Appendix B. Tuberculosis (TB) risk assessment worksheet

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

Scoring: ✓ or Y = Yes X or N = No NA = Not Applicable

1. Incidence of TB

a. 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?

b. 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 during 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.

Rate

Community _____
State _____
National _____
Facility _____
Department 1 _____
Department 2 _____
Department 3 _____

_____ c. Are patients with suspected or confirmed TB disease encountered in your setting (inpatient and outpatient)?

1) If yes, how many are treated in your health-care setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.)

	No. patients	
Year	**Suspected**	**Confirmed**
1 year ago	_____	_____
2 years ago	_____	_____
5 years ago	_____	_____

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

d. Currently, does your health-care setting have a cluster of persons with confirmed TB disease that might be a result of ongoing transmission of *Mycobacterium tuberculosis*?

2. Risk Classification

a. Inpatient settings

1) How many inpatient beds are in your inpatient setting?

Quantity _____

2) 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 _____

3) Depending on the number of beds and TB patients encountered in 1 year, what is the risk classification for your inpatient setting?

___ Low risk
___ Medium risk
___ Potential ongoing transmission

_____ 4) Does your health-care setting have a plan for triaging patients with suspected or confirmed TB disease?

b. Outpatient settings

1) How many TB patients are evaluated at your outpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.)

Previous year _____
5 years ago _____

_____ 2) Is your health-care setting a TB clinic? (If yes, a classification of at least medium risk is recommended.)

_____ 3) Does evidence exist that a high incidence of TB disease has been observed in the community that the health-care setting serves?

_____ 4) Does evidence exist of person-to-person transmission of *M. tuberculosis* in the health-care setting? (Use information from case reports. Determine if any TST or blood assay for *M. tuberculosis* [BAMT] conversions have occurred among health-care workers [HCWs].)

_____ 5) Does evidence exist that ongoing or unresolved health-care–associated transmission has occurred in the health-care setting (based on case reports)?

_____ 6) Does a high incidence of immunocompromised patients or HCWs in the health-care setting exist?

_____ 7) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?

Year encountered _____

8) When was the first time a risk classification was done for your health-care setting?

Date of classification _____

_____ 9) Considering the items above, would your health-care setting need a higher risk classifi

_____ 10) Depending on the number of TB patients evaluated in 1 year, what is the risk classifi for your outpatient setting (Appendix C)?

___Low risk
___ Medium risk
___ Potential ongoing transmission

_____ 11) Does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?

c. Nontraditional facility-based settings

1) How many TB patients are encountered at your setting in 1 year?

Previous year_____
5 years ago _____

_____ 2) Does evidence exist that a high incidence of TB disease has been observed in the community that the setting serves?

_____ 3) Does evidence exist of person-to-person transmission of *M. tuberculosis* in the setting?

_____ 4) Have any recent TST or BAMT conversions occurred among staff or clients?

_____ 5) Is there a high incidence of immunocompromised patients or HCWs in the setting?

_____ 6) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?

Year encountered_____

7) When was the first time a risk classification was done for your setting?

_____ 8) Considering the items above, would your setting require a higher risk classification?

Date of classification _____

_____ 9) Does your setting have a plan for the triage of patients with suspected or confirmed TB disease?

_____ 10) 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 (Appendix C)?

___ Low risk
___ Medium risk
___ Potential ongoing transmission

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

_____ a. Does the health-care setting have a TB screening program for HCWs?

If yes, which HCWs are included in the TB screening program? (check all that apply)

___ Physicians

___ Mid-level practitioners
(nurse practitioners [NP] and physician's assistants [PA])
___ Nurses
___ Administrators
___ Laboratory workers
___ Respiratory therapists
___ Physical therapists
___ Contract staff
___ Construction or renovation workers

___ Service workers
___Janitorial staff
___Maintenance or engineering staff
___ Transportation staff
___ Dietary staff
___ Receptionists
___ Trainees and students
___ Volunteers
___ Others _____

_____ b. Is baseline skin testing performed with two-step TST for HCWs?

_____ c. Is baseline testing performed with QuantiFERON®-TB or other BAMT for HCWs?

d. How frequently are HCWs tested for *M. tuberculosis* infection?

