoing or unresolved health-care-associated	Yes No

transmission has occurred in the health-care setting (based on case reports)?	
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
Nontraditional facility-based settings	
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"> <input type="checkbox"/> Physicians <input type="checkbox"/> Mid-level practitioners (nurse practitioners [NP] and physician's assistants [PA]) <input type="checkbox"/> Nurses <input type="checkbox"/> Administrators <input type="checkbox"/> Laboratory workers <input type="checkbox"/> Respiratory therapists 	<ul style="list-style-type: none"> <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"/> Receptionists <input type="checkbox"/> Trainees and students <input type="checkbox"/> Volunteers <input type="checkbox"/> Others _____

<input type="checkbox"/> Physical therapists <input type="checkbox"/> Contract staff <input type="checkbox"/> Construction or renovation workers <input type="checkbox"/> Service workers	
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="checkbox"/> Increasing <input type="checkbox"/> Decreasing <input type="checkbox"/> 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?	
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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 All 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)	
o Laboratory hoods o Booths for sputum induction o Tents or hoods for enclosing patient or procedure	
What general ventilation systems are used in your health-care setting? (Check all that apply)	
o Single-pass system o Variable air volume (VAV) o Constant air volume (CAV) o Recirculation system o Other _____	
What air-cleaning methods are used in your health-care setting? (Check all that apply)	
<u>HEPA filtration</u>	
o Fixed room-air recirculation systems o Portable room-air recirculation systems	
<u>UVGI</u>	
o Duct irradiation o Upper-air irradiation o 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>	
o Single-pass heating, ventilating, and air conditioning (HVAC) o Recirculating HVAC systems	
<u>Secondary (methods to increase equivalent ACH):</u>	
o Fixed room recirculating units o HEPA filtration o UVGI o 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"/> 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) _____ _____ _____ _____ <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													
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). <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;"><u>Manufacturer</u></td> <td style="text-align: center;"><u>Model</u></td> <td style="text-align: center;"><u>Specific application</u></td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </table>			<u>Manufacturer</u>	<u>Model</u>	<u>Specific application</u>	_____	_____	_____	_____	_____	_____	_____	_____	_____
<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).

Appendix C. Risk classifications for health-care settings that serve communities with high incidence of tuberculosis (TB) and recommended frequency of screening for *Mycobacterium tuberculosis* infection among health-care workers (HCWs)*

Setting	Risk classification [†]		Potential ongoing transmission [§]
	Low risk	Medium risk	
Inpatient <200 beds	<3 TB patients/year	≥3 TB patients/year	Evidence of ongoing <i>M. tuberculosis</i> transmission, regardless of setting
Inpatient ≥200 beds	<6 TB patients/year	≥6 TB patients/year	
Outpatient; and nontraditional facility-based	<3 TB patients/year	≥3 TB patients/year	
TB treatment facilities	Settings in which <ul style="list-style-type: none"> • persons who will be treated have been demonstrated to have latent TB infection (LTBI) and not TB disease • a system is in place to promptly detect and triage persons who have signs or symptoms of TB disease to a setting in which persons with TB disease are treated • no cough-inducing or aerosol-generating procedures are performed 	Settings in which <ul style="list-style-type: none"> • persons with TB disease are encountered • criteria for low risk is not otherwise met 	
Laboratories	Laboratories in which clinical specimens that might contain <i>M. tuberculosis</i> are not manipulated	Laboratories in which clinical specimens that might contain <i>M. tuberculosis</i> are manipulated	
Recommendations for Screening Frequency			
Baseline two-step TST or one BAMT [¶]	Yes, for all HCWs upon hire	Yes, for all HCWs upon hire	Yes, for all HCWs upon hire
Serial TST or BAMT screening of HCWs	No**	Every 12 months ^{††}	As needed in the investigation of potential ongoing transmission ^{§§}
TST or BAMT for HCWs upon unprotected exposure to <i>M. tuberculosis</i>	Perform a contact investigation (i.e., administer one TST as soon as possible at the time of exposure, and, if the TST result is negative, place another TST 8–10 weeks after the end of exposure to <i>M. tuberculosis</i>) ^{¶¶}		

* Health-care workers (HCWs) refers to all paid and unpaid persons working in health-care settings who have the potential for exposure to *M. tuberculosis* through air space shared with persons with TB disease.

[†] Settings that serve communities with a high incidence of TB disease or that treat populations at high risk (e.g., those with human immunodeficiency virus infection or other immunocompromising conditions) or that treat patients with drug-resistant TB disease might need to be classified as medium risk, even if they meet the low-risk criteria.

[§] A classification of potential ongoing transmission should be applied to a specific group of HCWs or to a specific area of the health-care setting in which evidence of ongoing transmission is apparent, if such a group or area can be identified. Otherwise, a classification of potential ongoing transmission should be applied to the entire setting. This classification should be temporary and warrants immediate investigation and corrective steps after a determination has been made that ongoing transmission has ceased. The setting should be reclassified as medium risk, and the recommended timeframe for this medium risk classification is at least 1 year.

[¶] All HCWs should have a baseline two-step tuberculin skin test (TST) or one blood assay for *M. tuberculosis* (BAMT) result at each new health-care setting, even if the setting is determined to be low risk. In certain settings, a choice might be made to not perform baseline TB screening or serial TB screening for HCWs who 1) will never be in contact with or have shared air space with patients who have TB disease (e.g., telephone operators who work in a separate building from patients) or 2) will never be in contact with clinical specimens that might contain *M. tuberculosis*. Establishment of a reliable baseline result can be beneficial if subsequent screening is needed after an unexpected exposure to *M. tuberculosis*.

** HCWs whose duties do not include contact with patients or TB specimens do not need to be included in the serial TB screening program.

^{††} The frequency of testing for infection with *M. tuberculosis* will be determined by the risk assessment for the setting.

^{§§} During an investigation of potential ongoing transmission of *M. tuberculosis*, testing for *M. tuberculosis* infection should be performed every 8–10 weeks until lapses in infection controls have been corrected and no further evidence of ongoing transmission is apparent.

^{¶¶} Procedures for contact investigations should not be confused with two-step TST, which is used for newly hired HCWs.