Frequency _____

_____ e. Are *M. tuberculosis* infection test records maintained for HCWs?

_____ f. Where are test records for HCWs maintained?

Location_____

_____ g. Who maintains the records?

Name_____

h. If the setting has a serial TB screening program for HCWs to test for *M. tuberculosis* infection, what are the conversion rates for the previous years?†

1 year ago _
2 years ago
_____
3 years ago
_____
4 years ago
_____
5 years ago _____

i. Has the test conversion rate for *M. tuberculosis* infection been increasing or decreasing, or has it remained the same over the previous 5 years? (check one)

___ Increasing
___ Decreasing
___ No change in previous 5 years

Appendix B. (*Continued*)Tuberculosis (TB) risk assessment worksheet

_____ j. Do any areas of the health-care setting (e.g., waiting rooms or clinics) or any group of HCWs (e.g., laboratory workers, emergency department staff, respiratory therapists, and HCWs who attend bronchoscopies) have a test conversion rate for *M. tuberculosis* infection that exceeds the health-care setting's annual average?

Rate _____
If yes, list. _____

_____ k. For HCWs who have positive test results for *M. tuberculosis* infection and who leave employment at the health setting, are efforts made to communicate test results and recommend follow-up of latent TB infection treatment with the local health department or their primary physician?

___Not applicable

4. TB Infection-Control Program

_____ a. Does the health-care setting have a written TB infection-control plan?

b. Who is responsible for the infection-control program?

Name_____

c. When was the TB infection-control plan first written?

Date _____

d. When was the TB infection-control plan last reviewed or updated?

Date _____

_____ e. 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 *M. tuberculosis*)?

_____ f. Does the health-care setting have an infection-control committee (or another committee with infection-control responsibilities)?

1) If yes, which groups are represented on the infection-control committee? (check all that apply)

___ Physicians
___ Nurses
___ Epidemiologists
___ Engineers
___ Pharmacists
___ Laboratory personnel
___ Health and safety staff
___ Administrator
___Risk assessment
___ Quality control
___Others (specify)

2) If no, what committee is responsible for infection control in the setting?

Committee _____

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

_____ a. Has a person been designated to be responsible for implementing an infection-control plan in your health-care setting? If yes, list the name.

Name_____

b. 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).

c. Through what means (e.g., review of TST or BAMT conversion rates, patient medical records, and time analysis) are lapses in infection control recognized?

Means _____

d. What mechanisms are in place to correct lapses in infection control?

Mechanisms _____

_____ e. Based on measurement in routine QC exercises, is the infection-control plan being properly implemented?

_____ f. Is ongoing training and education regarding TB infection-control practices provided for HCWs?

Appendix B. (*Continued*)Tuberculosis (TB) risk assessment worksheet

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

a. Which of the following tests are either conducted in-house at your health-care setting's laboratory or sent out to a reference laboratory? (check all that apply)

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 testing

b. 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 ____ Nucleic acid amplification testing _____ Other (specify) _____

_____ c. 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?

_____

7. Environmental Controls

a. Which environmental controls are in place in your health-care setting? (check all that apply and describe)

Environmental control	Description
____ All rooms	_____
____ Local exhaust ventilation (enclosing devices and exterior devices)	_____
____ General ventilation (e.g., single-pass system, recirculation system)	_____
____ Air-cleaning methods (e.g., _____ filtration and ultraviolet	_____ high efficiency particulate air [HEPA] _____ germicidal irradiation [UVGI])

b. What are the actual air changes per hour (ACH) and design for various rooms in the setting?

Room	ACH	Design

c. 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)
___ Laboratory hoods
___ Booths for sputum induction
___ Tents or hoods for enclosing patient or procedure

d. What general ventilation systems are used in your health-care setting? (check all that apply)
___ Single-pass system
___ Variable air volume
___ Constant air volume
___ Recirculation system
___ Other _____

e. What air-cleaning methods are used in your health-care setting? (check all that apply)

HEPA filtration	UVGI
___ Fixed room-air recirculation systems	___Duct irradiation
___ Portable room-air recirculation systems	___Upper-air irradiation
	___ Portable room-air cleaners

f. How many AII rooms are in the health-care setting? Quantity _____

g. What ventilation methods are used for AII rooms? (check all that apply)
Primary (general ventilation):
___Single-pass heating, ventilating, and air conditioning (HVAC)
___Recirculating HVAC systems
Secondary (methods to increase equivalent ACH):
___Fixed room recirculating units
___HEPA filtration
___UVGI
___Other (specify)_____

_____ h. 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?

_____ i. Are environmental controls regularly checked and maintained with results recorded in maintenance logs?

_____ j. Is the directional airflow in AII rooms checked daily when in use with smoke tubes or visual checks?

_____ k. Are these results readily available?

l. What procedures are in place if the AII room pressure is not negative?

_____

_____ m. Do AII rooms meet the recommended pressure differential of 0.01-inch water column negative to surrounding structures?

8. Respiratory-Protection Program

_____ a. Does your health-care setting have a written respiratory-protection program?

b. Which HCWs are included in the respiratory-protection program? (check all that apply)

___ Physicians
___ Mid-level practitioners (NPs and PAs)
___ Nurses
___ Administrators
___ Laboratory personnel
___ Contract staff
___ Construction or renovation staff
___ Service personnel
___ Janitorial staff
___Maintenance or engineering staff
___ Transportation staff
___ Dietary staff
___ Students
___ Others (specify) _____

c. 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).

Manufacturer	Model	Specific application

_____ d. Is annual respiratory-protection training for HCWs performed by a person with advanced training in respiratory protection?

_____ e. Does your health-care setting provide initial fit testing for HCWs? If yes, when is it conducted? Date _____

_____ f. Does your health-care setting provide periodic fit testing for HCWs? If yes, when and how frequently is it conducted? Date _____ Frequency _____

g. What method of fit testing is used? Method _____

_____ h. Is qualitative fit testing used?

_____ i. Is quantitative fit testing used?

9. Reassessment of TB Risk

a. How frequently is the TB risk assessment conducted or updated in the health-care setting? Frequency _____

b. When was the last TB risk assessment conducted? Date _____

c. What problems were identified during the previous TB risk assessment?

1) _____

2) _____

3) _____

4) _____

5) _____

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

1) _____

2) _____

3) _____

4) _____

5) _____

_____ e. Did the risk classification need to be revised as a result of the last TB risk assessment?

* 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 previous negative results during a certain period (see Supplement, Surveillance and Detection of *M. tuberculosis* Infections in Health-Care Settings).

Appendix C. Risk classifications for various health-care settings and recommended frequency of screening for *Mycobacterium tuberculosis* infection among health-care workers (HCWs)*

	Risk classification†		
Setting	**Low risk**	**Medium risk**	**Potential ongoing transmission§**
Inpatient <200 beds	<3 TB patients/year	≥3 TB patients/year	Evidence of ongoing *M. tuberculosis* 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 • 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 • persons with TB disease are encountered • criteria for low risk are not otherwise met	
Laboratories	Laboratories in which clinical specimens that might contain *M. tuberculosis* are not manipulated	Laboratories in which clinical specimens that might contain *M. tuberculosis* might be 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**	At least every 12 months††	As needed in the investigation of potential ongoing transmission§§
TST or BAMT for HCWs upon unprotected exposure to *M. tuberculosis*	Perform a contact investigation (i.e., administer one TST or BAMT as soon as possible at the time of exposure, and, if the result is negative, give a second test [TST or BAMT, whichever was used for the first test] 8–10 weeks after the end of exposure to *M. tuberculosis*)¶¶		

* The term 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 upon hire should have a documented 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 in settings classified as low risk do not need to be included in the serial TB screening program.

†† The frequency of screening for infection with *M. tuberculosis* will be determined by the risk assessment for the setting and determined by the Infection Control team.

§§ During an investigation of potential ongoing transmission of *M. tuberculosis*, testing for *M. tuberculosis* infection should be performed every 8–10 weeks until a determination has been made that ongoing transmission has ceased. Then the setting should be reclassified as medium risk for at least 1 year.

¶¶ Procedures for contact investigations should not be confused with two-step TSTs, which are used for baseline TST results for newly hired HCWs.

Appendix D. Environmental controls record and evaluation*

Type of environmental control†	No.§	Location in the health-care setting¶	How often maintained**	How often evaluated**	Last evaluation date	Next evaluation due date

* Some settings will not be able to complete all parts of the table. List environmental controls in order of effectiveness.

† For example, ultraviolet germicidal irradiation (UVGI), high-efficiency particulate air (HEPA) filters, or airborne infection isolation (AII) room.

§ Number of UVGI units, HEPA filters, and AII rooms in each location of the health-care setting.

¶ For example, inpatient rooms, emergency departments, bronchoscopy suites, sputum induction rooms, outpatient areas, and waiting areas.

** Daily, weekly, monthly, annually, or other frequency (describe).

Appendix E. Tuberculosis (TB) Internet addresses

CDC Websites

CDC	http://www.cdc.gov
Division of Tuberculosis Elimination (DTBE)	http://www.cdc.gov/tb
Major TB Guidelines	http://www.cdc.gov/nchstp/tb/pubs/mmwrhtml/maj_guide.htm
State TB Program Contact Information	http://www.cdc.gov/nchstp/tb/pubs/tboffices.htm
TB Education and Training Resources	http://www.findtbresources.org
TB Program	http://www.cdc.gov/nchstp/tb/tbwebsites.htm
Division of AIDS, STD, and TB Laboratory Research	http://www.cdc.gov/ncidid/dastlr/TB/default.htm
National Center for Infectious Diseases (NCID)	http://www.cdc.gov/ncid
National Institute for Occupational Safety and Health (NIOSH)	http://www.cdc.gov/niosh/homepage.html
Respirator Information	http://www.cdc.gov/niosh/npptl/topics/respirators
CDC/NIOSH Certified Equipment List (CEL)	http://www.cdc.gov/niosh/npptl/topics/respirators/cel
CDC/NIOSH-Approved Disposable Particulate Respirators (Filtering Facepieces)	http://www.cdc.gov/niosh/npptl/respirators/disp_part/particlist.html
Division of Healthcare Quality Promotion	http://www.cdc.gov/ncidod/hip/enviro/guide.htm
Emergency Preparedness and Response	http://www.bt.cdc.gov

Other U.S. Federal Government Agencies

National Institutes of Health (NIH)	http://www.nih.gov
National Heart, Lung, and Blood Institute	http://www.nhlbi.nih.gov/funding/training/tbaa/index.htm
National Institute of Allergy and Infectious Diseases (NIAID)	http://www.niaid.nih.gov/dmid/tuberculosis
AIDSinfo	http://www.aidsinfo.nih.gov/guidelines
Occupational Safety and Health Administration (OSHA)	http://www.osha.gov; www.osha.gov/qna.pdf
Tuberculosis (OSHA)	http://www.osha.gov/SLTC/tuberculosis/index.html
Recordkeeping (OSHA)	http://www.osha.gov/SLTC/respiratoryprotection/index.html
Respiratory Protection (OSHA)	http://www.osha.gov/recordkeeping
Ryan White Care Act/Wisconsin HIV/AIDS Program	http://www.dhfs.state.wi.us/AIDS-HIV/Resources/Overviews/AIDS HIV.htm
Food and Drug Administration (FDA)	http://www.fda.gov
Safety Information and Adverse Event Reporting System (FDA-AERS)	http://www.fda.gov/medwatch
FDA and CDC Public Health Advisory: Infections from Endoscopes Inadequately Reprocessed by an Automated Endoscope Reprocessing System	http://www.fda.gov/cdrh/safety/endoreprocess.html

Regional Training and Medical Consultation Centers

Francis J. Curry National Tuberculosis Center, San Francisco, California	http://www.nationaltbcenter.edu
Heartland Regional Training Center, San Antonio, Texas	http://www.dshs.state.tx.us/tcid/educationctr.shtm
New Jersey Medical School National Tuberculosis Center Newark, New Jersey	http://www.umdnj.edu/ntbcweb
Southeast Regional Training Center, Gainesville, Florida	http://sntc.medicine.ufl.edu/index.htm

Domestic Organizations

American Lung Association (ALA)	http://www.lungusa.org/diseases/lungtb.html
American Thoracic Society (ATS)	http://www.thoracic.org
Association for Professionals in Infection Control and Epidemiology, Inc. (APIC)	http://www.apic.org
HIV Drug Interactions Organization	http://www.hiv-druginteractions.org
Infectious Disease Society of America/Bioterrorism and Information Resources (IDSA)	http://www.idsociety.org/bt/toc/htm
National Prevention Information Network (NPIN)	http://www.cdcnpin.org/scripts/index.asp
National Tuberculosis Controllers Association (NTCA)	http://www.ntca-tb.org
PharmWeb: Rapid Screening of Tuberculosis Pharmaceuticals	http://www.pharmweb.net/pwmirror/library/pharmwebvlib.html

International Organizations

International Union Against Tuberculosis and Lung Disease (IUATLD)	http://www.iuatld.org/full_picture/en/frameset/frameset.phtml
Stop TB Initiative	http://www.stoptb.org
Tuberculosis Research Center, India	http://www.trc-chennai.org
World Health Organization (WHO) Global TB Program	http://www.who.int/gtb